Before an Independent Hearings Panel
at Rolleston

under: the Resource Management Act 1991

in the matter of: Submissions and further submissions in relation to the proposed Selwyn District Plan

and: Strategic Directions Chapter

and: **Christchurch International Airport Limited**
Submitter DPR-0371

Statement of Evidence of Felicity Blackmore

Dated: 23 July 2021

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STATEMENT OF EVIDENCE OF FELICITY BLACKMORE

INTRODUCTION

1 My full name is Felicity Jane Blackmore.

2 I am the Environment and Planning Manager in the Planning and Sustainability team at Christchurch International Airport Limited (*CIAL*). I have held this role since March 2018.

3 My qualifications include a Bachelor of Science with Honours from the University of Canterbury

4 I have been authorised by CIAL to provide evidence in relation to its submission (DPR-0371) and further submission on the proposed Selwyn District Plan. I am familiar with the content of CIAL's submission and further submission.

SCOPE OF EVIDENCE

5 My evidence will deal with the following:

5.1 an overview of CIAL, including CIAL's operations in Selwyn District; and

5.2 reverse sensitivity and incompatible activity issues affecting CIAL operations.

ABOUT CIAL AND CHRISTCHURCH INTERNATIONAL AIRPORT

6 CIAL is an airport company established under the Airport Authorities Act 1966. Section 3 of that Act confers the power on CIAL to establish, improve, maintain, operate and manage the Christchurch International Airport (*the Airport* or *CIA*). CIA is the largest airport in the South Island and the second-largest in the country. It connects Canterbury and the wider South Island to destinations in New Zealand, Australia, Asia and the Pacific.

7 CIAL owns the airport terminal, airfields, and surrounding land totalling approximately 859 hectares.[1] CIAL's wider interests (including land leased by CIAL) total some 1,052 hectares. CIAL works closely with many other businesses on the airport campus including passenger airlines, the Airways Corporation, the US Antarctic Program, air cargo operators, warehousing and aviation specialists, rental car companies, retail and food outlets.

8 Importantly, the Airport has a significant advantage over other airports in New Zealand, and in the southern hemisphere, as it

[1] This includes the Antarctic Centre site.

operates without a curfew and without restrictions as to the types of aircraft that can use the Airport. The ability of the Airport to operate 24 hours a day facilitates overnight freight movements and arrival/departure of international passengers and aircrafts requiring maintenance, and is integral to the future economic and social wellbeing of people and the communities of greater Christchurch and the South Island.

Significance of the Airport to the local and regional economy

9 There are approximately 7,000 people who are employed at the Airport campus. This includes, for example, over 1,000 engineering staff employed at the Air New Zealand maintenance hangar on Orchard Road.

10 Airports have a strong multiplier effect on the economies they serve. Independent estimates indicate that for every $1 Christchurch Airport earns, the wider South Island economy earns $50.[2] In 2017 the Airport was estimated to contribute $2.6 billion to the GDP of the Canterbury region.[3] Ministry for Business, Innovation and Employment research reports that one international airline passenger into Christchurch generates 12.3 commercial bed nights across New Zealand and 9.9 commercial bed nights into the South Island.[4]

11 Just under 7 million travelling passengers and their associated meeters and greeters currently pass through the Airport each year.[5] Combined airport activities see between 25,000 and 30,000 people visiting the Airport every day.

Non-passenger services

12 CIA is home to several international Antarctic science programmes and their associated facilities. As the departure point for the majority of the world's Antarctic scientists, considerable economic and societal benefits are brought to the region, the country, and the world by the operation of these facilities. The Antarctic relationship is highly valued by CIAL.

13 The Christchurch Engine Centre (*CHCEC*), a joint venture partnership between Pratt & Whitney and Air New Zealand Limited, is also located at Christchurch International Airport. The CHCEC provides engine overhaul and repair services for all Pratt & Whitney JT8D, Rolls-Royce Dart and International Aero Engines (*IAE*) V2500 engines. The partnership (formed in 2001) builds upon the success

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2 "The shape of Christchurch in 2025, Christchurch International Airport and three economic growth scenarios" BERL, May 2014

3 BERL. Christchurch International Airport. December 2017.

4 International Visitor Survey, Ministry for Business, Innovation and Employment (MBIE) 2018

5 Total achieved in 2018 calendar year.

of the original Air New Zealand Christchurch engine facility, and has been attracting third party work from around the world for more than 25 years.

14 The Airport is also the primary air freight hub for the South Island, playing a strategic role in New Zealand's international trade as well as the movement of goods domestically. On that basis, the Airport is a significant physical and economic resource in national, regional and local terms.

Freight connectivity

15 Airfreight is becoming increasingly important due to decreased viability, considerable delays and record high prices associated with land transport. This is particularly prevalent in food and beverage industries, with airfreight connections such as CIAL's helping to preserve jobs and industries across New Zealand. CIA is responsible for transporting over $1.6b of cargo a year to other ports. The importance of CIA is further emphasised by the fact that the average value per tonne for this cargo is 15% higher than that of Auckland International Airport and 12 times greater than the average tonne of cargo exported internationally through Lyttelton Harbour.

16 Prior to the emergence of COVID-19 about 90% of New Zealand's airfreight was carried in passenger aircraft. Initially through the Government's International Air Freight Capacity (*IAFC*) scheme, and more recently through the Maintaining International Air Connectivity *(MIAC),* funding has been provided to airlines for dedicated freight flights to ensure New Zealand's high value export products reach international markets.

17 CIA has played a critical role in New Zealand's ability to respond to and recover from the economic impacts of COVID-19 initially through the IAFC. This scheme enabled up to 30 dedicated freight services a week to operate out of Christchurch, flying to multiple international destinations and utilising different carriers. More recently, routes that are less viable due to the challenging market conditions caused by CVOID-19 are receiving some government support as part of the MIAC scheme. At CIA Singapore Airlines has reinstated more than half of its usual pre-COVID-19 international long-haul schedule, well ahead of other markets, even those that have a significant passenger demand recovery. As a result, this route is viable without accessing the MIAC scheme. These special freight services play a critical role in keeping the South Island's economy connected to the rest of the world, providing some economic stability during a recession.

18 Airlines are also becoming more interested in airfreight as an important revenue stream, especially looking into the future as international borders relax. CIA has some of the best infrastructure

to grow the airfreight export market in Christchurch, providing warehousing and freight forwarding facilities, a long runway and no curfew. Ensuring that it's easy to move New Zealand's high-value exports out of the country via CIA will provide benefits not only for greater Christchurch, but also the entire South Island.

Transport network resilience and connectivity

19 Airports facilitate a global transport network that is resilient to the effects of natural disasters and extreme weather events. CIAL provides a key link for both freight and passengers when other land-based networks in the South Island are compromised. For example, the Canterbury floods of May 2021 and the significant rain events in Canterbury and the West Coast in 2019 caused significant damage to the land transport network and closed off areas of the South Island from the rest of the country. Aviation, and specifically CIA, was relied upon for freight and passenger travel other parts of the transport network were repaired.

20 The ongoing impact of climate change means that New Zealand roads and rail remain susceptible to extreme weather events and natural disasters. This highlights the importance of CIA's operation to provide a regional, national and global connection when the land transport system is compromised.

CIAL's responsibilities

21 CIAL is responsible for ensuring the airport meets all safety and compliance requirements for passengers, visitors and aircraft. CIAL has its own Fire Service with state of the art fire fighting vehicles, 42 firemen, and a wildlife management team consisting of a manager and two full time Wildlife Officers, whose role is to keep the airfield as free of birds as possible and deploy CIAL's on-airport and off-airport bird strike risk management programme.

22 We also work closely with government agencies such as Customs, Immigration, Ministry of Agriculture and Fisheries, Aviation Security and Airways.

23 Regular activities for CIAL include:

23.1 patrolling the airfield;

23.2 maintaining runways;

23.3 ensuring the terminal building is safe, clean and warm;

23.4 ensuring services such as power, water stormwater discharges and transport are available for all businesses on the Airport campus;

23.5 managing car parking facilities;

23.6 planning for future growth; and

23.7 ensuring that airlines, passengers, visitors and tenants have the services they need.

24 As CIAL's Environment and Planning Manager, I work alongside stakeholders, regulators and airport users to facilitate on and off airport resource management and environmental issues. For example, I liaise with airways (New Zealand's air navigation service provider) and the aircraft maintenance sector to ensure CIA's noise footprint in the Canterbury region is appropriately managed. I also work with applicants, district councils and acoustic experts to protect the airport from reverse sensitivity effects and the establishment of incompatible activities.

Future growth and developments

25 The most recent revision of the Airport Master Plan (2016) identifies the following expected growth levels to 2040:

25.1 Passenger Movements to grow from 2018 levels of 6.9 Million (5.1 Million Domestic; 1.8 Million International) to 11.7 Million in 2040 (7.6 Million Domestic; 4.1 Million International);

25.2 Passenger Aircraft Movements to grow from 2018 levels of 72,000 movements (61,000 Domestic; 11,000 International) to 111,000 in 2040 (90,000 Domestic; 21,000 International); and

25.3 Cargo Aircraft Movements to grow from 2018 levels of 3,100 movements to 4,200 in 2040. It must be noted that in addition to these cargo specific aircraft movements, the clear majority of air cargo to and from Christchurch is carried in the belly hold of commercial passenger aircraft (see domestic and international movement growth above).

26 While we are currently experiencing unusual and unprecedented changes in these patterns due to the global COVID-19 pandemic, all projections indicate strongly that pre-COVID levels of activity will return.

27 Domestic tourism has recovered strongly following the lockdown, with an approximate 90% recovery in domestic passenger numbers, meaning there has been an approximate 20% increase in the number of kiwis flying domestically than prior to COVID-19 (prior to COVID-19, 30% of domestic passengers were international tourists).

28 International tourists continue to view New Zealand as natural, clean and green and as a consequence of the New Zealand Government response to COVID-19, it is also viewed as safe in terms of trusted public health measures. The tourism industry

expects that New Zealand will be in high demand as a destination once COVID-19 restrictions are lifted.

29 Tourism New Zealand has projected that although there are current uncertainties that will dictate whether recovery takes one year or three, the modelling shows tourist demand will be back at 2019 levels by December 2022, assuming unconstrained supply.

30 CIAL believe Aotearoa is well placed to be early adopters of future aviation technology, including having our domestic aviation fully transitioned to a low emissions fleet. There is also potential for fuel cell technology to decarbonise New Zealand's 'narrow body' fleet, enabling Trans-Tasman carbon free travel/freight. Sustainable Aviation Fuel has the immediate potential to reduce aviation emissions by up to 80%, compared with conventional aviation fuel as a direct replacement fuel to fossil-based jet fuel, and not requiring different infrastructure or engine technology.

31 CIAL is committed to providing the infrastructure to support future low emissions aviation decoupled from fossil fuels.

REVERSE SENSITIVITY AND PROTECTION OF AIRPORT OPERATIONS

32 The Airport itself is located in Christchurch City, not in the Selwyn District.

33 However, Airport operations are affected by land use activities in Selwyn. It is important that the new Plan recognises the significance of the Airport to the district and manages adverse effects on the Airport that arise from activities in Selwyn.

34 There are two main aspects of reverse sensitivity and incompatible activities that are of particular concern to CIAL:

34.1 noise sensitive activities establishing within the 50dB Ldn Air Noise Contour (the *Noise Contour*); and

34.2 activities which have the potential to increase the risk of bird strike at the Airport.

35 I will discuss both of these matters separately below.

Noise sensitive activities within the 50dB Ldn Air Noise Contour

36 Although the Airport is physically located within Christchurch City, planes landing and taking off at the Airport using the main runway fly over Selwyn and Waimakariri Districts. The effects of airport operations are therefore felt across the three districts, making the management of noise effects a cross boundary issue for all three

district councils, as well as a strategic regional issue for the Canterbury Regional Council.

37 Airport operations create unavoidable noise that negatively impacts on the amenity and comfort of people living in proximity to runways and predominant flight paths. In this respect, a large body of national and international experience and research demonstrates that if a group of residents are annoyed by airport noise then they are likely to seek to have the operations of airports curtailed either through curfews and/or impose restrictions on the type of aircraft which can operate at those airports. This is especially so when new areas of residential zoning are developed in close proximity to airports (and their associated flight paths) and large groups of new residents move into their 'dream' homes and find that they are adversely affected by aircraft noise.

38 For Christchurch Airport in particular these risks are significant as the ability to continue to operate without curfews is fundamental to maintaining and growing existing passenger, freight and aircraft maintenance services that are scheduled during periods likely to be subject to such a curfew.

Planning rules

39 In my day to day work I deal frequently with the higher-order planning regime which sets the framework for avoiding noise sensitive activities within the Noise Contour.

40 The Canterbury Regional Policy Statement (*RPS*) defines "noise sensitive activities" as follows:

> *means*
>
> - *Residential activities other than those in conjunction with rural activities that comply with the rules in the relevant district plan as at 23 August 2008;*
> - *Education activities including pre-school places or premises, but not including flight training, trade training or other industry related training facilities located within the Special Purpose (Airport) Zone in the Christchurch District Plan;*
> - *Travellers' accommodation except that which is designed, constructed and operated to a standard that mitigates the effects of noise on occupants;*
> - *Hospitals, healthcare facilities and any elderly persons housing or complex*

41 RPS Policy 6.3.5(4) requires that noise sensitive activities are to be avoided within the 50dBA Ldn airport noise contour unless they are within an existing residentially zoned urban area, residential greenfield area in Kaiapoi, or residential greenfield area identified in Map A of the RPS. RPS Policy 6.3.9(5)(a) further requires that the location and design of rural residential development shall avoid noise sensitive activities occurring within the Noise Contour.

42 Reverse sensitivity related to airport noise is managed in planning documents through controls on the density of residential development and other sensitive activities in proximity to the Airport, through the rules applicable to the Noise Contour.

43 To safeguard airport operations, it is critical to CIAL that the Noise Contour, and the policy position underpinning it, is recognised in the Strategic Directions chapter of the proposed District Plan.

Measures to address reverse sensitivity effects

44 I spend a lot of time dealing with proposals for further residential intensification of sensitive activities or new noise sensitive activities within the Noise Contour. It can seem, to those unfamiliar with this issue, that this type of activity would have a no more than minor impact on the airport for a single new dwelling. However, on an accumulated basis, sensitive development close to the Airport can have serious effects on operations.

45 The Noise Contour in Selwyn extends over land that is zoned 'General Rural'. This is appropriate as it is a zone that allows only a low density of housing to establish, thus minimising the number of people who live under the Noise Contour, and also the types of activities that can establish. Sensitive activities such as high-density residential development, hotels, pre-schools, or hospitals (where people generally expect a quiet environment, especially at night) do not tend to take place in the rural zone.

46 CIAL would be very concerned if any land within the Noise Contour was rezoned to a more intensive or urban land use. The minimum rural lot sizes and residential density controls play a complementary role in avoiding sensitive activities developing under the Noise Contour. The pressure for urban development in Selwyn at the moment is intense.

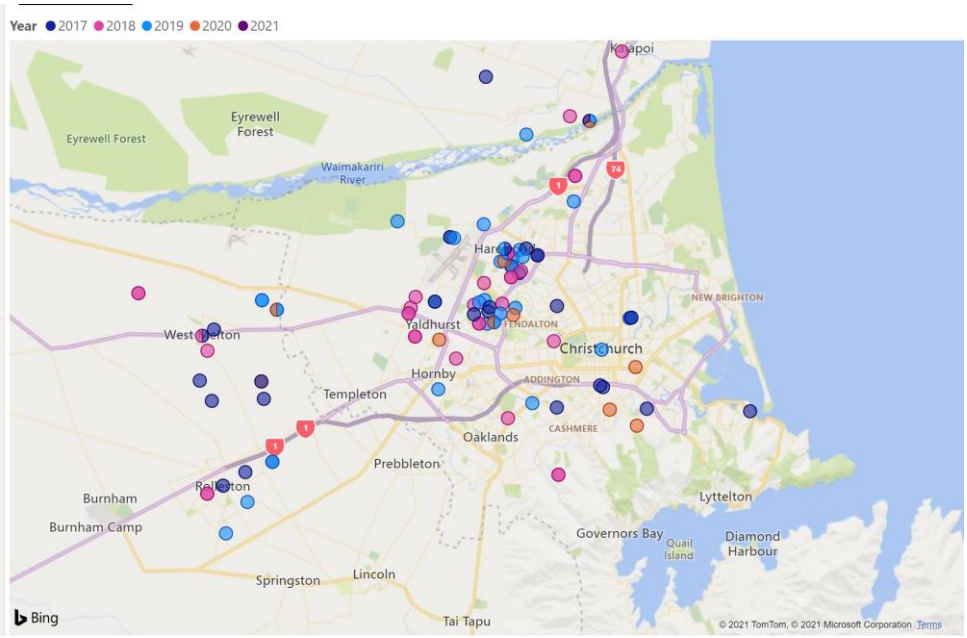
47 CIAL understand the need to provide housing capacity and business land in the district. However this development should not occur in a way that allows noise sensitive activities to establish and intensify within the Noise Contour.

Complaints about aircraft noise

48 In comparison to other airports across New Zealand, CIAL receives a proportionally low number of noise complaints, due to a long history of planning provisions that manage reverse sensitivity effects across all three districts. CIA uses a metric of complaints per 10,000 movements to measure noise management performance, with a goal of keeping complaints below 10, per 10,000 movements. CIAL consistently achieves this, and the average complaints per 10,000 movements of the last financial year was 4.6.

49 From February 2017 to July 2021 43 noise complaints have been received from addresses within the Selwyn District. A further 49 complaints were received within the wider "Canterbury" region, with no district identifiers.

50 The map below shows the location of noise complaints received by CIAL from 2017 to 2021. The complaints that CIAL do receive often originate from sites outside the noise contours. CIAL's efforts to minimise the number of noise sensitive activities within the contours have been integral in managing reverse sensitivity effects and the relatively low numbers of noise complaints can be attributed to the success of this framework. It is important that CIAL continue to manage reverse sensitivity effects across the Canterbury region.



Bird strike

51 Bird strike risk is a key threat to the safe operation of Christchurch International Airport and CIAL takes this risk around the Airport very seriously. For example, even if the risk of strike in a statistical sense is relatively low, it is beyond dispute that a single strike could have catastrophic effects.

52 CIAL is required to ensure the Airport meets all safety and compliance requirements for passengers, visitors and aircraft. Civil Aviation Authority (*CAA*) Rule 139.71 requires aerodrome operators to have an environmental management programme for minimising or eliminating wildlife hazard. Bird strike is a significant safety risk which requires diligent management and CIAL collaboration with local government and surrounding landowners.

53 I will explain below why bird strike management is important to CIAL and the steps that CIAL takes both on and off-airport to ensure that bird strike risk is appropriately managed. I will then discuss recent records that CIAL holds of bird strikes and near misses at the Airport. CIAL will call expert evidence on this issue at later hearings, when the rules that we have sought on bird strike are being considered.

Bird Strike Management Measures Implemented by CIAL

54 CIAL works extremely hard to ensure that the risk of bird strike hazards is as low as reasonably practicable on-Airport. In 2008, CIAL implemented a Wildlife Hazard Management Plan (*WHMP*), to achieve compliance with CAA Rule 139.71, which sets out how CIAL manages wildlife hazards both on and off the Airport. This document has been regularly reviewed and updated since it was first developed.

55 In 2019/2020 the wildlife hazard management plan was updated to align with Australian Aviation Wildlife Hazard Group template.

56 The WHMP deals extensively with bird hazards, which are the primary wildlife hazard at Christchurch International Airport. It sets out the responsibilities of various CIAL staff with respect to the plan. A copy of this plan is attached to my evidence as **Attachment A**.

57 The CAA monitors compliance with this rule as part of their scheduled annual audits of the Airport, CIA were passed the most recent audit.

58 CIAL takes the implementation of the WHMP very seriously and has staff available 24/7. CIAL have a dedicated wildlife team consisting of a Wildlife Manager, on site Monday to Friday, and 2 wildlife officer's (*WO*) who rotate over a 4 on 4 off shift. When the WO or Manager are unavailable, or it is after hours, then CIAL Airport Fire Service cover wildlife duties. Alongside this CIAL Asset Planning and Maintenance team work closely, and take guidance off, the wildlife team to manage the grounds habitat. Numerous staff play a role within all aspects of wildlife management.

59 CIAL, and airlines collect and record data on wildlife on and off the airport, near misses and strikes. This data is another key part of the overall wildlife management and is used to determine CIAL high risk species which is then where management techniques are focused.

60 The Dr J.R. Allan[6] risk assessment method has been adopted by CIAL for identifying wildlife species risk severity. This method uses historical strike data to assign a risk to specific bird species. Bird

[6] *Allan, J. O., 2006. A heuristic Risk Assessment Technique for Birdstrike Management at Airports. Risk Analysis, Vol. 26*

species are categorised in terms of their likelihood of being struck (using a five-year strike history from the airport), and the probability (consequence) of damage should they be struck (derived from the United Kingdom's bird strike database using body mass).

Probability of Damage	Likelihood of a Strike (5-year strike average for each species)				
	Very Low	**Low**	**Moderate**	**High**	**Very High**
Very Low	**Blackbird, Black-billed gull, Thrush**	**Skylark, Chaffinch, Swallow, Black-fronted Tern**	**Greenfinch, Goldfinch, Starling, Banded Dotterel**	**Yellowhammer**	**House Sparrow**
Low	**Red-billed gull**	**Little Owl**			
Moderate				**Spur-winged Plover***	
High	**Little Shag, Mallard Duck**	**South Island Pied Oystercatcher**	**Southern Black-backed gull, Harrier Hawk, Rock Pigeon***		
Very High					

Low Risk	**No further action beyond current management is required**
Moderate Risk	**Review current management practices and options for additional action required**
High Risk	**Immediate action required to reduce the current risk**

Indicates elevation of strike risk rank due to multiple strike

61 Species listed below are where CIA focuses and priorities on Airport wildlife management

61.1 Spur-winged Plovers - loafing on airfield movement areas. They display aggressive and are unpredictable in their behaviour

61.2 Southern Black Backed Gull - due to the number that transit the airfield and when landing on movement areas during adverse weather conditions seeking worms and refuge

61.3 Feral Pigeons - due to the number that transit the airfield daily

61.4 Australian Harrier when numbers increase and due to their traits while searching for food

62 Species listed below are where CIA focuses and priorities off Airport wildlife management

62.1 Canada Goose (Branta canadensis)

62.2 Southern Black-backed Gull (Larus dominicanus)

62.3 Feral Pigeon (Columba livia)

63 CIAL has chosen to proactively control not just high / very high-risk species, but also moderate risk species, particularly where the severity of a strike is "very high". There has been a strong focus on Canada Goose management, for example, where there are known to be numbers of these birds in the vicinity of the airport and the consequences of a strike would be significant.

64 Techniques and strategies for reducing the risk of strikes at CIAL can generally be describe as Passive or Active.

65 Passive management includes modifying habitats or other aspects of the environment to indirectly remove or reduce the number of wildlife. Habitat management measures are directed at three key principals of wildlife needs, food, shelter and water. The wildlife team actively work on airport to reduce opportunities for food shelter and water on airport. An example of this is identifying roosting habitats close to the airfield on CIA landholdings and removing these habitats.

66 Active management involves directly removing or reducing the numbers of wildlife in high risk areas on and around the airfield. Active techniques rely on dispersing wildlife with an audible or visual threat. These are to make wildlife uncomfortable and feel unsafe in high risk areas to move them into low risk areas or off the airfield completely.

67 Where required active management also involves disturbing or killing birds that are an immediate threat to aircraft. CIAL has authority from the Department of Conservation (*DOC*) under the Wildlife Act to disperse disturb or kill protected birds that are a threat to Aircraft. DOC also has guidance material on how to operate under this authority. CIAL rarely kill protected species, which are dispersed or disturbed in the first instance. Attached is CIAL's wildlife authority (**Attachment B**) and DOC Guidelines on how to operate under the Authority (**Attachment C**).

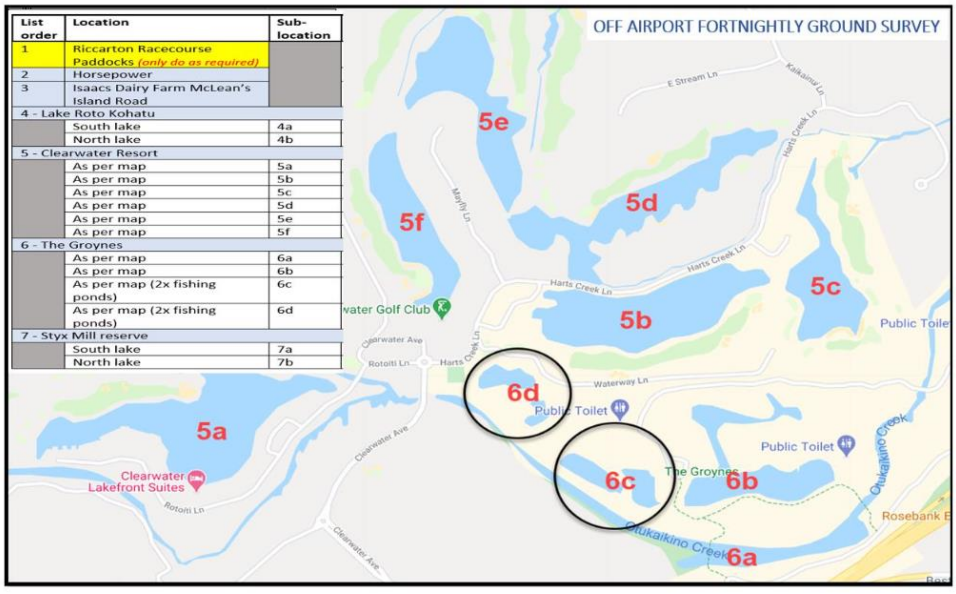
68 Monitoring wildlife both on and off airport is a tool used to direct where and when either active or passive management techniques are required.

69 Management of bird strike risk has traditionally been focused on the airport itself, however, over the past few decades there has been an increasing emphasis on managing bird populations in the vicinity of the airport and avoiding land uses establishing close to the airport that increase the risk from bird strike

70 The wildlife management team undertake a number of surveys on and off airport (ground and air). From these surveys the team gains an understanding of what/where wildlife are which may highlight any risk species and areas. From these surveys routine inspections can be instigated to monitor the risk and implement any actions needed to minimise or eliminate the risk.

71 CIAL also conducts fortnightly ground-based transect surveys of local waterways where high risk species may reside. These surveys inform CIAL of any particular fluctuations in bird populations around the airport.

List order	Location	Sub-location
1	Riccarton Racecourse Paddocks *(only do as required)*	
2	Horsepower	
3	Isaacs Dairy Farm McLean's Island Road	
4 - Lake Roto Kohatu		
	South lake	4a
	North lake	4b
5 - Clearwater Resort		
	As per map	5a
	As per map	5b
	As per map	5c
	As per map	5d
	As per map	5e
	As per map	5f
6 - The Groynes		
	As per map	6a
	As per map	6b
	As per map (2x fishing ponds)	6c
	As per map (2x fishing ponds)	6d
7 - Styx Mill reserve		
	South lake	7a
	North lake	7b



72 Where required CIAL engage property owners to work on managing risk species using both active or passive management techniques, in this process CIAL largely relies on the good will of the property owners to implement management techniques.

73 CIAL also organise and fund an annual helicopter survey along the lower Waimakariri river to gather Southern Black-backed gull (SSBG) GPS coordinates of breeding colonies. This is used to plan a strategy for the control of SBBG during the breeding season. Other CIAL high risk species are recorded during this operation with additional water bodies surveyed. Results from the 2019 Survey are included as **Attachment D**.

74 CIAL, CCC and ECan use the information collected during both aerial and transient surveys, to identify when off Airport control operations are required, and these are led by ECan and CCC, CIALs provides funding and where available resources to conduct the operation.

75 These joint operations include the follow:

75.1 Egg oiling (Canada Goose, SBBG)

75.2 Alphachloralose poisoning (Feral pigeon, SBBG)

75.3 Moult culls (Canada Goose)

75.4 Lethal management (SBBG, Feral pigeon)

75.5 Trapping (Feral pigeon)

76 The most common locations for large scale control operations are the Lower Waimakariri river bed and Avon Heathcote estuary (managed by ECan and CCC). CIAL have also built relationship's with landowners surrounding our boundary. They are encouraged to advise of any increase in bird activity and carry out control operations where and when needed to control them.

77 My role is to maintain a watching brief on developments in the region which may impact the risk of Bird Strike, and to work collaboratively with a variety of organisations to minimise the effect their activities may have on CIAL's operations. This includes proactively working with local government on planning documents which control land use activities within the vicinity of the airport.

78 CIAL spends a significant amount of money on managing wildlife hazards (primarily the risk of bird strike). Annually, CIAL's wildlife hazard operations have cost approximately $400,000 – $500,000, not including overheads such as vehicles, training, uniforms etc. This sum largely comprises of the following:

78.1 $400,000 on employee salaries;

78.2 $100,000 on consultant ornithologists and wildlife experts;

78.3 $30,000 on pest control services (including bird control operations such as egg oiling and Alphachloralose poisoning, but also rabbit and rodent control); and

79 CIAL has also previously funded the development of Avanex grass seed, a seed specifically designed to be unpalatable to birds, and also reduces the number of insects due to the endophyte fungus producing toxins. This seed is being used on the Airport, and also at selected off airport sites where it is appropriate.

80 CIAL has a responsibility (including legal duties as in CAA Rule 139.71) to provide a safe airport operating environment and therefore must actively work to minimise the threat and incidence of bird strike around Christchurch Airport as well as on the airfield and land controlled by CIAL. Bird strike that occurs, for example through the creation of water bodies, refuse dumps, landfills, sewage treatment and disposal and agricultural activities, will affect the ability of CIAL to provide this safe environment. CIAL is therefore heavily involved in bird management around the airport and is also a regular participant in planning processes which involve the potential creation of waterbodies or other suitable bird habitat.

81 In addition to active control measures on the airfield and on nearby land, CIAL maintains a watching brief on public notifications of proposed neighbouring and surrounding developments which might elevate the risk of bird strike. CIAL then participates in the application process and tries to work with developers and decision makers to ensure that there are appropriate management mechanisms in place to mitigate or avoid any bird strike risk arising on a proposal. Where CIAL is aware of proposals, it works with developers and landowners to educate them and encourage them to develop in a way which does not contribute to bird strike risk at the Airport.

82 CIAL currently relies on the cooperation of land owners and developers, and decision-makers understanding the risk of bird strike. There is consequently little consistency in the management of activities in the Greater Christchurch area in relation to bird strike risk.

83 The most consistent, effective and proactive means of off-airport bird strike management is the control of land-use activities through zoning and regulation of off-airport land. Clear guidance and rules relating to land uses that have the potential to elevate the bird strike risk at CIA are currently missing from the operative Selwyn District Plan.

84 In 2011, CAA produced an Advisory Circular[7] which provides aerodromes with an "Acceptable Means of Compliance" with Rule 139.71 Wildlife Hazard Management. The Circular sets out various management techniques for managing wildlife hazards, and states the following in relation to local authorities:

> *"Local authorities are responsible for planning land use activities, and setting bylaws for wastewater treatment, landfills and parks and reserves including sports fields.*
>
> *Local authorities should be told about the hazards and encouraged to develop land use restrictions and management techniques to minimise the presence of birds near aerodromes."*

85 CIAL considers that this process is that opportunity to tell the Selwyn District Council about the hazard and to seek clear rules in the proposed District Plan would make landowners and potential developers better aware of bird strike risk and of what kinds of activities elevate the risk of bird strike at the Airport.

86 The Board of Airline Representatives New Zealand Inc. also supports CIAL's efforts, and a letter to this effect is attached as **Attachment E**.

Recorded bird strikes and near misses at the Airport

87 CIAL keeps data of all recorded bird strikes and near misses at the Airport. Recording of these incidents has occurred for a number of years, since at least 2000[8]. According to the 2003 Civil Aviation brochure entitled "Bird Hazards", a Bird Incident is either a collision between an aircraft and a bird; or birds passing sufficiently closely to cause alarm to the pilot.

88 All bird strike records go into CIALs wildlife incidents dashboard, via our electronic wildlife incident form which is a replicate of the CAA form.

89 This data source provides a useful tool for analysing the incidence of strikes and near misses recorded by aircraft using the Airport.

90 The process to report a bird strike is the following:

91 Air Traffic Control are informed that an aircraft has had a Bird strike or near strike by the flight crew. ATC then advise wildlife officer if an inspection is needed on the airfield. ATC then fill in an electronic

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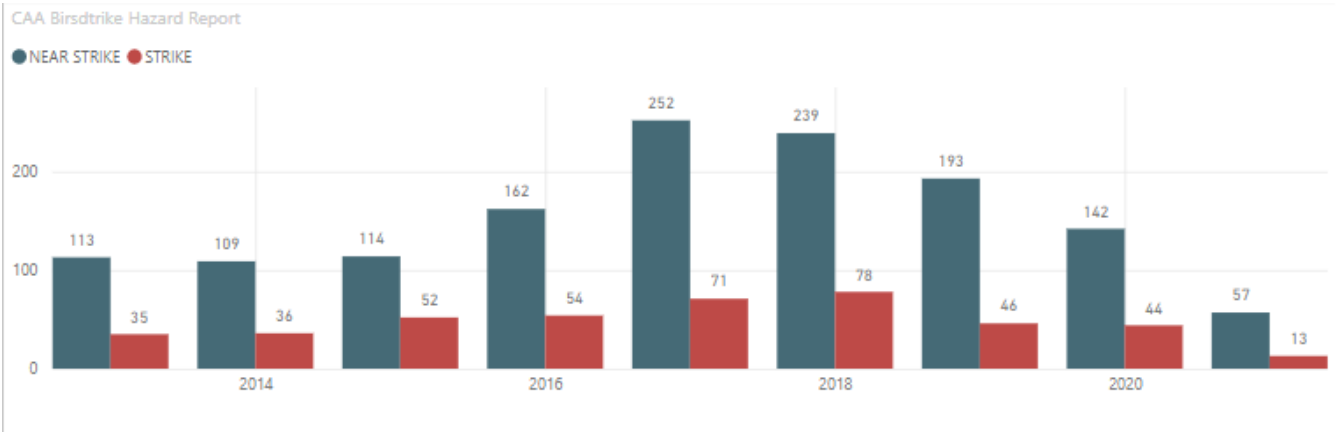
[7] Civil Aviation Authority, Advisory Circular AC139-16, Wildlife Hazard Management at Aerodromes

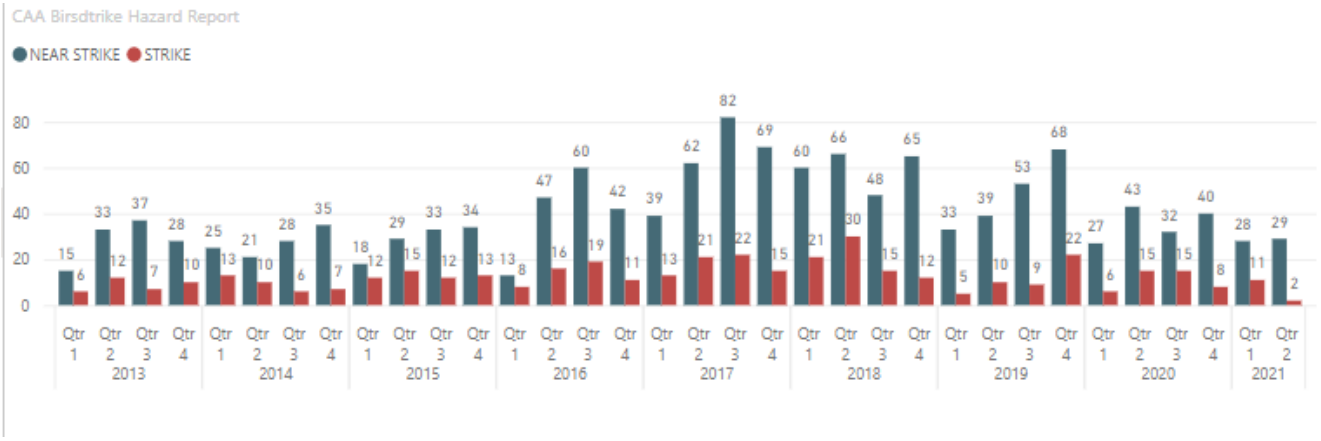
[8] The Wildlife Hazard Management Plan refers to data extending back to August 2000.

wildlife incident form that they send to the wildlife team, who will review it and add any relevant information. The wildlife team then submit the finalised report which is sent to CAA and CIAL.

92 The CAA also provides the airport with electronic monthly data and a quarterly report. The latest report (January to March 2021) is included in **Attachment F**. The wildlife team check this information against CIAL data to make sure they align and will advise if any changes are required.

93 The CAA data (which includes a review and update to include CIAL's records) is illustrated in the graph below, showing monthly strikes and near strikes at CIA from 2013 to June 2021.





94 Statistics for the three years ending 31 December 2020 indicate that Christchurch has higher levels of bird strike than Auckland or Wellington airports.

Conclusion

95 The CRPS (Chapter 9 Ecosystems and Indigenous Biodiversity) contains specific reference to the desire to take into account best practice in wetland and stormwater management design to alleviate the risk of bird strike in the vicinity of Christchurch International

Airport. Further, the CRPS identifies the need to ensure development does not limit efficient and effective operation or safety of the Airport.

96 The management of activities that constitute a bird strike risk is a matter that needs to be applied consistently across all zones in the proposed District Plan. Provisions relating to bird strike are similar to provisions relating to aircraft noise in that they are difficult to place within the Plan. CIAL suggests the same approach as that suggested for airport noise above should be taken. That is, rules relating to land use for bird strike management should be located within the relevant zones as that is where plan users go first when they want to check the planning regime for their land.

97 The Christchurch District Plan is a recent planning document that places bird strike risk specifically in rules relating to land use. CIAL's position is that a similar approach is appropriate and necessary in the Selwyn District Plan. CIAL has accordingly sought a number of amendments to ensure a broad and consistent approach to this risk, both within Selwyn and the wider Canterbury region.

Dated: 23 July 2021

Felicity Jane Blackmore

Attachment A

Christchurch International Airport Limited

Wildlife Hazard Management Plan

Document prepared by

Christchurch International Airport Limited

November 2020

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TERMS AND ABBREVIATIONS

Acronyms

AGL	Above Ground Level
ALE	Airport Lands Engineer
ALS	Airport Lands Supervisor
ABRAP	Airport Bird-hazard Risk Analysis Process
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
CAA	Civil Aviation Authority of New Zealand
CCC	Christchurch City Council
CCL	City Care Limited
CFO	Chief Fire Officer
CIA	Christchurch International Airport
CIAL	Christchurch International Airport Limited
CLA	Conjugated Linoleic Acid
CSL	Central Science Laboratories
CFO	Chief Fire Officer
DOC	Department of Conservation
ECAN	Environment Canterbury
FAA	Federal Aviation Administration
FFNZ	Federated Farmers of New Zealand
FGNZ	Fish and Game New Zealand
FOD	Foreign Object Debris or Damage
GA	General Aviation
IBSC	International Bird Strike Committee
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing Systems
IPM	Integrated Pest Management
MAO	Manager Airfield Operations
NASF	National Airports Safeguarding Framework

Ngāi Tahu	Te Rūnanga o Nāgi Tahu
NOTAM	Notice to Airmen
NZ	New Zealand
NZCAA	New Zealand Civil Aviation Authority
NZGBHA	New Zealand Game Bird Hunters Association
RESA	Runway End Safety Area
SDC	Selwyn District Council
SFO	Senior Fire Officer
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SWO	Senior Wildlife Officer
The City	Christchurch City
TOR	Terms of Reference
WDC	Waimakariri District Council
WHMC	Wildlife Hazard Management Committee
WHMP	Wildlife Hazard Management Plan
WM	Wildlife Manager
WO	Wildlife Officer

Active Management: The use of short-term management techniques such as distress calls, pyrotechnics, trapping and culling to disperse or remove wildlife.

Airbridge: An adjustable structure which is attached to the Terminal Building and which is used for loading and unloading aircraft passengers. Also known as a (Passenger Boarding Bridge or PBB).

Airport Works: Any construction or maintenance works carried out on or adjacent to the movement area that may create obstacles or restrict the normal taxiing, take-off and landing of aircraft.

Airside: The area of an aerodrome inside the perimeter fence, access to which is controlled.

ATIS: A continuous broadcast of recorded aeronautical information containing essential information such as weather, active runways, available approaches, NOTAM, and any other information required by pilots.

Bird Strike: When wildlife collides with an aircraft. There are several definitions relevant to strikes:

- ***Reported wildlife strike*** is deemed to have occurred whenever:
  - a pilot reports a strike to ATC
  - aircraft maintenance personnel find evidence of wildlife strike on an aircraft
  - personnel on the ground report seeing an aircraft strike with wildlife

- wildlife remains are found on the airside pavement area, or within the runway strip, unless another reason for the wildlife death can be found

➢ ***Confirmed wildlife strike*** is deemed to have occurred whenever:

- aircrew report that they saw, heard or smelt a strike
- Wildlife remains are found on the airside pavement area or within the runway strip, unless another reason for the bird or animals' death can be found
- aircraft maintenance personnel find evidence of a bird or animal strike on an aircraft

➢ ***Near strike*** is deemed to have occurred whenever a bird enters the sphere defined by the nose, tail and wing tips of an aircraft.

➢ ***On-Airport strike*** is deemed to be any strike that occurs within the boundary fence of the aerodrome. Where it occurred at or below 200ft AGL during the landing or approach, or below 500ft AGL during the take-off or climb

➢ ***Off-Airport Strike*** is deemed to be any strike that occurred above 200ft AGL during the approach and above 500ft AGL during climb.

CAA Advisory Circulars: Advisory documents containing information about standards, practices and procedures the CAA deems acceptable for compliance with associated Civil Aviation Rules. An advisory circular may also include guidance material generally including guidance on best practice as well as guidance to facilitate compliance with the rule requirements. An advisory circular may also include technical information that is relevant to the rule standards or requirements.

Foraging: When wildlife search for and obtain food.

FOD: Any debris (stones, plastic, nuts, bolts, rubber, aircraft pieces, dead birds or animals, etc) that would endanger aircraft operations on either the manoeuvring or movement areas of the aerodrome.

Habituation: The tendency for wildlife to become accustomed to certain stimulus when repeatedly exposed to it.

Landside: That portion of an aerodrome not designed as airside and to which the public normally has access.

Migration: When wildlife passes periodically from one region to another.

Nocturnal: Most active during the night.

NOTAM: Notice to Airmen/Airwomen.

On-Airport: Inside the secure perimeter fence

Off-Airport: Outside the secure perimeter fence

Passive Management: The modification of habitat to render it less attractive to wildlife.

Risk: The level of uncertainty of achieving objectives. It is measured in terms of consequences and likelihood.

Roosting: When birds repeatedly return to a place in numbers to loaf or spend the night.

RECORD OF REVIEW

Date of Review	Detail	Review By	Date
2012	Complete document review and re-issue	Vai Papali'i	07/2012
2015	Complete document review and re-issue	Ford Robertson/Vai Papali'i	05/2015
2020	Complete document review; update of On/Off Airport plan and publish	Mike Weir	11/2020
2021	Internal document review		
2022	Internal document review		
2023	Internal document review		
2024	Major document review	External Consultant	
2025	Internal document review		

RECORD OF AUDIT

Date of Audit	Detail	Audit By	Date
2011	Bird and Wildlife Management	Avisure	Jun 2011
2014	Bird and Wildlife Management	Avisure	Sep 2014
2017	Wildlife Hazard Management Processes	Deloitte	Apr 2017
2020	Wildlife Hazard Management Processes	Vai Papali'i (Internal)	Aug 2020

RECORD OF AMENDMENTS

Review	Description of Change	Amended by	Date
2008	Implementation of Wildlife Control Officer role	Ford Robertson	30/05/08
2012	Changes to Airport Lands Supervisor role	Ford Robertson	Oct 2012
2015	Addition of Canine SOPs	Ford Robertson	Sep 2015
2015	Update to Canine SOPs	Ford Robertson	Oct 2015
2018	Amalgamation of On/Off Airport Plans	Mike Weir	2019/2020

1 INTRODUCTION

Aircraft have encountered wildlife both in the air and on the ground since flight began. Encounters with birds and animals have become more frequent with the emergence of faster, quieter aircraft, thus increasing the potential for serious damage to aircraft and the risk to human lives.

The activity of birds and animals on and around an airfield is a recognised potential source of hazard to the safe operation of aircraft. This hazard results from the possibility of a collision between an aircraft and one or more birds or animals i.e. a bird strike. In some bird strike events, damage is sustained to the aircraft involved and/or the aircraft is delayed allowing for an inspection of possible damage. In more serious cases, the damage from a bird strike could result in the aircraft being unable to maintain safe operations. An analysis of strike data reveals that approximately ninety percent (90%) of bird strikes occur on or in the immediate vicinity of airports.[1]

The International Civil Aviation Organisation (ICAO) received 65,139 bird strike reports for 2011–14, and the Federal Aviation Authority counted 177,269 wildlife strike reports on civil aircraft between 1990 to 2015, growing 38% in seven years from 2009 to 2015. Birds accounted for 97%. Worldwide in civil and military aviation, there has been 123 recorded fatal bird strike incidents, resulting in 442 human fatalities and 470 aircraft loses (Thorpe 2015). Damages cost the commercial civil aviation industry (worldwide) an estimated US$1.2 billion per annum and involve more than just the repair of damaged aircraft and airframes (Allan and Orosz 2001) Historically, over 90% of reported bird strikes have occurred at, or close to airports (ICAO 1999)

[1] ICAO Bird Strike Information System (IBIS) manual (Doc 9332) provides analyses of bird/wildlife strike reports received.

1.1 EXECUTIVE SUMMARY

Christchurch International Airport Ltd (CIAL) are committed to ensuring the safety of aircraft using the Aerodrome. While the safety of aircraft at CIAL is paramount, it is not possible to prevent all wildlife strikes. CIAL recognises the potential hazards wildlife pose to aircraft and human lives so the Wildlife Hazard Management Plan (WHMP) aims to reduce the frequency and severity of strikes by focusing efforts on species and habitats that constitute significant hazards to aircraft that operate on the aerodrome.

CIAL has in place a comprehensive Health and Safety management system to enable our strategy goal - Protection of Our People. The system provides the framework to manage health and safety in all areas of our business. The Health, Safety and Wellbeing Manual documents the system and is located on the CIAL intranet 'Our Place' with further details available from the Health, Safety and Wellbeing team.

This plan will be valid until CIAL management or CAA determines that the plan should be updated due to changed conditions. The person of primary responsibility for coordinating this plan is the Wildlife Manager.

The Wildlife Hazard Management Plan for Christchurch International Airport Limited has been reviewed and accepted by the CIAL Executive Leadership Team. This document will become effective with the following signatures:

Tim Morris – *Manager Airfield Operations*	11-11-2020 Date
Mike Weir – *Wildlife Manager*	11/11/2020 Date
Todd Lester – *Facilities Manager, Airfield*	16.11.2020 Date
Ford Robertson – *Manager Aviation Safety & Security*	11-11-20 Date

2 LEGAL AND OTHER REQUIREMENTS

New Zealand has international obligations as a contracting state to the International Civil Aviation Organisation (ICAO). Civil Aviation Authority New Zealand (CAA) adopt the standards and recommendations into Rules and Advisory Circulars. CIAL must comply with rules governing their aerodrome certificate and are required to implement a Wildlife Hazard Management Plan (WHMP) to minimise the risk of Wildlife Incidents.

Control procedures for Wildlife are also discussed. Most wildlife is afforded some type of protection under government regulations.

2.1 CAA RULE PART 139.69 (PUBLIC PROTECTION)

(a) An applicant for the grant of an aerodrome operator certificate must provide at the aerodrome;

(1) safeguards for preventing inadvertent entry of animals to the movement area and

(1A) safeguards for deterring the entry of unauthorised persons and vehicles to the aerodrome operational area; and

(2) reasonable protection of persons and property from aircraft blast

(b) An applicant for the grant of an aerodrome operator certificate for an aerodrome referred to in rule 139.5(aa) must ensure the safeguards required by paragraphs (a)(1) and (a)(1A);

(1) in areas adjacent to the aerodrome operational area to which the public has direct vehicle or pedestrian access;

(i) are continuous barriers that may include existing structures, gates and doors with secured or controlled access; and

(ii) are at least 1200 millimetres in height; and

(2) in other areas, are of a construction and height appropriate to prevent incursion by animals likely to endanger aircraft operations.

2.2 CAA RULE PART 139.71 (WILDLIFE HAZARD MANAGEMENT)

An applicant for the grant of an aerodrome operator certificate must, if any wildlife presents a hazard to aircraft operations at the aerodrome, establish an environmental management programme for minimising or eliminating the wildlife hazard.

A Wildlife Hazard Management Plan (WHMP) establishes responsibilities, policies, resources, and procedures recommended by the Wildlife Hazard Management Committee (WHMC) to manage wildlife hazards at the airport derived from NZ CAA. *"Civil Aviation Authority Advisory Circulars contain information about standards, practices, and procedures that the Director has found to be an Acceptable Means of Compliance (AMC) with the associated rule."*

2.3 ADVISORY CIRCULAR 139-16

CAA Advisory Circular (AC) contain information about standards, practices, and procedures that the Director has found to be an Acceptable Means of Compliance (AMC) with the associated rule. An AMC is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate AC.

An AC may also include Guidance Material (GM) to facilitate compliance with the rule requirements. Guidance material must not be regarded as an acceptable means of compliance. It provides material to assist compliance with Civil Aviation Rule 139.71, particularly the control of bird hazards at aerodromes and in the vicinity of aerodromes. It presents a compilation of methods to assist aerodrome operators and local territorial authorities to establish or enhance a bird hazard management programme and may raise issues for their further consideration.

This Advisory Circular relates specifically to Civil Aviation Rule Part 139.

2.4 INTERNATIONAL

The International Civil Aviation Organisation (ICAO) Annex 14

- **Chapter 9, Section 9.5.3** states: "When a bird strike hazard is identified at an aerodrome, the appropriate authority shall take action to decrease the number of birds constituting a potential hazard to aircraft operations by adopting measures for discouraging their presence on, or in the vicinity of, an aerodrome".
- **Chapter 9, Section 9.4.4** states: "The appropriate authority shall take action to eliminate or prevent the establishment of garbage disposal dumps or any such other source attracting bird activity on, or in the vicinity of, an aerodrome, unless an appropriate aeronautical study indicates that they are unlikely that they are unlikely to create conditions conducive to a bird hazard problem".

Note: As a signatory to the Convention on International Civil Aviation, 1944 (the Chicago Convention) the New Zealand Civil Aviation Authority (NZCAA) are obliged legally to take heed of this Standard. In its strictest interpretation, for any development to proceed on or near an aerodrome, it must be shown that the development will not in itself increase bird risk.

3 BACKGROUND

3.1 SCOPE AND PURPOSE

The purpose of this document is to outline the objectives, responsibilities and procedures for managing, assessing, monitoring and recording wildlife hazards and or activity at CIAL Aerodrome, and, to provide CIAL with the discretion and capability to respond to situations while providing guidance for compliance with applicable CAA and municipal laws or regulations.

The function of this Wildlife Hazard Management Plan (WHMP) is to define the risk that wildlife poses and to set objectives, performance indicators and procedures for the systematic management of that risk. Also, to define the context of CIALs two specific areas of wildlife control. They are defined as being;

On the Airport – all aviation activity within the confines of the Airport perimeter fence line as per Rule 139.

Off the Airport – the focus is the area outside the perimeter fence up to a 13km radius from the airport. *refer Appendix A*

This plan will cover the roles these areas influence the day to day operations to ensure constant mitigation of wildlife hazards and emphasis on identification and abatement of wildlife hazards on and in the vicinity of the airfield environment. Implementation of specific portions of the plan is continuous, while other portions will be implemented as required by Wildlife activity.

3.2 GOALS AND OBJECTIVES

The goal of this WHMP is to enhance safe air carrier operation. This is to protect passengers, flight crews, aircraft and operational capability by minimising the risk of collisions between aircraft and wildlife on and near the aerodrome.

The objectives of the WHMP are to:

- Deter hazardous bird presence in operational areas and encourage them to alternative sites
- Target high and moderate risk species and habitats that primarily support them, both on and off the airport
- Ensure compliance with all relevant airport operational and environmental legislation and regulations
- Ensure that adequate systems are in place to define roles, responsibilities, and procedures for managing wildlife risks
- Define the methods by which wildlife hazards are managed by maintaining an adequate supply of resources for dispersing and controlling wildlife
- Develop performance goals and targets for management of wildlife issues and outline how these will be assessed and reviewed
- Ensure CIAL personnel are trained to a high standard so to preform Wildlife management safely and effectively

3.3 THE AIRPORT

Christchurch International Airport is situated in the City of Christchurch in the Canterbury Region. A description of the Airport is provided in *Table 1* below

Table 1 – Christchurch International Airport general information

Element	Description
Airport location	Christchurch International Airport is situated to the northwest of Christchurch City and approximately 9km from the city centre. The Christchurch district plan shows the site is designated as *Specific Purpose (Airport)*, and is situated on the *Rural Urban Fringe*
Airport land	The Airport campus consists of 860 hectares of land with approximately 240 hectares of which is grassland within the perimeter security fence. Much of the airfield vegetation consists of areas undertaken with a generic grass species (endophytic species) suited to the environmental conditions.
Surrounding land use(s)	***North*** - a mixture of farmland pasture, pine shelter belts with small stands of native trees and industrial zone. ***South*** - a mixture of farmland pasture, pine shelter belts with small stands of native trees ***West*** - a mixture of farmland pasture, pine shelter belts with small stands of native trees and a golf course ***East*** - a mixture of commercial quadrants with residential and golf course beyond. Minimal areas to be developed around campus boundary
Geography	The site is located within the Low Plains Ecological District of the Canterbury Plains Ecological Region. bounded by *Rural Waimakariri* Flat with numerous ponds and lakes to the West, North and North East. The extended centre line of RWY 20 meets the Waimakariri river 3.8nm from the north-eastern end of the main runway. (Waimakariri river running approximately from west to east and north of the airport) Significant terrain features – Southern Alps to the West, Port Hills to the Southeast
Elevation	The aerodrome has a field elevation of 37.5 meters
Airport ownership	Christchurch City Council Civic Offices; Government of New Zealand
Hours of operation	Christchurch Airport has 24hr operation with no curfew
Runways	Two sealed runways forming a cross. The main runway 02/20 is 3288m long by 45m wide. Runway code: 4E. The intersecting runway 11/29 is 1741m long by 45m wide. Runway code: 3D A grass runway (Grass 02/20) is 515m long and runs parallel with the main 02/20 runway which is primarily used for flight training operations.
Navigation aids	Primary Radar, VOR, ILS (both ends) and airfield lights. Maintained and owned by Airways New Zealand.
Communications	The Air Traffic Control Tower is manned 24hrs
Traffic profile	A mix of operators - Private, General Aviation (GA), Medical Rescue, Military and Charter including international wide body and domestic narrow body passenger and freight operations. All varieties of aircraft operating at the Airport.

Climate	Christchurch has a temperate, relatively dry climate with rain falling on fewer days than New Zealand's other major cities. The average temperature varies throughout the year from 24°C to 12°C in summer to 14°C to 1°C in winter. Winter nights can be below freezing resulting in frosts and at times fog will be present. The average annual rainfall is 40mm on an average 12 rain days.

3.4 SUPPORTING INFORMATION

The following documents and sites provide further background to the WHMP:

- Christchurch International Airport By-laws Approval-Order 1989: Part 1. Section 4.
- Christchurch District Plan 6.7.4.3 Bird strike Management Areas
- Christchurch International Airport Limited Health, Safety and Wellbeing Manual
- Christchurch International Airport Limited Landscape Guidelines
- Christchurch International Airport Limited Off-Airport Bird Hazard Management Plan - Avisure February 2016
- Christchurch International Airport Limited Policy Manual
- Wildlife Health & Safety hazard/risk register
- Avifauna Monitoring Report – Feral Pigeon Surveillance – Ecology NZ, 17 October 2019. Report Number 19008-001
- CAA - Advisory Circular - AC139-16
- CAA - Good Aviation Practice - Bird Hazards
- NZ Wildlife Act 1953
- NZ Animal Welfare Act 1999
- Birds New Zealand (2015) Available at http://www.osnz.org.nz/.
- New Zealand Birds Online. www.nzbirdsonline.org.nz
- ICAO Airport Services Manual Part 3 Wildlife Control and Reduction - DOC 9137
- Federal Aviation Authority (FAA) Code of federal regulations (CFR) Title 14 Federal Aviation Regulations (FAR) Part 139.337(f)
- Allan, J., and Baxter, A. (2006) The Management of Birdstrike Hazards on and around Christchurch International Airport. Birdstrike Risk assessment and Bird Control Audit
- Morgenroth, C. (2003): Development of an Index for Calculating the Flight Safety Relevance of Bird Species for an Assessment of the Bird Strike Hazard at Airports
- Sharing the Skies (an aviation guide to the management of Wildlife Hazards)
- Bell, M.D.; Harborne, P. 2019. Canterbury Southern Black-backed Gull/ Karoro control strategy discussion document. Unpublished Wildlife Management International Technical Report to Environment Canterbury
- Bell, M.D., 2020. Southern Black-backed Gull Survey of the Lower Waimakariri River 2019
- Heather, B. and Robertson, H. (2000) The Field Guide to the Birds of New Zealand. Penguin Books, Auckland

3.5 STRUCTURE

Christchurch International Airport Limited adopted a risk-based approach to develop this WHMP and established management procedures to ensure the WHMP is properly implemented in accordance with the relevant regulatory requirements, advice of Industry experts and Best Practice recommendations

4 PLANNING

CIAL has adopted a three-step approach to assessing and reducing the risk posed by wildlife to aircraft:

1. **Hazard Identification** – assessment of the Airport's hazard profile, including aircraft movements, the habitat and activities that attract wildlife both on and off Airport, the species most observed on and off Airport, and the trends observed in wildlife strikes
2. **Risk Assessment** - based on the information available on wildlife numbers, behavior, characteristics and/or strikes for each species encountered on and around the Airport
3. **Wildlife Management Plan –** a plan compromising actions for each of the highest risk species, supported by a summary of their relevant characteristics, identified by key Airport staff that help the Airport reduce the degree of risk and meet its wildlife management goals and objectives

4.1 HAZARD IDENTIFICATION

CIAL has a range of hazards on and in the vicinity of the aerodrome that could result in an increased bird strike risk, if not managed with robust mitigation processes. Grasslands, drains, hedgerows, buildings and other habitats, both on and adjacent to the Airport, provide attractive habitat for birds. These habitats contribute to the bird strike risk. There is also a considerable portion of the risk from birds overflying the Airport. These birds use feeding and breeding in several sites surrounding the Airport. A major bird flyway exists along the Waimakariri River and across to the coastal areas which at times has species passing near or across the aerodrome.

4.1.1 Aircraft movements and types

Generally, the more aircraft movements at an aerodrome the greater the chances of wildlife strike. Different aircraft have different susceptibility to wildlife strikes. Large turbo fan aircraft tend to fly fast, have a large frontal surface area, have a great sucking power through their engines, rendering them more likely to strike wildlife than propeller driven aircraft. In comparison, light aircraft are not subject to the same rigorous design standards imposed on commercial jet aircraft. It is therefore important to identify current and projected trends for aircraft movements, such as that provided in *Table 2* below.

Table 2 – Christchurch International Airport aircraft movements 2018/19 July to June

Aircraft Classification	Strike Susceptibility Level	Approximate Annual Movements	Forecast Annual Movements (increase, decrease, steady)	Other Considerations
1. Turbofan and Turbojet	High	34872	Decrease	Majority of movements are scheduled helping with management
2. Helicopter and Turboprop	Moderate	56770	Steady	Majority of Helicopters operate from their own base away from runways
3. Piston	Low	23199	Steady	Aircraft use grass and hard surface runways
Total Movements		**114841**		

4.1.2 On-Airport hazards

Following are identified hazards that occur inside the aerodrome perimeter fence. These can attract or become attractive to wildlife and are identified in the following tables

1. **Habitat** *(Table 3) note*: Airfield grass area map follow tables *(figure 1)*
2. **Activities** *(Table 4)*
3. **Natural Phenomena** *(Table 5)*

Table 3 – Christchurch International Airport Limited habitat types

Area	Habitat Type	Times of High Risk
Airfield grassed area 240 hectares *(figure 1)*	Avanex (Endophyte) Jackal grass	When not managed
	Grass or plant areas that have gone to seed	Generally during summer with fresh seed growth
	Flooding/Wet Ground	Generally; Winter
	Bare earth	After airfield works or after an airfield spray where dyeing weeds leave bare patches
Airfield hard surfaces	Runways, Taxiways, Airfield lighting, Car Parks	All year round

Area	Habitat Type	Times of High Risk
Trees and shrubs	Shelter belts, Hedge rows	All year round
Structures	Buildings, Hangers, Light Towers, Airfield signage	All year round
Airport boundaries	Fences	All year round

Table 4 – Christchurch International Airport habitat types

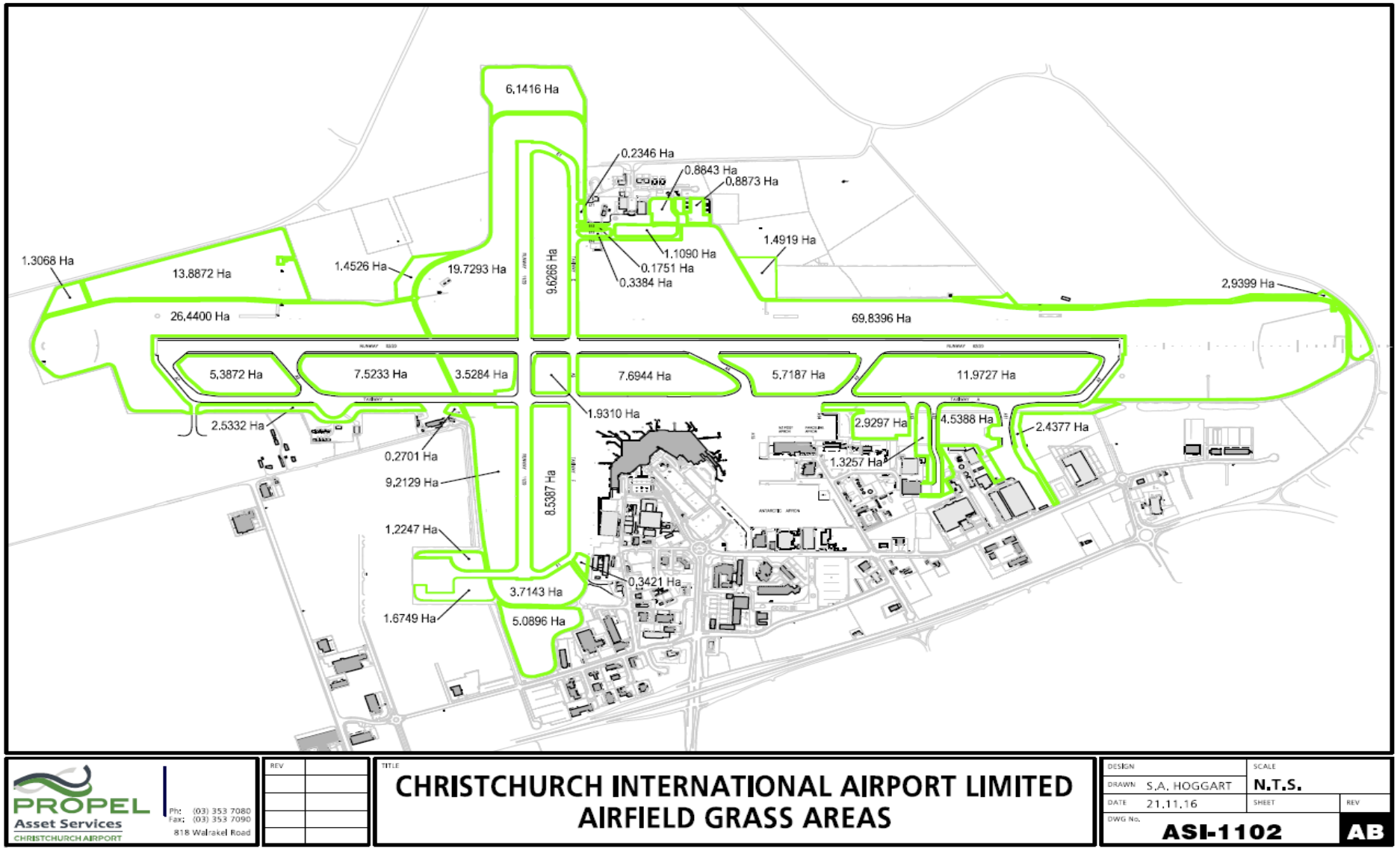
Activities	Hazard	Wildlife
Airfield mowing	- Mowing activities attract small birds (Passerines) - Scalping occurrence (grass cut to short) exposing invertebrates - Creates a preferential habitat for a variety of birds - Operating in High Risk areas (duty runway end etc) and in the heat of the day	Plover, Magpie, Starling, Skylark, all Finch species, Yellowhammer, Sparrow etc
Grass and weeds going to seed	Weeds not removed, and grass not managed	Skylark, all Finch species, Yellowhammer, Sparrow etc
Seeding new grass	Attracts small bird species	Skylark, all Finch species, Yellowhammer, Sparrow etc
Flooding/wet ground	- Pooling water - Insects breeding in wet environment	Mallard & Paradise Duck, SIPO (South Island Pied Oyster Catcher), Spur-Winged Plover and SBBG Swallow and Black-fronted Tern
Tree shelter belts and hedge rows	Roosting and burrowing habitat	Starling, Sparrow, all Finch species, Yellowhammer, Sparrow, Magpie, Pigeons, Rabbit and Hare
Bare earth	After airfield works or after an airfield spray where dying weeds leave bare patches	Spur-winged Plover, All Finch species, Yellowhammer, Starling, Skylark, Sparrow, SBBG and Pigeons
Stock piling soil	Exposing invertebrates and providing habitat for wildlife	Spur-winged Plover, Starling, SBBG, Rabbit and Hare

Activities	Hazard	Wildlife
Clearing and levelling of sites for developments	Expose soil and cause depressions attracting water	Spur-winged Plover, All Finch species, Yellowhammer, Starling, Skylark, Sparrow, SBBG, SIPO, Mallard & Paradise duck
Runway lights	Insects are attracted to the lights, in turn attracting birds that feed on them	Swallow, Owl, Magpie, Spur-winged Plover
Runway and Taxiway upgrades	Attracts seed-eating birds, brings invertebrates to surface and open bare loafing area for wildlife	Spur-winged Plover, All Finch species, Yellowhammer, Starling, Skylark, Sparrow, SBBG and Pigeons
Waste bins Rubbish dumped	Birds and rodents forage on waste bin contents and sitting rubbish	SBBG, Magpie, Sparrow, Rat and Mice

Table 5 – Christchurch International Airport habitat types

Type	Times of High Risk	Wildlife
Bird movements	All year-round overflights *(majority early morning and mid-afternoon)*	Pigeon and SBBG
Thermal air currents	All year round	Australian Harrier and SBBG
Insect emergence (eg; worms, moths)	- During and immediately after high rainfall - Spring growth	SBBG, Spur-winged Plover, Swallow, Black-fronted Tern, Owl, Magpie and Starling
Rodent emergence	During ideal conditions	Australian Harrier
High rainfall events	Mainly winter but adhoc throughout the year	SBBG, Duck (Mallard/Paradise) and SIPO

Figure 1. Grass areas on airfield



4.1.3 Off-Airport hazards

Land use surrounding Christchurch International Airport Limited significantly affects the number of birds attracted to the local area, transiting patterns to and from roost/breeding areas to foraging areas (which may cross aircraft flights) and provides resources for regional population growth which can contribute to an increase in bird-aircraft interactions. Therefore, off-Airport monitoring and management are key components of an effective wildlife hazard management strategy. Habitat types and activities occurring in the vicinity of CIAL that can be attractive to wildlife are identified in *Table 6* below. *Appendix A* shows CIAL surrounding features map

Table 6 – Off Airport habitat types

Habitat types	Times of High Risk	Wildlife
Waterways – Rivers, creeks, lakes, ponds, dams, beaches, tidal mudflats, bird sanctuaries, conservation areas, stormwater basins and oxidation ponds,	All year round	Water and wadding species
Agriculture – Stock, cropping and piggeries	Lambing, spraying, harrowing, re-seeding, harvesting	Pigeon, SBBG, Spur-winged Plover, Canada Goose, Mallard and Paradise Duck
Significant Industries - Landfills and treatment facilities, golf courses, resorts, horse racing tracks and facilities, zoo	All year round	Water and wadding species, Pigeon, SBBG, Spur-winged Plover, Canada Goose, Mallard and Paradise Duck, Hare and Rabbit
Property development - Commercial and Domestic	Clearing and levelling of sites, expose soil and cause depressions attracting water	Spur-winged Plover, All Finch species, Yellowhammer, Starling, Skylark, Sparrow, SBBG, SIPO, Mallard & Paradise Duck
Structures – Derelict buildings, Exposed beams, rafters, ledges and roof tops	All year round	Pigeon, SBBG, Starling, all Passerines
Tree shelter belts and Hedge rows – Roosting and burrowing habitat	All year round	Starling, Sparrow, All Finch species, Yellowhammer, Sparrow, Magpie, Pigeon, Rabbit and Hare
Hills and Cliff faces - Roosting areas	All year round	Pigeon

4.1.4 Wildlife strike history

Wildlife strike records are an important source of information for determining the hazards present at Airports. The information collected allows an assessment of species struck and trends across years, seasons, months and time of the day. *Appendix B* shows annual detailed strike data.

At Christchurch International Airport there has been a total of 130 confirmed strikes and 582 near strikes recorded between 11/04/2017 and 31/12/2019. Total strikes reported per 10,000 aircraft movements has been calculated at 3.28 in 2019, down from 5.93 in 2018. Damaging strikes to aircraft result in costs to operators, and potentially compromise safety. Therefore, these are the most important strikes to prevent. Between 11/04/2017 and 31/12/2019 a total of 4 known strikes resulted in damage or delay to aircraft. A summary of annual strike trends is in Table 7 below.

Table 7 – Christchurch International Airport annual wildlife strike trend summary

Year	**Total No. Strikes**	**No. Strikes / 10,000 aircraft movements**	**Total No. Damaging Strikes/year**	**Comments** *(e.g. species most frequently struck, changes to airport reporting processes that may influence data)*
2014	28	2.02	0	Predominantly sparrows with a small number of SBBG and Spur-winged Plover
2015	48	4.10	1	Predominantly sparrows with a mix of other small birds and small number of SBBG and Spur-winged Plover
2016	39	4.17	1	Predominantly sparrows with a mix of other small birds
2017	64	7.31	0	Predominantly sparrows with a mix of other small birds and small number of SBBG and Spur-winged Plover
2018	59	5.93	0	Predominantly sparrows with a mix of other small birds and small number of SBBG and Spur-winged Plover
2019	34	3.28	1	Predominantly sparrows with a mix of other small birds and small number of SBBG

4.2 RANKING SPECIES BY RISK

There are several methods available to rank the species present at an Airport in order of risk. Doing so allows for resources to be targeted at the species (and the habitats they prefer) that present the greatest threat to aviation and airfield operations.

4.2.1 Allan Risk Assessment

The Dr J.R. Allan[2] risk assessment method has been adopted at Christchurch International Airport for identifying wildlife species risk severity. This method uses historical strike data to assign a risk to specific bird species. Bird species are categorised in terms of their likelihood of being struck (using a five-year strike history from the airport), and the probability (consequence) of damage should they be struck (derived from the United Kingdom's bird strike database using body mass). *Appendix C* shows Risk Assessment Methodology.

[2] *Allan, J. O., 2006. A heuristic Risk Assessment Technique for Birdstrike Management at Airports. Risk Analysis, Vol. 26*

4.2.2 Risk Rankings

The result of the risk assessment for Christchurch International Airport is presented in risk matrix (*Table 9*) below. Based on the method used, the highest risk species are

SBBG, Harrier Hawk, Spur-winged Plover and Rock Pigeon and are priority targets of our wildlife management activities.

Table 9 – Risk ranking of species for Christchurch International Airport

Probability of Damage	Likelihood of a Strike (5-year strike average for each species)				
	Very Low	**Low**	**Moderate**	**High**	**Very High**
Very Low	Blackbird, Black-billed gull, Chaffinch, Thrush	Skylark, Swallow, Greenfinch	Goldfinch, Starling, Banded Dotterel,	Yellowhammer	House Sparrow
Low	Red-billed gull, Black-fronted Tern	Little Owl			
Moderate				Spur-winged Plover*	
High	Little Shag, Mallard Duck	South Island Pied Oystercatcher	Southern Black-backed gull, Harrier Hawk, Rock Pigeon*		
Very High					

Risk Rating	
Low Rik	No further action beyond current management is required
Moderate Risk	Review current management practices and options for additional action required
High Risk	Immediate action required to reduce the current risk
** Indicates elevation of strike risk rank due to multiple strike*	

4.3 WILDLIFE MANAGEMENT PLAN

Birds present the greatest wildlife hazard to aircraft. Mammals may not themselves be a major aircraft hazard, but mice, rats, hares, rabbits, and other species are attractive food for birds of prey. CIAL reports 13 instances of bird strike involving Spur-winged Plover and recognise that they are increasing in risk with higher numbers observed in areas surrounding the airfield. It is notable that while Feral Pigeon strike numbers are low it is their flocking behaviour which raises concern. In 2019 a strike involving multiple birds (eight carcasses recovered) struck an aircraft resulting in significant damage and undergoing repairs. (*M. Weir, Wildlife Manager, CIAL; pers. comm*.)

Previous five-year strike data (CIAL wildlife incident reporting) show:

- SBBG-6.5%
- Spur-winged Plover-5%
- Harrier-2.5%
- Feral Pigeon-2%

Observations by CIAL Wildlife staff are compiled into reports. These record the presence and number of species on and around the airfield along with strike/near strike

information. The most common bird species found at CIAL are - Passerine group (i.e. Starling, Chaffinch, Goldfinch, Greenfinch, House Sparrow, Yellowhammer, Swallow and Skylark), Spur-winged Plover, Australian Harrier, Magpie, Shag (Black and Pied), SBBG/Feral Pigeon (transiting). Species recorded seasonally at CIAL are: Paradise Shelduck, Mallard Duck, Black-fronted Tern, Banded Dotterel, South Island Pied Oystercatcher and Owl (nocturnal).

Other possible risk species for CIAL which are found off-Airport include: Canada Geese and Black Swan. These species are observed at nearby water bodies i.e. wetlands, lakes, rivers, irrigation ponds etc.

The main risk species identified at CIAL are:

- **Spur-winged Plovers** - loafing on airfield movement areas. They display aggressive and are unpredictable in their behaviour
- **SBBG**[1] - due to the number that transit the airfield and when landing on movement areas during adverse weather conditions seeking worms and refuge
- **Feral Pigeons** - due to the number that transit the airfield daily
- **Australian Harrier** when numbers increase and due to their traits while searching for food

Note: Species information tables are found in *Appendix D*. These include species that are observed on the airfield or in the vicinity of CIAL. Key information is outlined per species as in identification, known characteristics, risk rankings, 5 yearly incident numbers along with management actions. Off airport high risk species that are identified in Table 9 are found in 6.0: Off-Airport Wildlife Management

5 IMPLEMENTATION

5.1 ROLES AND RESPONSIBILITIES

Wildlife Manager will be responsible for the overall coordination, supervision and management of the WHMP. This includes allocating resources, designating responsibility, coordinating training, and reviewing performance of the Plan's implementation.

Wildlife Officers have a primary responsibility to minimise any potential hazard to aircraft that may be caused by wildlife, and complete detailed records and reports.

Facilities Supervisor, Airfield will be responsible for correcting aerodrome physical environmental conditions that increase bird strike potential, in consultation with the Wildlife team.

Note: A detailed description of the roles and responsibilities of direct CIAL staff and external stakeholders for managing wildlife hazards is provided in *Appendix E.*

5.2 TRAINING AND EDUCATION

CIAL will utilise the service of skilled human resources in operational and environmental functional positions to ensure operational and environmentally sound management. This will be achieved by enhancing the skills of existing employees through appropriate training as well as through recruitment of new employees with appropriate skills.

The development and implementation of a staff training program in the core elements of the WHMP is essential to, effective wildlife management which is critically dependant on staff with the tools, knowledge and motivation to safely and effectively fulfil the requirements of CIAL's Plan.

Additional training will be provided as required by discussion between the Airfields Operations Manager and Wildlife group. Training records will be collated and maintained by the Wildlife Manager. The staff training programme based on CIAL training needs analysis process is summarised in *Appendix F*.

5.2.1 Processes and Procedures

Processes and Procedures have been developed for activities aligned with Wildlife management. They enhance the team training program by highlighting the main elements of our business and captures those elements while adding more information for functional responsibilities, objectives, and methods. Located in Promapp[1]

[1] *A web-based application used to create, navigate, share and change business processes, enabling quality assurance, risk management and business continuity. Promapp provides an intuitive online process mapping tool, a central cloud-based process repository and a comprehensive process improvement toolset, supporting the development of smarter and safer ways to work & simplifying process mapping so that business teams can own and improve their own processes.*

5.3 COMMUNICATIONS

5.3.1 Wildlife hazard reporting

In the event of an identified threat/hazard on or near the Airport, steps will be taken to remove, or alternatively advise pilots of the hazard (see Table 10).

Table 10 – Wildlife hazard reporting

Task	Description	Frequency	Responsibility	Procedure
Reporting Hazard (immediate)	Notify CHC ATC to inform pilots of additional risk levels. For out of the ordinary hazards the Wildlife Manager is also notified	As required	WO's and AFS	Determining daily wildlife hazard levels. Wildlife harassment
Bird Hazard Watch Reports	Report to be issued to airlines and operators advising on known Wildlife hazards present at the aerodrome for that month	As required	Wildlife team	Bird Watch condition report
Notice to Airmen (NOTAM)	NOTAM is to be issued if a wildlife hazard exists whereby a wildlife strike is likely *Note: provide specific information on species, period of risk, likely location and flight path*	As required	Wildlife Manager and CHC ATC	Determining daily wildlife hazard levels

Wildlife strike reports are essential for understanding and managing risks. Strikes need to be accurately categorised and reported. Strikes reported are investigated by the wildlife team to gather accurate information i.e. location, species, any damage and confirmation (landing aircraft). All strike reports are forwarded to the CAA and captured within the CIAL wildlife incidents database. The steps in processing and reporting strikes are detailed in *Table 11*.

Table 11 – Wildlife strike processing and reporting

Task	Description	Frequency	Responsibility	Procedure
Managing strikes	Record every strike reported	As required	- CHC ATC - WO and AFS	Managing a Bird strike/Near Strike
Reporting strikes	Forward all reports to CAA and Wildlife group	As required	- WO	Report a Wildlife Incident

Data management	Maintain electronic records of wildlife strikes and review periodically to assess changes in populations	Ongoing	- IT - Wildlife team	NA
Task	**Description**	**Frequency**	**Responsibility**	**Procedure**
Strike remains	Collect strike remains from wildlife that cannot be accurately identified for further analysis by experts or DNA. This can be carcass, tissue, blood or feathers	As required	- WO and AFS	Under Construction

Note: *It is essential to ensure that all data collected is correct and accurate. Airline Operators and CAA will provide strike reports so CIAL's Wildlife team can action any changes or corrections required to their data.*

5.3.2 Stakeholder consultation

The following methods are available for CIAL to formally communicate Wildlife related messages and information to relevant stakeholders.

Meeting	Content	Frequency
CIAL Wildlife Management Committee Meeting	Quarterly report delivered to attendees. Information relating to on/off airport wildlife activities (passive and active), incidents, environmental and runway safety	Quarterly
Operations Meeting	Weekly brief between campus staff, tenants and contractors	Weekly
Airside Safety Committee Meeting	Safety issues from Apron and Airside. Works in progress and upcoming. Stakeholder feedback	Bi-monthly
Grounds Meeting (CIAL/CCL)	In progress and upcoming actives on the airfield and immediate vicinity habitat	Weekly
Inter-Agency	Mainly off-Airport risk species and land consent issues. (individual or collective groups with involvement from ECan, CCC, Federated Farmers, Fish and Game, Christchurch city and Canterbury region stakeholders, tenants and neighbours)	As required
Airfield Operators	Two way issues or concerns with Airlines, Airways New Zealand/ATC	As required

5.3.3 National Wildlife Group

New Zealand Aviation Wildlife Hazard Group (NZAWHG). This group was established in 2016 by Airports throughout New Zealand to have a network of likeminded individuals with a wealth of knowledge and experience. CIAL played a big role in the groups establishment and continues to be at the forefront with moving the group forward and pushing NZ Airports into a collective approach with wildlife management.

5.4 WILDLIFE MANAGEMENT MEASURES

Strategies for reducing the risk of strikes at CIAL focus on managing wildlife populations on and surrounding the Airport. Plans will be developed around vegetation (grasses, weeds and trees), Wildlife species (insects, mammals and birds) and shelter structures. Specifically working with the food chain, from the basics (weeds, insects) up to the second level of the food chain (birds etc). All areas and roles will follow the same goals and objectives outlined in these plans.

Management measures, summarised in the sections below, can be classified into the following two categories:

- Passive management – modifying habitats or other aspects of the environment to indirectly remove or reduce the number of wildlife; or
- Active management – directly removing or reducing the numbers of wildlife or animals in high risk areas.

5.4.1 Passive management

Passive management methods are developed by understanding animal behavioural aspects or habitat requirements. Manipulation of the environment will help to minimise the attractive features of the aerodrome. Passive management involves modifying habitats or other aspects of the environment to indirectly remove or reduce the number of wildlife in high risk areas. Habitat manipulation procedures should evolve around three wildlife needs, food, shelter and water which exist **On** and **Off Airport**.

Table 12 shows what these include but are not limited to:

Table 12 – Habitat areas

	ON	**OFF**
Food	Grass, seeds, invertebrates, rodents, Terminal catering areas, discarded waste/rubbish	Landscaping, agriculture crops, farming activities (e.g. lambing and feeding out), landfills, and improperly stored food waste around grocery stores, restaurants, and catering services
	Handouts from staff/public Waste management Excavations	

Shelter (for resting, roosting, escape, and reproduction)	Airfield structures, i.e. temporary and permanent buildings, hangers, and aircraft	Buildings design and age
	Construction debris and discarded equipment	
	Fences and gates	
	Poles/lighting structures	
	Trees, shrubs and grass	
Water	Standing water, leaking water structures (i.e. faucets and hydrants etc.), aircraft servicing spillage	Existing and manmade lakes, golf courses, rivers, farm troughs, marshlands, coastal sea
	Storm water	
	Excavations	

Any action that reduces, eliminates, or excludes one or more of these elements will result in a proportional reduction in the wildlife population at the Airport. Habitat modifications, to make the Airport and surrounding area as unattractive as possible to hazardous wildlife, must be the foundation of the Airport's WHMP.

Plans will be developed so all parties are aligned with CIALs strategic goals and objectives. These plans will be reviewed annually, and should include:

- Weekly plan
- Monthly plan
- Twelve-monthly plan
- Seasonal plan
- Long term plan (where required)

These plans should be developed with the understandings of working with the food chain. This involve beginning with the basics

  - Grasses
  - Weeds
  - Trees
  - Shrubs
  - Insects
  - Waste

Then up to the second level of the food chain

  - Wildlife

5.4.2 Passive management methods:

Vegetation management

- Mowing activities will be coordinated with the Airport Lands Supervisor and Wildlife team

- Grass areas to be monitored and managed seasonally to identify new problematic weed and grass species. A control programme will be adapted to suit
- Grass heights will be monitored by WO's as part of bird counts and patrols
- Alterations to grass cutting height need to be monitored to ensure changes do not increase the risk of wildlife strike. It is recommended that any changes that occur are discussed between all parties and if required an external expert
- High risk areas mowed at night, followed by a rotation process
- Not too short or going to seed
- Continued monitoring the performance of grass species (any trials to be performed in low risk areas)
- Spraying programme to manage weeds/grass over growth on hard surfaces, fertilise airfield grass areas to increase ground cover, perimeter and access roads and fence lines
- Long grass and over growth to be removed with weed eater/hand mower in difficult places
- Trees and shrubs used for roosting may need removing or topping the canopy
- All landscaping to follow *CIAL On-Airport Landscape Design Guidelines*
- Vegetation will be monitored by WO's as part of bird counts i.e. grass heights, weeds, trees and shrubs etc
- Excavations to follow CIAL standard

Food management

- WO's to periodically monitor grass areas to identify insect species and determine concentration levels (quadrant checks)
- Seasonal spraying activities will be coordinated with the Airport Lands Supervisor and Wildlife team to manage invertebrate (worms, grubs, bugs etc)
- Excavations to follow CIAL standard
- WO's to manage hare/rabbit numbers and regularly check roads and airport environs for road kill and carcasses
- Rodent management:
    - Off Airport - contract sits with CIAL Property
    - On Airport – contract sits with Asset Planning and Maintenance
- Waste/rubbish:
    - Areas where waste is a problem must have bird proof bins and frequently emptied
    - Signage on campus and around airfield to educate staff, stakeholders and public
    - WO's to monitor waste on and around the airfield

Water management

- WO's to monitor water build up around pits/depressions and water retention structures. Also report burst pipes or leaks
- Pits/depressions that fill with water after rains which have a slow infiltration rate should be levelled and drained
- Off Airport water bodies to be monitored via fortnightly, quarterly and adhoc surveys which assist with advice to parties where an increase in wildlife is observed

Excavations management

- To follow CIAL standard

Structure management

- Airside fences - to be monitored for ground breaches and foliage build up and rectified
- Construction debris and discarded equipment – Monitor and remove where possible
- Airfield temporary and permanent buildings, hangers, aircraft, lighting poles etc – to be monitored, managed with bird proofing and removed where possible

Note: *Passive methods and plans utilised by CIAL are found in the Airfield Asset Management Plan.*

5.4.3 Active management

Manipulating the habitat is not always possible or does not reduce the attractiveness of the Aerodrome. Active management involves directly removing or reducing the numbers of wildlife in high risk areas. In this case techniques need to be employed which involves wildlife dispersal through harassment, trapping and removal, or lethal management of wildlife. Techniques utilised at CIAL are covered in the Wildlife Operations Manual and procedures located in Promapp. *Table 13* shows active management that is performed **On** and **Off Airport** and these include but are not limited to:

Table 13 – Active techniques

	ON	OFF
Harassment	Periodic patrols Pyrotechnics, gas cannons, stock whip, laser, torch Runway sweep	Remote controlled boat/car Drone
	Sounds - Human, vehicle horn, sirens, bioacoustics Human/vehicle presence Bird spikes and netting Ultrasonic devices	

<table>
<tr><td>Trapping, removal and relocation</td><td colspan="2">Magpie, rabbit and cat traps
Nest removal
Net gun</td></tr>
<tr><td rowspan="2">Lethal Management</td><td>Firearms, poisoning (Airport authorised)</td><td>Firearms, poisoning (at request of landowners, lease holders or to seek approval)</td></tr>
<tr><td colspan="2">Poisoning operations - engage external contractors</td></tr>
</table>

Note: Ethical Responsibility - *CIAL staff required to handle wildlife are trained in the ethical handling and treatment of wildlife. CIAL follow and comply with the* **New Zealand Wildlife Act 1953** *and* **Animal Wildlife Act 1999**. *Advice can be sought from specialists for ethical removal of species where required.*

6 CHECKING AND REVIEW

6.1 MONITORING

Monitoring is a critically important tool in wildlife management at CIAL. Providing essential information to assist in the adaptation of the Plan, as required to shifts in hazards and level of risk. It also provides evidence of conformance to applicable regulations and standards and enables the assessment of the efficacy of the Plan in minimising the wildlife strike risk at CIAL.

6.2 ROUTINE HAZARD MONITORING

Routine detection of hazards in the field is achieved through regular runway and sub strip inspections and during airfield surveillance. Both aspects are important to ensure early detection of wildlife hazards in airside areas, particularly inside runway strips. The frequency of wildlife monitoring, beyond the activities detailed in *Table 14*, is a matter of professional judgement by the Manager Airfield Operations, Wildlife Manager or Senior Wildlife Officer and depends on wildlife numbers, species composition, weather and aircraft activity at the time.

Table 14 – Routine monitoring activities

Task	Description	Frequency	Responsible	Procedure
Wildlife patrols (routine)	Conduct airside wildlife management and surveillance patrols	Daily - ongoing	WO/AFS	Wildlife active management
				Determining daily Wildlife Hazard Level
Wildlife patrols (post-strike)	Conduct airfield surveillance patrol of area. Inspect arriving aircraft. If available contact destination port of departed aircraft	Daily - ongoing	WO/AFS	Identify and handle wildlife
				Review and submit wildlife incidents
				Customer communication
Wildlife patrols data collection	Wildlife management, incidents, surveillance and inspection actions in relevant logs and forms	Daily - ongoing	WO/AFS	Record wildlife activities
				Record all wildlife management
				Report wildlife incidents
Wildlife counts (staff)	Conduct on/off Airport counts	Daily/Fortnightly/Quarterly	WO	Daily survey
				Transect survey (fortnightly)
				Quarterly survey (Heli)
Wildlife counts data management	Maintain electronic records of wildlife counts and review to	Ongoing	Wildlife Manager	Dashboard management

	assess changes in populations			

6.3 NON-ROUTINE HAZARD MONITORING

Non-routine hazard monitoring (Table 15) is achieved through review of on and off Airport development proposals and changes to land use to assess the possible creation of undesirable wildlife habitat or attraction and its associated risk to aviation. Assessment of off-aerodrome land use planning and development proposals for compatibility with Airport operations involves ongoing liaison with several external stakeholders.

Table 15 – Non-routine monitoring activities

Task	Description	Frequency	Responsible	Procedure
ATC will advise on activity for action to remove immediate threats	Observing bird activity with a good oversight of the runway and taxiways	In relation to aircraft landing and taking off	ATC staff	Radio communication
Wildlife counts (external consultant)	Conduct on/off airport counts	As required	Ecologist/ Ornithologist	Wildlife counts
Development on CIAL land	Applications for development on CIAL land are assessed for wildlife attraction.	As required	CIAL property team/ Strategy & Sustainability team	Project management framework protocols
Development near CIAL	Liaise with local authorities/stake holders to ensure the airport is considered in development applications or land use planning	As required	CIAL Strategy & Sustainability team/Wildlife Manager	Protection of Airspace

CIAL Wildlife team also have available data from several sources (e.g. Christchurch City Council, Isaac Conservation and Wildlife Trust, Riccarton Bush Trust etc.) to monitor medium to long term and seasonal trends that, in turn, inform an annual risk assessment process. Data-analysis outcomes are used to update individual species' risk profiles and, where possible, assess the effectiveness of management actions. ECan, Wildlife Management International Limited and Waihora Ellesmere trust conducts periodic surveys around the Canterbury region which give CIAL access to species population data for a wider area via their databases. This information also assists with individual species risk profiles.

6.4 RECORD KEEPING

CIAL recognises the strength of its monitoring program is in good record keeping. Records of all monitoring activities are kept in several document types (relevant logs, spreadsheets, databases etc) which are accessible through CIAL's intranet 'Our Place' site. Data collected feeds into Power BI dashboards broken into following groups.

- Patrol data
- Incident data
- Scheduled survey (wildlife counts) data
- Tasks data
- Audit data

These records provide evidence of management actions and to demonstrate WHMP processes are in place to routinely detect and, where feasible, remove hazards, action change or add resource into areas where it is needed. All records are legible, accessible and stored in a secure environment that prevents loss or damage.

6.5 PERFORMANCE INDICATORS

Performance indicators will be established to help effectively assess how well CIAL is conforming to the requirements of this WHMP and, thereby, determine the need for adjusting how hazards are managed and/or modifying the Plan.

Primary (lead) performance indicators adopted at CIAL are:

- regular reviews of the system (annual review of WHMP and WHM procedures conducted)
- correctly filled wildlife management logs and reports
- scheduled bird counts completed
- staff training attendance
- correct post-strike species identification
- pre-dep/arrival wildlife patrols for wide body aircraft movements
- Grass heights maintained at the agreed height in all areas where mowing is needed
- Consultation occurs with CIAL stakeholders (Quarterly and adhoc meetings)

Secondary (lag) performance indicators adopted at CIAL are:

- Year on year reduction in unknown wildlife strikes - where a carcass cannot be recovered or unable to be properly identified and accurately recorded. (carcass examination or DNA analysis)
- Year on year reduction in number of wildlife strikes - number of wildlife strikes per 10,000 movements
- Year on year reduction in strike rate causing adverse effects (delays or damage)
- Habitat beyond perimeter fence maintained
- Feedback from stakeholders - airlines

6.6 RESEARCH PROJECTS AND TRIALS

Occasionally a research need will be identified. This may be related to a proposed change in airfield passive wildlife management (e.g. grass height, habitat species composition, insect invasion), active management techniques or species monitoring, at which time a small-scale research project may be initiated to provide an indication of which option works best in the overall framework of wildlife management.

Any necessary studies associated with changes to passive wildlife management techniques will be documented in this section in future revisions of this WHMP. Documentation will comprise a research summary (*Appendix F*) including the research purpose and objectives, methods, timelines, staff and expected/actual outcomes.
CIAL will consider all application for trials to reduce bird activity at the Aerodrome. Applications are submitted and reviewed by the Manager, Airfield Operations.

A trial application must include (but not limited to):

- Measurable outcomes
- Risk assessment including ensuring maintaining CAA compliance with AC 139-16 throughout the trial
- Implementation and management of the trial
- Trial period and costs

After reviewing the application, the Manager Airfield Operations will either

- In writing decline the trial due to safety concerns
- Submit the proposal to the CIAL Gateway Zero team for approval

The Manager Airfield Operations, Wildlife Manager and Facilities Manager Airfield have the authority to stop the trial if at any time aircraft safety is at risk.

Trials applications will be evaluated against the risk matrix priority species and the projected outcomes/benefits as well as risks.

Current research priorities at CIAL:

- Canada Goose Masters Project (Canterbury University)
- Pigeon surveillance study (Ecology NZ)
- Increased signage on and around airfield to educate staff and the public
- Annual monitoring and management of Southern Black-backed Gulls

Future research priorities at CIAL:

- Review of grass management strategy for the airfield
- Review tree management strategy
- Review food sources on the airfield
- New technologies and harassment techniques
- Additional monitoring of Feral Pigeons - determine changes to the population levels, locations and activity of these species and assess whether these changes will impact on CIAL.
- Additional monitoring of Canada Geese - determine changes to the population levels, locations and activity of these species and assess whether these changes will impact on CIAL.
- Mammal management in public areas on campus (rabbits)
- Viability of predator-free airfield

6.7 REPORTING

Routine reporting ensures that all staff and managers are equipped with the information needed to adapt hazard management activities when required. Procedures for reporting can be found in Promapp. General reports are all stored electronically. The regular reports are generated and distributed to relevant staff by the Wildlife team. *Table 16* outlines the regular reports created.

Table 16 – Routine reports generated at CIAL

Report	Description	Compiled by
Daily wildlife activity (logged into BIRDTab)	Notes details of weather, all active management (dispersals, techniques used, carcass recovery), observations	Wildlife Officer; Wildlife Assistant
Daily audit report (to advise Airfield Lands Supervisor)	Airfield inspection. Grass, weeds, ponding and any airfield reinstatement required	Wildlife Officer
Shift report	All information throughout a shift to pass onto incoming shift	Wildlife Officer
Quarterly Wildlife Committee Report	To provide an update on wildlife hazards, strike data and wildlife hazard management processes at CIAL to the Wildlife Management Committee	Wildlife Manager
Monthly Board Report	Details of strike/near strike data, wildlife active management data and any high-level project information	Manager Airfield Operations; Wildlife Manager

6.8 AUDITING

Auditing is recognised as an essential component to an effective WHMP.

- Internal audit to be completed on a yearly basis which will focus on:
  - Accuracy of identification and monitoring of the wildlife hazard
  - Review the hazard and rank wildlife species in their order of risk
  - Review the effectiveness of passive and active control measures
  - Review the Implementation the WHMP and monitor its effectiveness
  - Determine if benchmarks are being achieved

The findings from these audits will be used, where appropriate, to modify practices and generate corrective actions. They will be recorded and referred to in the annual WHMP review and incorporated into future reviews and versions of this plan.

- Every five years the Wildlife Manager will facilitate an audit by a suitably qualified external agent. Recommendations will be reviewed and presented to the Wildlife management team.

Note: *An external audit could be conducted inside five years if the internal audit findings identify the need for an adhoc audit.*

6.9 REVIEW

CIAL will ensure the WHMP is reviewed at least annually. To ensure the WHMP remains effective and is updated to fulfil future requirements the following processes have been established.

6.9.1 Major Review

A major review of the WHMP will be undertaken on a five yearly basis and is the responsibility of the Wildlife Manager. The review will result in a complete revision and reissue of the document. The review will be supported, where necessary, by a suitably qualified and experienced consultant.

Major reviews will take the place of annual updates in the years they occur.

6.9.2 Annual Update

The Wildlife Hazard Management Plan shall be reviewed annually by the Wildlife Manager. Further to this CIAL has set two (2) target strategies regarding annual updates and revision. They are:

- Continued implementation of the Bird and Wildlife Management Plan, updating where necessary in line with best practice
- Review strike data and reassess the risk species to aviation

The review will involve key personnel and is supported, where necessary, by a suitably qualified and experienced consultant. The annual update of the WHMP will:

- Be based on performance indicators and audit findings
- Ensure compliance with all current legislation
- Update the assessment of risk using updated strike and monitoring data observations
- Ensure all procedures, roles, responsibilities and associations listed are current and relevant
- Ensure all management actions undertaken by CIAL are appropriate and listed in the WHMP.

Moving forward: Key outcomes from reviews will be added into the following:

- Key outcomes of the most recent annual review for [YEAR] are summarised below:
- Key actions from the most recent review for [YEAR] are summarised below:

7 OFF-AIRPORT WILDLIFE MANAGEMENT

7.1 OVERVIEW

Off Airport Wildlife Management is important for CIAL as it assists to identify hazards that could pose a risk to the airline operators that use our aerodrome. These three topics need to be the focus in identifying potential hazards that could change the bird strike risk profile.

- Existing land use practices
- Future land uses
- Risk species

Proactive management can reduce the bird strike risk profile.

1. **Existing land use** - involves working with land owners to conduct routine surveys to gather data.
2. **Future land use** - involves working within the Resource Management Act (1991) to ensure bird strike reverse sensitivity effects are considered.
3. **Risk Species** – involves engaging with external agencies to assist with existing strategic management plans and to develop new ones where needed

Assessing Off-Airport bird strike risk requires considerations of several parameters to assess how the proposed land use will interact with existing land uses, risk species, and flight paths of both birds and aircraft.

7.2 REGULATORY REQUIREMENTS

7.2.1 International

The International Civil Aviation Organisation (ICAO) Airport Services Manual Doc. 9137 Part 3

Section 4.7.2 states: "…typically a 13 km (or 7 NM) circle is considered a large enough area for an effective wildlife management plan. However, as necessary, action should also be taken when the bird/wildlife attractants are outside the 13-km circle if the airport operator has any influence on planning and development issues."

Section 4.7.3 states: "For any new off-airfield developments being proposed that may attract birds or flight lines across the airport, it is important that the airport operator be consulted and involved in the planning process to ensure that its interests are represented.

Note: *As a signatory to the Convention on International Civil Aviation, 1944 (the Chicago Convention) the NZCAA are obliged legally to take head of this Standard. In its strictest interpretation, for any new development to proceed on or near an aerodrome, it must be shown that the development will not in itself increase bird risk.*

7.2.2 National

NZCAA Advisory Circular 139-16 (2011): Wildlife Hazard Management at Aerodromes states: "Although you can control the land use practices on your land to reduce the aerodrome's attractiveness to birds; bird-attractive land use activities outside the aerodrome's boundary and beyond your sphere of influence can counter your activities. It is crucial aerodrome operators make submissions during urban planning or district scheme reviews and work with local authorities to ensure bylaws are established, so municipal authorities know that such activities influence bird populations, which can be hazardous to air transportation if near an aerodrome and approach or take-off flight paths for aircraft." It also lists particular "hazardous land use practices" including:

- landfills
- wastewater treatment plants
- agriculture – crops, animals (e.g. lambing season, cattle yards)
- recreational activities – grounds (e.g. golf courses, sports fields parks and picnic areas)
- water

Resource Management Act 1991

On direction of the Ministry of Transport in 2013, the Honourable Gerry Brownlee identified that the Resource Management Act (1991) is the appropriate mechanism to manage land uses around Airports and the risk of birdstrike (*refer Appendix H).* Since 2013 CIAL introduced birdstrike management practices into the Christchurch District Plan and continues to participate in RMA (1991) planning processes lobbying for provisions in relation to the 3km, 8km and the 13km birdstrike management areas into the Waimakariri District Plan, Selwyn District Plan and the Canterbury Regional Policy Statement.

CIAL has been successful with the insertion of the birdstrike management provisions within 3km of the thresholds of the runways in the Christchurch District Plan. Within the birdstrike management areas, land use activities that may attract birds are restricted and/or specific birdstrike risk management techniques are required.

CIAL also actively participates in resource consent processes that may impact the birdstrike risk profile, an example of this is quarrying activities. CIAL successfully participated in numerous hearings process ensuring conditions managing reverse sensitivity effects have been applied. CIAL continues to be involved in these applications as they arise.

7.3 OFF-AIRPORT BIRD STRIKE RISK ASSESSMENTS

Reverse sensitivity provisions in Christchurch District Plan specify:

"Strategic infrastructure, including its role and function, is protected from incompatible development and activities by avoiding adverse effects from them, including reverse sensitivity effects. This includes: Manage the risk of birdstrike to aircraft using Christchurch International Airport" (CDP, Strategic Object 3.3.12.b.iv)"

In accordance with strategic direction object 3.3.12.b.iv Birdstrike Risk Assessments are required when an applicant's proposal has potential to impact the risk of bird strike. The purpose of the risk assessment is to assess how the proposed change in the existing environment (i.e. a new water body) will change the bird strike risk profile. Items to consider as part of a birdstrike risk assessment include:

- CIALs identified high risk bird species and existing behaviours i.e. flight movements, roosting and foraging habits.
- Identifying other bird species that could contribute to the increase of bird strike risk.
- Existing environment around the subject and CIAL.
- How the proposed change to the environment will impact behaviour of high-risk species.
- Monitoring and mitigation measures.
- Birdstrike Risk Assessment to be completed by Ecologist / Ornithologist.

7.4 BIRD STRIKE RISK ZONES

Australian Government's Department of Infrastructure and Regional Development has produced one of the most comprehensive guides to incompatible land use around airports known as the National Airports Safeguarding Framework (NASF). Guidelines C of the NASF categorises land use types into wildlife attraction risk categories (high, moderate, low and very low) and determines actions (incompatible, mitigate, monitor, no action) for existing and proposed developments within radical distances from the aerodrome (3, 8 and 13kms).

The US Civil Aviation Authority recommends a 10,000-foot (3.2km) separation distance between an airport's aircraft movement area and any hazardous wildlife attractant for airports that serve turbine powered aircraft. A 5-mile (8km) separation distance is recommended if the hazardous wildlife attractant may cause hazardous wildlife to move into or through an airport's approach/departure airspace. These separation distances are mandatory for airports that have received AIP funds after July 1999. If airport fails to meet these separation distances, they could be found in noncompliance of the grant's assurances. The FAA could then take enforcement actions.

UK Civil Aviation Authority requires such developments within 8 miles (13km) of an airfield to be scrutinised for bird strike risk prior to development approval. The UKCAA CAP 680 indicates that: "The risk to aviation from birds is, in principle, unacceptable and must be reduced to a level that is as low as reasonably practicable and kept under continuous review."

As detailed in CAP 772 options available for airports in managing risk associated with off-airport land use could include the:

- establishment of a process with the local planning authorities for consultation on proposed developments that have the potential to be a wildlife attractant within 13km of the aerodrome
- means to influence land use and development surrounding the aerodrome such that the strike risk does not increase and, where practicable, is reduced

- means to help encourage landowners to adopt wildlife control measures and support landowners' efforts to reduce wildlife strike risks, via land use agreements
- development of procedures to conduct and record the results of off-aerodrome site monitoring visits.

Why 3, 8 and 13kms?

The 13km area was derived from the fact that at that distance from an Airport, an arriving aircraft on a 3° glide slope is at approximately 3,000 feet above ground level. Data from various sources indicate that at and below this height, more 90% of strikes are recorded. The concept is that if land use is managed within this zone, many strikes will be averted. The 8km and 3km zones are areas where aircraft are progressively lower, where more strikes occur, and therefore there is a need to make land use restrictions progressively more stringent.

Unfortunately, there are no studies that definitively show that the concept is sound. Indeed, because birds are usually at or around ground level when they are taking advantage of a particular land use (unless it attracts soaring birds, which may use thermals above a particular land use), the concept is fundamentally flawed. It is the actual bird movements to and from the location that is likely to contribute to the aviation hazard, rather than at the site itself. The other consideration is that the land use may also contribute food or breeding places that fuel population growth and have a much more indirect, but still substantial contribution to the risk.

Ideally the development of distance requirements for land use would be site-specific and developed after local studies of bird populations. Interpretation of these studies would need to include probable long-term changes to populations, their sizes and species mix, including the consideration of factors such as species that may be introduced in the future.

Despite the inherent flaws, in the absence of any such studies or data that may suggest 3, 8 and 13km zones should be adjusted (either outward or inward), these international guidelines should be adhered to. They provide a reasonable balance between managing risk within a land area, but not extending to a distance that is unworkable within most planning schemes. When dealing with risk, the precautionary principal should apply, and under no circumstances should the area of influence be reduced from the suggested 13, 8 and 3km zones without substantial justification. It is important to note that planning decision taken today may leave a legacy for decades or centuries to come and there are some dynamics that simply cannot be predicted.

7.5 KEY OFF-AIRPORT SITES (EXISTING LAND USE)

Key off-Airport sites have been assessed for their possible contribution to birdstrike risk at CIAL which are listed in *Table 17*. Management prioritise sites ranked as moderate to very high and is prioritised according to the risk ranking (e.g. very high being priority sites, etc.). Key locations have been mapped and photographs of sites within proximity to CIAL are kept on file.

Sites are assessed, and data is collected during scheduled surveys. CIAL will update any new sites as they are developed (e.g. small waterbodies, quarries, etc.).

Note: *CIAL does not have responsibility, or power to act alone, at any sites off-Airport. The following table indicates key stakeholders at identified sites*

Table 17: Key bird hazard sites surrounding CIAL

Site	Proximity to CIAL	Description	Key stakeholders of site	Contribution to risk to CIAL
Waimakariri River [1]	3.6km North	A braided riverbed which is a key breeding and roosting site for Southern Black-backed Gulls, with thousands nesting there each year. SBBG move to and from the river and other parts of the region and with the proximity to CIAL they can cross aircraft flight paths, some of which are at heights that aircraft fly. Canada Goose are also found on the river but in relatively low numbers. Many other species also feed, roost and nest in the river but are categorised as low risk. In addition to the local population present, thousands of bird movements can occur seasonally, along the Waimakariri River, known as the Waimakariri Flyway, as part of migration. SBBG lethal management is undertaken on a seasonal basis, led by ECan	Environment Canterbury (ECan)	High
Agricultural land North and South of the Waimakariri River [1]	Various, starting at 4.7km	Farm land (both livestock and cropping) has long existed in the area surrounding the airport. But with recent land conversions, and an increase in water holding ponds and pivot irrigation they are major attractants to both SBBG,	Several private landowners	High

		Feral Pigeons, and at times Canada Geese and Ducks. These farms are increasing the attractiveness of the Waimakariri by providing nearby food sources, therefore increasing the associated risk.		
CBD (derelict buildings, structures/Red Zone)	10km to 14km South East	Attractants for roosting Feral Pigeons, foraging Canada Goose and at times SBBG. Sites would be contributing to population growth in the area. Feral Pigeons transit the aerodrome to numerous feeding sites.	Christchurch city council/Private owners (buildings)	High
Peacock Springs	1km North	A wildlife reserve that supports various water birds. The ISAAC Conservation and Wildlife Trust have instilled a Bird Hazard Management Plan and submit an annual report to CIAL. Any high-risk species i.e. Canada Geese and Mallard Ducks are managed and CIAL's Wildlife team are advised. They have the potential to cross the aerodrome and through aircraft flight paths flying to and from the site.	The Isaac Conservation and Wildlife Trust	High
Riccarton Racecourse and equine facilities [2]	3.2km South East	Feral Pigeons are observed during scheduled CIAL surveys. There is a plentiful food source in horse feed, and suitable perching/roosting structures. Given the proximity to the Airport and city, which likely provides additional foraging and roosting opportunities, it is important that Pigeons and bird attractants continue to be managed at this site.	Riccarton Park. Canterbury Jockey Club	Moderate to High
Lake Roto Kohatu [2]	2km North East	A Council managed habitat relatively attractive to water birds which is almost directly under the main runway northern approach. It comprises two disused gravel pits now being remodelled for recreational purposes.	Christchurch City Council	Moderate to High
The Groynes [2]	4.5km North East	A large public open space adjoining Peppers Clearwater Resort. It includes a series of waterbodies associated with the south branch of the Waimakariri River, surrounded by picnic and recreation areas. It is highly attractive habitat for water birds i.e. Canada Geese, Mallard Ducks and Black Swan. The shallow lakes with banks providing easy access	Christchurch City Council	Moderate to High

		to the water and significant amounts of bird feeding create a habitat ideal for the development of large bird populations. The surrounding grasslands and car parks provide suitable loafing opportunities with some species able to forage on new growth in the grassed sections of the park. Public feeding is also an issue. Higher level bird movements moving to and from The Groynes and the Waimakariri River, Orana Park or Peacock Springs can potentially enter aircraft flight paths.		
Peppers Clearwater Resort [2]	4.5km North East	The resort includes an 18-hole golf course, hotel, SPA and residential development, 2 tennis court and one main restaurant and one small conference room and two very big man-made lakes. These provide attractive habitat for water species. It has on-site staff responsible for the management of birds	Peppers Clearwater Resort	Moderate to High
Styx Mill Conservation Reserve [2]	4.5km East	Extends along the Styx River for nearly 1.6km and contains wetland habitat which supports large numbers of water birds. It is highly attractive habitat for water birds i.e. Canada Geese, Mallard/Paradise Ducks and Black Swan. Certain species have been observed moulting there (Peter Harper, expert statement). It offers feeding, nesting and sheltering opportunities for these and many other species.	Christchurch City Council	Moderate to High
Paparua Pig Farm	6.8km South West	Paparua farm attracts large flocks of Feral Pigeons, and at times SBBG, owing to the ample supply of animal feed and organic waste. Lethal management is undertaken at the site. Control has been successful for SBBG, but Pigeons continue to be an issue. Gulls moving to and from the Waimakariri River have the potential to cross the aerodrome and through aircraft flight paths flying to and from the site. Pigeons are known to	Department of Corrections	Moderate

		roost and nest in prison buildings on site. While these resident individual birds are unlikely to transit flight paths, they would be contributing to population growth in the area.		
Harewood Golf Course	140m North East	It is located on CIAL land. Small numbers of Feral Pigeons can be occasionally found roosting on site. Large numbers of rabbits inhabit the grounds and come onto the airfield. Lethal management operations at night are helping to control.	Harewood Golf Club	Moderate
Riccarton Bush	5.8km South East	Since the 2011-2012 earthquakes Feral Pigeons have been increasingly an issue here roosting overnight in Riccarton Bush. Birds feeing around the Riccarton Race Track are likely roosting at this location. Movement between these sites may bring Pigeons into conflict with the approach for RWY29.	Riccarton House and Bush	Moderate
Orana Wildlife Park	4.7km North West	A wildlife park and zoo facility with water moats and ponds included as part of its design. Birds moving to or from Orana Park to other surrounding water bodies could potentially enter aircraft flight paths.	Orana Wildlife Park	Moderate
Kaiapoi Oxidation Ponds [1]	14.7km North East	Situated near the mouth of the Waimakariri River. Canada Geese, Mallard/Paradise Ducks and Black Swan are regularly observed. Movement of birds up the Waimakariri or to surrounding water bodies and agricultural land, already highlighted, has the potential for birds to enter aircraft flight paths.	Waimakariri District Council	Moderate
Estuary of the Heathcote and Avon Rivers and Bromley Oxidation Ponds [3]	16.3km South East	The Estuary is at the convergence of the three main migratory flyways around Christchurch (Waimakariri-Estuary flyway; Pegasus Bay flyway and the Estuary Ellesmere flyway; Shaw and Patrick 2004). The Estuary and associated oxidation ponds support up to 32,000 waterfowl (Crossland, 1993), and has become a safe-	Christchurch City Council	Moderate

		haven for Canada Geese, Mallard/Paradise Ducks and Black Swan. SBBG (Crossland) also feed and roost on the estuary. There has been an increasing number of Canada Geese take up residence along the Avon River, following the 2011-12 earthquakes, with the establishment of green areas inside the Red Zones. The Estuary provides important resources to support large populations of large water birds. Movement up the Waimakariri River or to surrounding water bodies and agricultural land, already highlighted, has the potential for birds to fly through aircraft flight paths. However, no recent tracking records or surveys indicate this.		
Lake Ellesmere and Lake Forsyth [3]	32.8km South East	Lake Ellesmere supports one of the largest water bird populations in New Zealand, with an estimated 30% of the total New Zealand Canada Goose population (DOC 1996). Canada Geese move from this lake to the Canterbury high country and areas throughout the Southern Alps. There is potential for birds to fly through aircraft flight paths. However, no recent tracking records or surveys indicate this.	Waihora Ellesmere Trust/Environmental Canterbury	Low to Moderate
Brooklands Lagoon [1]	14.2km North East	Canada Geese have been recorded in increasing numbers in Brooklands Lagoon, and have been observed flying to and from Travis Wetland, the Estuary, in and over the city to Ellesmere. These flights are generally not in high conflict with flight paths. SBBG also gather at this site. Movement of birds up the Waimakariri River or to surrounding water bodies and agricultural land, already highlighted, has the potential for them to fly through aircraft flight paths. However, no recent tracking records or surveys indicate this.	Christchurch City Council	Low to Moderate

Travis Wetlands [3]	12.7km East	Canada Geese have been recorded in increasing numbers in his site. They have taken up residence as with most other city water bodies and wetlands. Movement of birds up the Waimakariri or to surrounding water bodies and agricultural land, already highlighted, has the potential for birds to enter aircraft flight paths.	Christchurch city council	Low to Moderate
Metro Road Waste Transfer Station	14.2km South East	Situated near the Estuary of the Avon, Heathcote Rivers and foreshore areas. This facility is attractive to gulls, mainly Red-billed Gulls, but SBBG can be observed there. Despite it mainly being positioned in an enclosed facility birds manage to reach the waste by flying through the large open doors. The site is distant enough from the airport to have negligible impact on the bird risk at CIAL but should be monitored for signs of population growth.	Christchurch city council	Negligible

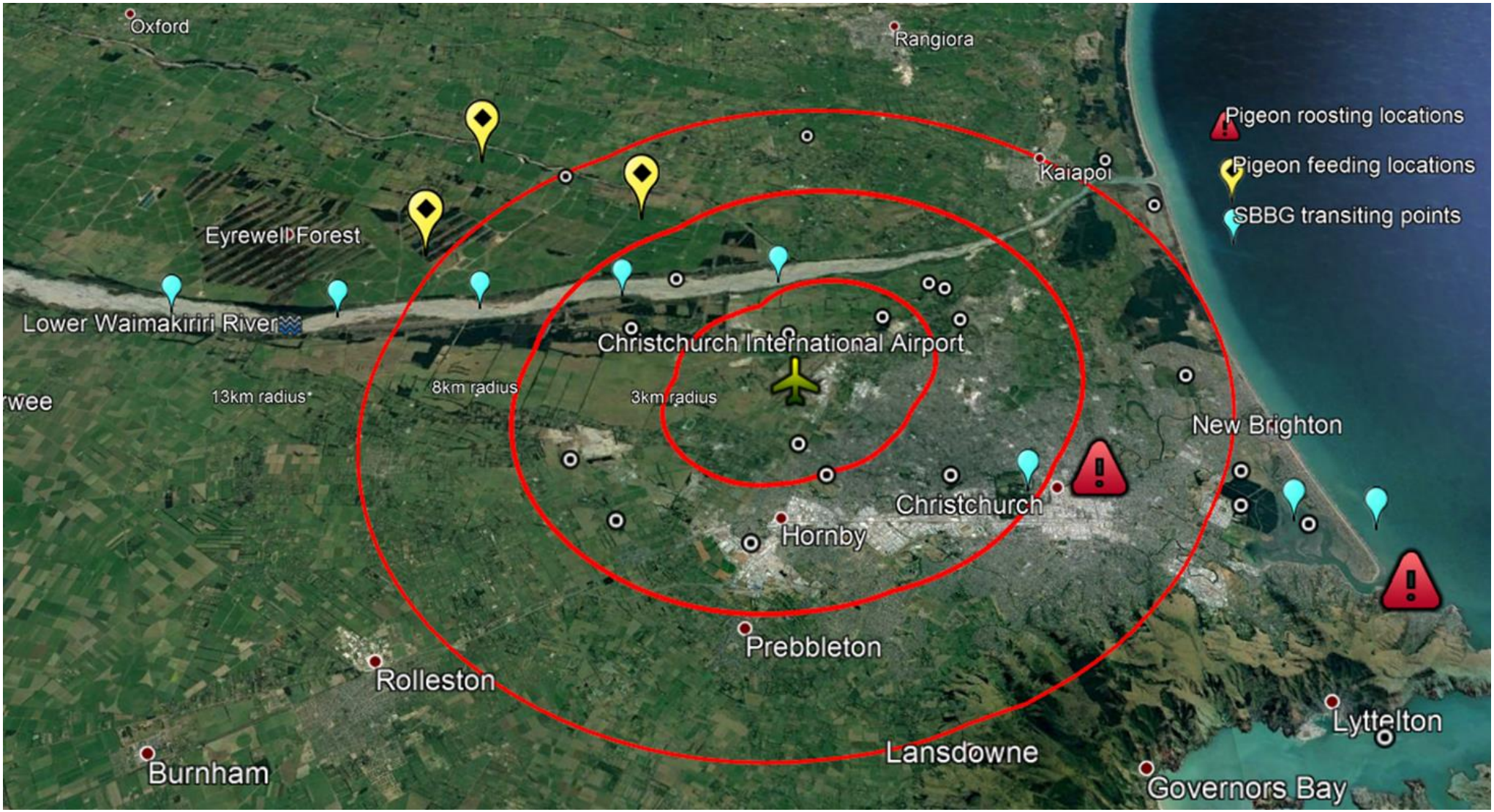
[1] Sites included in any air surveys (helicopter) that are preformed throughout the year

[2] Sites included in scheduled CIAL transect ground surveys. Data is collected to identify any high-risk species that need to be managed. Birds moving between surrounding water bodies can potentially enter aircraft flight paths.

[3] CIAL instigated a project to track Canada Geese (2019/20). This involved engaging with Canterbury University and to fund one of their students MSc thesis (Mapping the movements of Canada Geese to reduce the risk of bird strike hazards at Christchurch International Airport Limited). The objectives of this project were to (1) map the movements and identify key areas used by Canada geese in the Christchurch International Airport area, and (2) determine the diet of Canada Goose and identify feeding locations in the airport area that could be modified to reduce their attractiveness to the birds. The tracking data throughout this project, (from birds flying to and from different locations), has shown very little areas of concern in relation to birds flying across the aerodrome and flight paths.

Birds transiting CIAL are a continued risk to the aerodrome. The following map *(figure 2)* shows known key off-Airport sites of Pigeon and SBBG (two of the priority off-Airport species) that contribute to them transiting CIAL.

Figure 2; Known Pigeon and SBBG locations that contribute to these species transiting CIAL



7.6 PRIORITY SPECIES

The priority Off-Airport species identified as risks by CIAL are:

1. Canada Goose (Branta canadensis)
2. Southern Black-backed Gull (Larus dominicanus)
3. Feral Pigeon (Columba livia)

7.6.1 Canada Goose (*Branta canadensis)*

Distribution of the Canada Goose in NZ.
Source: Ornithological Society of New Zealand Inc.

CIAL Risk Ranking	Very Low – continue ongoing surveys and monitoring identified off airport sites. Assist Christchurch City Council, ECan and other agencies with ongoing management.
Mass (kg):	4.5kg – 5.5kg
Wildlife Act 1953 Listing	Schedule 5 – declared to be unprotected throughout New Zealand, except where that schedule otherwise provides.
New Zealand status	Introduced
Conservation status	Introduced and Naturalised

7.6.1.1 SPECIES INFORMATION

A native North American Goose with an extensive history of population isolation and substructure. The taxonomy accorded to these groupings remains labile but there is gathering agreement for two species to be recognised, a large-bodied *B. canadensis* and a small-bodied *B. hutchinsii* within each of which are several geographic races accorded sub-species status. The New Zealand population is primarily descended from an importation of 50 birds in 1905. The size and plumage characteristics of these birds, when examined in 1970, matched those of the then largest race recognised, *B. canadensis maxima*.

A wary, flocking bird, light-brown in colour with black neck and head and a conspicuous white chinstrap. The breast and abdomen are barred white and light brown, and the abdomen and under-tail is white. Back and upper wing surface a darker brown. Bill, legs and feet black, eye dark brown-black. Sexes alike but females are noticeably smaller than males. Goslings have yellowish-grey down and the juveniles appear as dull versions of the adult.

Widespread in the South Island and most numerous in pastoral areas of the eastern foothills of the Southern Alps from Marlborough to Central Otago, and around coastal lakes and lagoons. Their distribution is expanding in Fiordland and Southland. In the North Island, their distribution still reflects locations at which birds were released during the past 30 years, with the largest concentrations in Wairarapa, Hawkes Bay, Ruapehu-Taupo area, and Waikato. (Population of about 60,000, two-thirds of which are in the South Island, and have been maintained at this number for most of the past decade)

Many flocks are extended multi-generation family groups and remain close to their breeding locations. Others, however, may undertake extensive moult migrations to larger waters where they undergo their annual wing moult. The bulk of these migrating birds are non-breeders or failed breeders; successful breeders usually moult their wing feathers on the breeding sites while still guarding their young. Nest as solitary pairs but often near other members of the flock. Monogamous, with female completing all the incubation over about 27 days, and the gander actively defending a small territory around the nest. The nest is a down-lined ground depression often hidden amongst rushes or short protective vegetation. Clutch size generally 5 white eggs. Laying is mainly in September–October but can also extend considerably later in the North Island, and second nesting's have occasionally been recorded in December–February. Both parents actively guard the young during their 8-9 weeks of growth until capable of flight. The family may remain together for several months and join with other pairs and families into an extended flock. When pairs nest in close proximity, amalgamation of broods and shared parental duties are common.

7.6.1.2 STRIKE RISK

Canada Goose are identified as a very large bird and observed flying singular or in loose flocks, often at heights between 50 to 1000 feet AGL. Canada Goose seem to have gone through cycles at CIAL. Two to three decades ago they were infrequently observed, whereas a decade ago sightings had increased with birds flying across and near the airfield. This has now subsided in recent years with sightings being very rare (CIAL Scarecrow, BIRDTab data and ground/air surveys). This though, does not diminish the fact that this species is a known threat internationally when living in the vicinity of an aerodrome which have resulted in significant bird strikes causing major damage and loss of life. Their high risk to aircraft is due to:

- size
- flocking nature
- being very adaptable to conditions and areas leading to population growth in undesirable locations i.e. urban areas in parklands and grassed areas
- flocks remaining close to their breeding locations making them resident rather than migratory
- adaptation to where water can be found nearby
- ability to fly at very high altitudes and in very large numbers

With no recorded incident data at CIAL, Canada goose are considered a **LOW** strike risk but given that they have resulted in bird strikes elsewhere causing loss of life and damage, they are identified as a potential risk at CIAL. With the very high severity consequence they have been added to the risk rankings table.

7.6.1.3 LOCAL POPULATION AND MANAGEMENT HISTORY

Canada Geese are found in most water bodies throughout the wider Christchurch. While the big lakes, (Ellesmere and Forsyth) see large numbers of birds flying to the high country for breeding they are not considered a risk to aircraft flight paths. The high numbers in Christchurch City is a concern though, especially if their migration path takes them up the Waimakariri River flyway. This could bring them close to CIAL and into aircraft flight paths. However recent data from on-airport patrols, off-airport transect surveys and GPS tracking information from several sites is showing they are becoming more residential then migratory. The concern though is about a potentially increasing population around Christchurch City moving further afield to sites in close proximity to CIAL for example Styx Mill Conservation Reserve, Peppers Resort, the Groynes etc. The likelihood could be compounded by culling exclusion zones and less human disturbance in the City areas following the 2011-12 earthquakes (as seen around the Avon River; CIAL quarterly Heli surveys).

The South Island Canada Goose population was previously managed under the draft South Island Canada Geese Management Plan, prepared by the New Zealand Fish and Game Council (now FGNZ). While management under the Plan was effective in some areas, in other areas population targets set in the Plan were not being met (Gale 2012) This led to lobbying by farmers, and in 2011 resulted in Canada Geese being removed from Schedule 1 of the *Wildlife Act 1953,* which defined them as a game bird, and declared a pest under Schedule 5 (Gale 2012). This meant that the FGNZ was no longer legislatively mandated to manage them and announced their departure from Canada Geese management shortly thereafter. It also meant that hunters no longer required a permit to shoot them. Under the new classification, the management of Canada Geese is not the responsibility of a single agency or organisation (Gale 2012). A multi-stakeholder Canada Geese Management Group, which CIAL is a part of, has developed the Inter-agency Canada Goose Management Strategy (A collaborative, non-regulatory partnership covering greater Christchurch and Central Canterbury) which is in draft copy.

In recent years CCC have undertaken sporadic control measures which CIAL have assisted with when approached.

7.6.1.4 MANAGEMENT APPROACH

In addition to posing a significant strike risk, Canada Geese also impact on farmers and native species by directly competing for resources, as well as fouling pasture making it unpalatable to stock. They impact on water quality through nutrient loading and associated algal blooms. In urban areas, they foul parks and sports fields, which may also constitute a public disease risk (Spur and Coleman 2005). Given previous population growth rates, it is anticipated that without effective management at a regional level the strike risk from this species could be considerable in coming years.

CIAL is there to assist and support regional stakeholders with an interest in their management:

- Christchurch City Council
- ECan
- Federated Farmers

Management methods currently administered are:

- Ground Shooting
- Egg Oiling/Destruction
- Moult Culls (euthanasia)
- Toxic Baiting
- Habitat Modification and removing attractants
- Fish and Game competitions

7.6.2 Southern Black-backed Gull (*larus dominicanus)*

Distribution of the Southern Black-backed Gull in NZ.
Source: Ornithological Society of New Zealand Inc.

CIAL Risk Ranking	High – requires further action to reduce risk
Mass (kg):	1.0kg
Wildlife Act 1953 Listing	Schedule 5 – declared to be unprotected throughout New Zealand, except where that schedule otherwise provides.
New Zealand status	Native
Conservation status	Not threatened

7.6.2.1 SPECIES INFORMATION

The Southern Black-backed gull (or 'black-back') is one of the most abundant, familiar large birds and the only large gull found in New Zealand, although many people do not realise that the mottled brown juveniles (mistakenly called "mollyhawks") are the same species as the immaculate adults. Found on or over all non-forested habitats from coastal waters to high-country farms. They are particularly abundant at landfills, around ports and at fish-processing plants along with estuaries and harbours, rocky and sandy shores and riverbeds; occurs more sparsely inland over farmland, and even subalpine tussock land and herb fields. The largest breeding colonies are on islands, steep headlands, sand or shingle spits, or on islands in shingle riverbeds Considered a pest and is the only unprotected native bird species in New Zealand.

Adults have white head and underparts with black back, yellow bill with red spot near tip of lower mandible, and pale green legs. Juveniles are dark mottled brown with black bill and legs; their plumage lightens with age until they moult into adult plumage at 3

years old. Voice: a long series of loud calls '*ee-ah-ha-ha-ha*' etc, given in territorial and aggressive contexts.

Birds gather at breeding sites in September, and two to three grey-green eggs are laid between October and January. Colonial or solitary; monogamous, with shared incubation and chick care. Nest a bulky collection of grass, small sticks or seaweed, or a simple scrape in sand or shingle. Clutch 2-3 large grey-green eggs with dark brown spots and blotches. Laying mainly Oct-Jan. Incubation 23-26 days; chicks fledge at about 7-8 weeks old and are fed by adults for at least another month.

SBBGs are opportunists, conspicuous and bold that are often attracted to food sources provided, inadvertently or deliberately, by people. In cities, they often roost and even nest on roofs. Found in urban parks, seeking hand-outs and scraps, or harvesting earthworms from water-logged playing fields. are often seen on the water's edge where they scavenge corpses and fish frames washed up on the tide. Flocks follow ploughs or inshore fishing boats with equal vigour. Nest sites and colonies are defended with loud, persistent calls; some will swoop at human intruders, but they are typically wary, and never make contact (unlike skuas and some terns). They often nest near other birds and have been seen to predate on these species' chicks and eggs. SBBG are particularly attracted to farms during lambing where the placentas and dead lambs provide food (Heather and Robertson 2000). Also, areas where people regularly feed birds or where poor waste management practices results in supplemental feed.

7.6.2.2 STRIKE RISK

The SBBG is identified as a large bird and observed flying singular or in loose flocks, often at heights between 50 to 1000 feet AGL (CIAL Scarecrow, BIRDTab data). They are considered a **HIGH** strike risk for aircraft currently operating at CIAL.

They have been involved in several strikes and near strikes since 1993. It is possible this species was responsible for the multi-engine ingestion in 1985 which caused several million dollars' damage, disabling two engines and damaging a third in an Air New Zealand B747.

The main breeding ground for the Black-backed Gull is the Waimakariri River. From this location they make daily movements to and from feeding sites across the city and surrounds, many of which are across the aerodrome and aircraft flight paths.

7.6.2.3 LOCAL POPULATION AND MANAGEMENT HISTORY

The Waimakariri River with its braided riverbed provides ideal roosting and nesting opportunities. Large colonies form at this location at the beginning of the breeding season in September.

Around the time of the strike in 1985, it was estimated the population of the Waimakariri River was 10,000 (CIAL survey data). The closure of the Burwood Landfill in 2005, combined with river flood events and control efforts significantly reduced the local population to less than half this number. SBBG have readjusted and now benefit from feeding opportunities presented by changing agricultural practices, including the expansion of the Canterbury Irrigation Scheme and conversion of land to farming. This land conversion is especially evident around the Waimakariri River, which has brought them closer to CIAL year-round.

Management efforts in New Zealand date back more than 60 years (Caithness 1968). Around CIAL they have primarily focused on culling in and around the Waimakariri River. Ecan, CCC and farm managers have a shared interest with CIAL in the management of

this species. Control efforts in recent times appear to be having the desired effect of reducing numbers (Bell, M.D., 2020. Southern Black-backed Gull Survey of the Lower Waimakariri River 2019).

7.6.2.4 MANAGEMENT APPROACH

SBBGs, while being a strike risk, are considered a pest due to their impact on biodiversity, farmers and the community. They are a direct threat to populations of many native and threatened birds, competing for resources and predating on chicks and eggs (Mugan 2014). They also generally decrease biodiversity by introducing pest plants and behaving aggressively towards other bird species (Ledington 2006). They cause crop and livestock feed losses and are thought to have caused disease in pigs at nearby piggeries (W. Chilton, Department of Corrections, 2015, pers. Comm. 23 September).

The Canterbury Southern Black-backed Gull/Karoro Management Strategy (Bell, M.D.; Harborne, P. 2019. Canterbury Southern Black-backed Gull/ Karoro control strategy discussion document. Unpublished Wildlife Management International Technical Report to Environment Canterbury) was developed with input from several stakeholders during 2018/19. The strategy sets out key recommendations for management of SBBG in Canterbury and will be used when prioritising and aligning control work. It will also be used to inform existing work as well as provide support for future opportunities to redirect and seek further funding for key areas. the future hope is to develop another resource which provides detailed advice for those managing on-the-ground operational control work.

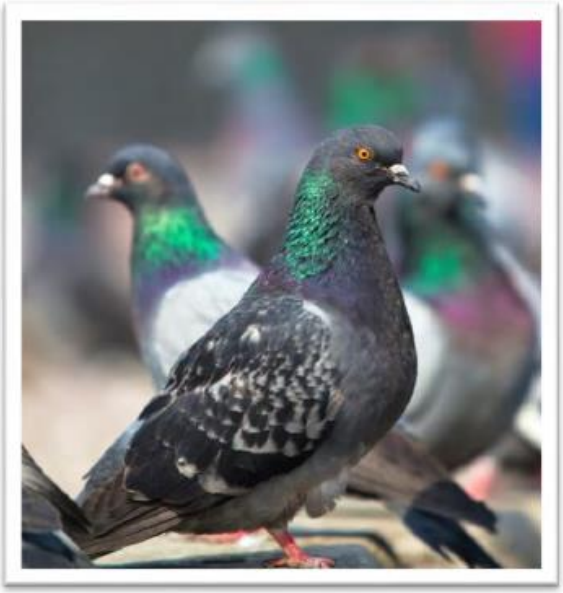
CIAL is committed in assisting Ecan where and when required. Along with continuing to collect survey data and management control on-airport and surrounding sites in close proximately to the airfield.

Management options are noted below:

- Toxic Baiting
- Ground shooting
- Egg Oiling
- Roost Disturbance
- Active Dispersal

7.6.3 Rock Pigeon (*Columba livia)*

Distribution of the Feral Pigeon in NZ.
Source: Ornithological Society of New Zealand Inc.



CIAL Risk Ranking	Moderate – Current risk requires review of available options and possible action
Mass (g):	430 g
Wildlife Act 1953 Listing	Schedule 5 – declared to be unprotected throughout New Zealand, except where that schedule otherwise provides. *Note: Every person commits an offence against this Act and is liable on conviction to the penalty when they intentionally shoot at, kill, disable, or otherwise injures, or ensnares, or detains any homing pigeon belonging to any other person*
New Zealand status	Introduced
Conservation status	Introduced and Naturalised

7.6.3.1 SPECIES INFORMATION

Were introduced for aviculture and racing and is now a familiar species to most New Zealanders, given its distribution from Northland to Southland, and being present in both urban and rural areas. While rural birds are usually quite timid, flying off at close approach, urban birds are often quite the opposite, walking about at one's feet and even alighting on people to take food. It is a gregarious species, often roosting, commuting and foraging in flocks. They are now well established in the North and South Islands and largely confined to towns, cities and agricultural land. There are few records of its occurrence in the central North Island and along the West Coast of the South Island. In urban and rural environments, they utilise a wide variety of habitats in which to forage, roost and nest. The bulk of food eaten is purposely or inadvertently provided by people in towns, cities and on farms. They roost and nest on and in buildings, both disused and in use, under bridges and wharves, and on ledges of cliffs and caves. A variety of

materials are used to form the nest, including twigs, grass stems, plastic drinking straws, bits of paper and even just the accumulated dried faecal material deposited by previous broods. When commuting between roosting and foraging sites they fly directly and quickly with steady-paced wing beats. They may travel several kilometres to reach foraging sites. Generally, forage in pairs or as a loose flock, with almost all searching for food being carried out while walking about on the ground. Males at foraging sites will court females during spring and summer which involves the male standing erect with head bowed, plumage puffed out, tail fanned while walking and running about the female and cooing loudly.

They occur in a wide variety of plumages, including entirely black. The wild-type rock pigeon is blue-grey, with lighter tones over the back and wings, has a white rump, and the tail has a black terminal band. The outer flight feathers are black or dark grey. There is a broad band of iridescent purple-green over the neck, upper mantle and chest. The bill is grey-black, the cere white, feet pink to red-pink, and the eyes red. Juveniles are smaller and slimmer than adults, with duller plumage lacking iridescence, feet grey to pink-grey, bill pink or grey-pink, eyes brownish, and cere pink or grey. Voice: a variety of "coo" calls are given and although not a vocalisation, wing claps over the back are often given when birds first take off from a roost, particularly at the start of a flight display.

Rock pigeons can initiate a nesting cycle in any month, but most clutches are laid in spring and summer. Clutch size is typically 2 eggs, although occasionally 1-, 3- or 4-egg clutches occur. Pair members share incubation and care of young. Chicks start flying when about 30 days old but remain near the nest for another week before dispersing with their parents. They become sexually mature at six months old (Johnston and Janiga, 1995). Some pairs with large young in one nest will start incubating a new clutch in a separate nest or even in the same nest meaning they have high breeding potential and the season can be long (Hetmanski and Wolk, 2005; Johnston and Janiga 1995 in Giunchi et al. 2012), therefore enabling shorter clutch intervals and increasing the number of clutches within a season. These features mean that Feral Pigeons are characterised by a high intrinsic demographic rate of increase (Neal 2004 in Giunchi et al. 2012). Life span is relatively short, rarely exceeding three years (Haag, 1990; Johnston and Janiga, 1995 in Giunchi et al. 2012).

7.6.3.2 STRIKE RISK

The Rock Pigeon is identified as a medium sized bird and are observed flying singular or in large loose or tight flocks. Heights vary due to weather conditions i.e. gusty days they can be seen just above ground level where on calm days can be at heights of 1000 feet AGL (CIAL Scarecrow, BIRDTab data). Their roosting and feeding sites intersect our aerodrome so are observed making daily movements across the airfield and flight paths numerous times a day. They are considered a **HIGH** strike risk for aircraft currently operating at CIAL.

Due to their flocking nature, it is possible for multi-engine ingestions to occur with this species. In recent years they have been involved in several strikes and near strikes with between 2 and 10 birds struck during these strike events. These have led to consequences for some airlines with aircraft returning to port, having maintenance required and some significant damage.

7.6.3.3 LOCAL POPULATION AND MANAGEMENT HISTORY

The Pigeon population and movements were significantly altered by the 2011-12 earthquakes. Many of the traditional pigeon rookeries in caves along the coastline were destroyed which saw birds moving into derelict buildings in the city thus bringing them closer to CIAL. With the rebuilding of the city and diminishing number of uninhabited buildings, Pigeons will be distributed to other areas. (no research on this: M. Weir) The conversion of many forested areas to farming land over the past decade have, as with SBBG, also benefited the Rock Pigeon with feeding opportunities presented by changing agricultural practices including the expansion of the Canterbury Irrigation Scheme. This has contributed to the increased number transiting the aerodrome, multiple times every day, between roosting and foraging sites. Historic and recent observation data at CIAL is confirming this. (CIAL Scarecrow, BIRDTab data and ground/air surveys). Nearby horse training facilities have numerous numbers of Pigeons which are monitored fortnightly and considered low risk.

Previous management has been very sporadic with no formal commitment from any agencies, groups etc. And while a management strategy has been mooted, as had with the development for a management strategy with SBBG, it has not developed any further. The main agencies (CCC and ECan) have not seen pest management of this species a priority. Some action taken

- The Botanic Gardens/North Hagley Park issues with Feral Pigeons have seen them use a range of techniques to discourage roosting, along with shooting to reduce the population.
- Riccarton Bush since the 2011-12 earthquakes had seen an increase in Pigeons. The Trust initiated a Pigeon cull between spring and autumn, closing the bush for an hour from daylight three days a week. In 2012-13 almost four hundred pigeons were culled (Riccarton Bush Trust 2013)
- Department of Corrections (Paparua pig farm) increased Pigeon populations have been a significant health risk and seen damage to structures. Thousands are culled every year (ground shoots) and trapping has been a new technique recently implemented
- CIAL have performed ground shoots at surrounding farm land and undertaken poison operations at sites off airport. The small number of residents found on and around the campus have been controlled by CIAL Wildlife Officers

7.6.3.4 MANAGEMENT APPROACH

In addition to strike risk, roosting and nesting Pigeons cause fouling damage, and being around buildings can impact on residents. There is potential risk of disease transfer to both humans and livestock. They also could cause significant economic loss through consumption of livestock feed and crop damage. From an efficiency and ethical point of view, managing the cause of the issue (e.g. resources allowing population growth) is an important principle in managing any species. As discussed by Giunchi et al. (2012), this is particularly important for a species able to rapidly breed and compensate for management efforts and is one of the most important features to be considered when planning Pigeon control. Effective management must focus on reducing resources to reduce carrying capacity, rather than simply removing individuals from the population.

CIAL is committed in the management of Pigeons around the Canterbury region to help:

1. Monitor: On and off (ground/air) Airport survey data will be collected and shared with external agencies and stakeholders
2. Supply: Resources, funds and internal expertise will be available for any identified management.
3. Action: Encourage and engage groups to help with any management plans. See the development of a control strategy discussion document that could lead to a published Canterbury Feral Pigeon Management Strategy (as has been done with SBBG).

Additional management options (around the campus):

- Reducing Attractants
- Habitat Modification
- Roost Disturbance
- Ground Shooting
- Toxic Baiting
- Trapping

7.7 CONSIDERATIONS FOR MANAGEMENT OF HIGH-RISK SPECIES

Considerations need to be given to the following regarding issues that could emerge from the management of any identified Off-Airport risk species:

- Cultural values
- Sustainable management of native species (SBBG)
- Protecting non-target species
- Animal welfare
- Game and economic value

Note: *CIAL personal involved in any management either directly or indirectly will follow the head agency or group advice and procedures in relation to the above but should question any undesirable actions.*

8 APPENDICES

Appendix A - CIAL surrounding features map

Appendix B - Strike Data History

Appendix C - Risk Assessment Methodology

Appendix D - Species information tables. *Note: Three high risk species can be found in - 6.5: Off-Airport Wildlife Management- Priority Species*

Appendix E - Roles and Responsibilities

Appendix F – Staff Training Module

Appendix G – Research Projects and Trials

Appendix H – Ministry of Transport 2013 - *Management of birdstrike risk at aerodromes*

APPENDIX A – CIAL SURROUNDING FEATURES MAP

Off aerodrome potential hazards (wildlife attracting features) surrounding Christchurch International Airport Limited up to 13km

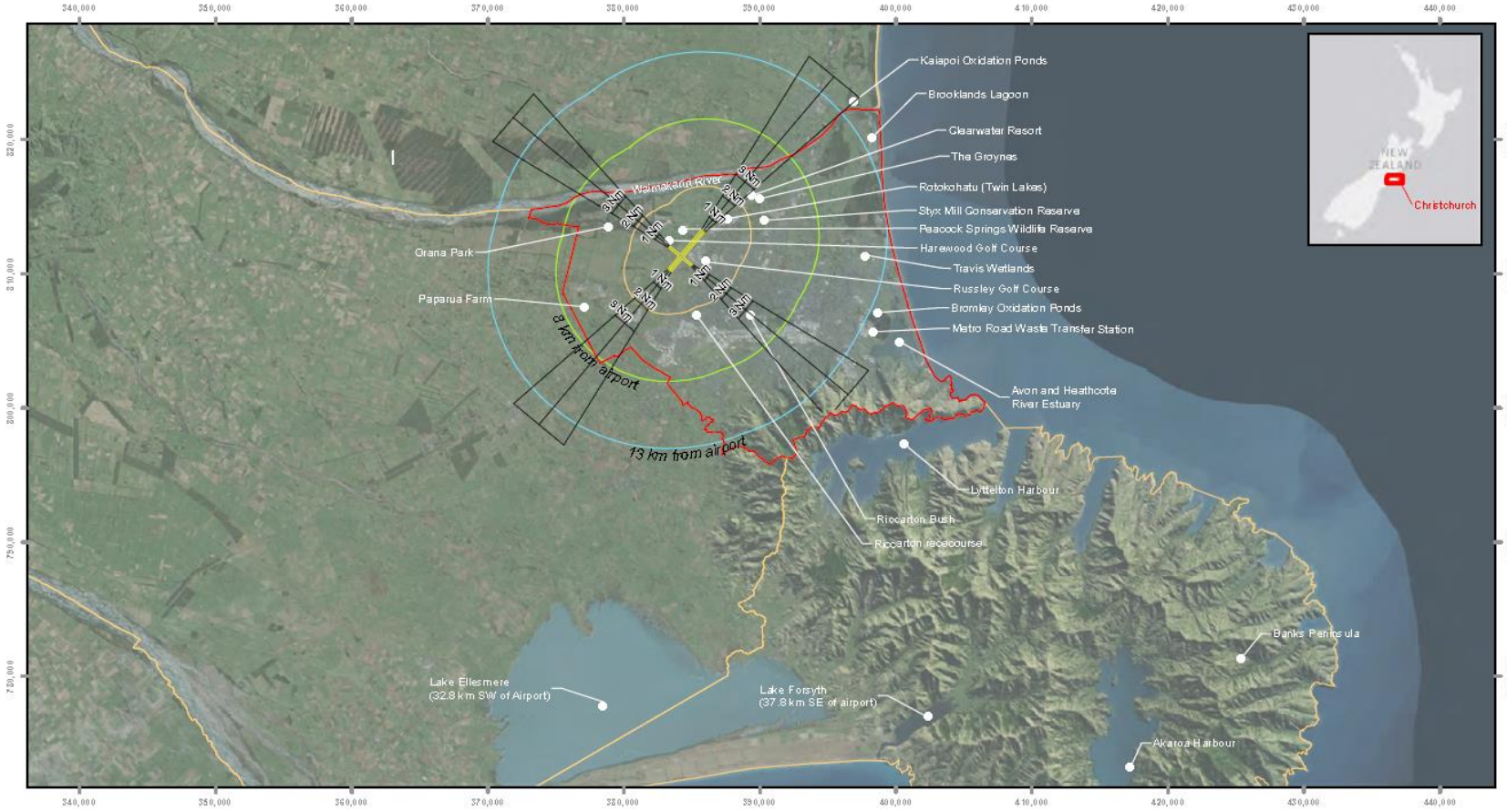


Figure 1: Christchurch Airport surrounding features

Christchurch Airport

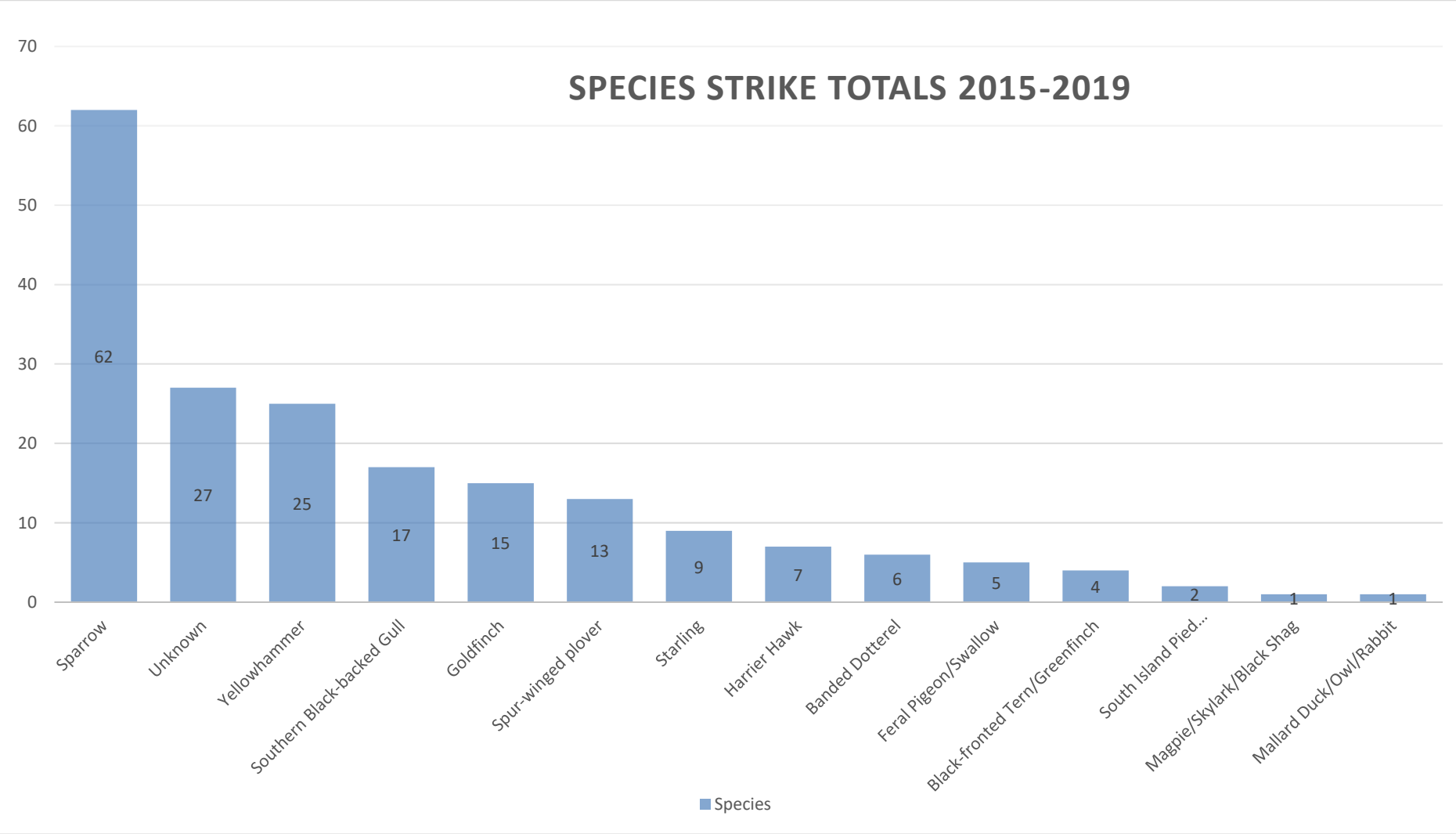
Off-airport Bird Hazard Management Plan

Christchuch City
Surrdounding district boundary
Runway
Flight approach

AVISURE MITIGATING BIRD STRIKE RISK

APPENDIX B – STRIKE DATA HISTORY

Species	Total No. Strikes	No. Strikes 10,000 aircraft movements	Annual Strike Trend	When/Where Strikes Mostly Occur		
				Month/Season	Time(s) of Day	Location on Airport
Sparrow	11	2.27	STABLE	Year round	All day	All areas
Yellowhammer	2	1.28	INCREASING	Year round	All day	All areas
Goldfinch	5	0.71	INCREASING	Year round	All day	All areas
Spur-winged Plover	2	0.43	DECREASING	Year round	All day	All areas
Southern Black-backed Gull	4	0.28	DECREASING	Year round	06:00 – 10:00 16:00 – 19:00	All areas
Swamp Harrier	3	0.28	STABLE	Year round	All day	All areas
Black-fronted Tern	1	0.28	DECREASING	March to May	Afternoon	Western grass
Rock Pigeon	3	0.14	STABLE	Year round – Peak July to September	07:00 – 09:30 14;00 – 17;30	Northern approach - all other areas adhoc
Black Shag	1	0.14	STABLE	Year round	07:00 – 09:30	Northern approach
Unknown	2	1.42	INCREASING	Year round	All day	All areas



Christchurch International Airport detailed wildlife strike analysis for 2019. Most commonly struck species 2015 to 2019.

APPENDIX C - RISK ASSESSMENT METHODOLOGY

Likelihood rating strike frequency categories are derived from the Airports strike record. Frequencies are the mean number of strikes with the species concerned averaged over the past five years. The assessment of likelihood is based on the following criteria

Number of strikes per Annum	**>10**	**3-10**	**1-2.9**	**0.3-0.9**	**0.2-0**
Probability Category	Very High	High	Moderate	Low	Very Low

Severity rating is determined by using the mass of the species along with tendency to flock. Assessment of damage from the outcome of a strike is based on the following criteria

Mass of species (grams)	**> 501**	**201-500**	**101-200**	**51-100**	**< 50**
Severity category	Very High	High	Moderate	Low	Very Low

Risk assessment combining the Severity (consequence) and likelihood which determine the level of risk based on the following matrix

	Very High	**High**	**Moderate**	**Low**	**Very Low**
Very Low	Low	Low	Low	Moderate	Moderate
Low	Low	Low	Moderate	Moderate	High
Moderate	Low	Moderate	Moderate	Moderate	High
High	Low	Moderate	Moderate	High	High
Very High	Low	Moderate	High	High	High

Assessment of serious multiple strike frequency. Serious multiple strikes are defined as incidents where more than one bird is struck, and more than 10 birds are seen, or more than 10 birds are struck. Any serious multiple strikes in the last 5 years with species other than those with very low damage probability would automatically result in the risk level for that species being raised by one level (Level 1 raised to Level 2, or Level 2 to Level 3). A second serious multiple bird strike with that species would result in the risk level being raised to level 3 automatically.

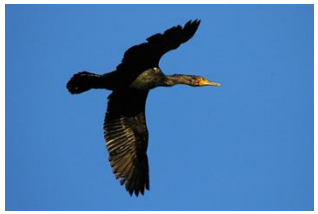
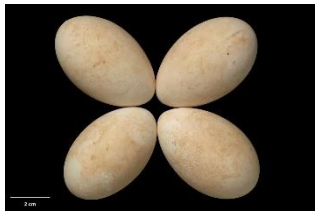
APPENDIX D - SPECIES INFORMATION.

Note: Additional information on bird species and habitats can be found in [New Zealand Birds Online]

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">High</td><td rowspan="4">Spur-winged Plover
(Vanellus miles)
 
 
  </td><td>Length: 38 cm
Weight: 350 - 370 g
Similar species: None
Other names: Masked Lapwing, Masked Plover, Spur-wing, Spurwinged Plover, Spur winged Plover
A large stocky wader with yellow bill, facial wattles, eye rings and 'spurs' at the carpal joints of each wing, black on the crown and hind neck extending to the breast, and long reddish-brown legs. The rest of the head, neck and under parts are white, the mantle, back and coverts are uniform light grey-brown contrasting with a white rump, and the black tail has a white base and thin white tip.
Juvenile:
Like adult, but speckled head, wings and back</td><td>Breeding: Isolated pairs. Nest in a wide-open habitat and are a simple scrape that may be lined with various nearby materials, including dried grass or twigs, small pebbles and sheep droppings. 3-4 eggs are olive-yellow, brown or green with irregular dark brown or purple spots and blotches. Lay Jun to Nov. Incubation 30-34 days. Monogamous with shared incubation and chick care. Precocial chicks leave the nest almost immediately after hatching. Fledging 6-7 weeks. Independent 8-9 months.
Food: A wide range of marine and terrestrial invertebrates including molluscs, crustaceans, insects, and worms
Behaviour: Loud staccato cry, often in response to disturbance. Vigorous defenders of their territories. Commonly seen mobbing swamp harriers. On airfield in pairs but large groups of juveniles will arrive. Like to loaf on runways and taxiways.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 13
Previous year: 2</td><td>➢ All available equipment (audible & visual)
➢ Lethal management where safe (on/off Airport)
➢ Destroy nests</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">High</td><td rowspan="4">Swamp Harrier
(Circus approximans)
 
 
  </td><td>Length: 50 - 60 cm
Weight: 650 g (male), 850 g (female)
Similar species: New Zealand Falcon, Black Kite
Other names: Australasian Harrier, Harrier Hawk, Hawk, Kāhu, Kahu
A large long-legged Harrier with long taloned toes, long pointed wings, prominent facial disks and a strongly hooked bill. Adults have a tawny-brown back, pale cream streaked breast, yellow eyes, yellow cere and a creamy white rump visible in flight; juvenile and immature birds are uniformly dark chocolate brown.
Immature bird:
Similar to adult, but undersides more chocolate brown</td><td>Breeding: Solitary breeders. Courtship displays Jun-Oct where birds of a pair perform spectacular rocking dives, then swoop back up in a large U-shaped loop. Lay Oct-Dec. Incubation and brooding are undertaken by the female alone.
Food: Small to medium-sized birds and mammals, insects, lizards and frogs. Road-kill can make up a large proportion of the diet (possum, rabbit and hedgehog). Lamb carcasses and afterbirth, tadpoles, fledgling birds and crickets are taken when seasonally available
Behaviour: Generalist predator, can be harried by other birds especially Magpies and Spur-winged plovers. Wings are held in a shallow V-shape to react to variable air currents while flying low to the ground. A high-pitched kee-o, kee-o call is made during displays. Often circle up high on thermals above runways and taxiways. Can get caught out by aircraft when slowly hunting airfield.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 7
Previous year: 3</td><td>➢ All available equipment (audible & visual)
➢ Lethal management if numbers increase and juveniles arrive
➢ Pick up road-kill and bird carcasses
Note: Resident airfield birds are monitored/managed and mainly left alone to control rodents and ground mammals</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Moderate</td><td rowspan="4">Mallard
(Anas platyrhynchos)
 
Male
 
Female
  </td><td>Length: 50 - 70 cm
Weight: 1050 - 1300 g
Similar species: Grey Duck
Other names: Mallard Duck, Wild Duck, Northern Mallard, Greenhead
A large dabbling Duck with a yellowish or grey and orange bill, dark eyes, orange legs and feet, chestnut breast, and metallic blue speculum. Breeding plumage males have a glossy green head and neck, pale grey back and flanks, and blackish rump and undertail with curled black upper tail coverts; females are dull brown with buff edged body feathers and a dark eye-stripe on the face.
Duckling (2 - 3 weeks old):
Blackish brown.
Face – yellow.
Eyes – dark line through them.
Juvenile:
Similar to adult female, but duller.</td><td rowspan="2">Breeding: Mature rapidly and can breed in their first year. Lay late Jul-Sep. Re-nest if necessary Oct to early Nov. Nests on the ground under cover, seldom far from water. Incubation 27-28 days. Ducklings leave the nest as soon as all are dry, and follow the female closely, though feeding themselves. Fledging 7-9 weeks
Food: Consume mostly plant material, including seeds, grains, grasses, clovers, tips of most aquatic plants, bread, and human food scraps. Animal foods, consumed whenever available, include a wide range of insect larvae and adults, freshwater snails and worms, and estuarine invertebrates.
Behaviour: Typically associated with waters in proximity to human activity but will also occur on remote lakes and headwater rivers. Form large flocks in December–March when moulting. Females may moult secretively in lakeside vegetation. Although strong fliers, mallards tend to be quite sedentary, and widespread dispersal or movements are uncommon. Can be seen transiting airfield periodically and on airfield in wet conditions</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 1
Previous year: 0</td><td rowspan="2">➢ All available equipment (audible & visual)
➢ Lethal management where safe
➢ Monitor during adverse weather conditions around standing water areas
➢ Remove nests</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Moderate</td><td rowspan="4">Black Shag
(Phalacrocorax carbo novaehollandiae)
 
 
  </td><td>Length: 80 - 88 cm
Weight: 2.0 - 2.4 kg

Similar species: Little Black Shag, Little Shag, Pied Shag

Other names: Black Cormorant, Great Cormorant, Kawau, Large Black Shag

A large all-black Shag of coastal and inland waters with white feathering on the cheeks and throat, yellow facial skin, black feet and grey-green eyes. Adults in breeding plumage have red-orange facial skin, white thigh patches, a small black head crest, and white filoplumes on the neck.

Young:
Browner than adult
Upper parts – brown
Sides of head, front and sides of neck – dark brown mottled with pale bluff
Centre breast and abdomen - yellowish white
Sides of body – bottled with brown</td><td>Breeding: While most pairs lay clutches in autumn-winter, it is possible to find Black Shags nesting in any month. Colonies occur on trees or shrubs, on the ground in swamps, coastal cliffs and headlands, and on artificial structures. Nests, often used repeatedly over several years consisting of sticks, twigs and foliage. Both members of the pair incubate the eggs (clutch 3-5 eggs) and care for the young. Chicks flying at 7-8 weeks. Fed by their parents for 5-11 weeks.

Food: Mainly consume small and medium-sized fish of a variety of species, both pelagic and benthic. Common prey include mullet, carp, red cod, spotties, smelt, eels, bullies, trout and perch. They also take freshwater crayfish, large invertebrates, molluscs and ducklings.

Behaviour: Adults tend to remain year-round within a few kilometres of where they nest. Generally, feed alone, but occasionally form into flocks to forage cooperatively where prey is abundant. Can forage in highly turbid waters, and even forage at night in mid-winter at high latitudes. They forage mainly in water less than 3 m deep, dives averaging 21 seconds, with 7 seconds between dives. All observations have been flying across airfield.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total 0</td><td rowspan="2">➢ All available equipment (audible & visual)
➢ Record observations
Note: These birds are not a problem</td></tr>
<tr><td>Previous year 0</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th colspan="2">Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Moderate</td><td rowspan="4">Hare
(Lepus europaeus)
  </td><td colspan="2">Length: 60 - 75 cm
Weight: 3 – 5kg

Other names: Brown Hare

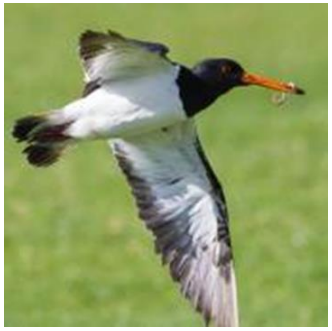
Fur colour:
- yellow-brown black
- reddish-brown shoulders, neck and throat
- white underside
- black tail and ear tips
- fur on back is typically longer and more curled than rest of body</td><td>Breeding: Bear young (three to four) in a depression of the ground rather than a burrow. Young are born fully furred with eyes open. Fend for themselves soon after birth. Female can bear three litters a year. Twelve-year life span.

Food: Herbivorous, feed on grasses and herbs, supplementing these with twigs, buds, bark and field crops, particularly in winter.

Behaviour: Swift, shy animal. Changes behaviour in spring, when they can be seen in daytime chasing one another. During this spring frenzy, both sexes can be seen "boxing", striking one another with their paws. Mainly observed on western side of airfield around old gold course and RW11 grass areas.</td></tr>
<tr><td colspan="2">Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total</td><td>0</td><td rowspan="2">➢ All available equipment (audible & visual)
➢ Lethal management where safe on airfield
➢ Thermal night operations on/off airport</td></tr>
<tr><td>Previous year</td><td>0</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th colspan="2">Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="5">Moderate</td><td rowspan="5">Australian Magpie
(Gymnorhina tibicen)
 
 
  </td><td colspan="2">Length: 41 cm
Weight: 350 g
Similar species: Magpie-lark
Other names: Magpie, White-backed Magpie, Black-backed Magpie, Makipae
A large black-and-white songbird in which the adult male has a white hind-neck, rump and shoulder patches, upper tail and under-tail coverts. The female is similar, but the mantle may be grey, and the black parts of the plumage are less iridescent; both sexes have a blue-grey bill with a dark tip, and red eyes.</td><td>Breeding: Usually from 2 years old. Nest in the crown or side-branches of tall trees, especially pine, Macrocapa and Gum. Lay in Apr 3-4 greenish blue eggs. Incubation 18 – 19 days. Fledging at 4-5 weeks. Rely on their parents for a further 2 months and remain until the winter, then evicted before the next breeding season.
Food: Feed on invertebrates, taken mostly from the ground (army worm caterpillars, crickets, wasps, spiders, stick insects and snails). Cicadas when available (late summer) Earthworms in winter, but mainly insects. Caterpillars of the Porina moth extracted from their ground tunnels.
Behaviour: Found mainly in pairs (residents) and defend a territory year-round. Groups consist of single pairs, or pairs with young from the previous season. Non-territorial flocks consist of evicted juveniles and sub-adults, numbering up to 80 or more. Resident birds are predictable on the airfield.</td></tr>
<tr><td colspan="2">Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total</td><td>1</td><td rowspan="2">➢ All available equipment (audible & visual)
➢ Lethal management where safe on airfield
➢ Trapping- mainly juveniles

Note: Resident airfield birds are monitored/managed and mainly left alone</td></tr>
<tr><td>Previous year</td><td>0</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="5">Moderate</td><td rowspan="5">South Island Pied Oystercatcher
(Haematopus finschi)
 
 
  </td><td>Length: 46 cm
Weight: 550 g

Similar species: Variable Oystercatcher, Chatham Island Oystercatcher

Other names: New Zealand Pied Oystercatcher, Finsch's Oystercatcher, Tōrea, Torea, SIPO, South Island Oystercatcher

A large solidly-built black-and-white wader with a long straight bright orange bill and stout pink legs. The sharply delineated border on the lower breast between the black upperparts and white underparts is diagnostic.

Young:
Brownish tinge to their plumage, dusky red bill and dull pink legs</td><td>Breeding: Breed in spring and summer. Nests are unlined scrapes on a mound or raised area of sand, gravel or soil with good visibility all around. Both adults incubate the 1-3 eggs and care for the young. Incubation takes 24-28 days, and the young fledge 28-42 days after hatching. Most birds commence breeding when 3 years old.

Food: Coastal areas, feed on molluscs and worms, and for preying on bivalves, crustaceans, cnidarians and fish. On wet pasture, feed on earthworms and beetle larvae

Behaviour: Found on most estuaries Strong fliers and have highly ritualised displays. Voice: a loud shrill “kleep”. Loud piping calls are given when defending breeding and feeding territories. Most birds retain their partner from one breeding season to the next. Not easily dispersed and will walk in front of vehicle or move minimal distance.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total</td><td>2</td><td rowspan="3">➢ All available equipment (audible & visual) and be persistent
➢ Lethal management as a last resort
➢ Move into low risk areas</td></tr>
<tr><td>Previous year</td><td>0</td></tr>
<tr><td></td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Moderate</td><td rowspan="4">Little Owl
(Athene noctua)
 
  </td><td>Length: 23 cm
Weight: 180 g
Similar species: Morepork
Other names: German Owl
A small, plump grey-brown Owl with white streaks and spots, pale grey facial discs either side of their face below the eyes, and prominent white bands above the yellow eyes and below the chin. The legs have thick white feathering down to the pale yellow-grey toes.

Young:
Brownish tinge to their plumage, dusky red bill and dull pink legs</td><td>Breeding: Occurs during the months of October to January. Generally, a cavity nester and will use trees, stacked hay bales, old buildings, banks or rocky crevices. The female is solely responsible for incubation of the 2-5 white eggs, which takes about 28 days. The chicks leave the nest after about 33 days.

Food: Mainly eat insects (particularly beetles, also caterpillars, earwigs and moths); they eat small mammals, small birds, lizards and frogs.

Behaviour: Are solitary and are most often seen perched in the open in the late afternoon. They mainly hunt at dawn and dusk, often feeding on the ground, where they walk and run freely (unlike Morepork)</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total 1</td><td rowspan="2">Mainly observed at night. No dispersal management required but will record any observations</td></tr>
<tr><td>Previous year 0</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Moderate</td><td rowspan="4">House Sparrow
(passer domesticus)
 
Male
 
Female
  </td><td>Length: 15 cm
Weight: 28 g
Similar species: Dunnock, Chaffinch, European Greenfinch
Other names: Tiu, English Sparrow
A small songbird species in which breeding adult males have chestnut-brown, white and grey plumage with a distinctive black bib, grey underparts, variegated brown and white backs and wings, a robust black conical bill, dark brown eyes and dull pink legs. Females and juveniles lack the bib, are greyer with lighter brown dorsal plumage than adult males, and a have a pinkish-brown bill.</td><td>Breeding: Is semi-colonial, nests normally spaced a metre apart, mainly in holes in buildings. Chirping male defends territory around the nest site. Eggs are laid late September to early February. Incubation overnight by the female, the male plays a minor role by day only. Sparrows are largely monogamous. Another clutch can be initiated within five days of a brood fledging, but the interval averages 10 days. The average clutch is 3.8 and there are up to four clutches a year, but mortality of eggs and nestlings is high.
Food: Adults eat mainly grain, but also the buds, flowers, nectar, fruit and seeds of a wide range of other introduced plants (especially amaranth, birch, knotweed, meadow grass, fat-hen, chickweed and mouse-ear). Invertebrates are a minor element of the adult diet, mainly beetles, grasshoppers, bugs, aphids, scale insects, caterpillars, craneflies, muscid flies and spiders.
Behaviour: A flocking species, not often seen alone. Roosting is communal- Several hundred in dense shrubs or trees. Nest sites and much of the food depend upon human endeavour and is rare to find sparrows living away from habitation. Small pockets on airfield, in carpark building and feeding in Terminal.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 62
Previous year: 11</td><td>➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces
➢ Place netting over holes in buildings</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Moderate</td><td rowspan="4">Yellowhammer
(Emberiza citronella)
Male:
 
Female:
  </td><td>Length: 16 - 16.5 cm
Weight: 18 - 30 g
Similar species: Cirl Bunting, Yellowhead, New Zealand Pipit, Eurasian Skylark, Chaffinch
Other names: Yellow Bunting
A small relatively long-tailed songbird with a grey-black bill and pinkish legs in which the male has a mostly bright yellow head and underparts, and a dark-streaked brown mantle, and the browner female has more streaking on the head and upper surface with some yellow on the underparts. Both sexes have a rich chestnut rump and white outer tail feathers, which show during flight.
Juveniles:
Lighter coloured bill and plumage than adult.</td><td>Breeding: Normally double-brooded and defend a territory throughout the rather long breeding season-October to March. The nest is usually on or close to the ground in long grass or thick shrubby vegetation. It is a loosely-constructed cup of dry grass lined with rootlets, hair or other fine fibres. 3-5 eggs are pinkish-white with dark-brown scribbles and spots. Incubated mostly by the female. Chicks are fed by both parents mainly on invertebrates for 12-13 days, and a further 3 weeks after fledging.
Food: Mostly seeds, especially those of grasses. Barley grass, ryegrass and Poa annua seeds, also chickweed, dandelion and Amaranthus. Invertebrates are an important food source in the breeding season-grasshoppers, moths, caterpillars, flies, beetles, aphids, bugs, cicadas and spiders. Chicks are largely fed on invertebrates before fledging.
Behaviour: Spend most of their time on the ground, on pasture, ploughed land, crops and stubble, and on lawns and in gardens. Often in mixed flocks on airfield with other passerine species at a good food source.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 25
Previous year: 2</td><td>➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces.</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td>Low</td><td>Paradise Shelduck
(Tadorna variegata)
 
Male
 
Female
  </td><td>Length: 63 - 70 cm
Weight: 1.7 kg (male); 1.4 kg (female)
Similar species: Chestnut-breasted Shelduck
Other names: Paradise Duck, Pūtangitangi, Putangitangi, Pari, Parry, Parrie
A large goose-like Duck with rich chestnut, black and white plumage and grey-black bill and legs. Both sexes have a chestnut undertail, black primary and green secondary wing feathers, and a white upper wing surface; males have a dark grey or black body and head while females are rich chestnut brown with a white head and upper neck.
Duckling (2 - 3 weeks old):
When hatched – white
Top of head – brown
Back of head to tail – brown stripe
Wings – brown mark
Fledgling:
Resembles adult male
Available strike history
5-year total: 0
Previous year: 0</td><td>Breeding: Territorial pairs for breeding, Lay Aug to Sep, some young birds and repeat nesters may lay in October Incubation 30-35 days. Parents guard ducklings for 55-65 days until able to fly.
Food: Mainly herbivorous - pasture grasses and clover. Diet can embrace a broad range of leaves/seeds of terrestrial herbs, some aquatic plants and terrestrial/aquatic invertebrates.
Behaviour: Found mainly in pairs (residents) and defend a territory year-round. Inhabit extensive river-side pastoral flats or expansive areas of young grass. The annual communal moult extends over January-March. Birds gather in large numbers around isolated or large ponds or lakes, or on expansive riverbeds, to shed all wing feathers. Can be seen periodically and on airfield in wet conditions
Management Actions
➢ All available equipment (audible & visual)
➢ Lethal management where safe
➢ Monitor during adverse weather conditions around standing water areas</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Low</td><td rowspan="4">Black-fronted Tern
(Chlidonias albostriatus)
 
 
  </td><td>Length: 28 cm
Weight: 95 g
Similar species: White-winged Black Tern, Whiskered Tern

Other names: Tarapirohe, Tarapiroe, Tern.

A medium-small blue-grey Tern with a forked tail, short orange legs and bright orange pointed decurved bill. Breeding adults have pale blue-grey body plumage contrasting with a black cap and narrow white cheek stripe; non-breeding adults have a mottled grey cap, a black patch around the eye and ear coverts, and a black-tipped bill.

Juvenile:
Similar to non-breeding adults but have the crown and nape more heavily streaked or mottled black.</td><td>Breeding: Nests are widely spaced. Laying Oct-Dec. Sometimes into January but are probably replacement clutches. 1-3 eggs, with most having 2. Incubation shared lasting 25 days. Chicks leave the nest 1-3 days after hatching, often moving away from the colony. Young fed invertebrates and small fish and skinks up until two weeks after fledging. Fledge after 4 weeks. First breed at two years. Return to the same river to breed each year, although colony location can shift between years.

Food: During breeding season feed on emerging nymph and subimago mayflies, stoneflies and small fish or in nearby fields or river flats on earthworms, grass grub larvae and skinks. After breeding, most birds move to the coast where they feed in coastal waters up to 50 km from shore, taking mostly planktonic crustaceans. They also often feed over wet pasture on earthworms, especially during rough weather.

Behaviour: Colonial breeders. Nests are placed on shingle bands on braided rivers, away from vegetation, and are simple scrapes in sand or amongst river stones, lined with a few fine twigs. Colonies are small, typically 2-50 pairs, but up to 250 pairs. Usually transiting and rare to see landing on airfield, but can be seen in small groups scanning hard surfaces for food.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 4
Previous year: 1</td><td>➢ All available equipment (audible, visual)
➢ Do not cull
➢ Record If observed transiting airfield</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Low</td><td rowspan="4">Banded - Dotterel
(Charadrius bicinctus)
 
  </td><td>Length: 20 cm
Weight: 60 g

Similar species: Lesser Sand Plover, New Zealand Dotterel

Other names: Double-banded Plover, Tūturiwhatu, Tuturiwhatu, Pohowera

A small compact brown and white Plover with a short black bill, relatively long dark legs and large round dark eyes. Breeding males have a broad chestnut breast band with a narrow black neck band above it; females have both bands, but they are duller.

Young:
Wings – short down – golden brown speckled with black on top, creamy yellow underneath.
Tiny wings have white on outer edges.</td><td>Breeding: Solitary and territorial but can be high concentrations in good habitat. Arrive at breeding grounds and set up territories in July. Nest are shallow scrapes in gravel, sand or soil, usually lined with tiny stones. Lay three eggs Aug to early Nov-coloured grey to pale-green or olive with small dark spots. Incubation performed by both adults for 4 weeks and chicks fledge after another 5-6 weeks. First breed at one year of age

Food: Banded dotterels are primarily carnivorous, but also take berries of shrubs such as Muehlenbeckia and Coprosma. Animals eaten are varied and reflect local availability e.g. crustaceans, worms and flies at many coastal sites. On the breeding grounds the diet is more varied and includes spiders, beetles, insect larvae, adults and subadults of many aquatic insects, e.g. mayflies, stoneflies and caddisflies, as well as terrestrial flies.

Behaviour: Solitary feeders both during the breeding season and non-breeding season. Defend prime feeding areas on tidal flats and lagoon edges. Mainly feed at night particularly at estuaries. Form roosting flocks of sometimes many hundreds of birds. Can turn up on airfield in group of 30-50. Pairs have been known to nest on airfield.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 6
Previous year: 0</td><td>➢ Move into low risk areas
➢ Monitor nests
➢ All available equipment (audible & visual)
➢ Do not cull unless for gut analysis

Note: These birds can come in flocks</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Low</td><td rowspan="4">Common Starling
(Sturnus vulgaris)
 
 
  </td><td>Length: 21 cm
Weight: 85 g
Similar species: Common Myna, Song Thrush
Other names: Starling, European Starling
A medium-sized glossy iridescent black songbird with tiny white spots, a tapering pointed yellow bill (black in winter and in juveniles), and a short tail and orange-red legs. Males have dark eyes and females have a pale brown edge to the iris; juveniles leaving the nest are pale greyish brown and lack white spots.
Juvenile:
Upper parts – uniform greyish brown flecked with brown
Under parts – brown
Bill – brownish black
Juvenile (first autumn):
Feather tips – white and buff, giving spotted appearance
Juvenile (first spring):
Spots wear off; like adult, but iridescent colours less bright</td><td>Breeding: Nest in hollow trees, under the eaves of houses, letter boxes, crevices in cliffs, burrows. Excavate sites in clay banks or roadside cuttings (recorded only in New Zealand). Often nest colonially; males may control several sites and females. Most eggs laid within 7 days of the median laying date in September-October. Replacement clutches and late starters lay in Nov. Early nesters may have a second brood in early Dec. Clutch size averages 4-5, but sometimes larger with nests being shared. Incubation-12 days, fledging 20-24 days. Many do not survive to fledge. Males incubate mornings with both parents feed the young until 1-2 weeks after fledging.
Food: Main diet is pasture invertebrates, including earthworms, caterpillars, beetles and their larvae, and spiders. Readily take food scraps in urban areas. Soft fruit (apples, pears, cherries, grapes). Cicadas are caught on the wing-also take nectar from flowers so often seen with orange flax pollen on their foreheads.
Behaviour: Difficult to approach. Much behaviour is social. Travel and roost in large flocks. Nests have caused fires in aircraft, and hundreds of fires in tractors and farm machinery. Fairly predictable around airfield and rarely cross runways.</td></tr>
<tr><td colspan="2">Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total</td><td>9</td><td rowspan="2">➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces
➢ Place netting over holes in buildings.</td></tr>
<tr><td>Previous year</td><td>1</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Low</td><td rowspan="4">Eurasian Skylark
(Alaudia arvensis)
 
 
  </td><td>Length: 18 cm
Weight: 38 g

Similar species: New Zealand Pipit, Yellow Hammer

Other names: Skylark, Kaireka, Common Skylark

A small brown and creamy-buff bird with off-white underparts, streaked breast and throat, variegated brown upperparts, a sturdy horn-coloured bill that is yellow-brown at the base, and pink legs and feet with a long slightly curved hind toe. Adults have a faint mask of pale feathers around and behind the eye, and a small streaked crest on the hind crown that is raised when alert.</td><td>Breeding: Neat grass-lined cup nest on the ground, often within or beneath an overhanging clump of grass or rush. 2-3 clutches of up to five densely brown-speckled greyish eggs between Sep and Jan. The speckling is denser at the broad end of the egg, often forming a ring. Female incubates the eggs, although both parents feed the nestlings.

Food: Mostly eat seeds, especially those of grasses but including cereals, clover and weeds; also, invertebrates such as beetles, flies, spiders, bugs and larvae of various groups. Nestlings are fed initially on invertebrates. This largely granivorous diet contrasts with the New Zealand pipit, which feeds primarily on invertebrates.

Behaviour: Monogamous and strong territorial during the breeding season, but often gregarious outside it. Territorial males perform distinctive aerial displays between Aug-Jan where fly steeply upwards, singing as they go eventually levelling off 30-100 m above ground. There it hovers or circles slowly, singing continuously for 3-5 minutes, before parachuting down with wings and tails held out stiffly, still singing, ending with a steep dive towards the ground for the last 15 m or so. The song is a rippling sequence of melodic notes, occasionally including phrases of other species’ songs and calls. Spread out around airfield in small numbers</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 1
Previous year: 0</td><td rowspan="2">➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Low</td><td rowspan="4">Chaffinch
(Fringilla coelebs)
 
Female
 
Male
  </td><td>Length: 14.5 cm
Weight: 17.5 - 24.5 g
Similar species: House Sparrow
Other names: Pahirini, Common Chaffinch
A small songbird species in which males are brightly coloured in spring-summer with a brick-red breast and chestnut mantle, greyish-blue crown and nape, black wings with a prominent white wing-bar and shoulder patch. Males are duller in winter while females are dull brownish-grey with similar wing markings year-round; both sexes have white outer tail-feathers that show during flight.</td><td rowspan="2">Breeding: Territorial and monogamous during breeding, Sep-Feb. Males establish a territory and commence singing in late July or early August. The male’s courtship display consists of a headlong chase during which it appears that he is attacking his mate. Neat cup-shaped nest of fine grass, wool and moss, lined with feathers in a tree or shrub 1-18 m above the ground. Female incubates for 11-15 days. Chicks fed by both parents and up to 3 weeks after fledging. Normally single-brooded, but occasionally raise a second clutch.
Food: Feed predominantly on seeds in winter. A wide range of seeds-fat hen, chickweed, Amaranthus, dandelion and thistle, including tree seeds such as those of Beeches, Pinus radiata, and Rimu, flax seeds from heads or ground. Chicks fed on invertebrates (bugs, flies, beetles, moths, caterpillars, aphids, cicadas and spiders) before and after fledging. Adult diet on invertebrates during the breeding season.
Behaviour: Form flocks of varying size outside the breeding season. Feed on ground seeds, also in trees-pines and native beeches. Catch insects by hawking. that of the South Island bird voice sounds more like ‘chek-chek’ whereas North Island ‘chink-chink’ Often in mixed flocks on airfield with other passerine species at a good food source.</td></tr>
<tr><td>Available strike history</td></tr>
<tr><td>5-year total: 0
Previous year: 0</td><td>Management Actions
➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Low</td><td rowspan="4">European Goldfinch
(Carduelis carduelis)
 
 
  </td><td>Length: 12 cm
Weight: 15 g

Similar species: European Greenfinch

Other names: Goldfinch

A small songbird with bright yellow wingbars, black wings and tail, a buff-brown back, and pale legs and conical bill, in which adults have bright red, white and black facial feathering, and juveniles are drab brown on the head. Often seen in flocks, Goldfinches have a bouncy undulating flight accompanied by frequent liquid, tinkly calling.</td><td>Breeding: Monogamous breeding at one-year-old. Pairs defend a small territory around the nest which is small woven cup lined with thistle down and feathers placed among foliage in an outer fork of a tree or shrub. Breeding Oct-Feb, 4-5 eggs and normally raise two broods. The male feeds the female on the nest while she incubates and broods the young chicks. Both feed the chicks for final week, and for the first 2-3 weeks after fledging

Food: Forage on ground at all levels of vegetation in small flocks. Diet of weed seeds- thistles, pigweed, fat hen (Chenopodium spp.), dandelion, chickweed, Poa annua, ryegrass, paspalum and other grasses along with small invertebrates fed to chicks.

Behaviour: Agile and often hang upside down from seed heads, and flutter from plant to plant. Can mix with other flocks outside of breeding season (Finches and Yellowhammers). Specialise in seeking the tiny winged seeds of thistles. Full song is mainly given Oct-Mar. Found in pockets around airfield and normally with own species</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 15</td><td rowspan="2">➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces</td></tr>
<tr><td>Previous year: 5</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td>Low</td><td>Welcome Swallow
(Hirundo neoxena)
 
 
  </td><td>Length: 14 - 16 cm
Weight: 9 - 20 g

Similar species: Tree Martin, Fairy Martin, Fork-tailed Swift, White-throated Needletail

Other names: Warou, House Swallow

A small bird with rufous on the forehead, neck, breast and flanks, a black eye stripe, a short broad black bill, blue-black back and upperwings, pale buff underparts, long dark tail with white spots towards the ends of the feathers, and a deeply-forked tail and long pointed wings.

Juveniles are similar but with duller colouring and a darker head.

Available strike history
5-year total: 0
Previous year: 0</td><td>Breeding: Can raise three broods, Aug-Feb. Mud and grass, cup-shaped nests on ledges, attached to vertical supports, manmade structures, bridges and culverts out of direct sunlight. Nests built from the base upwards, lined with fine grasses and feathers and take 6-24 days to build. Lay 3-5 pinkish eggs with brown speckles at 24-48-hour intervals and incubated by the female for 15 days. Nests, and are often re-used within and between breeding seasons

Food: Swallows forage aerially for small invertebrates. They occasionally perch on plants to take insects or sweep them up from the water. Swallows often drink while flying, scooping water from the surface of a lake or pond

Behaviour: Are gregarious. They often nest as pairs. Other birds may help with caring for the young. When not breeding they roost together in large numbers. Periodically seen on airfield in pairs or single.

Management Actions
➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Negligible</td><td rowspan="4">California Quail
(Callipepla californica)
 
  </td><td>Length: 25 cm
Weight: 145 - 210 g
Similar species: Brown Quail
Other names: Plumed Quail, McPherson Quail
A stocky grey and brown Quail with a forward-curling black plume rising erect from the top of the head, sturdy black legs, and hooked black bill. Males have a black chin and cheeks edged with white, white ‘eyebrows’ that join on the forehead, blue-grey breast, a cream to rust brown belly with black scalloping; females are slightly smaller, duller and browner.</td><td>Breeding: Nests are a flattened grassy area well concealed among dense vegetation. The eggs hatch synchronously, partly achieved by the chicks calling to each other while still in the egg. The walnut-sized striped chicks leave the nest as soon as they are dry and are extremely active. Older chicks keep together in more coherent groups, attended by the parents. The chicks can fly at a surprisingly young age, when about a quarter of the size of the female.
Food: consume seeds of many kinds, some fruit and leaves. Feed early in the morning and late afternoon. The young are insectivorous initially.
Behaviour: Males are aggressive when courting and will fight each other. Courtship displays include head dips, puffing up of contour feathers and spreading of the tail feathers.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 0
Previous year: 0</td><td>➢ All available equipment (audible, visual)
➢ Do not cull
➢ Record If observed on airfield
Note: This species is not a problem</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Negligible</td><td rowspan="4">Silvereye
(Turdus merula)
 
 
  </td><td>Length: 25 cm
Weight: 90 g

Other names: Waxeye, Tauhou, White-eye

A small songbird with olive-green upperparts, grey hindneck, neck-sides and upper back, dark olive-green tail, whitish-cream underparts on the throat and upper breast, creamy grey on the belly and undertail, pinkish-buff flanks, white thighs, and creamy-white on the underside of the wings. Both eyes have a silvery-white ring and dark reddish-brown iris, and the bill and legs are dark brown-black.</td><td>Breeding: Pairs are monogamous and territorial when breeding, nesting between Aug-Sep and February, peaking in Sep-Nov. Nests in the outermost branches of trees and shrubs. A well-built, delicate cup woven into small branches. Two or three clutches may be raised during a season, with 2-5 eggs per clutch. Eggs are pale blue and laid at 24-hour intervals. Incubation is shared by the sexes and takes 10-12 days. Young are blind and naked when hatched, eyes open after 4 days, are well-feathered 10 days after hatching, and fledge at 9-11 days-old.

Food: Omnivorous and eat a range of small insects such as aphids, caterpillars and flies, also spiders, gleaned from shrubs and trees. Also feed on a range of small and large fruits including small berries and ripening fruit including grapes, cherries, apples, pears, figs, apricots and peaches

Behaviour: Well known for flocking especially in winter. They are a mobile species that forages actively for food in parklands, woodlands, suburban gardens, forests and scrublands. Aggressive interactions are common within flocks, with a dominant bird performing rapid wing fluttering and short aggressive chases of other birds. Some local seasonal movement and even migration within the country may occur.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 0</td><td rowspan="2">➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces</td></tr>
<tr><td>Previous year: 0</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Negligible</td><td rowspan="4">White-faced Heron
(Egretta novaehollandiae)
 
  </td><td rowspan="2">Length: 67 cm
Weight: 550 g

Similar species: Reef Heron, Pacific Heron

Other names: Matuku Moana, Matuku, Blue Heron, Blue Crane, Whitefaced Heron, White Faced Heron

A medium-sized blue-grey Heron with white face, long dark grey bill, and pale-yellow legs. In flight the open wings show a marked contrast between the pale grey fore-wing and dark grey main flight feathers on both the upper and lower surfaces.</td><td rowspan="2">Breeding: Nest usually a loose platform. Lay 3-5 eggs. Incubated by both parents-approx 26 days. Usually only one nest per tree but can breed in loose colonies. Nesting starts around Jul and laying peaking around Oct. It is unusual for more than two chicks to be raised per brood

Food: catch and consume a wide range of prey, including small fish, crabs, worms, insects, spiders, mice, lizards, tadpoles and frogs.

Behaviour: Forage with long, controlled steps, watching for any signs of prey, which is grabbed with lightning speed. Roost, solitarily or occasionally pairs, in trees or on top of man-made structure. During courtship and nesting, white-faced Herons raise their plumes, and they may perform aerial displays near the nest.

These birds are occasionally observed on Harewood golf course but are not observed on the airfield.</td></tr>
<tr><td>Available strike history

5-year total: 0

Previous year: 0</td><td>Management Actions

➢ All available equipment (audible, visual)
➢ Do not cull
➢ Record If observed transiting airfield

Note: This species is not a problem</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Negligible</td><td rowspan="4">Blackbird
(Turdus merula)
 
Male
 
Female
  </td><td>Length: 25 cm
Weight: 90 g
Similar species: Song Thrush
Other names: Common Blackbird, Manu Pango
A medium-sized songbird that is entirely black in adult males with a yellow bill, a yellow eye-ring around the dark eye, and long reddish-brown legs. Adult females are mostly dark brown, with light brown or grey throat, and a light brown bill; juveniles are similar but with light mottling over the body.
Juvenile:
Bill – dark brown
Body – rust brown
Breast – mottled
Immature males:
Bill - dark
Wings – brown
Body – brown with patches of black</td><td>Breeding: Solitary, monogamous pairs. Nesting between Aug-Feb with Sep-Nov peak. Males establish territories Apr-May. Nests well concealed by foliage in the forks of shrubs or trees 3-10 metres above ground. Nest is a woven bowl of grass, small twigs, moss, fragments of plastic bags, dead leaves and may be lightly lined with mud. Laying Aug-Dec (3-4 greenish-blue eggs) with three or more clutches Incubation (13-14 days) and feeding shared. Well feathered by day 13 and fledge 13-15 days.
Food: mainly eat earthworms, insects, spiders, snails and slugs. They mainly forage on the ground on lawns or pasture, or among leaf litter under trees, hedges, forests or in woodlands. They also eat the small berries of some shrubs and eat ripening fruit.
Behaviour: Feed on the ground in parklands, woodlands and suburban gardens, walking slowly or running short distances looking for food. Often seen listening for food (earthworms beneath the ground surface). Strongly territorial. In small numbers around the airfield outskirts.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 0
Previous year: 0</td><td>➢ All available equipment (audible & visual)
➢ Monitor runway edges
➢ Use vermicide and pesticides on manoeuvring area grassed surfaces
Note: This species is not a problem</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Negligible</td><td rowspan="4">Black-billed Gull
(Larus bulleri)
 
 
  </td><td>Length: 35 - 38 cm
Weight: 230 g
Similar species: Red-billed Gull
Other names: Buller's Gull, Tarāpuka, Tarapuka, Seagull
A medium-sized white Gull with pale grey wings and back, white-tipped black margins to the main flight feathers, white iris, red eye-ring, black legs and a relatively long straight black bill. Non-breeding adults have a bi-coloured bill, reddish at the base with a black tip and a line through the middle.
Juvenile:
Head –brown and back.
Wings – brown patches.
Tail – white with traces of black.
Eye ring – dark brown.
Iris – dark brown.
Bill – flesh pink with grey black tip.
Legs – flesh pink with black tinge.</td><td>Breeding: Colonies are established in Aug-Sep then abandoned at seasons end, Dec-Feb. This could occur earlier due to floods and predator/human disturbance. Approx mean nest density in colonies is 1.2 nests/m2 and can reach 4-5 nests/m2 in dense colonies. Usually lay two eggs but up to five have been observed. Incubated for 20-24 days, and chicks fledge at approximately 26 days.
Food: Feed primarily on invertebrates during the breeding season taken from rivers and adjacent pasture. Also feed on fish such as whitebait. During winter, birds continue to use agricultural habitats, but also feed in the coastal marine zone on fish and marine invertebrates.
Behaviour: Nest in noisy, dense colonies, mainly on riverbeds. Rare to nest as isolated pairs. Colony locations often change along with numbers known to fluctuate from one year to the next. During the breeding season, birds feed at the river’s edge, or take insects on the wing over the river, but they are much more likely to be observed following ploughs on farms adjacent to the river. Will fly tens of kilometres for food. Rarely seen on airfield.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total 0
Previous year 0</td><td>➢ All available equipment (audible, visual)
➢ Do not cull
➢ Record If observed on airfield
Note: This species is not a problem</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Negligible</td><td rowspan="4">Red-billed Gull
(Larus novaehollandiae)
 
 
  </td><td rowspan="2">Length: 37 cm
Weight: 240 - 320 g
Similar species: Black-billed Gull
Other names: Silver Gull, Tarāpunga, Tarapunga, Mackerel Gull, Jackie (Chathams), Akiaki, Seagull
A medium-sized white Gull with pale grey mantle, back and wing coverts, black main flight feathers with white tips, white iris, and bright red bill, eyelids and legs. Immatures are similar to adults but with brown patches on the mantle, brownish primaries, and dark brown iris, bill and legs.
Juvenile:
Head –brown and back.
Wings – brown patches.
Tail – white with traces of black.
Eye ring – dark brown.
Iris – dark brown.
Bill – flesh pink with grey black tip.
Legs – flesh pink with black tinge.</td><td rowspan="2">Breeding: Breed in large, dense colonies on the mainland. Long season-mid-Sep-Jan. Monogamous, share nest-building, incubation and provisioning the chicks. Nests consist of grass, seaweed or twigs. Lay two eggs, (brownish or greenish-grey with dark brown spots or blotches), sometimes up to three clutches. Incubation 21-25 days. Chicks fly at 35 days and fed for another 30 days. Most birds return to the same colony.
Food: Are dependent upon an abundant and regular supply of the surface-swarming krill for successful breeding but can sustain themselves on alternative foods such as earthworms, small fish, garbage and kelp flies. Outside of the breeding season the diet is highly variable. Some still feed at sea; others feed on small invertebrates along the shore, or from human sources such as handouts in towns or cities, offal being discarded from fishing boats and garbage at rubbish dumps.
Behaviour: Seldom found inland. Pairs known to stay together for several years. Courtship feeding of the female by the male is an important feature of breeding. Rarely seen on airfield.</td></tr>
<tr><td>Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total: 0
Previous year: 0</td><td>➢ All available equipment (audible, visual)
➢ Do not cull
➢ Record If observed on airfield
Note: This species is not a problem</td></tr>
</table>

<table>
<tr><th>Risk</th><th>Species</th><th>Identification</th><th>Characteristics (habitat, food, sources, etc.)</th></tr>
<tr><td rowspan="4">Negligible</td><td rowspan="4">Common Pheasant
(Phasianus colchicus)
 
MALE
 
FEMALE
  </td><td>Length: 80 cm (male), 60 cm (female)
Weight: Up to 1.5 kg (male), 1.2 kg (female)
Similar species: Weka
Other names: Ring-necked Pheasant, English Pheasant, Peihana, Chinese Pheasant
A chicken-like bird found in rough farmland and shrublands along coasts and rivers. Males are long-tailed with boldly marked blackish heads with red facial wattles. Females are smaller and brownish-grey.</td><td>Breeding: Solitary outside the breeding season. Males are polygamous, mating with several females and taking no part in nest building or incubation. Breed Oct-Dec. Lay 7-15 eggs in a bowl-shaped indentation in grass, well hidden among vegetation. Incubation 23-28 days. Chicks leave nest when dry. Fly short distances after 12 days
Food: Omnivorous, feeding on foliage, seeds, grains, berries and invertebrates. Chicks mainly consume insects. Adults can dig in the ground with their beak and claws up to a depth of 8 cm.
Behaviour: Wary and have good eye-sight. Stay close to vegetation, seeking cover when disturbed by slinking away or will erupt into vertical flight and fly low and swiftly until pitching back into cover.</td></tr>
<tr><td colspan="2">Available strike history</td><td>Management Actions</td></tr>
<tr><td>5-year total</td><td>0</td><td rowspan="2">➢ All available equipment (audible, visual)
➢ Do not cull
➢ Record If observed on airfield
Note: This species is not a problem</td></tr>
<tr><td>Previous year</td><td>0</td></tr>
</table>

APPENDIX E: - ROLES AND RESPONSIBILITIES

Position or entity	Responsibilities
Manager Airfield Operations	➢ Endorse the final version of the WHMP. ➢ Ensure the resources for implementing the WHMP are provided
Willdife Manager	➢ Oversee the implementation and review of the WHMP ➢ Oversee On and Off Airport wildlife management as outlined in the WHMP ➢ Chair the CIAL Wildlife Hazard Management Committee Meeting ➢ Ensure the WHMP and procedures are issued to relevant staff and applied where necessary ➢ Ensure that CIAL Wildlife Officers are trained in the functions required for all wildlife hazard management activities including, but not limited to, wildlife identification, harassment, counts, reporting and active techniques ➢ Liaise with the Asset Planning and Maintenance Team (Facilities Supervisor, Airfield) on habitat management ➢ Liaise with Airport Operators, Local Government Agencies and other Stakeholders to identify and manage wildlife issues at CIAL and assist with wildlife management at off-Airport sites ➢ Facilitate all reviews of the CIAL WHMP ➢ Attend relevant Forums and Meetings (i.e. NZAWHG, CAA, Airside Safety Committee, Airfield Project Meetings and relevant worldwide events etc.) and provide feedback on wildlife management topics

Position or entity	Responsibilities
Facilities Supervisor, Airfield	➢ Maintain or modify grass, landscapes and ground conditions where need is identified ➢ Manage food sources on and around airfield ➢ Implement passive management plans (weekly, monthly, yearly, seasonal) ➢ Review passive management plans and implement controlled trials where required ➢ Liaise with Wildlife team on habitat management activities ➢ Ensure waste is disposed of appropriately and bins and other waste storage facilities are maintained with closed lids or other suitable covering wherever practicable ➢ Audit Contractors and report findings
Wildlife Officers	➢ Manage Wildlife and their habitats as described in the WHMP ➢ Adhere to Wildlife management procedures and processes ➢ Count, survey, inspect, assess, record and report as described in the WHMP ➢ Accurately record management actions and report issues to Wildlife Manager ➢ Use, store and maintain equipment as required by CIAL procedure ➢ Attend training as required ➢ Attend Meetings and Forums as required ➢ Monitor and report wildlife attraction to landscapes on the airfield and surrounding land ➢ Audit, where required, identified areas of airfield being managed by externals i.e. grass heights, weed build up etc.
Strategy and Sustainability	➢ Provide information on sites (existing/under development) that could contribute to bird strike risk at CIAL ➢ Review and discuss with Wildlife management all proposals for land use changes within 13-kilometres of CIAL, giving due consideration to potential bird and wildlife hazards. Where necessary, ensure such proposals are modified to ensure that the risk posed by birds to aircraft is not increased.

Position or entity	Responsibilities
Manager, Aviation Safety and Security	➢ Conduct an annual audit of the WHMP to report on the updated results from data analysis and risk assessments. Provide recommendations to improve the CIAL WHMP.
Manager, Airport Fire Service	➢ Assist with resource for Wildlife management cover when Wildlife staff are unavailable
Ecologist	➢ Provide as required, in specified scope of works, consultation on Wildlife management relating to any manner of passive and wildlife control
Airways New Zealand	➢ Forward Wildlife Incident Reports from flight crew to CIAL Wildlife staff ➢ Report wildlife concentrations or hazards to WO's to allow for appropriate management or action as required ➢ Provide WO's with priority access to the runway when wildlife hazard conditions require immediate action ➢ Issue Wildlife Advisories to flight crews as required
Christchurch Helicopters	➢ Provision of turbine powered helicopter for required bird counting or observation operations requested by CIAL Wildlife team
CIAL Property Managers	➢ Promptly report observations of bird nesting in structures to Wildlife staff. ➢ Advise Wildlife team of any contract work performed which results in a disturbed earth surface
Aircraft Operators	➢ Air and ground crew to inform of all wildlife incidents ➢ Ground staff to relay evidence of strikes including damage, carcasses, feathers, or other material to WOs for collection. ➢ Provide copies of strike/near strike records ➢ Attend quarterly WCC Meetings and provide feedback on wildlife management issues at CIAL

APPENDIX F: - STAFF TRAINING PROGRAM

Training Type	Position(s)	Frequency	Method of Training Delivery
Airside Driving (CAT 3)	All Wildlife staff	3 yearly	➢ Internal refresher
Radio procedures (phareseology)	All Wildlife staff	Quarterly	➢ Internal ➢ Stakeholder participation
Wildlife Driving Areas	All Wildlife staff	Quarterly	➢ Internal ➢ Stakeholder participation
Wildlife Hazard Management Plan	All Wildlife staff	- On commencement of employment - Completion of document reviews - Self-yearly refresher	➢ Internal
CIAL Wildlife Identification	All Wildlife staff	- On commencement of employment, - As required	➢ Internal ➢ Contract Consultant (Ornithologist)
IT related – Reports, Data collection, Audits	All Wildlife staff	- As required - Self refresher	➢ Internal
Bird Strike Management	All Wildlife staff	Annual	➢ Internal
Willdife On-Airport Patrol	All Wildlife staff Airport Fire Service staff	- Annual with quarterly audits - Annual	➢ Internal

Training Type	Position(s)	Frequency	Method of Training Delivery
Wildlife Management Techniques (active)	All Wildlife staff Airport Fire Service staff	- Annual with quarterly audits - Annual	➢ Internal
Lethal Management (main)	All Wildlife staff	Annual	➢ Contract Consultant
Lethal Management (Team refresher)	All Wildlife staff	Quarterly	➢ Internal ➢ Contract Consultant participation
Pyrotechnics	All Wildlife staff Airport Fire Service staff	Annual	➢ Internal ➢ Contract Consultant (2 yearly)
Data cCllection (surveys, patrols, adhoc)	Airport Fire Service staff	Annual	➢ Internal
Wildlife Management Techniques (passive)	All Wildlife staff	As required	➢ Internal ➢ Contract Consultant (Ecologist)
Fire Extingisher	All Wildlife staff	2 yearly	➢ Internal

APPENDIX G – RESEARCH PROJECTS AND TRIALS

Canada Goose Masters Project (University of Canterbury)

- Research description: A strategy to better understand the risk posed by Canada Geese to aircraft at CIAL.
- Objectives:
  1. To map their movements and identify key areas used near CIAL
  2. Determine their diet and identify feeding locations near the Airport, to modify or reduce these locations attractiveness to them
  3. Submit thesis for MSc degree

Pigeon Surveillance Study (Ecology NZ)

- Research description: Literature review and Survey design to understand the movements of Feral Pigeons on campus at CIAL.
- Objectives:
  1. Field Survey in two parts: *1a.* Feral Pigeon activity *1b.* CIAL Property Survey
  2. Surveillance Report

Increased signage on and around airfield to educate staff and the public about waste

- In conjunction with CIAL Marketing, develop signage to advise all campus Staff and Public about the risk of waste in relation to wildlife
- Required workshops or briefs to all Stakeholders, Tenants and Staff

Annual monitoring and management of Southern Black-backed Gulls:

- Alongside ECan, determine changes to SBBG numbers and nesting sites around Christchurch to assess required management actions (such as egg-pricking/oiling or culling of adults)

APPENDIX H – MINISTRY OF TRANSPORT 2013 - *MANAGEMENT OF BIRDSTRIKE RISK AT AERODROMES*

Office of Hon Gerry Brownlee

MP for (lam

Leader of the House - Minister for Canterbury Earthquake Recovery

Minister of Transport - Minister Responsible for the Earthquake Commission

24 APR 2013

Kaye McNabb

Chief Executive
Nelson Airport
Limited
kayemcnabb@nelso
nairport.co.nz

Dear Ms McNabb

Thank you for your letter of 15 March 2013 regarding the management of birdstrike risk at aerodromes.

You have referred to ambiguity surrounding the term 'appropriate authority' as used in Annex 14 (Aerodromes) to the Convention on International Civil Aviation. While the Convention and its Annexes place obligations on New Zealand as a Contracting State, it is the government's responsibility to determine the appropriate regulatory mechanism.

In New Zealand, the Resource Management Act 1991 (the Act) is the relevant mechanism in relation to land use planning. The Act provides that Airport Authorities may be designated as "requiring authorities" and, as such, submit a notice of requirement to their local authority in respect of any hazards that pose a significant aviation risk.

In April 2012, I issued the National Airspace Policy of New Zealand. The Policy expresses the government's expectation that the aviation sector and local authorities should proactively address their respective interests in any future planning. This includes decisions relating to land use, activities, potential obstacles or hazards that are incompatible with aerodrome operations or create adverse effects. The Ministry of Transport also wrote to every local authority drawing attention to that aspect of the policy. The policy can be found on the Ministry of Transport's website at:

http://www.transport.govt.nz/ourwork/air/airspace/

Private Bag 18041, Parliament Buildings, Wellington 6160, New Zealand, Telephone 64 4 817 6802 Facsimile 64 4 817 6502

Additionally, Civil Aviation Rule Part 139 requires certificated aerodromes to have a wildlife hazard management programme in place to mitigate the risk of bird incidents. Civil Aviation Advisory Circular 139-16 emphasises that aerodrome operators should make submissions during urban planning or district scheme reviews so that local authorities are well aware that their planning decisions may influence bird populations near an aerodrome or the flight paths of aircraft. This advisory circular was developed in conjunction with aerodromes and the New Zealand Airports Association. Submissions made to local authorities should not be limited to planning decisions within a specific radius from an airport as there may be hazards that lie beyond the immediate area surrounding an airport.

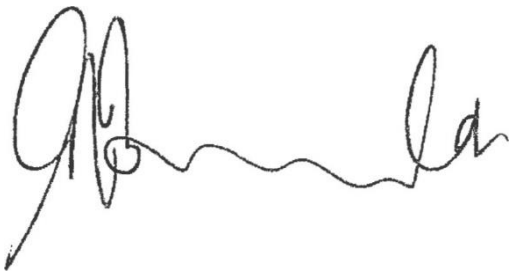
The Rule and Advisory Circular can be found on the Civil Aviation Authority's website at:

http://www.caa.govt.nz/rules/Part 139 Brief.htm.

and http://wmM.caa.qovt.nz/Advisory Circulars/AC139 16.pdf.

If you have further queries, you are welcome to contact Glen-Marie Burns, Manager Aviation and Security at the Ministry of Transport on (04) 439 9331 or at g.burns@transport.govt.nz.

Yours sincerely



Hon Gerry Brownlee

Minister of Transport

Copy to:Hon Dr Nick Smith - Minister of Conservation

Attachment B

CONSERVATION

AUTHORITY TO DISTURB OR KILL PROTECTED BIRDS AT AIRPORTS

PURSUANT To Section 54 of the Wildlife Act 1953:

Chief Executive
Christchurch International Airport Ltd
P.O. Box 14-001
CHRISTCHURCH

or any person acting under the licencee's instruction on delegation is hereby authorised to disturb and kill any protected bird species within the boundaries of the airport at Christchurch for the purpose of reducing bird hazard to aircraft subject to the following conditions:

1. Alternative methods of disturbing the birds must be tried prior to a decision being made to kill birds.

2. The birds are not to be killed unless it is essential to ensure safe operation of aircraft.

3. Only the minimum number required to ensure safe operation of aircraft may be killed.

4. No chemicals are to be used to kill birds.

5. Any unusual birds killed under this authority are to be labelled, showing the date killed and location, and are to be kept chilled. The local Department of Conservation Office shall be notified for further action.

6. All birds are to be carefully checked for leg-bands. Any band which is found shall be sent to the Banding Officer, Department of Conservation, PO Box 10-420, Wellington, with details of when and where the bird was killed.

7. By 30 September each year a report is to be forwarded to the Regional Conservator at the nearest Conservancy Office showing the following details for the year ended 31 August:

   (a) The number of times this authority was actioned.

   (b) For each time the authority was actioned, the methods used to disturb and kill birds.

   (c) For each time the authority was actioned, the number and species of birds killed.

This Authority may be revoked or its conditions altered at any time.

Dated at Wellington this 7th day of February 1990.

Director, Protected Species
for Director-General of Conservation

DEPARTMENT OF CONSERVATION
PO BOX 10 420 WELLINGTON, NEW ZEALAND
59 BOULCOTT STREET, WELLINGTON 1
TELEPHONE 64-4-[illegible], FAX 71-1082

Attachment C

Department of Conservation
Te Papa Atawhai

GUIDELINES RELATING TO AUTHORISATIONS GIVING AUTHORITY TO DISTURB OR KILL PROTECTED BIRDS AT AIRPORTS

BACKGROUND

A bird strike can pose a serious threat to an aircraft. Engines will often stop working if a bird as small as half a kilogram is sucked into them. Birds striking leading edges of wings can destroy control linkages to wing flaps and ailerons. Birds striking landing gear can destroy hydraulic hoses that operate wheel brakes. Larger birds can break through windshields, impacting on the pilots' control of the aircraft through injury or damage to the aircraft. Even near misses can distract crew attention in critical phases of flight. Damage to external aerials and sensors from bird strikes can also negatively affect or disable essential cockpit instruments.

All such impacts and near misses create significant safety issues for passengers and aircrew, and may inflict high costs on airlines and the public. Airport authorities need to be able to manage and control bird hazards, and respond quickly to situations of hazard that suddenly arise.

Airport responsibility:
The New Zealand Government is a signatory to the Chicago Convention on International Civil Aviation of 7 December 1944, the foundation of the International Civil Aviation Organisation (ICAO). ICAO is a specialised agency of the United Nations, formed to promote the safe and orderly development of international civil aviation throughout the world. It sets standards and regulations necessary for aviation safety, security, efficiency and regularity, as well as for aviation environmental protection. The Organization serves as the forum for cooperation in all fields of civil aviation among its 190 Member States.

Chapter 9 of ICAO Annex 14 to the Convention on International Civil Aviation requires of States that when a bird strike hazard is identified at an aerodrome, the appropriate authority shall take action to decrease the number of birds constituting a potential hazard to aircraft operations.

Through the Civil Aviation Act and the Civil Aviation Rules, the New Zealand Government gives effect to the standards of ICAO.

Civil Aviation Rule Part 139.71 requires New Zealand airport operators to establish an environmental management programme for minimising or eliminating any wildlife hazard that exists. Airports are audited on their compliance with this rule, and the Civil Aviation Authority actively records bird strike and 'near miss' incidents for all of New Zealand, providing regular formal feedback to airports on their performance in terms of reported incidents.

The Civil Aviation Authority (CAA) has published a "Good Aviation Practice" guide on bird hazards in conjunction with the Department of Conservation.

Managing bird hazard:
Different bird species pose different levels of hazard to aircraft depending on their size, flying and foraging habits, and dispersal behaviour when disturbed or threatened. Experienced airport managers tend to be very skilled in managing airport grounds in ways that make them unattractive to birds. This greatly reduces conflict between aircraft and birds.

The killing of birds is always used as a last resort in reducing bird hazard at airports. Unnecessary killing can pose a risk to the population of a protected species but also creates a risk of significant negative publicity to the airport operator. Historically, airport managers have been good at balancing the needs of aviation safety with minimising impacts on protected wildlife and risks of adverse public reaction.

Early management action (for example at the start of a season) can help minimise the total number of birds needing to be disturbed or killed.

Protected species:
Often the birds needing to be managed to prevent bird strikes are protected under the Wildlife Act 1953 therefore airports need an authorisation under that Act to do so. These authorisations all come in a standard format as agreed between DOC and CAA and NZ Airports Association. All three organisations will work together to share and provide information on protected wildlife.

The authorisation is designed to allow airports to disturb or kill protected species as required by the individual airport as the situation warrants; however DOC grants this ability subject to some conditions. Please see the example of the Authorisation attached to this policy – the conditions mainly require airport operators to kill birds only as a last resort, and describe what to do when the more threatened species are killed.

All birds in New Zealand are protected if they are **NOT** included in Schedule 5 of the Wildlife Act 1953. (The reason for having a list of non-protected birds in the Act rather than a list of protected ones is that the resulting list is much, much shorter.)

Notifiable birds
For a small number of protected birds that are threatened, DOC would like to be advised if any are killed. The bird should be put inside two plastic bags (double-bagged), which is to be labelled with the date/time of the death (or as close as known), the location where the bird was killed, the weather conditions at the time, and any other relevant comment, and put into a freezer until DOC advises what should be done with it.

Freezing the bird allows a post-mortem to be done if required, and may help identify why the bird is at that location. DOC can then work with the airport concerned to consider management options that minimise risk to the species while maintaining aviation safety.

The list of Notifiable Birds is given in Appendix 1 to the standard authorisation for airports. This list does not include all threatened bird species, only the ones DOC would like to know about and which might visit airports.

Non-protected birds:
Non-protected species (those listed on Schedule 5 of the Wildlife Act) can be disturbed or killed at any time and do not require authorisation, this list is attached to the authorisation. However, where an airport operator is controlling a flock of non-protected species, there can

be a risk of a protected bird being killed unintentionally and so an authorisation for killing protected species will often be required to cover this eventuality.

For convenience, a list of non-protected birds is given in Appendix 2 to the standard authorisation for airports. No authorisation is required for killing a bird on the non-protected list; therefore an authorisation is required to kill any and all birds NOT on that list.

Who to contact in DOC:
Authorisations for airports under these provisions of the Wildlife Act are dealt with by the DOC Permissions Team in Hamilton, contact details are:
DOC Permissions Team Leader
Hamilton
ph: 07 858 1585
Email: permissionshamilton@doc.govt.nz.

Authority under Wildlife Act 1953 -
Disturbing or killing protected wildlife at airports

Authorisation Number:

THIS AUTHORITY is made this day of 20XX

PARTIES:

The Director-General of Conservation and where required the Minister of Conservation (the Grantor)

AND

[Airport] (the Authority Holder)

BACKGROUND:

A. The Director-General of Conservation is empowered to issue authorisations under the Wildlife Act 1953.

B. The Authority Holder wishes to exercise the authorisation issued under the Wildlife Act 1953 subject to the terms and conditions of this Authority.

OPERATIVE PARTS

In exercise of the Grantor's powers the Grantor **AUTHORISES** the Authority Holder to disturb and kill protected wildlife under Section 54 (Hunting or Killing of Wildlife causing damage) Wildlife Act 1953, subject to the terms and conditions contained in this Authority and its Schedules.

_____

SIGNED on behalf of the Grantor by *[name and title of delegate*] acting under delegated authority

in the presence of:

_____

Witness Signature

Witness Name: _____

Witness Occupation:_____

Witness Address: _____

A copy of the Instrument of Delegation may be inspected at the Director-General's office at 18-32 Manners Street, Wellington.

SCHEDULE 1

1.	**Authorised activity (including the species, any approved quantities and collection methods).** (Schedule 2, clause 2)	Disturb and kill any bird species protected under the Wildlife Act 1953 (referred to hereafter as "birds") for the purpose of reducing bird hazard to aircraft.
2.	**The Land** (Schedule 2, clause 2)	Within the boundaries of XXX aerodrome at GPS co-ordinates, and/or as shown on the attached map at Schedule 4
3.	**Personnel authorised to undertake the Authorised Activity** (Schedule 2, clause 3)	All employees, contractors or, agents undertaking the Authorised Activity under the Authority Holder's instructions.
4.	**Term** (Schedule 2, clause 4)	Commencing on and including [start date] and ending on and including [end date] (usually 10 years)
5.	**Authority Holder's address for notices** (Schedule 2, clause 8)	The Authority Holders address in New Zealand is: Airport address Airport contact email address
6.	**Grantor's address for notices**	The Grantor's address for all correspondence is: Permissions Team Leader Private Bag 3072 Hamilton 3240 Ph +64 7 858 1585 Email: permissionshamilton@doc.govt.nz

SCHEDULE 2

STANDARD TERMS AND CONDITIONS OF THE AUTHORITY

1. Interpretation

1.1 The Authority Holder is responsible for the acts and omissions of its employees, contractors or, agents. The Authority Holder is liable under this Authority for any breach of the terms of the Authority by its employees, contractors or agents as if the breach had been committed by the Authority Holder.

1.2 Where obligations bind more than one person, those obligations bind those persons jointly and separately.

2. What is being authorised?

2.1 The Authority Holder is only allowed to carry out the Authorised Activity on the Land described in Schedule 1, Item 2.

2.2 All wildlife remains the property of the Crown. This includes any dead wildlife, live wildlife, any parts thereof, any eggs or progeny of the wildlife, genetic material and any replicated genetic material. The Authority Holder must comply with any reasonable request from the Grantor for access to any wildlife disturbed or killed under this authority.

2.3 The Authority Holder must not donate, sell or otherwise transfer to any third party any wildlife, material, including any genetic material, or any material propagated or cloned from such material, from any wildlife killed under this authority.

3. Who is authorised?

3.1 Only the Authority Holder and the Authorised Personnel described in Schedule 1, Item 3 are authorised to carry out the Authorised Activity.

4. What are the liabilities?

4.1 The Authority Holder agrees to exercise the Authority at the Authority Holder's own risk and releases to the full extent permitted by law the Grantor and the Grantor's employees and agents from all claims and demands of any kind and from all liability which may arise in respect of any accident, damage or injury occurring to any person or property arising from the Authority Holder's exercise of the Authorised Activity.

4.2 The Authority Holder must indemnify the Grantor against all claims, actions, losses and expenses of any nature which the Grantor may suffer or incur or for which the Grantor may become liable arising from the Authority Holder's exercise of the Authorised Activity.

4.3 This indemnity is to continue after the expiry or termination of this Authority in respect of any acts or omissions occurring or arising before its expiry or termination.

5. What about compliance with legislation and Grantor's notices and directions?

5.1 The Authority Holder must comply with all statutes, bylaws and regulations, and all notices, directions and requisitions of the Grantor and any competent Authority relating to the conduct of the Authorised

Activity. Without limitation, this includes the Conservation Act 1987 and the Acts listed in the First Schedule of that Act and all applicable health and safety legislation and regulation.

6. When can the Authority be terminated?

6.1 The Grantor may terminate this Authority at any time in respect of the whole or any part of Authorised Activity if:

(a) the Authority Holder breaches any of the conditions of this Authority; or

(b) in the Grantor's opinion, the carrying out of the Authorised Activity causes or is likely to cause any unforeseen or unacceptable effects.

6.2 If the Grantor intends to terminate this Authority in whole or in part, the Grantor must give the Authority Holder such prior notice as, in the sole opinion of the Grantor, appears reasonable and necessary in the circumstances.

7. How are notices sent and when are they received?

7.1 Any notice to be given under this Authority by the Grantor is to be in writing and made by personal delivery, by pre paid post or email to the Authority Holder at the address, or email address specified in Schedule 1, Item 5. Any such notice is to be deemed to have been received:

(a) in the case of personal delivery, on the date of delivery;

(b) in the case of post, on the 3rd working day after posting;

(c) in the case of email, on the date receipt of the email is acknowledged by the addressee by return email or otherwise in writing.

7.2 If the Authority Holder's details specified in Schedule 1, Item 5 change then the Authority Holder must notify the Grantor within 5 working days of such change.

8. What about the payment of costs?

8.1 The Authority Holder must pay the standard Department of Conservation charge-out rates for any staff time and mileage required to monitor compliance with this Authority and to investigate any alleged breaches of the terms and conditions of it.

9. Are there any Special Conditions?

9.1 Special conditions are specified in Schedule 3. If there is a conflict between this Schedule 2 and the Special Conditions in Schedule 3, the Special Conditions will prevail.

10. Can the Authority be varied?

10.1 This Authority may be revoked or varied by the Grantor at any time.

10.2 The Authority Holder may apply to the Grantor for variations to this Authority.

SCHEDULE 3

SPECIAL CONDITIONS OF THE AUTHORITY

1. The Authority Holder must use the best practicable options to manage the bird hazard before resorting to killing birds.

2. Only the minimum number of birds may be killed in order to ensure safe operation of aircraft.

3. The only chemical to be used to kill birds is alphachloralose. Any other chemical may be approved by the Grantor, by way of a variation to this Authorisation.

4. All birds killed must be carefully checked for leg bands. Any band found must be removed from the bird and sent to the Banding Officer, Department of Conservation, PO Box 10420, Wellington, with details of when and where the bird was killed.

5. Records must be kept, and be made available to DOC or the Civil Aviation Authority on request, of the number and species of protected birds killed each year, including the date on which each bird was killed.

6. Notwithstanding clause 2.3 in Schedule 2, the Authority Holder may send the bodies of dead wildlife, or parts thereof, to third parties to allow DNA testing to enable species to be identified.

7. The Authority Holder may cut open dead wildlife killed under this Authority, that is not on the Notifiable Birds list in Appendix 1, in order to inspect the contents of their crops and gizzards to assist in understanding wildlife behaviour to assist aviation safety.

8. The Authority Holder must immediately inform DOC Permissions Team Leader, Hamilton (tel 07 858 1585, or email permissionshamilton@doc.govt.nz) whenever a bird of a species on the List of Notifiable Birds, attached to this Authorisation as Appendix 1, is killed. The bird should be put inside two plastic bags (double-bagged), which is to be labelled with the date/time of the death (or as close as known), the location where the bird was killed, the weather conditions at the time, and any other relevant comment, and put into a freezer until DOC advises what should be done with it.

NOTE: If a killed bird cannot be identified, the airport authority should take a picture of it, and email the picture to Permissions Hamilton permissionshamilton@doc.govt.nz who will advise what the species is. The bird must then be recorded in the airport authority's records as normal.

Appendix 1: Notifiable birds

The list below includes only threatened protected birds that could be at risk of being killed at airports and which DOC would like to know about if they are killed.

The Authority Holder must immediately inform DOC Permissions Team Leader, Hamilton (tel 07 858 1585, or email permissionshamilton@doc.govt.nz) whenever a bird of a species listed below is killed. If one of the birds listed below is killed, the bird should be put inside two plastic bags (double-bagged), which is to be labelled with the date/time of the cull, the location where the bird was killed, the weather conditions at the time, and any other relevant comment, and put into a freezer until DOC advises what should be done with it.

Freezing the bird allows a post-mortem to be done if required, and may help identify why the bird is at that location.

DOC can then work with the airport concerned to consider management options that minimise risk to the species while maintaining aviation safety.

There are many more threatened species not included on the list that are unlikely to turn up at airports or, if they do, are probably sick and dying anyway. DOC doesn't need to be told about such birds.

List of Notifiable Birds

Common name	**Scientific name**	**Threat Status (as at September 2015)**
White heron	*Ardea modesta*	Nationally Critical
Southern NZ dotterel	*Charadrius obscurus obscurus*	"
Black stilt	*Himantopus novaezelandiae*	"
Black-billed gull	*Larus bulleri*	"
NZ fairy tern	*Sternula nereis davisae*	"
NZ shore plover	*Thinornis novaeseelandiae*	"
Bittern	*Botaurus poiciloptilus*	Nationally Endangered
Black-fronted tern	*Chlidonias albostriatus*	"
Orange-fronted parakeet	*Cyanoramphus malherbi*	"
Reef heron	*Egretta sacra sacra*	"
King shag	*Leucocarbo carunculatus*	"
Kea	*Nestor notabilis*	"
Wrybill	*Anarhynchus frontalis*	Nationally Vulnerable
Lesser knot	*Calidris canutus rogersi*	"
Northern NZ dotterel	*Charadrius obscurus aquilonius*	"
NZ falcon	*Falco novaeseelandiae*	"
Caspian tern	*Hydroprogne caspia*	"
Blue duck, whio	*Hymenolaimus malacorhynchos*	"
Stewart Island shag	*Leucocarbo chalconotus*	"
Yellowhead (mohua)	*Mohoua ochrocephala*	"
Kaka	*Nestor meridionalis*	"
Southern crested grebe	*Podiceps cristatus australis*	"
NZ dabchick	*Poliocephalus rufopectus*	"

Appendix 2: Non-protected birds

All birds in New Zealand are protected if they are **NOT** included in Schedule 5 of the Wildlife Act 1953. This list below is a copy of that Schedule as at November 2015. Any subsequent changes to the Schedule mean this list will change accordingly.

No authorisation is required for killing a bird on the list below. For any other bird species, an authorisation is needed.

List of Non-Protected Birds

Blackbird (*Turdus merula*)
Red-vented bulbul (*Pycononotus cafer*)
Cirl bunting (*Emberiza cirlus*)
Cape Barren goose (*Cereopsis novaehollandiae*)
Chicken—any bird of the genus *Gallus*
Dove—all species of the genus *Streptopelia*
Chaffinch (*Fringilla coelebs*)
Goldfinch (*Carduelis carduelis*)
Greenfinch (*Carduelis chloris*)
Lesser redpoll (*Carduelis cabaret*)
Goose—any bird of the genus *Anser*
Canada goose (*Branta canadensis*)
Guineafowl (*Numida meleagris*)
Black-backed gull (*Larus dominicanus*)
Kookaburra—any bird of the genus *Dacelo*
Magpie—
- Black backed magpie (*Gymnorhina tibecen*)
- White backed magpie (*Gymnorhina leuconota*)

Muscovy duck (*Cairina moschata*)
Mynah (*Acridotheres tristis*)
Parrot—
- Budgerigar (*Melopsittacus undulatus*)
- Crimson rosella (*Platycercus elegans*)
- Eastern rosella (*Platycercus eximius*)
- Galah (*Eolophus roseicapilla*)
- Rainbow lorikeet (*Trichoglossus haematodus*)
- Ring-necked parakeet (*Psittacula krameri*)
- White (or sulphur-crested) cockatoo (*Cacatua galerita*)

Peafowl (*Pavo cristatus*)
Rock pigeon (*Columba livia*)
Rook (*Corvus frugilegus*)
Skylark (*Alauda arvensis*)
Song thrush (*Turdus philomelos*)
Sparrow—
Hedge sparrow (*Prunella modularis*)
House sparrow (*Passer domesticus*)
Spur-winged plover (*Vanellus miles*)
Starling (*Sturnus vulgaris*)
Turkey—any bird of the genus *Meleagris*
Yellowhammer (*Emberiza citronella*)

Attachment D

Southern Black-backed Gull Survey of the Lower Waimakariri River 2019

WMIL Wildlife Management International

WMIL 1992 - 2017
25 YEARS OF WILDLIFE CONSERVATION

Southern Black-backed Gull Survey of the Lower Waimakariri River 2019

Mike Bell

Wildlife Management International Limited
PO Box 607
Blenheim 7240
New Zealand
www.wmil.co.nz

This report was prepared by Wildlife Management International Limited for Christchurch Airport and Environment Canterbury.

February 2020

Citation:

This report should be cited as:

Bell, M.D., 2020. Southern Black-backed Gull Survey of the Lower Waimakariri River 2019. Unpublished Wildlife Management International Technical Report to Christchurch Airport and Environment Canterbury.

Cover image: Waimakariri River from the air (Kailash Willis).

Southern Black-backed Gull Survey of the Lower Waimakariri River

On 31 October 2019 Wildlife Management International Limited (WMIL) undertook a survey of the lower Waimakariri River to determine the number and size of Southern Black-backed Gull (SBBG) breeding colonies. The survey encompassed the entire section of the Wiamakariri River between the river mouth and the Waimakariri Gorge. This survey was the third successive year that these counts have been undertaken in this area.

The survey was undertaken by helicopter commencing at the river mouth and working upstream to the gorge. As each colony was encountered it was marked with a handheld GPS, and the number of SBBG breeding pairs were estimated. As many of the colonies on the river are spread over a large area, an individual colony was defined as a group of breeding gulls separated by over 500m of riverbed which had no breeding gulls. Surveys using the same methodology have been carried out annual on the same section of the Waimakariri River from 2016.

A total of 3,810 breeding pairs of Blacked-backed Gulls were recorded from 29 breeding colonies on the lower Waimakariri River (Figure 1). Colonies were observed from approximately 10km upstream of the river mouth, to just below the gorge (Figure 1). The distribution of colonies is similar to the 2016, 2017 and 2018 surveys (Figure 2), highlighting that SBBG are using the same sections of river for breeding.

The number of SBBG recorded on the Waimakariri has reduced by approximately 1,000 pairs since 2016 (Figure 3), suggesting that long term control measures are working to reduce SBBG numbers.

Figure 1. Location and size of Southern Black-backed Gull colonies on the Lower Waimakariri River, Canterbury, November 2019.

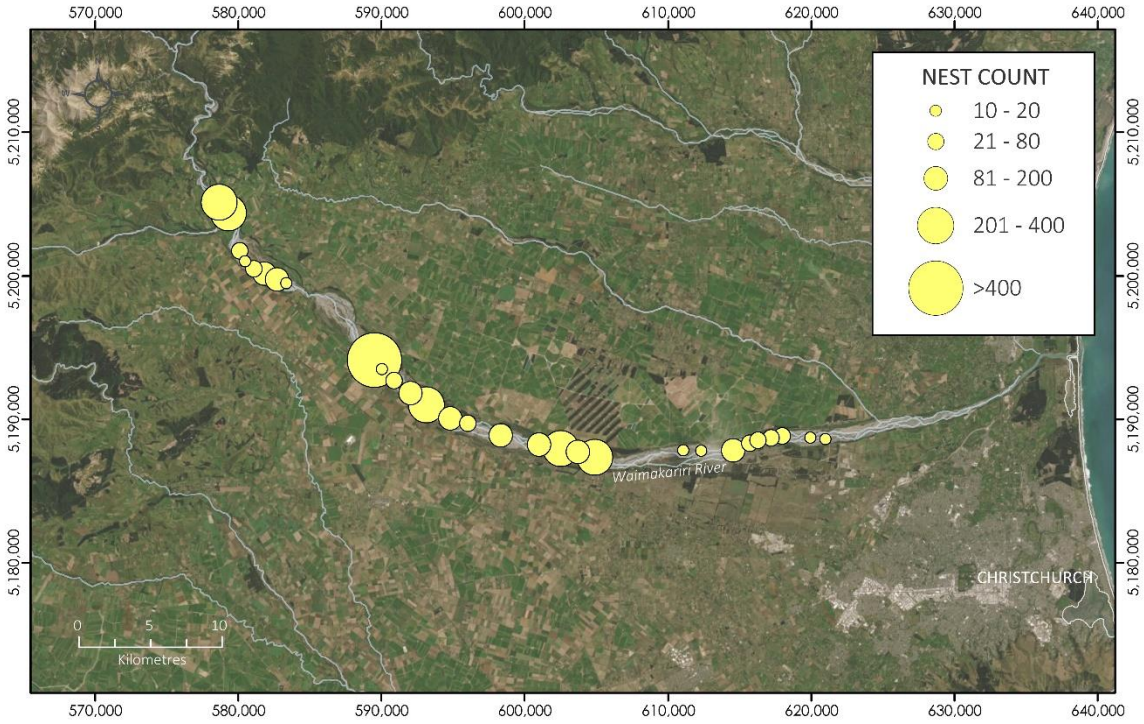


Figure 2. Location and size of Southern Black-backed Gull colonies on the Lower Waimakariri River, Canterbury, 2016-2018.

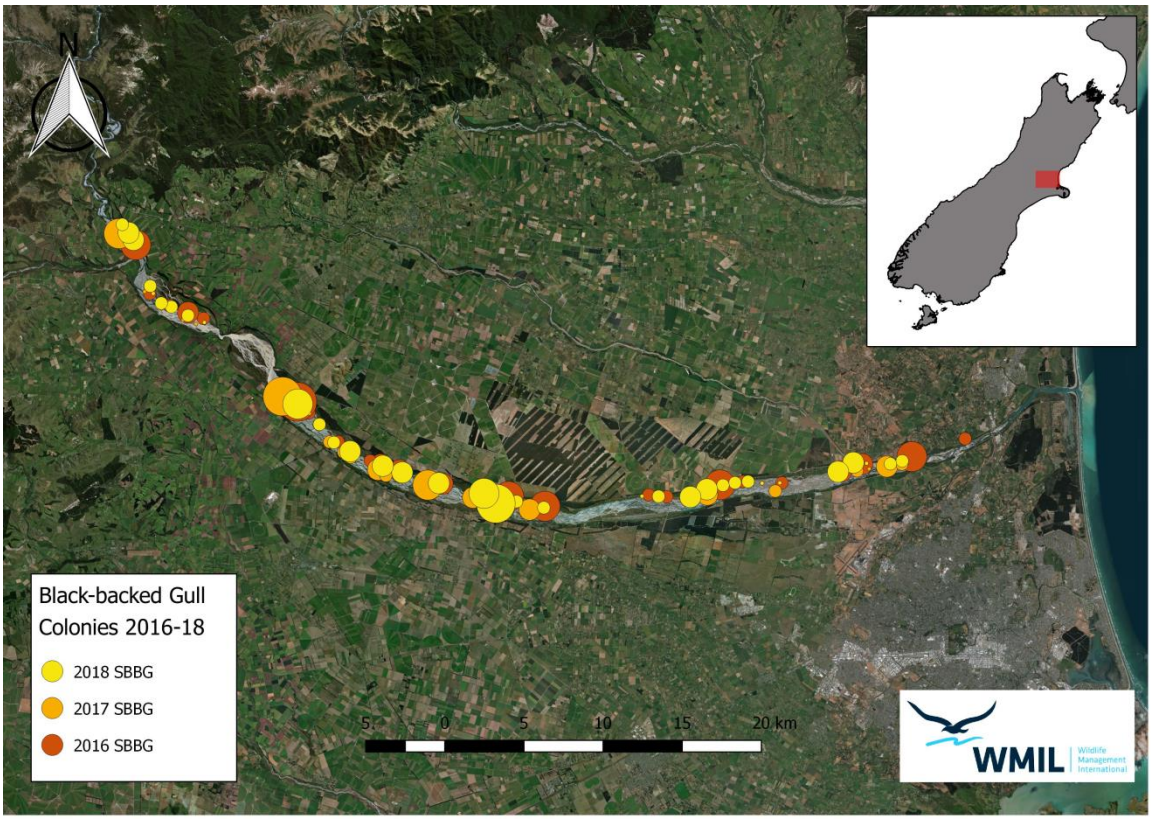
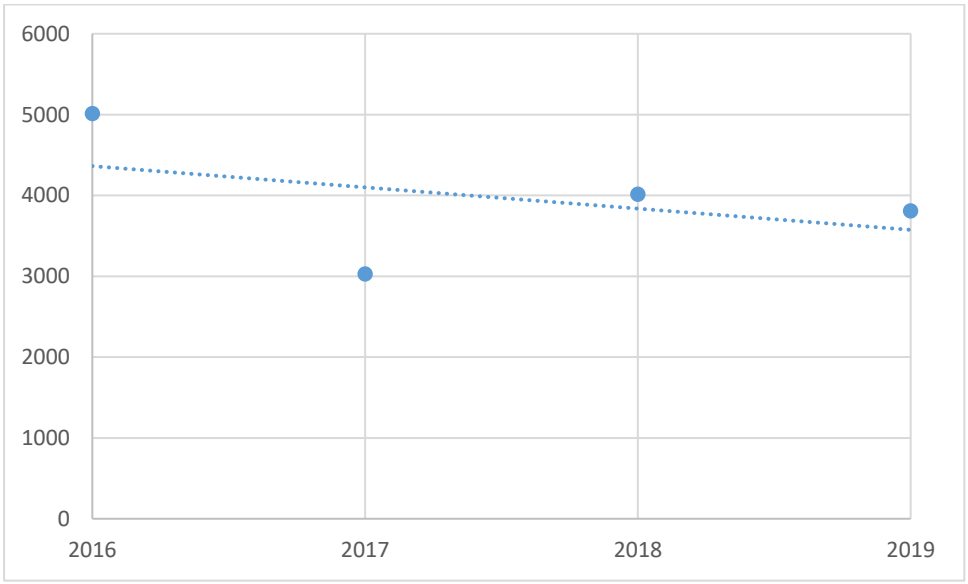


Figure 3. The number of breeding pairs of Southern Black-backed Gull on the Lower Waimakariri River, Canterbury, 2016-2019.



A total of 29 colonies were recorded, with mean colony size being 131 breeding pairs (range 10 -500 pairs). since 2016 there has been weak trend for an increase in the number of colonies recorded (Figure 4), and a decrease in the average colony size (Figure 5). Suggesting that in response to long term control operations SBBG colonies are tending to spread out across the river, and colony size is decreasing. Maximum colony size has decreased from 800 nests in 2016 to 500 nests in 2019.

Figure 4. Number of Southern Black-backed Gull breeding colonies on the Lower Waimakariri River, Canterbury, 2016-2019.

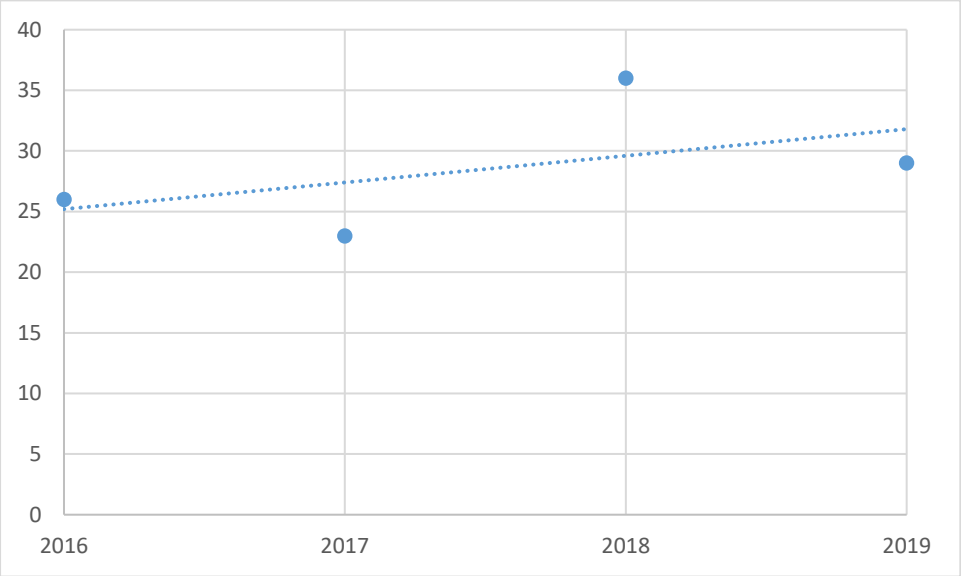
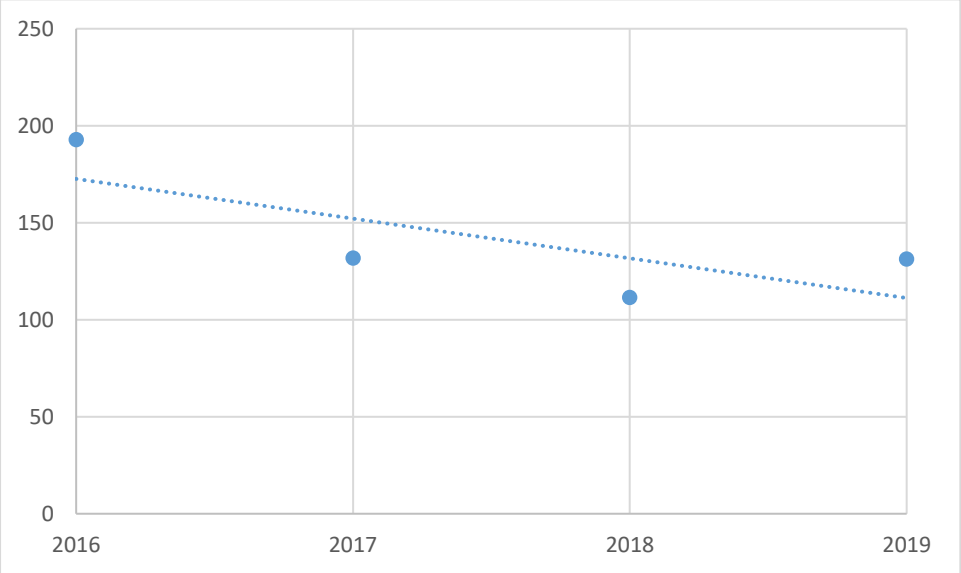


Figure 5. Average colony size of Southern Black-backed Gull breeding on the Lower Waimakariri River, Canterbury, 2016-2019.



No Black-billed Gull colonies we located on the Waimakariri River during this survey, but a large colony was observed on the Ashley River.

Attachment E

Board of Airline Representatives NZ
Level 1 Quad 7 Building, 6 Leonard Isitt Drive, Auckland 2022

To: Malcom Johns
Chief Executive Officer
Christchurch International Airport Ltd

21 July 2021

Airline risks associated with bird strike

Dear Malcolm

You have asked for BARNZ's view on the risks associated with bird strike.

Who we are

BARNZ (the Board of Airline Representatives New Zealand Inc.) is the association of international and domestic airlines which operate scheduled airline services to, from, and within New Zealand. The list of BARNZ members is appended to this letter. BARNZ represents its members on matters affecting their common interest through to government and the aviation sector.

BARNZ's interest and expertise

BARNZ's interest on behalf of its members and the aviation sector in general is to protect the ability for airports to function in a safe and efficient manner. Constraints on operations and compromise on safety raise costs and consequently airfares and airfreight rates.

Importance of Christchurch Airport to the Airlines

Christchurch International Airport is the second-most important airport in New Zealand (after Auckland) in terms of international and domestic traffic and is expected to see rapid growth in air movements as international aviation opens up again following the global efforts to roll out the COVID-19 vaccine.

Need for Protection

Bird strike is a serious issue for airline operators. The most vulnerable time for bird strike is during take-off, ascent, descent and landing as birds fly at low altitude. Serious bird strikes are not common, although most can pose a risk to life if they occur. Smaller aircraft will most likely experience structural damage such as damage to control surfaces or flight deck windscreens while larger aeroplanes powered by jet engines may experience engine malfunction and loss of thrust when birds connect with the engines.

Aside from the obvious risk to the safety of passengers and crew, bird strike causes costs to airline operators including direct repair costs and lost revenue opportunities while damaged aircraft are out of service. This cost can be substantial annually.

The Civil Aviation Authority regularly publishes statistics on bird strike incidents at airports and aerodromes around New Zealand. The statistics for the three years ending 31 December 2020 indicate that Christchurch has higher levels of bird strike than Auckland and Wellington international airports in New Zealand.

Incidents such as the 2016 bird strike on an Air Namibia aircraft and the emergency landing of the US Airways flight into the Hudson River in 2009 remind us that bird strike remains an ever-present risk, and that it is appropriate to manage this risk for the safety of passengers and crew.

BARNZ appreciates that Christchurch International Airport Ltd (CIAL) takes bird strike extremely seriously and supports the management that CIAL undertakes on airport to minimise bird strike risk. BARNZ also sees appropriate bird strike management on and around aerodromes as critical to a safe operating environment.

Yours sincerely

Justin Tighe-Umbers
Executive Director
Board of Airline Representatives New Zealand

List of BARNZ Members

Airline Members	
Air Calin	Air Chathams
Air China	Air New Zealand
Air Tahiti Nui	Air Vanuatu
Airwork	American Airlines
Cathay Pacific Airways	China Airlines
China Eastern Airlines	China Southern Airlines
Emirates	Fiji Airways
Jetstar	Korean Air
LATAM Airlines	Malaysia Airlines
Philippine Airlines	Qantas Airways
Qatar Airways	Singapore Airlines
Tasman Cargo Airlines	Thai Airways International
United Airlines	Virgin Australia Airlines

Non-Airline Members	
Menzies Aviation (NZ)	OCS Group NZ
Swissport	

Attachment F

BIRD INCIDENT RATE REPORT

January to March 2021 - Christchurch Airport

CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

Introduction

Bird incident rates are reported quarterly by aerodrome. This is achieved by querying the database for the number of incidents at aerodromes and summarising by quarter. The results of this query are then divided by the aircraft movements at each aerodrome for the same quarter and multiplied by 10,000 to achieve strikes per 10,000 aircraft movements. Aircraft movements at aerodromes are obtained from the ACNZ, and where available, from individual airport companies. Where no movement data are available, CAA estimates are used. Aerodrome operators are invited to supply more accurate movement data where appropriate.

Definition of 'On-Aerodrome'

Not all bird strike incidents occur within the wildlife management area that relates to the aerodrome stated in the incident report so this report breaks incidents down into 'On aerodrome', 'Off aerodrome' and 'Undefined'.

An "on airport" bird strike is defined within IBIS (ICAO Bird Strike Information System) as one which occurs between 0 to 200 ft inclusive on landing and 0 to 500 ft inclusive on take-off. This definition doesn't align well with the level of 50 ft that is widely used in NZ as the boundary between take-off and climb and between approach and landing. This misalignment makes it inappropriate to use the reported 'Phase of Flight' as the sole factor in determining whether a reported strike is on or off an aerodrome.

This report therefore makes the following assumptions:

If the distance from the airport is greater than 5 NM the strike is Off Aerodrome

If no altitude is reported the strike is Off Aerodrome if the flight phase is Cruise or Holding, On Aerodrome if the flight phase is Taxiing, Hover Taxi, Takeoff or Landing and Undefined in all other cases

If the altitude is reported as zero the strike is Undefined if the flight phase is Parked or Unknown otherwise it is On Aerodrome

If the altitude is reported as greater than zero but not greater than 200 feet the strike is Undefined if the flight phase is Parked, Unknown or Taxiing otherwise it is On Aerodrome

If the altitude is reported as greater than 200 ft but not greater than 500 ft the strike is On Aerodrome if the flight phase is Takeoff or Climb, Off Aerodrome if the flight phase is Approach, Descent or Landing and Undefined otherwise

If the altitude is reported as greater than 500 ft the strike is Undefined if the flight phase is Parked, Taxiing, Hover Taxi or Unknown and Off Aerodrome otherwise

These rules are applied in the above order with later rules having no effect if a strike meets the conditions of an earlier rule.

On-Aerodrome 12-Month Moving Average Strike Rate per 10,000 Aircraft Movements

The following table shows the 12-month moving average on-aerodrome strike rates for identified aerodromes for the three years ending 31 March 2021.

	Qtr											
Aerodrome	18/2	18/3	18/4	19/1	19/2	19/3	19/4	20/1	20/2	20/3	20/4	21/1
Auckland	2.0	2.6	2.3	2.3	2.1	1.6	1.7	1.5	1.6	2.1	2.7	2.3
Ardmore	0.2	0.3	0.9	0.7	0.8	0.8	0.2	0.5	0.7	0.6	0.8	0.6
Chatham Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Christchurch	8.4	7.3	7.1	5.5	3.6	3.1	4.0	4.0	5.3	6.4	4.9	5.5
Dunedin	10.5	8.5	8.1	5.9	2.2	3.0	3.5	5.5	6.4	7.0	5.9	5.0
Gisborne	12.6	10.2	7.8	5.7	4.5	4.0	3.3	3.0	2.4	1.8	2.5	2.0
Hamilton	2.6	2.5	2.6	1.8	1.9	1.8	1.6	2.3	1.9	2.2	2.1	1.4
Hokitika	2.5	2.4	2.5	2.4	2.4	2.4	2.4	2.4	0.0	2.8	6.2	6.0
Invercargill	4.4	3.7	3.2	4.1	3.6	5.8	6.4	5.9	6.8	5.7	6.6	7.5
Kerikeri	4.4	5.3	5.3	2.1	3.1	3.2	5.0	4.7	2.8	1.9	2.1	2.5
Manapouri	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Napier	19.3	18.8	19.7	22.0	22.0	19.6	18.0	15.9	14.5	14.3	14.4	11.9
Nelson	4.5	4.2	4.3	3.8	5.0	5.5	6.5	5.7	5.4	6.5	5.9	7.8
New Plymouth	8.7	7.4	7.5	7.5	7.4	6.5	6.6	5.8	1.9	2.0	2.7	3.9
Ohakea	1.4	1.6	1.8	1.7	1.1	0.8	0.5	1.7	3.3	4.1	4.0	3.9
Palmerston North	4.7	4.3	4.1	4.1	4.1	4.5	6.5	6.2	6.9	5.1	3.9	3.1
Paraparaumu	0.4	0.9	0.5	0.5	0.4	0.8	0.8	0.8	1.0	0.4	1.4	1.6
Queenstown	2.2	1.7	2.7	2.8	2.7	2.9	4.1	4.9	5.9	6.0	3.7	3.3
Rotorua	10.9	8.6	7.9	6.2	5.3	5.0	5.0	4.1	5.5	6.1	6.8	8.8
Taupo	2.5	2.4	2.9	2.3	1.8	1.4	0.9	0.5	0.6	2.0	3.4	4.1
Tauranga	3.7	4.1	4.8	4.7	4.5	3.9	4.1	5.1	4.6	4.9	6.1	6.7
Timaru	4.2	4.2	4.2	2.8	4.3	4.3	3.7	2.4	1.1	0.9	0.0	0.8
Whanganui	0.7	0.3	0.3	0.5	0.7	0.9	1.0	0.8	0.8	1.2	1.1	1.1
Wellington	4.9	4.5	4.1	3.9	3.3	2.7	2.5	2.7	1.9	2.4	3.1	2.8
Westport	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	8.9
Whakatane	10.0	8.3	8.1	11.8	7.9	6.2	5.7	6.6	8.0	7.2	6.6	4.3
Whangarei	2.5	1.6	1.6	2.2	3.6	3.7	4.5	3.2	1.9	2.8	1.8	5.4
Whenuapai	11.6	9.6	13.8	15.1	16.3	15.0	12.1	12.2	7.2	10.1	9.1	7.1
Woodbourne	7.6	7.7	8.3	9.7	8.9	10.3	9.9	8.4	10.2	8.9	9.4	6.2
Overall	4.7	4.4	4.5	4.2	3.6	3.5	3.5	3.5	3.6	3.8	3.8	3.5

Data with a pink background is based on CAA estimates of aircraft movements for the aerodrome because the CAA has either no data or incomplete data for that aerodrome.

Analysis

Each aerodrome is assigned a risk category based on the most recent 12 month average bird strike rate per 10,000 aircraft movements. These categories are:

Low	where the rate is less than 5 strikes per 10,000 movements
Medium	where the rate is not less than 5 strikes per 10,000 movements but less than 10 strikes per 10,000 movements
High	where the rate is not less than 10 strikes per 10,000 movements.

Each aerodrome is also assigned a trend category based on a straight line approximation to the 3 year history of bird strike rates. These categories are:

Trending down	where the trend graph has a slope of less than -0.059 strikes per 10,000 movements
Constant	where the trend graph has a slope of between -0.059 and +0.059 strikes per 10,000 movements
Trending up	where the trend graph has a slope of more than +0.059 strikes per 10,000 movements

The CAA then determines what if any actions are required based on the combination of the above categories

Current details for individual aerodromes are shown in the following table.

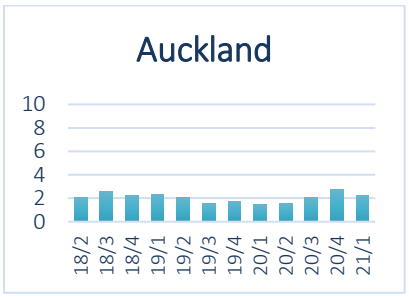
Aerodrome	Incident Rate	Trend
Auckland	Low	Constant
Ardmore	Low	Constant
Chatham Islands	Low	Constant
Christchurch	Medium	Downward
Dunedin	Low	Downward
Gisborne	Low	Downward
Hamilton	Low	Downward
Hokitika	Medium	Upward
Invercargill	Medium	Upward
Kerikeri	Low	Downward
Manapouri	Low	Constant
Napier	High	Downward
Nelson	Medium	Upward
New Plymouth	Low	Downward
Ohakea	Low	Upward
Palmerston North	Low	Constant
Paraparaumu	Low	Upward
Queenstown	Low	Upward
Rotorua	Medium	Downward
Taupo	Low	Constant
Tauranga	Medium	Upward
Timaru	Low	Downward
Whanganui	Low	Upward
Wellington	Low	Downward
Westport	Medium	Upward
Whakatane	Low	Downward
Whangarei	Medium	Upward
Whenuapai	Medium	Downward
Woodbourne	Medium	Constant
Overall	Low	Constant

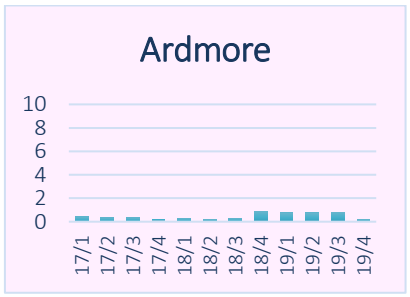
The following table summarises the numbers of aerodromes in each Risk/Trend Category.

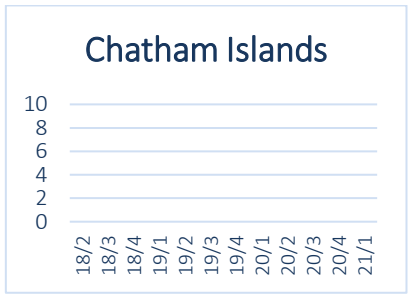
	Trend			
Risk Category	Downward	Constant	Upward	Total
Low	8	6	4	18
Medium	3	1	6	10
High	1	0	0	1
Total	12	7	10	29

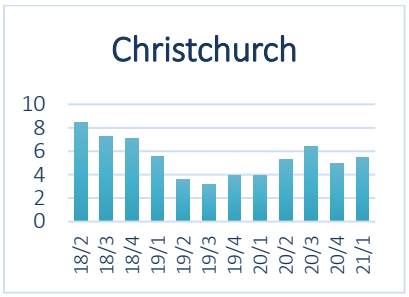
The graphs that follow show the 12 month moving average on-aerodrome bird-strike rates per 10,000 movements for each monitored aerodrome for the three year period ending 31 March 2021.

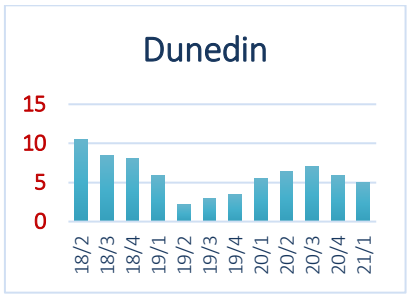
Graphs with a pink background are based on CAA estimates of aircraft movements for the aerodrome because the CAA has either no data or incomplete data for that aerodrome.

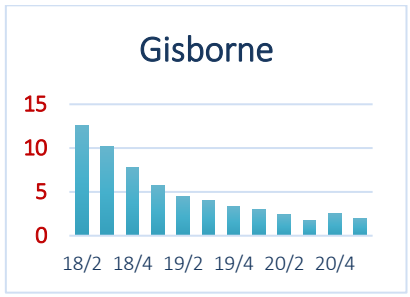


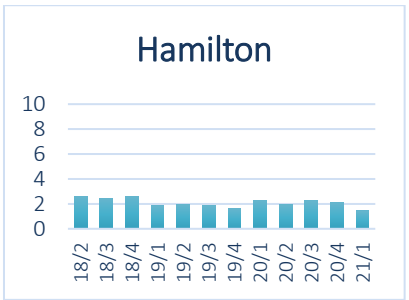


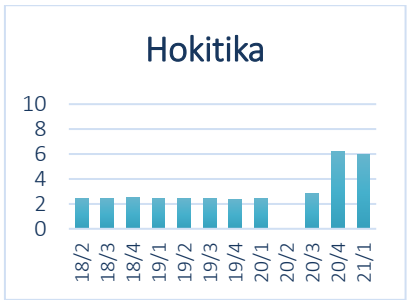


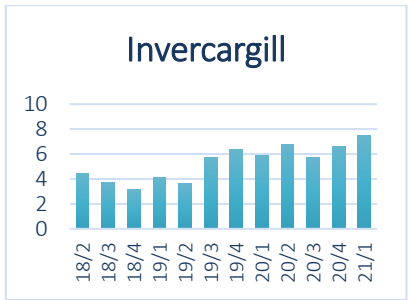


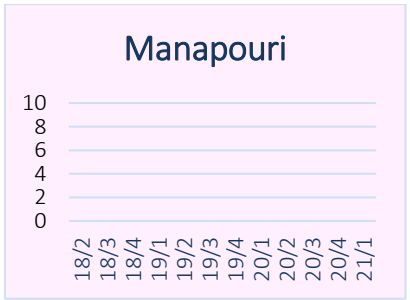


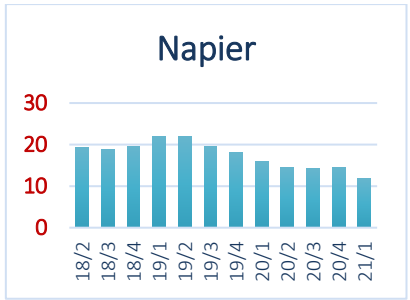


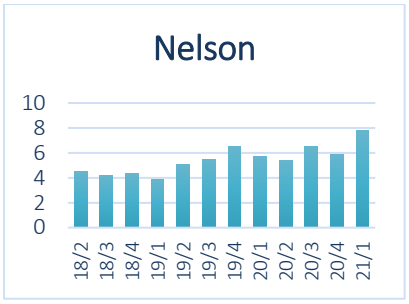


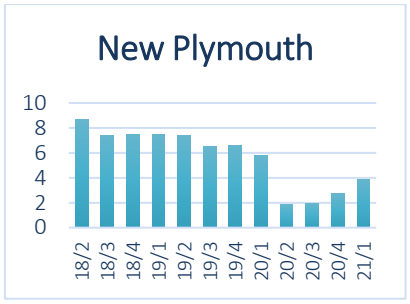


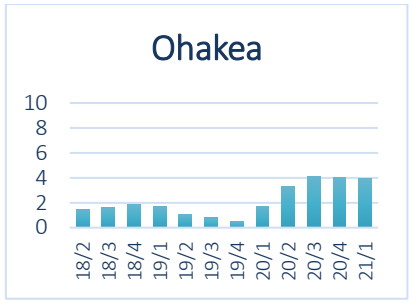


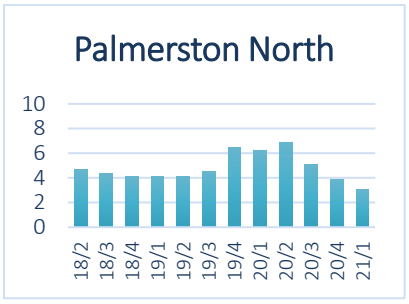


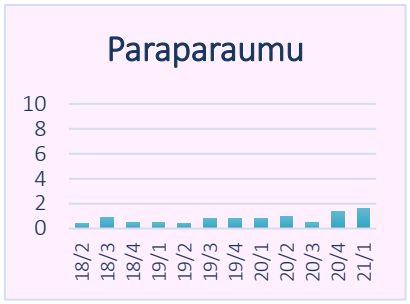


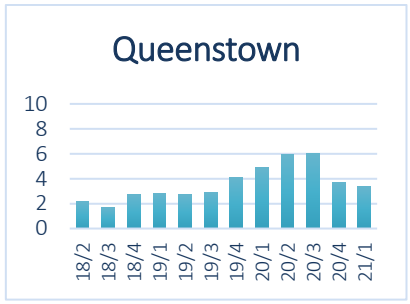

Nelson
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

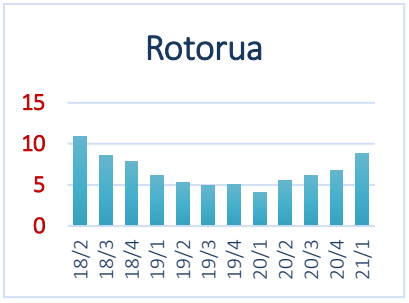

New Plymouth
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

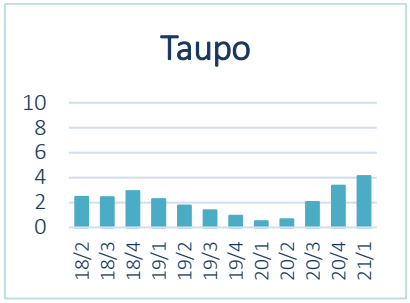

Ohakea
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

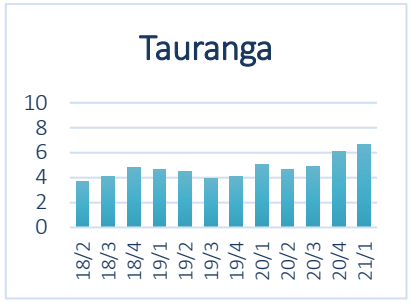

Palmerston North
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

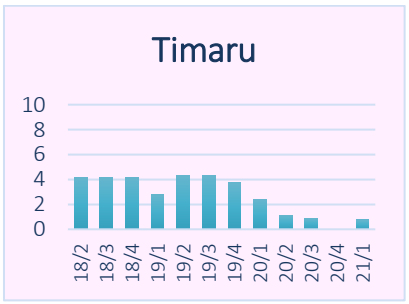

Paraparaumu
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

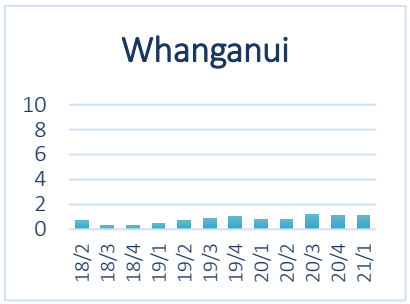

Queenstown
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

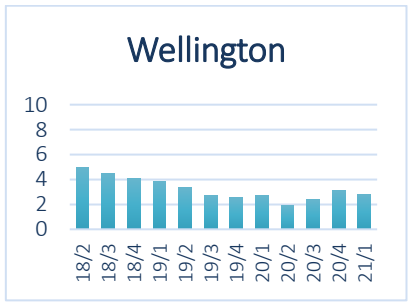

Rotorua
15
10
5
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

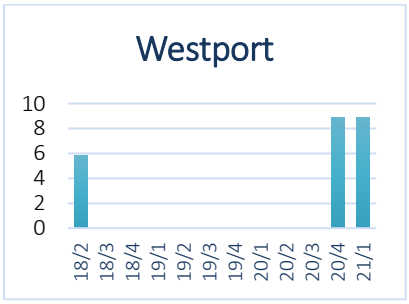

Taupo
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

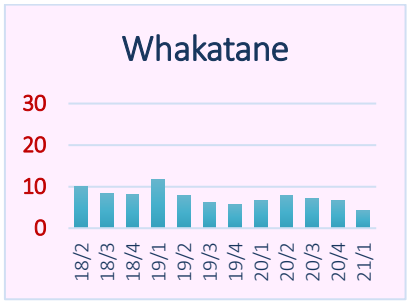

Tauranga
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

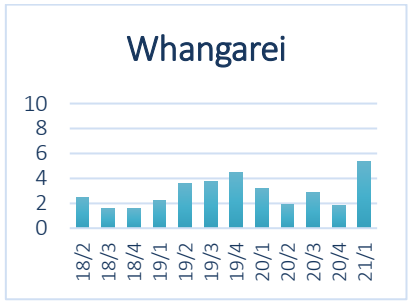

Timaru
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

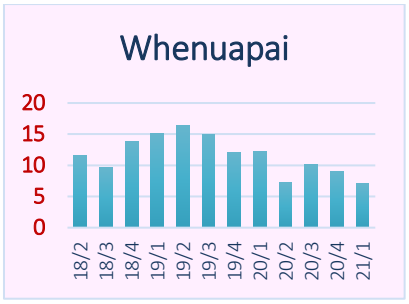

Whanganui
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

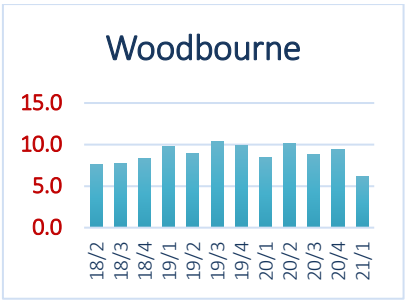

Wellington
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

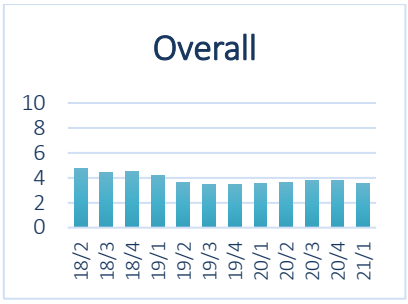

Westport
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1


Whakatane
30
20
10
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1


Whangarei
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1


Whenuapai
20
15
10
5
0
18/2
18/3
18/4
19/1
19/2
19/3
19/4
20/1
20/2
20/3
20/4
21/1


Woodbourne
15.0
10.0
5.0
0.0
18/2
18/3
18/4
19/1
19/2
19/3
19/4
20/1
20/2
20/3
20/4
21/1

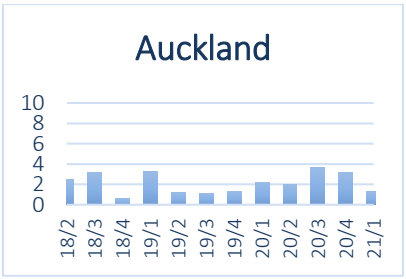

Overall
10
8
6
4
2
0
18/2
18/3
18/4
19/1
19/2
19/3
19/4
20/1
20/2
20/3
20/4
21/1

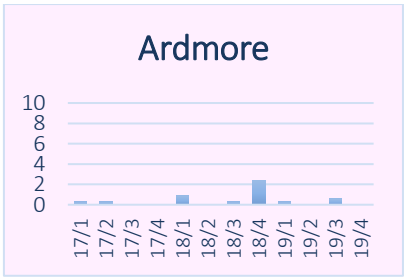
On-Aerodrome Quarterly Strike Rate per 10,000 Aircraft Movements

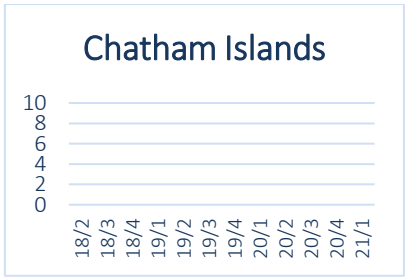
The following table and graphs show the quarterly on-aerodrome strike rates for identified aerodromes for the three year period ending 31 March 2021

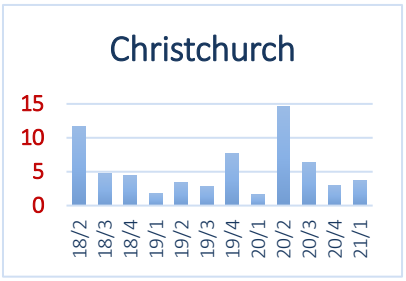
Data with a pink background is based on CAA estimates of aircraft movements for the aerodrome because the CAA has either no data or incomplete data for that aerodrome.

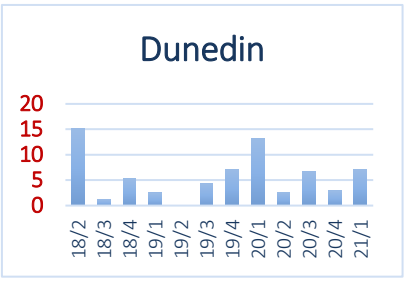
	Quarter											
Aerodrome	18/2	18/3	18/4	19/1	19/2	19/3	19/4	20/1	20/2	20/3	20/4	21/1
Auckland	2.5	3.2	0.6	3.2	1.2	1.1	1.3	2.2	2.0	3.6	3.1	1.3
Ardmore	0.0	0.3	2.4	0.3	0.0	0.6	0.0	1.2	1.4	0.0	0.6	0.7
Chatham Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Christchurch	11.7	4.7	4.4	1.8	3.4	2.9	7.8	1.6	14.6	6.4	3.0	3.7
Dunedin	15.2	1.3	5.4	2.5	0.0	4.3	7.1	13.2	2.7	6.7	3.0	7.1
Gisborne	8.9	5.4	5.4	3.7	3.7	3.3	2.6	2.2	0.0	1.2	5.8	0.0
Hamilton	2.8	1.5	2.3	0.8	3.4	1.0	1.6	3.0	1.5	2.2	1.0	1.2
Hokitika	9.8	0.0	0.0	0.0	9.4	0.0	0.0	0.0	0.0	10.6	13.2	0.0
Invercargill	5.9	0.0	2.2	8.3	3.9	8.4	4.7	6.4	8.0	4.6	8.0	9.5
Kerikeri	5.0	5.0	0.0	0.0	9.6	6.0	6.2	0.0	0.0	0.0	9.1	0.0
Manapouri	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Napier	20.5	17.5	19.2	31.7	20.4	8.1	13.2	22.9	14.1	4.7	13.2	16.1
Nelson	0.9	1.6	2.4	9.8	6.3	3.3	6.1	7.4	4.5	6.8	4.0	13.2
New Plymouth	16.4	4.2	1.9	7.6	15.9	0.0	2.1	4.3	0.0	0.0	4.8	7.5
Ohakea	1.9	1.9	2.9	0.0	0.0	1.0	1.1	5.5	6.7	3.5	0.0	5.3
Palmerston North	2.5	5.1	1.8	7.4	2.3	7.0	9.8	6.1	1.8	1.5	5.1	3.0
Paraparaumu	0.0	2.1	0.0	0.0	0.0	3.6	0.0	0.0	0.0	1.4	3.2	1.3
Queenstown	3.4	0.8	5.3	1.7	2.7	1.7	10.1	3.9	12.3	1.8	2.9	2.9
Rotorua	8.5	4.2	5.3	6.6	4.4	2.6	5.5	3.7	18.4	5.2	7.9	9.5
Taupo	2.2	2.3	3.3	1.4	0.0	0.0	1.7	0.0	0.0	7.5	6.7	0.0
Tauranga	7.5	4.1	3.4	4.1	7.5	1.5	4.1	7.4	5.2	2.6	8.2	9.4
Timaru	0.0	0.0	5.6	5.7	6.3	0.0	3.4	0.0	0.0	0.0	0.0	5.6
Whanganui	2.8	1.5	2.3	0.8	3.4	1.0	1.6	3.0	1.5	2.2	1.0	1.2
Wellington	8.6	3.2	1.6	2.4	6.1	0.8	0.8	3.3	4.9	2.2	2.9	2.4
Westport	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.7	0.0
Whakatane	46.3	14.3	13.7	3.3	9.4	3.6	6.0	7.3	25.1	0.0	3.7	0.0
Whangarei	0.0	0.0	2.8	5.3	6.1	0.0	5.9	0.0	0.0	3.5	2.7	11.5
Whenuapai	18.8	4.3	24.0	12.0	24.0	0.0	12.4	12.5	4.2	11.1	8.3	4.2
Woodbourne	10.0	4.0	6.0	16.8	6.2	10.1	4.1	13.7	19.3	5.2	5.0	4.5
Overall	6.1	3.2	3.5	4.2	3.6	2.5	3.6	4.3	4.7	3.0	3.6	3.5

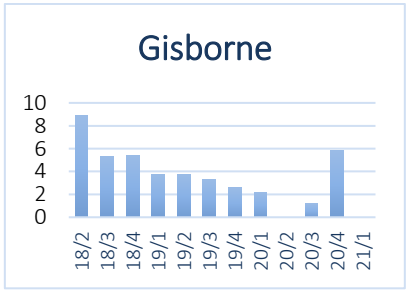

Auckland
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1

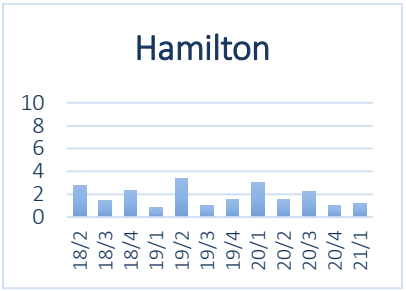

Ardmore
10
8
6
4
2
0
17/1 17/2 17/3 17/4 18/1 18/2 18/3 18/4 19/1 19/2 19/3 19/4


Chatham Islands
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1


Christchurch
15
10
5
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1


Dunedin
20
15
10
5
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1


Gisborne
10
8
6
4
2
0
18/2 18/3 18/4 19/1 19/2 19/3 19/4 20/1 20/2 20/3 20/4 21/1


Hamilton
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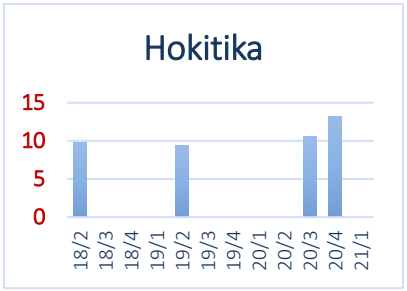
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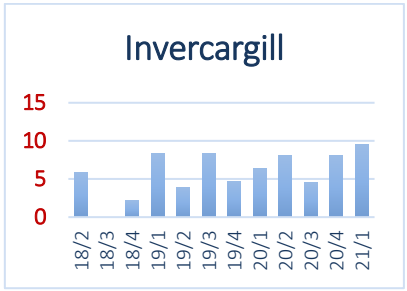
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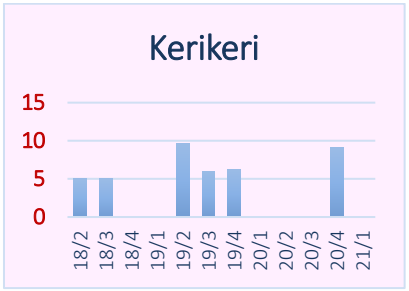
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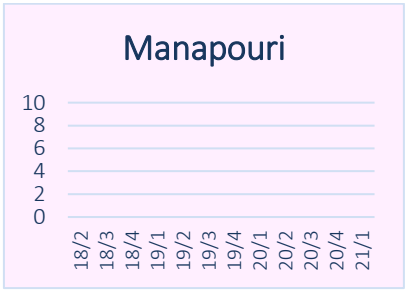
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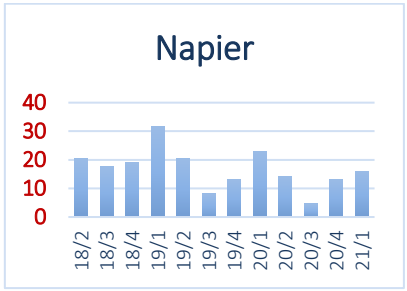
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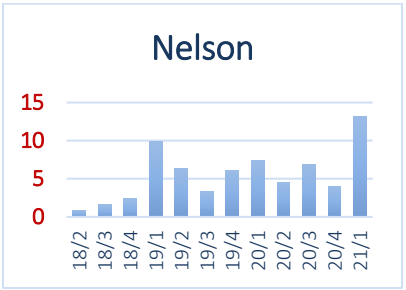
Nelson
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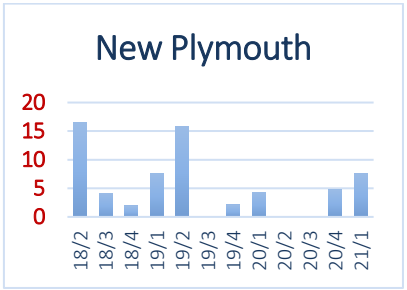
New Plymouth
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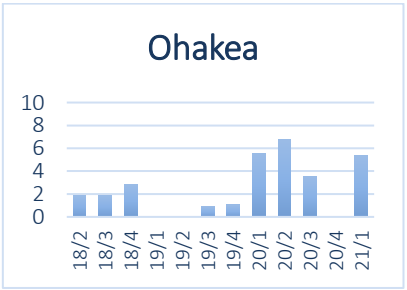
Ohakea
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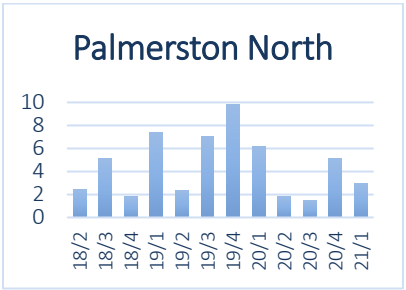
Palmerston North
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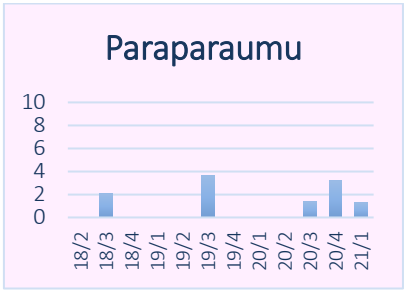
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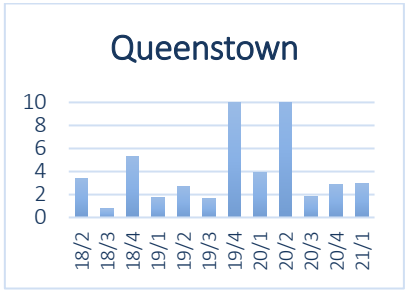
Queenstown
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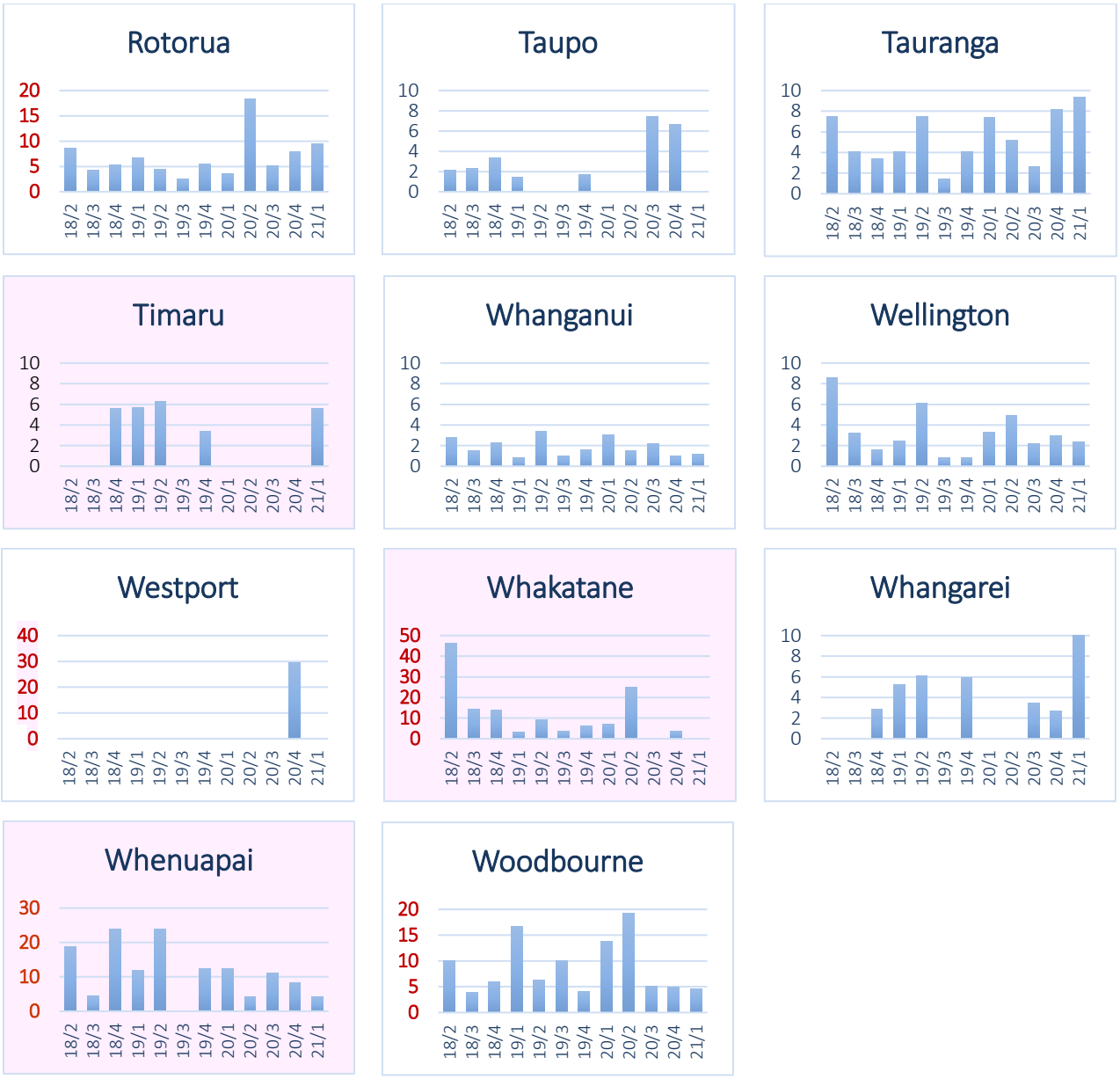
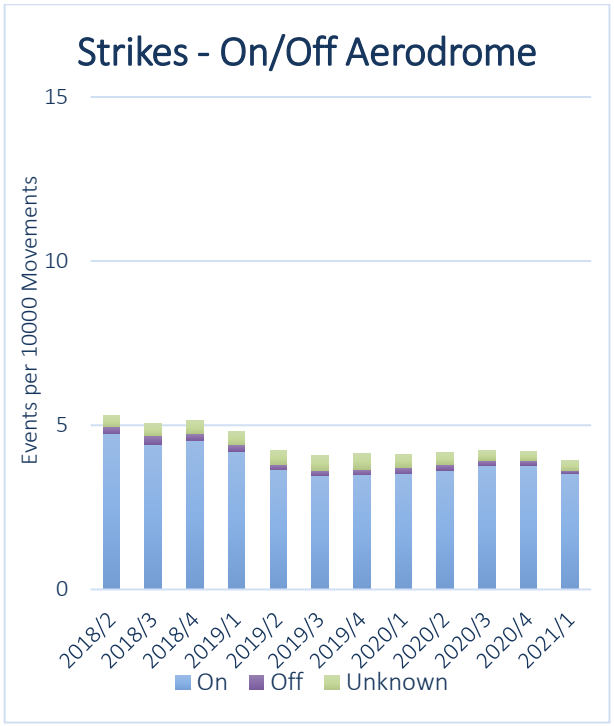
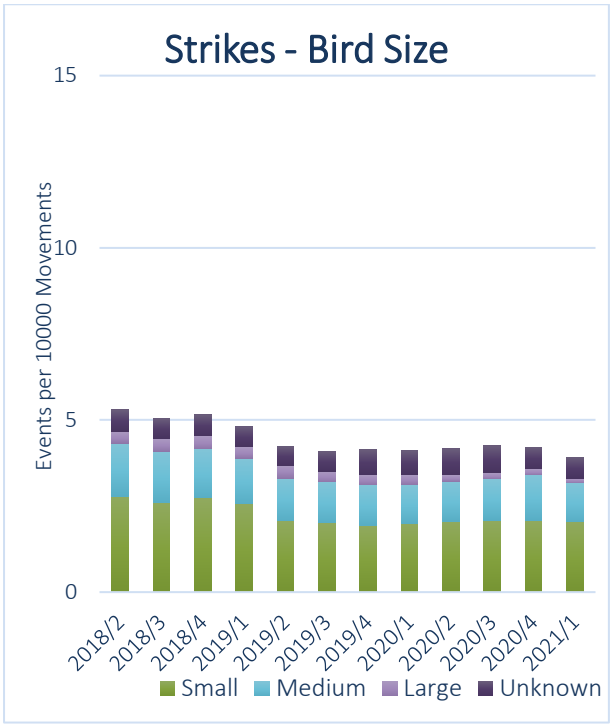


. The remainder of this report records the results of analysis of individual aerodromes' reported bird strikes and near strikes broken down by on-/off-aerodrome and separately by bird size. One page is also included to cover the same information averaged across all monitored aerodromes.

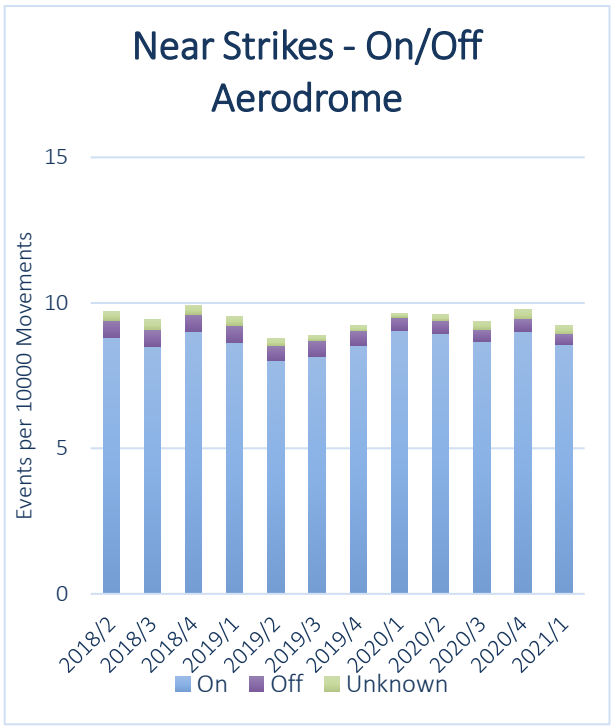
The version of the report distributed internally within the CAA includes a separate page for each monitored aerodrome but the version delivered to each aerodrome operator carries only the pages relevant to that operator. The version delivered to the NZAFSC and NZALPA carries none of these individual pages

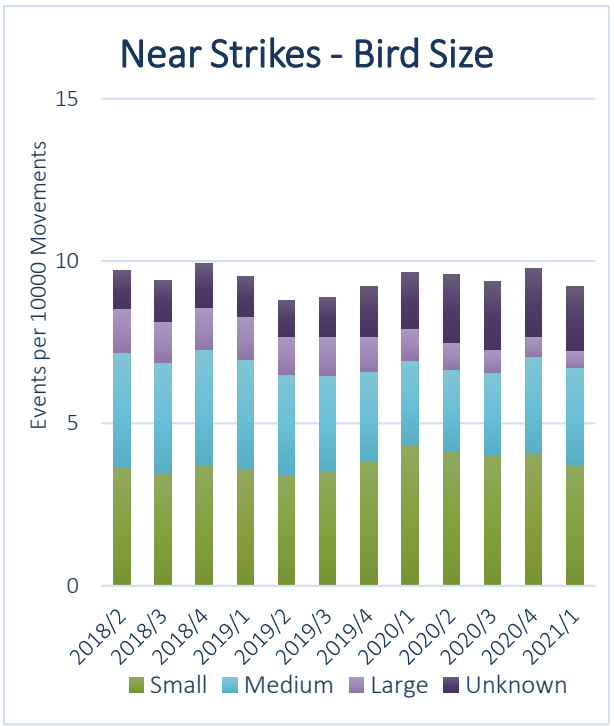
Strike Rates per 10000 Movements - All Monitored Aerodromes (12 month moving averages)



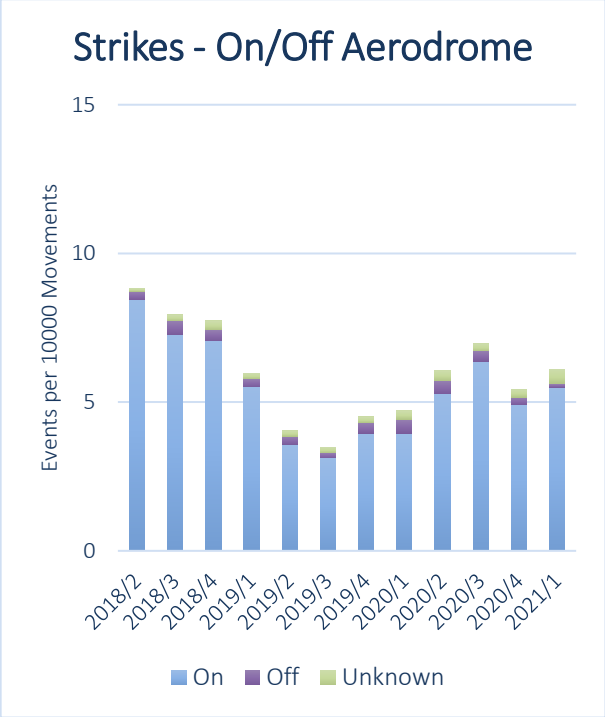


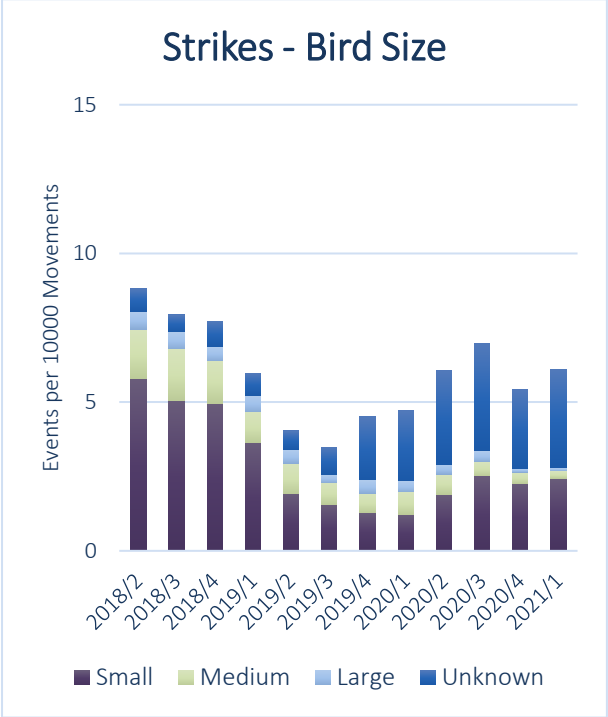
Near Strike Rates per 10000 Movements - All Monitored Aerodromes (12 month moving averages)





Strike Rates per 10000 Movements – Christchurch (12 month moving averages)





Near Strike Rates per 10000 Movements – Christchurch (12 month moving averages)