

The effects of aviation on birdlife in their natural habitat

How airports and birds co-exist (a 'bird's eye view') – Avifauna: Part I

December 2022

Birdlife near the airport site is a key consideration

Avifauna (birdlife) is a key consideration at every airport around the world. This project carefully examines avifauna from two perspectives:

1. The potential effects of a new regional airport on birdlife in their natural habitat (a 'bird's eye view').
2. The effects of birdlife on aviation operations (a 'pilot's eye view').

Christchurch Airport has engaged experts to undertake preliminary, desktop research of the existing information regarding the current avifauna associated with the site and in the wider landscape.

A radius from the site of approximately 50 kilometres was selected as the basis of that initial analysis.

This information paper explains the preliminary findings and observations of that work. A second information paper, entitled '*The effects of birdlife on aviation operations; How airports and birds co-exist (a 'pilot's eye view') – Avifauna: Part II*' examines the impact birdlife can have on aviation operations.

Further, more detailed, analysis is now underway and will take approximately 12 months.

New Zealand's birdlife is legally protected

New Zealand has more than 200 native bird species with some of these found nowhere else in the world.

Most bird species in New Zealand, whether native or introduced, are legally protected. To manage populations or the adverse effects they might cause, some species are given lesser levels of protection.

These species and the levels of protection afforded to them are set out in schedules to Wildlife Act 1953¹.

Airports are not able to make their own independent decisions on managing Threatened species that may pose a risk to aircraft operations. Overall responsibility for the management and control of wildlife in New Zealand, rests with the Department of Conservation (DOC).

A framework for the management of bird species is in place with strict requirements imposed on airports. DOC recognises airports have shown themselves to

be 'good at balancing the needs of aviation safety with minimising impacts on protected wildlife.'

In line with international protocols the Civil Aviation Authority (CAA) requires airport operators to establish environmental management programmes for managing wildlife hazards, including birds, and has published a 'Good Aviation Practice' guide on bird hazards in conjunction with DOC.

The death of birdlife, particularly Threatened species, is a last resort that only DOC may authorise and that authorisation may be subject to conditions. Where a bird on the DOC list of notified species is killed at an airport, DOC requires it to be double bagged, carefully labelled and frozen so a post mortem can be carried out.

Airports are audited to ensure compliance with these rules.

¹ Department of Conservation

<https://www.doc.govt.nz/about-us/our-role/legislation/wildlife-act/#:~:text=Listed%20on%20Schedule%205%20means,are%20listed%20on%20this%20schedule>

Bird species' conservation status is important

A bird species' conservation status is an important consideration for the project team and their experts. This helps determine the potential impact a new airport could have on a species overall.

To understand the threat to a species, DOC and external conservation scientists created the New Zealand Threat Classification System (NZTCS) in 2001.

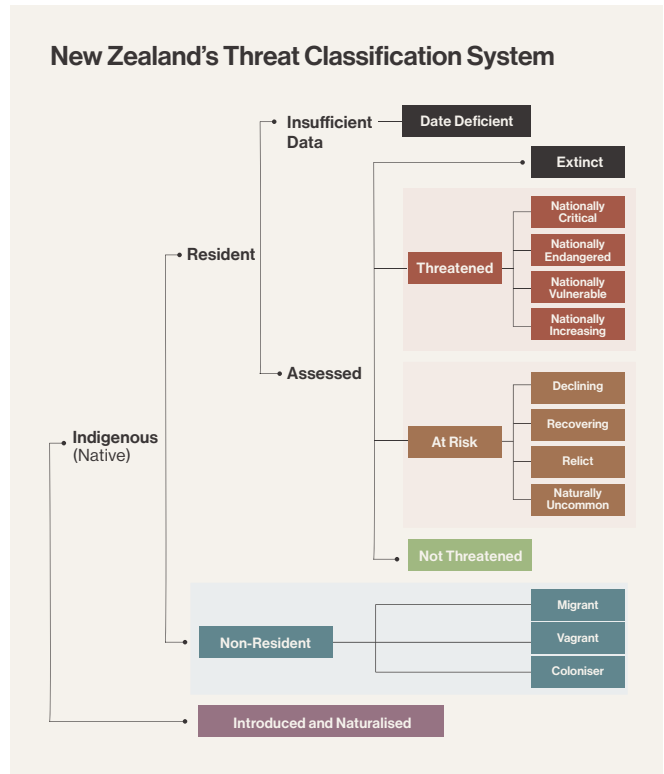
The conservation status of 491 bird species is assessed using this system.

Experts from New Zealand's scientific community make a number of assessments when determining the conservation status of a species, including:

- What's the current population size? This can be the number of breeding adults or the area of occupied habitat.
- How much is the population estimated to rise or fall over either the next three generations or 10 years (whichever is longer)?
- If the population is stable, has it declined in the past?
- Is the population state a result of human-induced effects?

Panels of experts reassess the status of each species group every five years to ensure its currency.

The revised (2020) structure of the NZTCS is shown below.



A variety of bird species exist in Central Otago

An initial review found up to 49 different species of birds have been recorded on the proposed airport's 750-hectare site and its wider landscape.

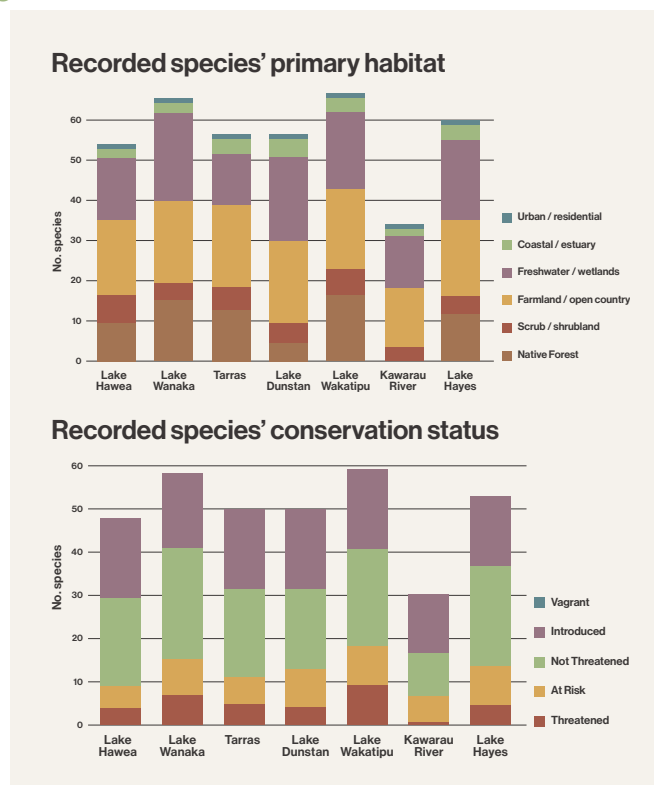
That is not to say that all 49 species will be found on the site but some of these are within the vicinity and may traverse the location.

The majority of the landcover on the site comprises pasture grass with scattered exotic trees, including several shelterbelts. Based on the on-site habitat, resident species are likely to be widespread common native (Not Threatened) and introduced pastoral species such as finches, starlings and silver-eye.

It is possible that some braided river birds such as South Island pied oystercatcher could roost, forage and nest on the invertebrates in the pasture grass.

Across the wider region, the greatest species diversity can be found at Lake Wakatipu (58 species) which also has the most Threatened and At Risk species.

More detail on the species recorded at each location, their conservation status and habitat associations is set out in the Appendix of this document.



The Upper Clutha is an Important Bird Area

The Dunstan Upper Clutha River is recognised as an Important Bird Area due to the presence of an estimated 35 nests for breeding black-fronted tern (Threatened).

Black stilt (Threatened – Nationally Critical) and black-billed gull (At Risk - Declining) have been recorded on the Clutha/Mata-au River and at the head of Lake Dunstan, where a number of other species are confirmed or likely to be breeding.

Bendigo Wetland, at the northern end of Lake Dunstan, is the closest Otago Regional Council significant wetland to the proposed airport site. It is approximately 9 km to the south-west and beneath a potential aircraft flight path.

A number of Threatened and At Risk species have been recorded at Bendigo Wetland and Lake Dunstan, including Australasian crested grebe, black shag, little shag, banded dotterel, black-fronted tern,

South Island pied oystercatcher, black-billed gull, southern falcon, marsh crane and grey duck.

Australasian crested grebe and New Zealand scaup are consistently recorded throughout much of the year, as are the common widespread waterfowl species and shag.

Early information suggests national migrants are observed primarily during the summer months, with one international migrant (an eastern bar-tailed godwit) observed in a winter month. Marsh crane were only recorded in early autumn.

Although most of the Lindis River is not classified as a braided river, the lower 1.5 km delta area is braided when the river has sufficient flow. Surveys conducted between October 2014 and January 2016, observed eight braided river bird or waterfowl species. Pied stilts and black-fronted tern were the most numerous species observed throughout those surveys.

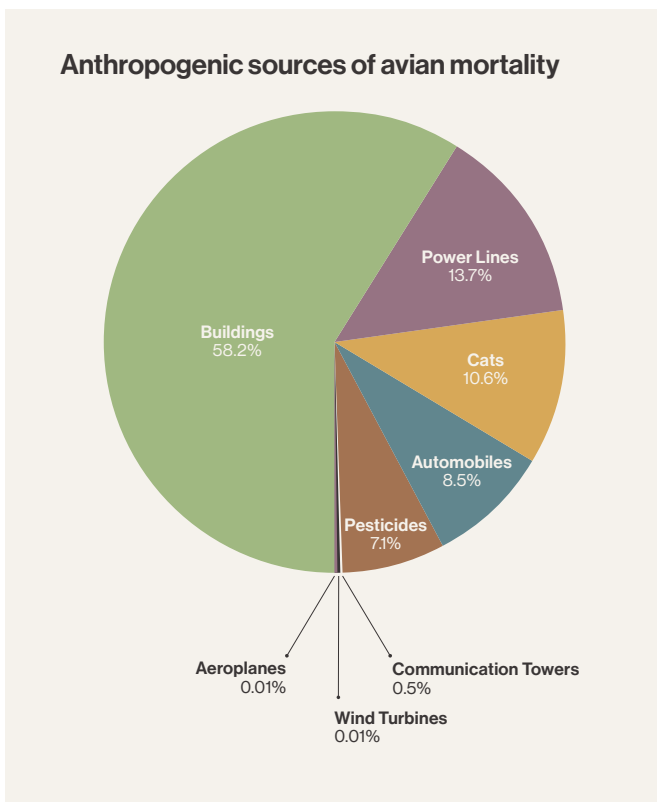
Aviation collision is not a significant mortality risk for birdlife

The flighted nature of most birds means they do collide with structures, both moving and static.

A study in the United States analysed bird deaths from anthropogenic sources including collisions with human-made structures.

The primary anthropogenic cause of avian mortalities was in relation to collisions with tall buildings (58.2%), with aircraft being responsible for only an estimated <0.01% of deaths.

Thus, while not a major cause of birdlife mortality as a whole, aircraft collisions involving Threatened or At Risk species need to be given due consideration, given that population numbers or trends of these species generally make them more vulnerable to any kind of impact.



Native birds forage, roost and nest in close proximity to airports around New Zealand

A number of airports around New Zealand are located in close proximity to significant populations of native bird species, a number of which are Threatened or At Risk. For example:

- Auckland Airport is surrounded by the intertidal mudflats of the Manukau Harbour, an internationally and nationally significant site for thousands of Threatened, At Risk and Migrant shorebirds. Species forage on the intertidal mudflats immediately adjacent to the runway and continue to do so in the presence of departing and arriving aircraft.
- Nelson Airport is adjacent to the Waimea Inlet where some 52 estuarine species have been recorded on the tidal flats and saltmarsh areas, and the inlet itself has been identified as a site of international and national importance for a number of shorebird species.

- Napier Airport is situated near the Ahuriri Estuary which is utilised by over 70 species of resident and migratory waterbirds.
- Christchurch Airport is located to the south of the nearby Waimakariri River which is home to breeding colonies of black-billed gull.



Aerial image of Auckland Airport and surrounding intertidal mudflats within the Manukau Harbour. The area provides for many thousands of Threatened and At Risk wading and shorebird birds.

Themes are emerging from initial work



The majority of species identified on the proposed airport site include Not Threatened and Introduced pastoral species, however several At Risk river bird species have been recorded breeding on the lower Lindis River to the south of the airport site.



Over the wider Central Otago landscape, there are large waterbodies (wetlands, lakes and rivers) which are used by a high diversity of avifauna species, including Threatened and At Risk species. There are a lot of similarities between the species assemblages at the various lakes, with most appearing to have a number of resident species including waterfowl and shag. A number of species associated with freshwater often use a network of habitats across a landscape.



Seasonal patterns were observed in the data in relation to the presence of specialist riverbirds such as South Island pied oystercatcher, banded dotterel, pied stilt, black-billed gull and black-fronted tern; these species were largely absent during the non-breeding (autumn / winter) months.

A comprehensive assessment of direct and indirect effects will be undertaken

Direct effects are those that have the potential to permanently remove habitat or result in injury to or the mortality of birds. These are generally considered to have the greatest potential impact on the local or national population of the affected species.

Available desktop information indicates there is likely to be limited impacts on avifauna through direct habitat loss during construction, as the site itself does not appear to provide significant breeding habitat for Threatened or At Risk species.

While the pasture may provide roosting and foraging opportunities for species, there are other areas of similar habitat nearby that could provide the same function.

Initial indications are the loss of habitat under the project footprint would not result in a significant adverse effect on local or national populations of Threatened or At Risk species.

Indirect effects are those that may reduce available habitat (effective habitat loss through disturbance or displacement from that area), contaminate that habitat, or affect the ability of a species to forage, roost or nest effectively.

Disturbance activities could occur during both the construction and operational phases of the project.

Disturbance to avifauna may result in short or long-term displacement, decreased feeding rates, unattended nests (leading to incubation failure and increased opportunities for predators), and energy and time costs. These potential impacts will be thoroughly and carefully assessed.

Threatened and At Risk species are generally considered to be more vulnerable to the potential impacts of disturbance due to their small population sizes and/or declining numbers.



Next steps

Christchurch Airport is using qualified experts to carefully and thoroughly scope the potential impacts.

Existing desktop information provides a high-level overview but constraints and information gaps exist.

Our experts will continue with the collection of sufficient field data on the avifauna assemblages, including species, abundance, behaviours both at the proposed airport site and across the wider landscape (including the Bendigo Wetlands).

This work will inform the expert effects assessments that will form part of any planning assessment.

This includes understanding the effects of birdlife on aviation operations and the development of a draft Birdlife Hazard Management Plan as discussed in the information paper, entitled '*The effects of birdlife on aviation operations; How airports and birds co-exist (a 'pilot's eye view') – Avifauna: Part II*'.

The information provided in this paper is of a preliminary and general nature and for informational purposes only. Information may change as further, more detailed, investigations are undertaken.

Appendix

Species	Threat Classification*	HABITAT										LAKE HAWAIA		LAKE WANAKA		TARRAS		LAKE DUNSTAN	LAKE WAKATIPU	KAWARAU RIVER	LAKE HAYES		
		Native forest	Exotic forest	Scrub/shrubland	Farmland/open country	Freshwater/wetlands	Coastal/Estuary	Urban/residential	eBird hotspot	DOC plots	eBird hotspot	DOC plots	eBird hotspot	DOC plots	eBird hotspot	DOC plots	eBird hotspot	DOC plots	eBird hotspot	DOC plots	eBird hotspot	DOC plots	
Beltbird	Not Threatened																						
Brown creeper	Not Threatened																						
Kea	Threatened																						
Kereru	Not Threatened																						
Kingfisher	Not Threatened																						
Longtailed cuckoo	Threatened																						
Mohua/yellowhead	At Risk																						
Morepork	Not Threatened																						
Parakeet spp	At Risk																						
Shining cuckoo	Not Threatened																						
South Island fantail	Not Threatened																						
South Island kaka	Threatened																						
South Island robin	At Risk																						
South Island rifleman	Not Threatened																						
South Island tomtit	Not Threatened																						
Tui	Not Threatened																						
Weka	Not Threatened																						
Blackbird	Introduced																						
California quail	Introduced																						
Chir bunting	Introduced																						
Grey warbler	Not Threatened																						
Pheasant	Introduced																						
Rock wren	Threatened																						
Silvereye	Not Threatened																						
Canada goose	Introduced																						
Chaffinch	Introduced																						
Chukar	Introduced																						
Duncock	Introduced																						
Goldfinch	Introduced																						
Greenfinch	Introduced																						
House sparrow	Introduced																						
Little owl	Introduced																						
Magpie	Introduced																						
NZ pipit	At Risk																						
Redpoll	Introduced																						
Skylark	Introduced																						

* Robertson et al. (2021) with qualifiers (Rolf et al., 2021) : CD=Conservation Dependent (CDB indicates the need for only good biosecurity); CI=Climate Impact; CR=Conservation Research Needed; De=Designated; De=Data Poor; Recognition; DFS=Data Poor Size; DPT=Data Poor Trend; EF=Extreme Fluctuations; IE=Island Endemic; Inc=Increasing; OL=One Location; PD=Partial Decline; PF=Population Fragmentation; RF=Recruitment Failure; RR=Range Restricted; SO=Secure Overseas; Sp=Sparse; TO=Threatened Overseas.

