Birds New Zealand Conference

Scientific Days Programme and Abstracts

Scientific Day Presentations
Saturday 1st June 2019

0900	Opening and Welcome	
	Session 1	**Launch of the New Zealand Bird Atlas**
	Chair:	**Bruce McKinlay**
0915	**McArthur & Bell**	Introducing the New Zealand Bird Atlas
1000	Morning tea	*Sponsored by Greater Wellington Regional Council*
	Session 2	**Keynote Address**
	Chair:	**Natalie Forsdick**
1030	**Digby**	Kākāpō - the next challenge
	Session 3	**Wellington Birds**
1115	**de Lisle**	Wellington Region Birds – Projects, sightings & issues
1145	**Cotter**	Establishing an artificial seabird colony – the results five years on
1200	Lunch	
	Session 4	**Auckland Island Symposium**
	Chair:	**Ian Armitage**
1300	**Miskelly**	Explorers, ship-wrecks, coastwatchers and lost gold – the ornithology of the Auckland Islands
1345	**Russell**	The introduction and impacts of land mammals on birds of the Auckland Islands
1400	**Elliott**	Population decline in Gibson's and Antipodean wandering albatrosses
1415	**Rexer-Huber**	Fisheries bycatch and the black box of biology: white-capped albatross
1430	**Taylor**	Movements and activity patterns of white-headed petrels breeding on Adams Island (Auckland Island group)
1445	Afternoon tea	
1515	**Parker**	Kārearea / New Zealand falcon in the Auckland Islands: distribution, habitat and morphology
1530	**Shepherd**	Genetic analyses reveal an unexpected refugial population of subantarctic snipe
1545	AGM	
1930	Informal Dinner	

Scientific Day Presentations
Sunday 2nd June 2019

	Session 1	**Old DNA and Old Bones Plenary**
	Chair:	**Bruce McKinlay**
0830	**Rawlence**	The ancient DNA revolution: how this new tool has radically changed our understanding of New Zealand birds
0900	**Tennyson**	A summary of the extinct species of birds recently described from New Zealand
	Session 2	**Seabirds**
	Chair:	**Bruce McKinlay**
0930	**Whitehead**	Threats to seabirds in northern New Zealand
0945	**Mattern**	Homesick for the Subantarctic? The epic journeys of Fiordland penguins / tawaki outside the breeding season
1000	Morning tea	
	Session 3	**Seabirds (*continued*) and General**
	Chair:	**Colin Miskelly**
1030	**Fischer**	Burrowing in sand and urupā*:* lessons learned from a breeding biology study of the Whenua Hou diving petrel
1045	**Sagar**	Maximising success: translocation does not negatively impact stress reactivity and development in petrel chicks
1100	**Friswold**	The Impacts of Light Pollution and Other Fallout Factors on a Native Hawaiian Seabird
1115	**Schlesselman**	More birds in the bush – large-scale restoration across complex forests
	Session 4	**General**
1130	**Reid**	Understanding attacks by kea on sheep in the South Island high country
1145	**Erastova**	Is it really so sweet to feed sugar water to native birds? Insights into urban feeding practices
1200	**McKinlay**	The Dunedin Town Belt Project: using five minute bird counts to build capability and community engagement
1215	Lunch	
	Session 5	**Tracking Migration**
	Chair:	**Sharon Alderson**
1315	**Amaya-Perilla**	Tracking migration: What technology is out there and what can we do with it?
1330	**Battley**	Why does godwit migration timing vary across New Zealand?

1345	**Holdaway**	First tracking of shining cuckoo migration using geo-locators and investigation of their non-breeding habitat use by stable isotope analysis
1400	**Bradshaw**	Bird migration, data migration
1415	**Gale**	Shorebird nest - searching in the Alaskan Arctic
1430	3-minute Poster Talks	
1445	Afternoon tea and Posters	
	Session 6	**General**
	Chair:	**Keith Woodley**
1515	**Bulgarella**	Risk assessment of permethrin exposure on a passerine bird: Implications to protect Darwin's Finches from an avian parasite in Galápagos
1530	**Galbraith**	Motu Kaikoura: recovery of terrestrial avifauna over 12 years of "minimal interference" restoration
1545	**Hunter-Ayad**	Predicting takahē habitat in Kahurangi National Park following a reintroduction
1600	**Sutherland**	Do conservation translocations influence song diversity: New Zealand Saddleback, a model system
1615	**MacFarlane**	The long-term consequences of genetic rescue on the reproductive success of two inbred South Island robin populations
1630	**Marsland**	AviaNZ: Software and Research into Acoustic Monitoring of Birds
1645	**Castro**	Unobtrusive monitoring of kiwi
1930	Conference Dinner	

2019 Birds New Zealand Conference Abstracts

New Zealand Bird Atlas

Nikki McArthur and **Mike Bell**

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Birds New Zealand is embarking on a major new citizen science initiative to map nationwide patterns in the occupancy and abundance of all of New Zealand's bird species, called the New Zealand Bird Atlas. The bird occupancy component of the scheme will be launched on the 1st June 2019, and will involve mobilizing thousands of volunteer observers to record the presence of bird species within 10 x 10 km grid squares across New Zealand. Bird 'presence' data will be structured into complete species checklists, and will be entered into the New Zealand eBird database.

In addition, Birds New Zealand will investigate the feasibility of adding a bird abundance component to the scheme, which will likely consist of observers carrying out 5-minute point-distance counts and randomly pre-selected locations within each 10 x 10 km grid square.

An outline will be presented on the sampling design and field methodology for this scheme, and provide a plan for implementing the scheme, including a description of the infrastructure and a recommended approach to managing the project.

Kākāpō - the next challenge

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The kakapo is one of the world's most intensively managed species, and monitored using some of the most advanced conservation technology. As a result, the population is expanding fast, with two consecutive record breeding seasons resulting in a 60% population increase in four years. In 2019 all 49 adult females bred, laying 249 eggs: 60% of the entire total laid since conservation efforts began 37 years earlier.

This increase brings challenges. An expanding population requires more reliance on remote monitoring methods to enable recovery to continue with greater efficiency. In addition, high infertility continues to hamper growth, with only 1/3 of eggs resulting in fledged kakapo. We highlight these challenges and the technological and management methods employed to overcome them, and address one of the biggest, best headaches: where to put all these new chicks?!

Wellington Region Birds – Projects, sightings & issues

Geoffrey W. de Lisle

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This talk will cover some of the bird-associated activities in the Wellington region, especially those which have involvement of Birds New Zealand members. Monitoring birds is an important activity which includes a number of different programmes, carried out by multiple agencies. The Greater Wellington Regional Council has been surveying birds in its region and most notably has been at the forefront of the use of eBird. Recently, there have been translocation of rifleman to Zealandia, fernbird to Pauatahanui and Mana Island, and white-faced storm petrels to Mana Island. These translocations all require monitoring to determine whether or not they have been successful. Wellington Harbour is a focus of birding activity with ongoing longitudinal studies on the nesting success of little penguins and banded dotterel and a new Birds New Zealand Harbour survey, part of the series which dates back to 1975. An ongoing issue in the Wellington Region is the increasing recreational use of beaches, often in areas which are important habitat for birds. Proposed developments around the Wellington Harbour include the dredging of the harbour, new cycle/pedestrian ways and an extension to the airport, all of which may adversely affect birds using the harbour. Longitudinal studies provide data for assessing adverse effects of new developments and also offers suggestions as to how these effects can be mitigated. There is an increasing need for information to address the question as to how much effect the suburban predator control programmes are having on bird numbers and the range of species.

Establishing an artificial seabird colony – the results five years on

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In pre-European times, fluttering shearwaters bred on Matiu/Somes Island in Wellington Harbour. In 2010, a sound system was installed playing their calls from dusk till dawn each night to attract passing adults to an artificial colony set up there. A small number of adults were drawn in but no breeding occurred. During 2012–2014, 237 fluttering shearwater chicks were translocated from Long Island in the Marlborough Sound to Matiu/Somes Island to assist in establishing this artificial colony. Monitoring of the artificial colony has occurred since then with overnight visits being made each month. Each adult captured on the colony has been sexed using DNA. Five years after the last translocation of chicks, this monitoring has established when fluttering shearwaters first return to the colony and first bred along with return rates of cohorts as well as comparisons between sexes.

Explorers, ship-wrecks, coastwatchers and lost gold – the ornithology of the Auckland Islands

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The Auckland Islands are the largest and most biologically rich of New Zealand's subantarctic islands, with eight endemic bird taxa. They also have a rich human history, with the survivors of several shipwrecks relying on the local wildlife for vital sustenance. However, there has never been a comprehensive account of the birds of the Auckland Islands. We collated more than 22,600 unique bird records collected since 1807 into a database, which we used to document the status of each of 143 bird species, and the history of ornithological discovery and research in the group. Close to 76% of these observations are unpublished. The two main sources of records were Heritage Expedition ecotourism wildlife logs (5961 records) and 'Cape Expedition' (WWII coastwatcher) logbooks and archives (4889 records). Recording rates peaked in 1942, with 1537 records, most of which were contributed by Charles Fleming. Many species are reported from the islands for the first time, including confirmation of the first New Zealand record of Macquarie Island shag (*Leucocarbo purpurascens*), and details about the first welcome swallow (*Hirundo neoxena*) record for New Zealand. Records were strongly biased both seasonally (with 95% of recent records collected during November-February) and spatially, with 43% of the land-based birds records reported from Enderby Island (1.2% of the land mass). Research on Auckland Islands' birds has also been strongly biased, with most effort focused on large surface-nesting seabirds and/or species affected by fisheries by-catch. Several endemic taxa remain poorly known.

The introduction and impacts of land mammals on birds of the Auckland Islands

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Since its European discovery at least ten species of land mammals have been introduced to the Auckland Islands. Many species died out and required multiple introductions before establishing. For those populations that naturalised, cattle *Bos taurus* occupied Enderby Island and were eradicated in 1991, goats *Capra aegagrus hircus* remained restricted to the northern end of Auckland Island and were eradicated in 1991, while pigs *Sus scrofa* spread across the entire Auckland Island and remain today. Rabbits *Oryctolagus cuniculus* established on Enderby and Rose Islands and were eradicated in 1993. Cats *Felis catus* and

mice *Mus musculus domesticus* were both first recorded in 1840 on Auckland Island and remain today. Brushtail possums *Trichosurus vulpecula* were liberated in 1890 but did not establish. Collectively, cattle, goats, sheep, pigs and rabbits transformed habitat and ecosystem processes, and suppressed tussock and mega herbs, on Auckland, Enderby, Rose, Ewing and Ocean Islands. Cats and pigs are together responsible for the extirpation or major reduction of surface-nesting and burrowing seabird colonies and ground-nesting land birds from Auckland Island. Disappointment Island remained free of introduced mammals while Adams Island had only minimal impact. Humans also had direct impacts on birds through hunting for consumption, with large surface-nesting seabirds severely impacted around Port Ross. The Auckland Island merganser was driven to extinction by mammal predation and museum collecting. Eradication of pigs, cats and mice from Auckland Island and Masked Island would remove the last introduced mammals from the New Zealand subantarctic island group.

Population decline in Gibson's and Antipodean wandering albatrosses

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Gibson's wandering albatross nesting on Adams Island in the Auckland Islands and Antipodean wandering albatrosses on Antipodes Island have been monitored annually since 1991 and 1994 respectively. On each island there is a study area in which demographic data is collected and two other areas in which all nests are counted. These data provide an accurate picture of the population trajectories of the two albatrosses. In addition, the at-sea distribution of the birds was monitored during the 1990s using satellite tags, and again during recent years using geolocator loggers. Up until 2004 populations of both were increasing: Antipodean birds quickly, and Gibson's more slowly. Since 2004 both populations have declined due to high mortality, particularly amongst females, and the reductions in abundance were accompanied by decreased nesting success. The decline in Gibson's wandering albatross has now almost stopped and the marked sex imbalance has almost disappeared. In contrast the Antipodean birds continue to decline and there are still many more males than females. The population declines were accompanied by changes in the at sea distribution of both taxa. Since the population crashes both have foraged over larger ocean areas, and female Antipodean birds now regularly visit the coast of Chile – something they rarely did in the 1990s. We speculate on the role of changes in oceanic conditions and fisheries bycatch in these declines.

Fisheries bycatch and the black box of biology: white-capped albatross

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The white-capped albatross is endemic to the Auckland Islands, with ~95% of the population breeding on Disappointment Island. White-capped albatrosses are caught as incidental bycatch in commercial fisheries in New Zealand and around the Southern Hemisphere. To understand the risk of fisheries to seabird populations, robust information on key aspects of biology like survival, productivity, recruitment, trends and foraging areas are vital. A white-capped albatross study area, established on Disappointment Island in January 2015, has been revisited annually to collect data for estimating demographic parameters like adult survival and for population trend assessment. Tracking data from birds in the study area build on existing data on the at-sea range of white-capped albatrosses. A time-lapse nest camera trial in 2018 tested suitability for estimating nest survival, fledging dates, and colony return dates. We discuss what is known about population trends, and provide preliminary estimates of adult survival to test whether the study will provide robust, meaningful survival estimates. The nest camera trial provided tentative dates of fledging and adult returns to the colony, along with preliminary chick survival rates.

Movements and activity patterns of white-headed petrels breeding on Adams Island (Auckland Island group)

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White-headed petrels are the largest of 34 species of *Pterodroma* petrels (weight 600g). Several birds breeding on the northern slopes of Adams Island were selected for an opportunistic study to assess their at-sea foraging range and gather information on their breeding cycle and breeding biology. Small archival tags (BAS geolocation tags recording light levels, sea water contact and sea temperatures) were attached to leg bands on 14 birds in 2011-12 and 10 individuals (6 females, 4 males) were recovered with tags from 2012-14. White-headed petrels start returning to colonies between mid-August and early October. The courtship period can be short with females spending just 2 days in the burrow before departing on exodus. By contrast males can spend a month inside burrows guarding their nests from intruders. The pre-laying exodus is possibly the longest recorded in any bird species with one female away for 77 days before laying. Incubation shifts are also very long, typically 19 days but extending to 21 days ashore. Chicks are fed infrequently by both partners (sometimes more than a week between meals) and feeds are delivered up to mid-May. After breeding the birds disperse widely with most going west of the Auckland Islands into the Indian Ocean but some staying in the Tasman Sea and others going into the South

Pacific Ocean. Most foraged west of the Auckland Islands during the breeding season, using the deep pelagic seas between Australia and Antarctica. Birds can penetrate cold polar seas reaching temperatures of -1 degrees.

Kārearea / New Zealand falcon in the Auckland Islands: distribution, habitat and morphology

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The kārearea / New Zealand falcon *Falco novaeseelandiae* includes the Auckland Islands in its range, but none of New Zealand's other sub-antarctic islands. The Auckland Islands are characterised by a sub-antarctic climate of high wind and rainfall, average temperatures in the single digits and large populations of a number of seabird species available as prey to falcons.

Little is known about the population distribution, demographic rates or breeding biology of kārearea in the Auckland Islands. The objective of our work was to describe the population distribution of kārearea in the Auckland Islands based on historical information and contemporary surveys. In addition, we compared morphological measurements of Auckland Island kārearea with kārearea measurements from the southern South Island of New Zealand.

Kārearea have been recorded throughout the Auckland Island group, but the majority of records are from islands without introduced mammalian predators, particularly Adams Island where most ornithological work has been conducted. Historical records revealed evidence of nesting in most habitats on mountainous Adams Island: in rata forest on the north coast, mega-herb dominated cliff sites on the south coast and inland at tussock dominated sites at 440 m asl. We were able to identify fourteen nesting areas used on Adams Island. Surveys revealed pairs nest in relatively close proximity to one another. We suggest that the majority of the Auckland Island breeding pairs are on Adams Island, perhaps as many as 17 pairs. We did not find any morphological differences between Auckland Island and southern South Island kārearea.

Genetic analyses reveal an unexpected refugial population of subantarctic snipe

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Auckland Island snipe *Coenocorypha aucklandica aucklandica* are presumed to have occurred throughout the Auckland Island archipelago, but became restricted to a subset of the islands following mammal introductions. Snipe were known to have survived on Adams Island, Ewing Island and Disappointment Island. However, it is uncertain whether snipe were continually present on Enderby Island and/or adjacent Rose Island. These islands lie near Ewing Island, and both hosted a suite of introduced mammals until the last two species were eradicated in 1993. Using SNPs generated by ddRAD-Seq we identified four genetically distinct groups of snipe which correspond to the expected three refugia plus a fourth comprised of Enderby Island plus Rose Island. Each genetic group also exhibited private microsatellite alleles. We suggest that snipe survived *in situ* and undetected on Rose and/or Enderby Island in the presence of mammals, and discuss the conservation implications of our findings.

The ancient DNA revolution: how this new tool has radically changed our understanding of New Zealand birds

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Since the first publication in 1992 of ancient DNA from the extinct moa, this scientific tool has radically changed our understanding of New Zealand birds. Ancient DNA is defined as degraded, fragmented and chemically modified DNA extracted from subfossil and archaeological remains. Combined with radiocarbon dating, stable dietary isotopes, and morphological analysis, ancient DNA has become one of the go to tools in New Zealand ornithology. Utilising New Zealand's rich subfossil and recent archaeological record, ancient DNA has revolutionised what we know of the origin of New Zealand's birds, their taxonomy, how the bird dominated pre-human ecosystem functioned and responded to climate change and human impact, and what the future may hold.

A summary of the extinct species of birds recently described from New Zealand

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Since 2006, 37 new taxa of bird have been described from New Zealand on the basis of fossil remains. These taxa were found in deposits of the following epochs: Paleocene (4), Eocene (1), Oligocene (2), Miocene (22), Pliocene (1), Holocene (7). The richest areas for discovering new species were the lacustrine deposits of the St Bathans region of Central Otago; all 22 Miocene records come from here. The new Paleocene, Eocene and Oligocene species are from marine sediments in Canterbury and Otago, while the Pliocene species is from a marine site in Taranaki. Five of the 7 Holocene taxa come from the Chatham Islands. A diverse range of species have been described: 1 kiwi, 7 ducks, 1 palaelodid, 10 penguins, 3 petrels, 1 shag, 2 herons, 1 adzebill, 2 rails, 2 wading birds, 2 pigeons, 4 parrots and 1 songbird. The current rate of discovery of extinct New Zealand bird species is unprecedented, for example, only 18 taxa from the Paleocene to Pliocene epochs were described between 1859 and 1997, compared with 30 described in the last 13 years.

Threats to seabirds in northern New Zealand

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Seabirds are the most threatened group of birds globally. Northern New Zealand hosts a huge diversity of seabird species, some found nowhere else in Aotearoa or the world. To establish a baseline from which to work on researching and conserving these species, we must first understand what they're up against. The Northern New Zealand Seabird Trust and a team of regional seabird experts has produced a review of threats to seabirds in northern New Zealand, drawing on both regional and international literature. Broadly, threats are categorised into several topic groups: Invasive species, fisheries, pollution, climate change, disease, and direct human impacts (disturbance, coastal development). The review identifies knowledge gaps regarding both threats to seabirds and the biology of seabird species that need addressing, but also highlights the need for rapid action to mitigate threats. This

template could be adopted by groups elsewhere in New Zealand and overseas for protecting and enhancing seabird populations.

Homesick for the Subantarctic? The epic journeys of Fiordland penguins / tawaki outside the breeding season

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Crested penguins are generally considered archetypal penguins of the Subantarctic region. One key feature of the Subantarctic oceans are frontal systems where water masses of different physical properties meet. At such fronts, physical processes accumulate penguin prey creating predictable forging conditions. Consequently, crested penguins are known to target fronts. Fiordland penguins or tawaki, however, breed in the temperate region of the New Zealand mainland. Breeding tawaki stay remarkably close to their breeding colonies when raising chicks owing to the highly productive coastal waters. However, satellite tracking revealed that once chicks have fledged tawaki undertake epic southward journeys to forage beyond the Subantarctic front, some 2000 km southwest of the mainland, despite having only 8-10 weeks before entering annual moult. Particularly puzzling about this behaviour is that breeding concludes in late spring when coastal productivity around the mainland reaches its peak, so that in theory there should be plenty of food for the penguins to prepare to moult. After the moult, the penguins leave on 4-month long winter journeys. We are currently using satellite transmitters to follow the penguins' movements through their winter dispersal. Available data indicates that tawaki again target the Subantarctic and even the Polar frontal systems. Tradition rather than necessity could be the one explanation for this behaviour. We propose that, fundamentally, tawaki remain Subantarctic penguins that, by breeding in the temperate regions of New Zealand, are avoiding the general trend of declining crested penguin populations observed elsewhere.

Burrowing in sand and urupā: lessons learned from a breeding biology study of the Whenua Hou diving petrel

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* Student presentation

Detailed knowledge of breeding biology and breeding success is key to developing conservation strategies to restore threatened populations of seabirds. The Whenua Hou diving petrel (*Pelecanoides whenuahouensis*; WHDP) is a 'Critically Endangered' burrowing Procellariiform seabird. Due to the small remaining population size on Whenua Hou (Codfish Island), the species requires conservation management. Data on WHDP breeding biology and success, however, are anecdotal due to I) the fragility of the sand dune in which the WHDPs breed, and II) the presence of urupā (Māori burial grounds) within this dune. In 2017-18, we used a burrowscope to study WHDP breeding phenology and success (n = 151 presumed WHDP nests) and nest boxes (n = 10) to study chick growth curves. WHDP breeding phenology was structured as following: arrival: 12 September, laying: 09 October, hatching: 26 November, post-guard: 3 December, and fledging: 11 January (mean dates reported). The time between arrival and laying is extremely short for any Procellariiformes ($\bar{x}$ = 26.5 days). Preliminary WHDP breeding success rates were: lay rate = 0.87, hatch rate = 0.75, fledge rate = 0.85. We documented factors affecting WHDP breeding success, including competition for nest sites with Common Diving Petrels (*P. urinatrix*; CDP) and Mottled Petrels (*Pterodroma inexpectata*), and interbreeding attempts between WHDPs and CDPs. All 25 interbreeding attempts failed at egg stage. Nest boxes remained mostly unused (only one chick fledged in 2017-18), limiting information on growth curves. The continuation of detailed WHDP breeding biology studies will facilitate the development of future conservation strategies.

Maximising success: translocation does not negatively impact stress reactivity and development in petrel chicks

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Translocations of petrel chicks are increasingly recognised as a powerful conservation tool with multiple benefits: restoring species to their former range, restoring lost land-sea ecological linkages and 'spreading the risk' for threatended species. However, translocations are stressful events and could induce chronic stress in petrel chicks, resulting in energy divergence away from growth and condition, with potentially ongoing negative effects throughout the birds' lives. This research aims to define how translocation impacts stress reactivity and development in petrel chicks and to use this information to guide best-practice for petrel translocations.

Mottled petrels (*Pterodroma inexpectata*) are a target for major translocation-restoration programmes across New Zealand. We measured total corticosterone from mottled petrel chicks at regular intervals coinciding with key translocation events from two groups: one that underwent translocation according to current best practice (Translocation group), and a group that remained in the natal colony (Control group). Growth, weight and fledging parameters of the Translocation group were compared against a multi-year source colony average. There was no difference in stress reactivity between Translocation and Control chicks, or development between Translocation and chicks at the source colony. Petrel translocation practitioners may proceed in the knowledge that current practices did not induce chronic stress or alter stress reactivity in mottled petrel chicks, and therefore are unlikely to negatively impact post-fledging survival, and their capacity to establish viable colonies. We caution that these results may not apply to other petrel species with different life-history strategies to mottled petrels, and encourage testing in a wider range of species.

The Impacts of Light Pollution and Other Fallout Factors on a Native Hawaiian Seabird

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The attraction to light was a previously beneficial behavior for seabirds. The invention of artificial light is now negatively impacting survival due to distraction and disorientation, leading to fallout and often death. Hundreds of wedge-tailed shearwaters (WTSH, 'Ua'u Kani, *Ardenna pacifica*) experience fallout each fledging season across O'ahu, possibly due to artificial light pollution. It was hypothesized that presence of artificial light was a significant factor contributing to fallout, compared to other fallout factors. From 2002 to 2010 standardized surveys were conducted on the Southeastern shore of O'ahu during the WTSH fledging season. The location of downed WTSH as well as the presence of an artificial light source or fallout factor within 25 feet was analyzed along transects. We employed spatial and temporal analyses to determine if a correlation existed between likelihood of fallout with presence of artificial light and other fallout factors. The effects of wind, lunar cycles, colony size/proximity, and power lines were also analyzed. It was found that artificial light was present in 94% of recovered WTSH, power lines in 83% and that fallout has been steadily increasing over time despite some years of decline. This research suggests artificial lights

and power lines are negatively impacting seabirds, one of the most endangered taxonomic groups. The results can improve management of seabird colonies near urban areas and direct management by assessing colony risk to fallout based on exposure to fallout factors. The information will assist with proactively resolving human-wildlife conflict concerning a federally protected species.

More birds in the bush – large-scale restoration across complex forests

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The goal of the "More birds in the bush" research program is to improve the ability to forecast predator threats and bird responses across New Zealand's different forests now and under future climates. An important aspect we want to understand is how impacts of forest productivity (e.g. climate, species diversity, fertility, etc.) and pest mammals combine to produce population outcomes in native forest birds. This is complex, because forest productivity and pest mammal abundance are related and the interacting effects on bird population outcomes not well understood. We are collating existing data on native forest bird demographic rates (fecundity; juvenile and adult survival) to model relationships between demographic rates and pest mammal density as well as forest productivity. In addition, we will convene expert panels to obtain distributions of demographic rates in relation to pest mammal densities and for different forest types, for forest bird species for which no data are available. We will also conduct field studies of selected species to add to the existing database and further our understanding of bird population responses across New Zealand's forests. Using the collated data and our research, we hope to increase ability to model forest bird population trajectories over large scales as functions of pest mammal density and of forest productivity.

Understanding attacks by kea on sheep in the South Island high country

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An ongoing case of human-wildlife conflict in New Zealand occurs between high country sheep farmers and kea (*Nestor notabilis*) as a result of intermittent predatory behaviour ('kea strike') of kea towards sheep (*Ovis aries*). Although the conflict has occurred for 150 years, it is not well documented. Kea are endangered and rapidly declining, and as the conflict continues to have an economic impact on farmers and results in kea mortality via lethal control, an understanding of the phenomenon and its implications is required to address the problem. To this end, we examined sheep flocks on five high country stations in Whakatipu,

Otago, to formally characterise kea strike wounds, and calculate their prevalence and the risk factors involved. We also conducted an online survey of farmers to gauge their experiences of kea strike, and carried out behavioural experiments with wild kea to examine potential underlying behaviours of kea strike. We found that kea strike wound prevalence was low (0–1.25%), with the majority (80%) of wounds being in the loin (lumbar) region. Although the response to the online survey was low (~7.6% of applicable stations), it provided valuable data for a descriptive study. The results of our behavioural study indicate that a limited number of kea initiate kea strike, and that they are innovative, exploratory males of high social rank. The results of this research can be used to inform kea conservation management decisions regarding farmer-kea conflict, to the benefit of farmers, their stock, and the kea population.

Is it really so sweet to feed sugar water to native birds? Insights into urban feeding practices

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Many householders in New Zealand attract native birds into their gardens by feeding sugar water. However, little is known about how sugar-water provisioning affects bird behaviour and health. Despite the benefits of this practice for humans, there are concerns around reliance of birds on the artificial food source and increased contact resulting in disease transmission and aggression.

We conducted an online survey aimed at revealing typical New Zealand sugar-water feeding practices in urban gardens. The survey included 25 questions on preferred feeder types, sugar concentrations, solution composition and cleaning methods, as well as motivations to feed, demography and whether people preferred to support native species versus introduced. We received 990 responses from New Zealanders, with 58% of them providing birds with sugar water in their private gardens or backyards. We outline the main trends in people's feeding practices and underlying motivations, and we present a portrait of a typical kiwi feeding householder.

Based on the survey data we selected 16 private gardens in Auckland and Dunedin with existing sugar-water feeders. In December-February 2018-2019 we conducted field work at these sites to assess potential risks for visiting birds (e.g., disease transmission and increased aggression). Data on visitation rates and aggressive behaviour were obtained via direct observations. Additionally, focal species (bellbird, tui, and silvereye) were caught in mist-nets, colour banded and data on body condition and disease prevalence were collected. Here we discuss trends in bird abundance, diversity, behaviour and disease load between the two cities.

The Dunedin Town Belt Project: using five minute bird counts to build capability and community engagement

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Maintaining bird observation skills and providing opportunities for people to develop bird recording skills is an ongoing challenge. In Dunedin, Birds New Zealand Otago Region, has developed a project to address these issues. We have marked a series of fixed point stations along 5 km of the Dunedin Town Belt and developed a five minute bird count project that local member's, friends and others can participate in and submit real data. 805 counts from two sampling sessions have been completed by local members. It was initially designed to focus effort during the months of October and November and is starting to build a baseline of the relative abundance of birds in the Town Belt.

At the same time Birds NZ have engaged with community groups who are identifying the Town Belt as: a source of biodiversity in the city; a site for learning outside the classroom; and an urban restoration site. So far, we have developed links with Town Belt Kaitiaki and Dunedin Amenities Society both of which have a need to develop monitoring techniques to support their projects. We highlight the networks of people who want to develop five minute bird count skills and who want to gather real data to inform their projects.

Tracking migration: What technology is out there and what can we do with it

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For four decades VHF radio tracking has offered a much deeper insight into avifauna than binoculars and a notebook can offer. Since the turn of the century, new technologies have reduced in size and power consumption to the extent that they are becoming suitable for use on progressively smaller species. Tracking highly-migratory or dispersing species becomes a reality where it was difficult-to-impossible using beeper radio tracking. Improved location accuracy and reduced power consumption allow much finer spatial and temporal scale studies to be conducted. For small migratory bird species, the Motus Wildlife Tracking System provides an international collaborative research network that uses a coordinated array of automated logging radio-receivers to track the movement and behaviour of small flying organisms. Geolocators and Store on Board GPS provide a solution for small migratory birds that can be recaptured after a long-term study. For bigger migratory birds, GPS with remote download and PTT Satellite tags can provide a solution. However, the challenge of a wider range of options can make the selection of the most appropriate technology difficult. In this talk we look at the different technologies and discuss how they can be used for birds no matter what their size is.

Why does godwit migration timing vary across New Zealand?

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Godwits are consistent animals. They return to the same non-breeding sites year after year, and migrate on consistent schedules that differ between individuals. Drawing from a large body of banding and individual resighting work around New Zealand, we explore the process by which birds settle on a non-breeding site, and how this early-life decision may directly affect lifelong patterns of behaviour. Most godwits migrate north for the first time aged 2, 3 or 4, and they may explore widely around New Zealand during these early years before settling on a non-breeding site. Measurements confirm that birds from across the breeding range settle throughout the country and there is no genetic structure between sites. Given the lie of the land in New Zealand, there are only relatively small differences in flight lengths from northern and southern New Zealand to the East Asian stopover sites used on northwards migration and no expectation of different migration schedules at different sites. It was therefore a great surprise to find that, while larger birds tended to migrate earlier than smaller birds at all sites (reflecting the Alaskan breeding gradient), birds from southern New Zealand departed on migration 10–11 days earlier on average than North Island birds. In the absence of convincing adaptive explanations, a latitudinal response to photoperiod seems to be a likely generator of the regional differences in migration timing.

First tracking of shining cuckoo migration using geolocators and investigation of their non-breeding habitat use by stable isotope analysis

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Two adult shining cuckoos, *Chrysococcyx lucidus lucidus*, were fitted with geolocator (GLS) units at Kowhai Bush, Kaikoura, and recovered in their following breeding season at the same site. Both birds migrated to the Bismarck Archipelago. Each made two non-stop trans-oceanic flights of 2500+ km in both their northward and southward migrations. Maximum and

minimum temperatures recorded at 4-h intervals for one bird allowed the times and dates of departure and arrival to be defined, recorded the timing of movements near the Equinoxes when GLS accuracy is poor, and supported GLS evidence for significant, non-migratory movements at other times. Carbon and nitrogen stable isotope ratios of feathers from other birds showed that individuals returned to the same isotopic space at their non-breeding area, within a wide species' isotopic niche. Data from one breeding site do not record the full range of migration directions and timing for shining cuckoos but provide the first direct evidence for the migration tracks and other movements of these small, and often cryptic, birds.

Bird migration, data migration

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The New Zealand National Bird Banding Scheme curates banding data spanning almost a century, and we are in the process of migrating some 2 million records into a new database. The data migration process mimics bird migration in many respects, including various sources, a staging area and a final destination only reached by those data that are in the best 'condition'. Data are converted from several different formats into a standardised template (Version 9.2), after which error-checking scripts identify and separate 'unfit data' from the migration stream. Data that are 'fit' (for purpose) will migrate to the final database, enabling analysis and reporting. Progress so far totals 229,691 records migrated, including >30,000 inventory records, and almost 200,000 individual birds of 96 species; an update will be provided at the Birds NZ Conference. Some of the errors that have been picked up during this process include the same band placed on two different birds, birds resighted a decade before being banded, or even dying twice – future resightings have even been foretold! In trying to track individual birds – as with bird migrations – we have also identified the need to keep track of individual banders, some of whom have tens of aliases. Lessons learnt include not only the value of data standardisation and keeping old records for reference, but most importantly the extent to which banding data are intricately linked not only to the birds but to the banders.

Shorebird nest - searching in the Alaskan Arctic

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It was a great privilege to spend seven weeks in Utqiaġvik (formerly known as Barrow) in Alaska between May – July 2018 volunteering as a shorebird nest finder for the Fish and Wildlife shorebird group led by Rick Lanctot. With peak solar intensity and duration, the Alaskan Arctic rapidly comes to life in late May to June resulting in: widescale snow and ice melt, growth and flowering of Arctic tundra plants, emergence of insects and the spectacular

mass arrival of seabirds, waterfowl and shorebirds, most who have migrated here to try and breed. We located shorebird nests by walking through established quadrats on the tundra searching for signs and behaviour cues of nesting shorebirds and later on in the season by rope-dragging to flush out the most cryptic birds. We also monitored located nests every five days to document nesting success, re-sighted colour banded birds, collected environmental data on avian predators, lemmings (i.e., alternative food for predators), snow melt, and invertebrates. Our most commonly encountered shorebird species were dunlin, semipalmated sandpipers, American golden-plovers, pectoral sandpipers, red-necked phalarope, red phalarope, and long-billed dowitchers. We (and the birds) were faced with daily challenges including very harsh conditions, late snow melt and the odd surprise polar bear visit to our plots. The complex data collected as a part of this ongoing trial, continues to be used by Rick and his team to understand shorebird life-history parameters, food and habitat requirements and the changing matrix of threats in the face of rapid climate change at this latitude.

Risk assessment of permethrin exposure on a passerine bird: Implications to protect Darwin's finches from an avian parasite in Galápagos

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Philornis downsi is a bird-parasitic fly native to mainland South America that invaded the Galapagos Islands where it is pushing some Darwin's Finch species over the brink of extinction. Flies lay eggs in bird nests and the larvae feed on nestlings, often killing them. Protecting Galapagos landbirds from this parasite is a conservation priority. A short-term solution involves providing permethrin-treated cotton to the finches or injecting wild nests with permethrin. However, the risk of permethrin to long-term bird health and reproduction has not been formally tested. Our experiment represents a worst-case scenario to determine the effects of exposure to permethrin in zebra finches (*Taeniopygia guttata*) across consecutive generations. The experiment consisted of two treatments. Treatment finches received nesting material sprayed with 1% solution of permethrin and control finches received nesting material sham-fumigated with water. The parental generation laid two clutches of eggs (F1.1 and F1.2). Adults reared from the F1.1 clutch were used to establish a second generation (F2). Blood was drawn to evaluate liver function by assaying aspartate aminotransferase and bile acids levels. Permethrin treatment affected hatching mass for both the F1 and F2 generations. Birds exposed to permethrin produced smaller nestlings than controls. The F2 control birds hatched all nestlings, whereas F2 treatment pairs only

fledged 70% of nestlings. Treatment had no effect on liver function tests for any generation. Our study represents a worst-case scenario and permethrin exposure for birds in the field would likely be much lower than doses tested in this experiment.

Motu Kaikoura: recovery of terrestrial avifauna over 12 years of "minimal interference" restoration

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Motu Kaikoura in the Hauraki Gulf, New Zealand, was gazetted as a scenic reserve in 2004. The 564ha island has almost complete vegetation cover, though the canopy has little diversity, reflecting a long history of anthropogenic degradation. Ecological restoration has taken a "minimal interference" approach, allowing the island to revegetate naturally and without species translocations. Management actions have focussed on the eradication of invasive plants and mammals. Fallow deer (*Dama dama*) were eradicated in 2008, but a rodent eradication attempt in the same year failed. Rats (*Rattus* spp.)are currently managed at low density. An initial bird survey in 2006 recorded thirty-seven bird species, including 25 species of land or wetland birds, and 12 species of seabirds and shorebirds. Since this survey, three further species, korimako (bellbird *Anthornis melanura*), kākāriki (red-crowned parakeet *Cyanoramphus novaezelandiae*) and koekoeā (long-tailed cuckoo *Eudynamys taitensis*), have been recorded. Annual surveys of the terrestrial bird species since 2006 provide an insight into the nature of ecological recovery where species' translocations have not been a restoration action. The abundance of insectivorous species has fluctuated from year to year, but, generally, the trend is of increasing abundance. Frugivorous species, relatively scarce at the start of the survey period, are still at low abundance but have shown a gradual increase in abundance. These increases are considered to be correlated with vegetation recovery following the release from browse pressure. We will present the differing patterns of species' recovery on Motu Kaikoura, and consider the island's restoration future.

Predicting takahē habitat in Kahurangi National Park following a reintroduction

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In March 2018 takahē, nationally vulnerable flightless rails, were reintroduced to the Kahurangi National Park in New Zealand. As habitat attributes (quality, area and fragmentation of habitat patches) are a key factor influencing the potential success of any reintroduction, gaining an increased understanding of these attributes in Kahurangi is a vital first step in informing the management of the reintroduced population. We produced correlative habitat suitability models to create a data-driven model of takahē habitat requirements. First we used subfossil records to identify broad climatic tolerances. Then records from a relict population in the Murchison Mountains, Fiordland, were used to identify fine-scale habitat patterns based on structural attributes. These models were combined to generate a predictive takahē habitat quality map for Kahurangi National Park. The accuracy of these habitat quality predictions was assessed with GPS tag data collected from the released birds. Actual use of the landscape was compared to a null model assuming non-selective use of space, but biased towards locations proximal to the release sites for each bird. The results show that the released takahē are preferentially using areas with higher habitat quality scores as predicted by the habitat model. Having confirmed the ability of the habitat model to successfully predict habitat selection by reintroduced takahē, the next step will be to identify habitat-matrix thresholds for this model, enabling predictions of total habitat area, fragmentation and carrying capacity to be made in Kahurangi, which will be of high value for the management of the reintroduced population.

Do conservation translocations influence song diversity: New Zealand Saddleback, a model system

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One of the most intriguing features of songbirds is in the formation of distinct, geographical song dialects – or cultures. Song learning from conspecifics is a crucial aspect of songbird ecology as song cultures can have important consequences for the survival and reproduction of individuals and potentially contribute to speciation through their influence on mate choice. That being said, conservation translocation procedures commonly measure their success on the preservation of genetic diversity and consequently the impacts of these practices on cultural processes goes largely overlooked. With growing evidence emphasising the importance of preserving socially transmitted song cultures, the conservation tactics employed at Tawharanui Nature Reserve, New Zealand for the North Island Saddleback / Tīeke (*Philesturnus rufusater*) provides us a unique case study.

To maximise song diversity, the group composition of Saddleback selected to be reintroduced into Tawharanui was composed of birds from three culturally distinct island populations. Our research intends to examine how the cultural evolution of the species is affected by simultaneously reintroducing culturally divergent populations into the same area. Indeed, this presents us with the ability to investigate how song dialects permeate through a fragmented landscape and to test the cultural processes that shape/drive the movement. Do

increased cultural mutation rates following translocation cause new dialects to rapidly form? Have translocation efforts of the past caused rapid cultural contact barriers to form, thus impacting effective population size? Are there song learning biases? Exploring these questions and their results will have profound impacts on conservation management policies moving forward.

The long-term consequences of genetic rescue on the reproductive success of two inbred South Island robin populations

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Anthropogenic activities have led to large declines in New Zealand's bird populations, leaving many species with limited genetic diversity and exhibiting signs of inbreeding depression. Previous studies have shown it is possible to increase genetic diversity and reduce inbreeding via translocations of individuals from outbred populations of the same species (genetic rescue). However, in New Zealand, few outbred populations survive to use as donors for genetic rescue. In 2008, we took a novel approach by using a reciprocal translocation between two highly inbred island populations of South Island robin (*Petroica australis*). The reciprocal translocation was a success in the short-term, increasing multiple fertility measures, but the long-term effects of genetic rescue on fertility are unknown. If the genetic divergence between source and donor populations is too great fitness traits may decline due to outbreeding depression, while allelic diversity is likely to be lost over the long-term due to genetic drift. To establish the long-term outcomes, we revisited the two populations and repeated fertility measures a decade after the genetic rescue. We observed several life-stage specific heterozygosity fitness correlations and population-wide breeding changes. Breeding success for the number of eggs hatched was positively correlated with male and female heterozygosity. A significant increase in chick survival to one month of age was observed within the populations, but no correlation was observed with the parent's heterozygosity scores, suggesting that chick heterozygosity is important at this stage. Importantly, no outbreeding depression was observed. The results of this experiment highlight the long-term value of using inbred populations of endangered species as donors to increase population viability when outbred donors are not available.

AviaNZ: Software and Research into Acoustic Monitoring of Birds

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Many ecologists, ornithologists and managers love their acoustic recorders. They are a great way to know what is happening in the bush, and whether wildlife management programs are

working. Unfortunately, while getting data with an acoustic recorder is easy, getting the right data is a bit harder, and analysing that data is even harder! In this talk, we will provide a brief overview of the AviaNZ software, which provides tools to assist in the analysis of acoustic recordings of birds. The software is free and easy to use. It enables the user to visualise and listen to recordings, manually label them, train filters to recognise different species (which can be shared between people), and quickly and easily review the outputs of the recognition. We are continually adding new features and facilities to the software as we develop them. This long-term, inter-disciplinary project is a collaboration between ecologists, mathematicians, and statisticians, aiming to provide real tools for birdsong analysis. We are also working on establishing protocols for the use of acoustic recorders to monitor New Zealand birds efficiently and effectively, statistical methods to turn the outputs of these into useful umbers to improve outcomes for wildlife, and demonstrations on many bird species of importance to New Zealand.

Unobtrusive monitoring of Kiwi

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How do we know about the conservation status of our cryptic, nocturnal national bird? One way is monitoring the populations using acoustic recorders and camera traps. As part of the AviaNZ project, we have been using these methods to monitor several species of kiwi, or have been given data by those that are doing their own monitoring. We are analysing these data, and calibrating the results with other methods that are used to establish population sizes, such as call count surveys and good old-fashioned radio-telemetry. We have designed a protocol for the use of acoustic recorders that people can use to have the best chance of detecting changes in kiwi population density. We really want people to think about, use this protocol, and use our analyses methods to look at the resulting data. We have developed software, to both look at the calls and automatically recognise kiwi calls of different kiwi species, that is freely available for use at www.avianz.net. We have also considered the best metrics to use to turn the recorded sounds into *call rate densities*, based on statistical analysis methods, and we have ongoing projects to work out how to turn this number into an *estimate of population*. While this talk will focus on kiwi, our methodologies are designed to be applicable to other bird species as well.

Poster Abstracts

Surveying the coastal birds of the Wellington Region

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Large stretches of the Wellington Region's coastline are inaccessible, resulting in an incomplete picture of the coastal birds' abundance and distribution. The regional council wanted to address this to support planning for marine oil spill response and biodiversity protection. We divided the coastline into 1km stretches to survey the mainland on foot and the offshore islands by boat across the summers of 2017/2018 and 2018/2019. From these surveys we have mapped the spatial patterns in shorebird abundance and distribution, and the occurrence of nesting colonies of gulls, shags and terns. Kapiti and Mana Islands, along with Castlepoint, emerged as important nesting colonies for gulls, shags and terns. The Waikanae River, Otaki River, Ngakauau Stream near Castlepoint, and Opouawe River in the south Wairarapa emerged as the most species rich estuaries, important for coastal birds. Other species rich estuaries included: Makara Stream west of Wellington, Oteranga Stream on the Wellington south coast, Hutt River, Motuwaireka Stream at Riversdale Beach, estuaries around the Porirua Harbour and the Whakataki and Mataikona Rivers on the north Wairarapa coast. Black-fronted dotterel were encountered at three locations along the south-eastern Wairarapa coast. New Zealand dotterel were encountered at three locations along the eastern Wairarapa coast, while banded dotterel were encountered around the whole Wellington Region coast. Reef heron were recorded from Wellington, Kapiti coast and northern Wairarapa, with one record near the Pahaoa River on the east coast.

Responses of avian feeding ecology to anthropogenic environmental changes

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In this project, we are investigating if avian populations can rapidly respond to anthropogenic impacts via changes in their feeding ecology. Moreover, we want to assess if such changes can predict the success of conservation actions. New Zealand birds are particularly interesting because the translocations of some populations are analogous to large-scale experiments, which end up exposing birds to new environments. Using museum specimens, we are creating two long-term datasets of feeding ecology and trophic niche: (1) a dataset of stable isotope signatures (nitrogen and carbon) of feathers; and (2) a dataset of morphology, including traditional measurements and geometric morphometrics, focusing on bill shape. We are studying 10 endemic New Zealand bird taxa, divided into three closely-related groups: (a) Nestoridae + Strigopsidae (kakapo, North and South Island kaka); (b) Callaeidae (North and South Island kokako, North and South Island saddlebacks, and huia); (b) Meliphagidae (tui and bellbird). We contacted ca. 60 museums from New Zealand and overseas and discovered that 40 of them housed New Zealand specimens (in Australia, Austria, Canada, Denmark, Germany, Italy, Ireland, Japan, Finland, France, Netherlands, New Zealand, Poland, Russia, Spain, Sweden, Switzerland, UK and US). So far, from 20 of those, we obtained 420 feather samples and over 1000 bill photos, of specimens collected across 239 years (1780 – 2019). Here, we present some preliminary results of the stable isotopes part, based on a subsample of 200 feathers.

Exploring a different niche: geek birds, science communication and animal conservation

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Works of fiction can contribute to science communication and environmental education. This now goes beyond books and movies, including video games, board games, comic books and all sorts of entertainment that are broadly labelled “geek culture”. Thus, it should be a no-brainer that we can use this niche to begin conversations about science and conservation. There are several ways to use this largely untapped potential: (1) directly using games in education, especially those with more ecological bent such as Valleys Between (Little Lost Fox, New Zealand) and Wingspan (Stonemaier Games, USA). (2) getting parent companies to join in conservation efforts, such as the partnership between Rovio (creators of the Angry Birds franchise), WWF and BirdLife. (3) Using the (often) cute critters from games and comics as a starting point in science communication, as is done by the Journal of Geek Studies (https://jgeekstudies.org). The scientific exploration of games and comics by scientists and communicators can be done from simple questions like “what real-life bird was the inspiration for that Pokémon?” to much more complex stories involving all branches of Biology and Palaeontology. Having science and the entertainment industry crossing paths is still a very recent phenomenon and it largely depends on museums, universities and environmental bodies to forge this link. Birds are charismatic animals (some more than others) and thus are perfect for this kind of initiative.

Hidden diversity in the present and past avifaunas of New Zealand: have we saved the North and South Island saddlebacks?

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Conservation efforts are shaped, constrained, and often targeted according to data on relationships (systematics), crystallised in technical taxonomic publications and checklists. Taxonomic treatments based on limited data have sometimes led to misplaced optimism in the conservation status of species. An example is the change in effort resulting from the separation of the brown teal from the Auckland Island teal, based on two independent genetic studies. Similarly, assumptions of taxonomic homogeneity have allowed translocations of bird populations that would not be countenanced for plants. Examples of taxa from moa to dotterels and passerines will be presented that suggest that, as result of geographic and volcanic events over the past 100,000 years, higher levels of evolutionary diversity exist (and existed) in the New Zealand than is appreciated at present. Much of that potential diversity does not figure in any management plan today. As a corollary, extinctions may have bitten deeper into the diversity of both marine and terrestrial birds, and be threatening even more of the surviving diversity than we might wish to know. This leads to many questions for conservation management, not least of which is: Do we even know half of what we have lost or what has actually been saved? Do we even still have the North and South Island saddlebacks?

Status report: Maukahuka – Pest Free Auckland Island

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The New Zealand Subantarctic Islands are some of the least modified island systems in the world and are globally recognised for their incredibly high biodiversity, ecological and cultural values. Auckland Island (46 000ha) is the largest island in the Auckland Islands group, which are both the largest and most biologically rich of all the New Zealand Subantarctic island groups. During the 19th century more than ten species of mammals were introduced to the Auckland Islands by European sealers and settlers. Today pigs, cats and mice remain on main Auckland Island and have caused extensive damage to its ecological values, significantly reducing the abundance and diversity of native species found there. A study commenced in September 2017 to investigate the feasibility of eradicating pigs, cats and mice from Auckland Island, the last island in the New Zealand Subantarctic region where mammalian pests remain. The eradication of any of the target species from Auckland Island will be a large challenge. Key difficulties relate to the remoteness, scale, inhospitable environmental conditions and a lack of pre-existing infrastructure. Earlier this summer the Maukahuka team commenced an ambitious field trials programme on Auckland Island to reduce uncertainty before the conclusion of the feasibility assessment. Testing ideas on site will go a long way to towards helping us understand what it will take to successfully undertake this project. The results of the summer trials and next steps towards eradication will be discussed.