Birds New Zealand Conference Te Anau 2017

Scientific Days Programme and Abstracts

Photo: Glenda Rees

Saturday 3 June

Time	
0730	Registration
0900	Introduction and Welcome (RR and President)
Session 1	**Chair: Bruce McKinlay - Part 1 – FIORDLAND BIRDS, Part 2 - YOUNG BIRDERS**
0915	**Thomas Mattern** - The Fiordland penguin / tawaki – our behaviourally most versatile penguin species?
0930	**Colin M. Miskelly** - Breeding petrels of Dusky Sound, Fiordland
0945	**Kerry Weston** - Breeding Ecology of the New Zealand Alpine Rock Wren
1000	**Maddie van de Wetering** - Restoration of a remnant mainland subpopulation via translocations from predator free islands: the Eglinton Valley mōhua story so far
1015	**Fiordland School Students** - Kids restore the Kepler
1030	**Amber Calman** – Young Birders – stories from the 2017 Youth Camp
1045	MORNING TEA
Session 2	**Chair: Ian Armitage - Part 1 – SHOREBIRDS, Part 2 - PASSERINES**
1115	**David S. Melville** - The Democratic People's Republic of Korea – a safety valve for shorebirds migrating through the Yellow Sea?
1130	**Colin F.J. O'Donnell** - Benefits of long-term integrated pest control for forest bird populations in the Landsborough Valley, South Westland
1145	**Mara Nydegger Bell** - Effects of mast-triggered 1080 pest control on South Island Robin survival and nesting success in Tennyson Inlet, New Zealand.
1200	**Mel Galbraith** - Seasonal differences in the distribution of the North Island fantail on Tiritiri Matangi Island – a preliminary analysis
1215	**Natalie Forsdick** - Genetic diversity and population differentiation within and between island populations of Chatham Island black robins and tomtits
1230	**Jenny Dent** - Memory informed foraging by Bellbirds
1245	
1300	LUNCH
Session 3	**Chair: Helen Taylor - BIRDS NZ SCHEMES AND PROGRAMS**
1400	**Ian Armitage / Lloyd Esler** - Progress in developing a digital database for the Beach Patrol Scheme for recording and reporting information about birds found dead on New Zealand coastlines
1415	**Michelle Bradshaw** - Bird banding database upgrade: from punch-cards to cloud-hosting
1430	**Catriona MacLeod** - Making the best use of citizen science data: NZ Garden Bird Survey
1445	**Terry Greene** - A national monitoring programme for common and widespread birds: a standardised framework
1500	**Helen Taylor** – How to Grow BirdsNZ: results from member and non-member survey
1515	**AFTERNOON TEA**
Session 4	**Chair: Colin Miskelly - SEABIRDS (SOUTHERN)**
1545	**Graham C. Parker** - First northern giant petrel Macronectes halli breeding population survey, Auckland Islands
1600	**Kalinka Rexer-Huber** - Conservation of New Zealand's white-chinned petrels: a numbers and distribution story
1615	**Rachael L. Sagar** - Can't touch this: regular handling reduces stress reactivity but not condition of semi-precocial mottled petrel chicks
1630	**Johannes H. Fischer** - Analyses of phenotypic differentiations among South Georgian diving petrel populations reveals an undescribed and highly endangered species from New Zealand
1645	**Hendrik Schultz** - Year-round distribution, movement patterns and diet of Chatham Island brown skuas
1700	***Housekeeping and General Notices***
1715	***Birds New Zealand 2017 Annual General Meeting***
1930	***Informal Dinner***

Sunday 4 June

Time	Workshops
08:30-10:00	eBird Workshop – Main Conference Hall – **Nikki McArthur**
07:30-11:10	Banding Workshop (departs Distinction at 0730) – **David Melville, Hannah Edmonds** *et al*.
08:30-09:45	Introduction to Ornithology – DOC Visitor Centre – **Bruce McKinlay**
08:30-09:45	Describing and Reporting (Unusual) Birds – Te Anau Scout Hall and Bird Park – **Lloyd Esler**

Time	Presentation
Session 5	**Chair: Colin Miskelly - INTERNATIONAL**
1015	**Francesca Cunninghame** - Ten years conservation of the Critically Endangered mangrove finch of the Galapagos Islands, is their future secure?
1030	**Karen Baird** - Beck's Petrel – a Pacific seabird enigma
1045	MORNING TEA
Session 6	**Chair: Keith Woodley - RIVERBED, WETLAND AND SHORE BIRDS**
1115	**Nikki McArthur** - An update on the status of black-fronted dotterels in the Wairarapa
1130	**Claudia Mischler** - How is the black-billed gull population doing?
1145	**Courtney H. Hamblin** - Colony movement patterns in black-fronted terns
1200	**Ann-Kathrin V. Schlesselmann** - Managing black-fronted terns in their dynamic landscape
1215	**John F. Cockrem** - Adverse effects of proposed sand mining on kororā (little penguins) and other seabirds in the South Taranaki Bight
1230	**Kevin Carter** - Saving the Southern New Zealand Dotterel
1245	LUNCH
Session 7	**Chair: Sharon Alderson - LAND BIRDS (NON-PASSERINE)**
1400	**Robin Toy** - Revised distribution and population estimate of great spotted kiwi in NW Nelson
1415	**David Vieco Gálvez** - Incubation in difficult conditions: The kiwi paradox
1430	**Harry S. Taylor** - The circadian cycle of oocyst shedding of Eimeria spp. affecting brown kiwi
1445	**Jane Tansell** - Landscape-scale trapping of stoats benefits Northern Fiordland tokoeka in the Murchison Mountains
1500	**Emmanuel Oyston –** Save Our Iconic Kiwi – Establishing landscape scale management for Fiordland tokoeka
1515	**Denise Martini** - Whole genome insight into Kea's alpine lifestyle
1530	AFTERNOON TEA
Session 8	**Chair: Lloyd Esler - SEABIRDS (NORTHERN)**
1600	**Graeme Taylor** - Return of the Chatham petrels – an overview of a successful recovery programme
1615	**Todd J. Landers** - The challenges of seabird monitoring by local government and what Auckland Council is doing about it
1630	**Lauren Roman** - Plastic Ingestion in Australasian Seabirds
1645	**Chris P. Gaskin** - Birds fly underwater – yeah right! - diving and foraging behaviour of petrels and shearwaters
1700	**Ivan B. Campos** - Preliminary results of an automatic identification of seabird calls from multispecies field recordings
1715	**Matt Rayner** - Breeding and non-breeding foraging behaviour by common diving petrel
1730	**Shae Vickers** - Comparing the foraging locations and stress physiology of Common Diving Petrels between colonies in the Hauraki Gulf
1745	***Housekeeping and General Notices***
1800	**POSTER SESSION**
1800	**Banding Advisory Committee Meeting (open)**
1930	***Conference Dinner***

Birds New Zealand Annual Conference 2017
Abstracts for Presentations in the Scientific Programme

The Fiordland penguin / tawaki – our behaviourally most versatile penguin species?

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With an estimated population size of 5,500-7,000 individuals, the Fiordland penguin / tawaki is currently ranked the third rarest penguin species world-wide after Galapagos and Yellow-eyed penguins. At the same time, it remains one of the least studied penguin species even through it lives and breeds on the New Zealand mainland. This also means that tawaki are exposed to anthropogenic activities and influences that range from large scale tourism operations and potential interactions with both inshore and offshore fisheries, to the effects of pollution and climate change. Many of these factors affect the penguins at sea, so that it is vital to gain basic understanding of the species marine ecology. Since 2014, the Tawaki Project is studying the species' foraging behaviour using GPS dive loggers. The study is conducted at three sites covering the species' entire breeding, at Jackson Head / West Coast, Milford Sound / Fiordland, and Whenua Hou. Preliminary results indicate that tawaki not only inhabit very variable oceanic environments but also show that substantial behavioural versatility allows the penguins to use these variable habitats effectively. Likewise, depending on habitat type environmental phenomena such as El Niño appear to have substantially different effects on the species. We will examine the site-dependent differences in foraging ranges and diving behaviour, explore the underlying factors determining these differences, and provide insights into a species that despite its (apparently) low population size may be doing better than many of our other New Zealand penguin species.

Breeding petrels of Dusky Sound, Fiordland

Colin M. Miskelly[1], Alan J.D. Tennyson[1], Jean-Claude Stahl[1], Andrew (Max) F. Smart[2] and Hannah K. Edmonds[2]
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A total of 49 breeding colonies of 3 petrel species was found on 44 of 56 islands surveyed in Dusky Sound, Fiordland National Park, in November 2016. Sooty shearwater (*Puffinus griseus*) was the most widespread and abundant species, with an estimated 21,400 burrows on 35 islands. Mottled petrels (*Pterodroma inexpectata*) were breeding on 12 islands (5500 burrows estimated), and broad-billed prions (*Pachyptila vittata*) on 2 islands (560 burrows estimated). Sooty shearwaters were found breeding among mottled petrels on 4 islands, and among broad-billed prions on 1 island. This is a 5-fold increase in the number of petrel colonies in Dusky Sound identified in published accounts, and the first estimate of their population sizes. Survival of most or all of these colonies is dependent on ongoing control of stoats (*Mustela erminea*) in Dusky Sound. Grey-backed storm petrels (*Garrodia nereis*) are considered likely to breed within Dusky Sound, with a minimum of 3 birds seen at night at 2 widely separated localities.

Breeding Ecology of the New Zealand Alpine Rock Wren

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The ecology of rock wren (*Xenicus gilviventris*), a threatened alpine specialist, has been largely unstudied. This is in part due to the challenges that alpine ecosystems present to observational studies, but also due to the increasingly low density of most populations throughout their range. We report on the breeding ecology and nesting success from four rock wren populations within Fiordland and South Westland from 1983 – 2017.
Nesting commenced in October, with the construction of enclosed, spherical or pouch-like nests built into cavities. Nests were comprised predominantly of native grasses and insulated with moss, feathers, and often fur from introduced mammals. Both parents were found to construct nests; and share incubation, brooding and feeding of chicks. However, males roosted away from the nests at night. The incubation period lasted for 19.6 ± 0.1 days (n=33, range 18.0 – 22.3 days), followed by a nestling period of 24 ± 0.2 days (n=33, range = 21-26 days).
Clutches comprised 2-5 eggs (mean = 3.97 ± 0.11, n = 31), though less than one chick on average fledged per nest (mean= 0.97 ± 0.28, range 0 – 4, n= 30). Replacement clutches were common after nest failures and successful double-clutching was also observed within seasons.
Nesting success was determined for 133 nests, and was highly variable between year, sites and predator management regimes (0 – 90%). Daily nest survival estimates were higher at sites where predator control was implemented. Using infra-red cameras, we identified stoats (*Mustela erminea*) as the primary predators of nests, though we also found evidence of rodent and possum predation.

Restoration of a remnant mainland subpopulation via translocations from predator free islands: the Eglinton Valley mōhua story so far

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The Eglinton Valley, Fiordland had been a stronghold for mōhua (yellowhead; *Mohoua ochrocephala*) until two consecutive beech mast events in 1999/2000 resulted in predator irruptions causing a catastrophic decline in mōhua numbers in the valley. Since then a combined predator control approach has been implemented by the Department of Conservation over a large area of the valley, and increases in several other species (kaka, long-tailed and lesser short-tailed bat species) have been observed. Mōhua numbers were considered too low to be viable/recover without the input of additional birds, and so in 2010 a translocation of 69 mōhua from predator free Chalky Island/ Te Kakahu was implemented. Each bird was colour banded allowing for individual recognition, and nest success and movement post release were monitored. There have been two follow up transfers in 2015 and 2016 from Anchor Island/Pukenui. This presentation is a discussion of the results seen so far, and how island to mainland transfers of this nationally vulnerable species do not seem to be as straightforward in their outcome as those seen in mainland to island translocations.

Kids Restore the Kepler project

Lane McDuff[1], Keela Matthews[1], Callum McMurtrie[2], Beth McBride[2], Nina Zink[2]

[1]Fiordland College, [2]Te Anau School

Imagine a 3000 hectare prime piece of habitat made safe for NZ birds, insects, lizards and bats. Imagine a brilliant reserve that happens to also be one of Aotearoa's Great Walks. And now imagine that the driving force behind this remarkable restoration project is the next generation of New Zealanders!
Kids Restore the Kepler is a major conservation project with a difference. As well as having conservation goals seeking to restore birdsong in the area, the project also has a strong education focus. The project aims to help Fiordland's young people, from pre-school through to college, develop knowledge, values and skills so they can be confident, connected and actively involved in caring for their environment.
Kids Restore the Kepler is led by the Fiordland Conservation Trust in partnership with the Department of Conservation, Fiordland College, Te Anau School, Mararoa School, Fiordland Kindergarten and Southern Stars Early Learning Centre.

The Democratic People's Republic of Korea – a safety valve for shorebirds migrating through the Yellow Sea?

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The Yellow Sea is a critical stopover site for many shorebirds migrating along the East Asian-Australasian flyway. Extensive land claim projects in China and the southern provinces of the Korean Peninsula, together with degradation of remaining intertidal habitats are resulting in population declines of many shorebird species, including Bar-tailed Godwits and Red Knots from New Zealand. The West Sea coast of the DPRK remains relatively little developed at present. Surveys conducted by the Pūkorokoro Miranda Naturalists' Trust and the Nature Conservation Union of Korea in 2009, 2015, 2016 and 2017 have identified several sites of international importance for shorebirds and this information is being used by the Ministry of Land and Environmental Protection in preparation of a nomination proposal for the Ramsar Convention on Wetlands of International Importance.

Benefits of long-term integrated pest control for forest bird populations in the Landsborough Valley, South Westland

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The control of introduced mammalian predators has become a standard response to protecting the viability of threatened bird species in New Zealand. However, examples of successful outcomes of integrated pest control in forests are few. Monitoring of birds, particularly mōhua (yellowhead, *Mohoua ochrocephala*) in the Landsborough Valley, South Westland in the 1980s and 1990s showed significant declines in numbers following heavy beech seedfall and subsequent predator irruptions. We investigated the efficacy of a pest control programme in the Landsborough Valley, during 1998–2015, which used continuous trapping to control mustelids and pulsed aerial application of the toxin 1080 to control and rats (*Rattus* spp.) and brushtail possums (*Trichosurus vulpecula*). We predicted recovery in the populations of mōhua and other predator-sensitive hole-nesting birds and maintenance of kākā (*Nestor meridionalis*) numbers. Annual counts of four of 11 native bird species found at the site (bellbird *Anthornis melanura*, brown creeper *M. novaeseelandiae*, mōhua and tui *Prosthemadera novaeseelandiae*) increased during the study and no declines in other species were detected. Mōhua numbers on study transect increased from a low of 14 birds, to >300 in 2016. The predictive framework using beech seedfall as an indicator for determining when different forms of pest control were required was useful in the Landsborough Valley. These results suggest that the pest control strategy was sufficient to mitigate the impacts of predation on forest birds in the Landsborough Valley.

Effects of mast-triggered 1080 pest control on South Island Robin survival and nesting success in Tennyson Inlet, New Zealand.

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In recent years introduced mammalian pest control has changed its target species from possums (*Trichosurus Vulpecula*) to rats (*Rattus rattus*). It was not until the noughties that plague levels of rats and mass seeding (masting) of beech trees were linked to local bird extinctions, such as Mohua (*Mohua ochrocephala*) on Mt. Stokes, Marlborough Sounds. NIWA climate models can now accurately predict the likelihood of beech masts. This has allowed for aerial 1080 pest control operations to targeting rats specifically. This study is assessing the effectiveness of mast-triggered 1080 operations in coastal mixed forest at protecting South Island Robins (*Petroica australis*).
Robin survival and nesting success were monitored in a 1080 treatment and a non-treatment area of Tennyson Inlet, Marlborough Sounds. Birds were colour banded for five successive breeding seasons between 2012 and 2017. All accessible nests were fitted with motion triggered cameras to capture nest fates.
Over the five breeding seasons 217 nests were monitored. To establish baseline non-treatment predator pressures 101 nests in the non-treatment were monitored of which 23 nests fledged. Cameras accurately identified the cause of failure for 70% of camera fitted nests; 42% rat, 27% stoat and 20% possum predations, 11% natural failures including abandonment (N=4) and Morepork predation (N=1).
On average nests in the non-treatment area had a 22% chance of fledging that varied between 11% and 33%

per year. The nesting attempts in the treatment area immediately after 1080 application had a 70% chance of fledging. This dropped to 48% one year post treatment and to 14% two years post treatment. It is clear that without mammalian pest management, species like SI Robins will face a similar fate as Mohua in the Marlborough Sounds. Though finding the 'perfect' pest management approach is not yet clear for a mixed coastal forest system.

Seasonal differences in the distribution of the North Island fantail on Tiritiri Matangi Island – a preliminary analysis

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The fantail (*Rhipidura fuliginosa*) is an iconic species nationwide, and generally a conspicuous species in a range of habitats. However, their conspicuousness can be variable, and island populations of fantail have been documented to fluctuate dramatically. This project set out to investigate this variability on Tiritiri Matangi Island, and to pilot a sampling and analysis method based on Geographic Information Systems software. Fantail presence data was recorded over a period of three years at different seasons on Tiritiri Matangi Island. To address sampling bias in bird counts and facilitate the geostatistical process of monitoring data, the island was subdivided into uniform hexagonal cells which were then assigned to volunteers for monitoring during the months of May and December. Recorded count data was processed in ArcMap v10.2. Preliminary results suggest distinctive differences between the two months sampled as well as between different areas of the island. Significant hotspots as well as clustering of abundance show seasonally different distribution patterns, consistent across the survey period. The project also showcases citizen science in actively supporting research to generate the knowledge base required for evidence-based decision making.

Genetic diversity and population differentiation within and between island populations of Chatham Island black robins and tomtits

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Small island populations are particularly prone to extinction due to the effects of genetic drift and inbreeding reducing genetic variation and fitness of such populations. Furthermore, isolated island populations may experience population divergence due to drift or divergent selection. Reciprocal translocations of individuals between populations may be used to stimulate gene flow between such isolated populations. To determine whether populations of the endangered Chatham Island black robin *Petroica traversi* may benefit from such translocations, we compared levels of genetic diversity and differentiation within and among populations of the black robin and its sympatric sister-species, the Chatham Island tomtit *Petroica macrocephala chathamensis*. Although the black robin has recovered following a severe population bottleneck, the bottleneck and subsequent intense inbreeding experienced by the black robin have likely had long-term consequences affecting the viability of this endangered species. We analysed the genetic diversity and population structure of the black robin at 15 polymorphic microsatellite loci, and compared this to the level and pattern of genetic diversity from 17 polymorphic loci for the tomtit, which comprises three larger island populations. The black robin displayed a lower number of alleles and expected heterozygosity than the Chatham Island tomtit. We also found that island populations of both species have differentiated from one another, likely due to strong genetic drift acting independently on these populations over a period of isolation. Reciprocal translocations of black robins between islands are recommended to prevent further loss of diversity through drift, and so to improve

the probability of species persistence.

Memory informed foraging by Bellbirds

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Spatio-temporal heterogeneity in the distribution of nectar is a major constraint upon nectivorous species. As a result, many species have evolved the ability to anticipate the distribution of nectar via formation of complex, integrated memories. In this study we carried out a series of experimental trials to determine whether the foraging behaviour of bellbirds (*Anthornis melanura*) was influenced by previously collected spatial information. Adult bellbirds were trained to use sugar water feeders at three sites in Christchurch and Akaroa. Each trial consisted of four identical feeders; one feeder contained a high concentration reward (20%, 15%, and 10%) whilst the other three contained lower concentration rewards (5%). Trials ran for 48 hours and were divided into two phases; the search phase and the return phase. In the search phase, birds visited the feeders randomly which indicates that they were not relying on intrinsic cues, e.g. sight, smell. In the return phase, birds visited the feeders non-randomly. This suggests that bellbirds were using spatial information acquired during the search phase to inform future foraging decisions. Lowering the concentration of the high reward feeder did not affect the formation of memories but led to an increase in sampling behaviour.

Progress in developing a digital database for the Beach Patrol Scheme for recording and reporting information about birds found dead on New Zealand coastlines

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The 'Birds New Zealand' Beach Patrol Scheme commenced in 1951 and for more than 65 years has aimed to systematically document the identity and numbers of seabirds found dead on New Zealand beaches. Regular beach patrols by members of the society provides a unique long-term record and the data collected has helped to establish the occurrence and to some extent the distribution of more than 110 seabird species in New Zealand coastal waters. The development of a new internet-based digital data management system commenced in 2015 that will overcome existing technical shortcomings and will engage a wide group of members who can share in the beach records entry effort thereby ensuring that the database archive and data analysis is kept up-to-date.
Progress will be described in the development of a digital data management system in consultation with Dragonfly Data Science Ltd for archiving, analysis and reporting of Beach Patrol data. Through the volunteer efforts of several interested members data entry has progressed very well since 2015 and is leading towards the formation of a high quality database that will enable summaries and long-term trends for seabird species having a conservation threat ranking to be assembled.

Bird banding database upgrade: from punch-cards to cloud-hosting

Michelle Bradshaw[1] and **Sandy Taylor**[1]
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Bird banding and recovery data are vital to the conservation of threatened bird species. The imminent online interface and associated fit-for-purpose Bird Banding Database will significantly improve the public service provided by the Banding Office, contribute to the Department of Conservation's statutory responsibility of the management of marking systems on wildlife, and drive better species management outcomes. The current dataset holds over 1.5 million records of banded birds and 400,000 recoveries, representing millions of dollars of research investment since the first bird was banded in 1936. An average of 20,000 birds are banded in New Zealand each year and about 1,500 recoveries are reported to the Banding Office. The new online interface will facilitate the use of banding data and contribution to bird conservation objectives by the banding and birding community. Registered banders will be able to upload their banding schedules and recovery spreadsheets directly, and members of the public will be able to report sightings of banded birds through the same interface, receiving immediate feedback. Reports of banding and recovery data per species, region or project will be available subject to login privileges and data sharing agreements or moratoria. Of course, this system will only work if the database holds all the relevant records, and if it performs according to the expectations of the users. The Banding Office will therefore be requesting input from stakeholders as to their anticipated use and requirements of the system to incorporate these into the project.

Making the best use of citizen science data: NZ Garden Bird Survey

MacLeod CJ[1], Howard S[2], Green P[1], Gormley A[2], Spurr EB[3]
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Citizen science is increasingly being promoted as mechanism for improving NZ biodiversity reporting and management. To be successful, we need to ensure that the data gathered are used as efficiently and effectively as possible, while also learning how to enhance our citizen science efforts in the future. Here, we highlight the benefits of a new system for calculating and reporting garden bird trends at multiple scales (national, regional, towns and suburbs). Using specialist analytical tools, the system accounts for variation in the locations and types of gardens surveyed. It also provides online interactive tools that allow the user to explore the species and places of interest to them, as well as identify any trends that have triggered a conservation alert. In this talk, we will illustrate some of the advances made using 16 common garden visitors.

A national monitoring programme for common and widespread birds: a standardised framework

Terry Greene[1], James Mortimer[1], Paul Van Dam-Bates[1]

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The Department of Conservation is required to demonstrate to the government and report to several national and international agencies on progress toward achievement of conservation outcomes. The National Biodiversity Monitoring and Reporting System (NBMRS) has been designed to report on status and trend for species (native and pest), inform prioritisation for resource allocation, evaluate effectiveness of conservation management, and provide an early warning system for large-scale environmental disturbances. Broad-scale, unbiased and spatially balanced national monitoring of common and widespread species on PCL (Tier 1) has been implemented at >1300 locations using an 8 x 8 km grid on a 5-year rotation. 58% of these plots are currently classified as forest and the remaining 42% as non-forest locations. Bird monitoring is an important component of this programme. Data is collected using multiple sampling methods including five-minute bird counts, distance sampling, acoustic recording devices and incidental records. We demonstrate how the data is collected, analytical procedures, summary reporting formats and a vision for a comprehensive, meaningful, and

national bird monitoring scheme that everyone could contribute to.

How to grow Birds NZ: results from member and non-member survey

Helen Taylor, University of Otago, BirdsNZ council member

Growing and diversifying the BirdsNZ membership is an important part of ensuring the society's continued success. Attracting new members and retaining existing ones is challenging due to the competition for membership fees from a wide variety of other organizations. The BirdsNZ council recently conducted an online survey of members and non-members. Its purpose was to better understand our current membership and ascertain what we could be doing to attract more new members. We received responses from 415 members and 149 non-members of BirdsNZ. The majority (64%) of respondents were over 50 years old, reiterating the issue the society has in attracting the interest of younger people. Non-member responses highlighted the need to properly define the benefits of being a member of BirdsNZ, and to present a friendlier, more welcoming face of the society. Feedback from members reiterated the importance of field trips and the appetite for workshops and training opportunities. The survey also collected feedback on benefits offered by competing societies, the annual conference, the current website, and the possible change of the society's logo. I will discuss the survey results and potential plans for the future direction of the society that might attract a new, diverse cohort of ornithology enthusiasts.

First northern giant petrel *Macronectes halli* breeding population survey, Auckland Islands

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Northern giant petrels face conservation threats in terrestrial and marine environments. Introduced mammals at breeding sites cause nesting failures and may depredate adults. In the marine environment Northern giant petrels are threatened by incidental capture in commercial fisheries, pollution, human persecution and disturbance, and climate change.
The contemporary size and population trends of Northern giant petrels on New Zealand islands are not known. Records of their numbers in the Auckland Islands are based solely on anecdotal evidence, the most recent summary dates to the 1980s. We estimated the size of the Northern giant petrel breeding population and describe their spatial distribution in the Auckland Islands.
Surveys counted Northern giant petrel chicks on eight of the 15 islands visited in December 2015 and January 2016. Three of the eight islands were recounted in January 2017. Enderby Island had the largest breeding population, with 96 chicks counted in 2016 and 123 in 2017. This represents a large increase in the population on Enderby Island compared to the only historic comprehensive count on that island in 1988, when just two Northern giant petrel chicks were counted. No breeding Northern giant petrels were reported from two islands where the species has previously been recorded breeding.
Applying crude correction factors we estimate the breeding population in the Auckland Islands 2015-2016 to be approximately 340 (310-390) breeding pairs. Future monitoring of the Auckland Island Northern giant petrel breeding population is recommend. We also review the current state of knowledge of Northern giant petrels in New Zealand.

Conservation of New Zealand's white-chinned petrels: a numbers and distribution story

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Globally, white-chinned petrels are the seabirds most affected by incidental mortality in fisheries. Three of their eight breeding islands are in New Zealand's subantarctic, but information about New Zealand's white-chinned petrel populations is almost completely lacking. Since this species remains a major part of fisheries bycatch within New Zealand's EEZ, the information gaps pose serious challenges to conservation management. I focus on two main areas: estimating white-chinned petrel numbers in our region, and describing their at-sea distribution. Population size estimates for the Auckland Island and Campbell Island breeding populations establish baselines for future monitoring. Tracking data from Auckland and Antipodes white-chinned petrels show where they forage during the breeding season, and where they spend the rest of the year. These research areas are linked to discuss how small on-land studies can contribute to management of at-sea threats, in our back yard and internationally.

Can't touch this: regular handling reduces stress reactivity but not condition of semi-precocial mottled petrel chicks

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Handling of avian study species is common in ecological research, yet our understanding of stress reactivity in free-living avian young is limited. In this study we examined the cumulative impact of three levels of research-relevant handling (minimally, daily and every three days) on the development of the stress response, growth and condition of semi-precocial seabird chicks from near-hatching to near-fledging. We found that mottled petrel (*Pterodroma inexpectata*) chicks were capable of mounting an adult-level stress response from near-hatching, and regular handling had no negative effect on the growth or condition of chicks in any handling group. However, daily handling significantly reduced the capacity of chicks to respond to stress by six weeks of age, and baseline corticosterone levels were diminished by 12 weeks of age, likely due to desensitization of the hypothalamic-pituitary axis. Reduced stress reactivity may be particularly damaging for fledglings, and to an individuals' long-term fitness. Our findings highlight that there is no universal rule to explain stress responsiveness in avian young, and that chronic stress, exhibited as reduced stress activity, can result from research-relevant levels of handling in semi-precocial avian young.

Analyses of phenotypic differentiations among South Georgian diving petrel populations reveals an undescribed and highly endangered species from New Zealand

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Unresolved taxonomy of threatened species is problematic for conservation as the field relies on species being distinct taxonomic units. Differences in breeding habitat and results from a preliminary molecular analysis indicated that the New Zealand population of the South Georgian diving petrel (*Pelecanoides georgicus*) was a distinct, yet undescribed, species. We measured 11 biometric characters and scored eight plumage characters in 154 live birds and 73 study skins originating from most the known populations of *P. georgicus*, to assess their taxonomic relationships. We analysed differences with principal component analyses (PCA), factorial ANOVAs, and Kruskal-Wallis rank sum tests. Results show that the New Zealand population differs from all other populations through: 1) longer wings, 2) longer outer tail feathers, 3) deeper bills, 4) longer heads, 5) longer tarsi, 6) limited collar extent, 7) greater extent of contrasting scapulars, 8) larger contrasting markings on the secondaries, 9) lighter ear coverts, 10) lighter collars, and 11) lighter flanks. Furthermore, we used a species delimitation test with quantitative phenotypic criteria to reveal that the New Zealand population of *P. georgicus* indeed merits species status. Due to severe historic range restrictions and very low number of remaining individuals (150 individuals limited to a single breeding colony on Codfish Island (Whenua Hou)) the species warrants listing as Critically Endangered.

Year-round distribution, movement patterns and diet of Chatham Island brown skuas

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Top predators play an important role for biodiversity and ecosystem function. Brown skuas (*Catharacta antarctica lonnbergi*) are large predatory seabirds that are thought be declining at one of their major breeding sites in New Zealand, the Chatham Islands. Possible reasons include human induced mortality on nearby farmland and historical changes in diet availability. Knowledge on skuas' year-round distribution and movement patterns is key to understanding the factors that may contribute to brown skua decline. Here, we use bird-borne GPS and archival geolocation loggers to follow fine- and coarse-scale movements of individual brown skuas during breeding and non-breeding. In addition, we use stable carbon and nitrogen analysis of skua blood and feather tissue to gain insights into year-round composition and trophic level of skua diet. Geolocators show that skuas switch to a pelagic life style in mid February/March, dispersing throughout Sub-Antarctic

latitudes, before returning to their territories in June/July. Our GPS data suggests that, during breeding, skuas spend most of their time at their territories, leaving their nests only at times to forage for food and bathe in freshwater. While males display a tendency to forage at sea, females are more inclined to forage on farmland, a finding with potential conservation implications for this iconic seabird.

Ten years conservation of the Critically Endangered mangrove finch of the Galapagos Islands, is their future secure?

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The Critically Endangered mangrove finch (*Camarhynchus heliobates)* has an estimated population of 100 individuals containing fewer than 20 breeding pairs. Historically distributed through mangrove habitat on two of the Galapagos islands, extensive surveys in the 1990s confirmed a current range of just 30ha of mangrove forest. Mangrove finches have been the focus of conservation research and management since 2006. Several techniques have been used in an attempt to halt the species decline with the results used to inform future conservation. Introduced rat (*Rattus rattus*) control significantly reduced egg predation, which in turn highlighted the extent of nestling mortality due to parasitism from larvae of the introduced fly *Philornis downsi*, currently the greatest threat to the mangrove finch. A translocation to increase their range resulted in birds returning to the source population. To avoid removing more adults from the population, head-starting was initiated in 2014. To date 39 hand-reared individuals have been released with observed survival and recruitment into the breeding population. However the technique is expensive, logistically challenging and presents many complications. Additionally life history traits make monitoring of the released birds a challenge. A potential method for protecting nestlings *in situ* was trialled in 2017. The goal to conserve mangrove finches in the wild remains forefront, however the best way to achieve this is yet to be determined. Results of the past 10 years are presented as we continue to work towards ensuring the future conservation of the rarest of Darwin's finches.

Beck's Petrel – a Pacific seabird enigma.

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Beck's Petrel is an enigma, one of several, amongst Procellariiformes of the tropical and southern Pacific Ocean. The species went unrecorded for 75 years between its discovery in the Bismarck Archipelago, Papua New Guinea in 1928, and its rediscovery at sea off southern New Ireland, Papua New Guinea in 2007, and subsequently seen in the same region during birdwatching cruises. Its breeding sites are unknown. In 2012, BirdLife International conducted the first land-based searches for Beck's Petrel, which identified a hotspot for the species within inshore waters off southern New Ireland. The first step towards safeguarding highly threatened, and poorly known, seabirds in the Pacific is to locate breeding sites (Procellariiformes nest colonially) so that the population status and threats can be ascertained. We outline what has been learnt about the species during two expeditions in 2016 and 2017.

An update on the status of black-fronted dotterels in the Wairarapa

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The black-fronted dotterel is a comparatively recent arrival in New Zealand, having first been recorded in Hawkes' Bay in 1954 and in the Wairarapa in 1966. Since the early 1970s, the Wellington and Wairarapa branches of Birds New Zealand have taken an active interest in monitoring the Wairarapa black-fronted dotterel population, carrying out complete or partial census counts in 1972, 1989, 1993 and 1996.
In January 2017, we carried out a shorebird survey along 210 km of rivers in the Wairarapa, including all those reaches covered during previous Birds NZ surveys. This survey was carried out as part of Greater Wellington Regional Council's efforts to monitor the effects of the council's flood mitigation activities on local shorebird populations. During this survey, observers counted the numbers of all shorebird species found along each 1 km section of river surveyed, taking care to systematically search all of the open gravel and muddy backwater habitats found within the active bed of the river.
We report that there has been a 50% increase in the number of black-fronted dotterels breeding on rivers in the Wairarapa since 1996. Black-fronted dotterels are now the most numerous and widespread shorebird species present on rivers in the Wairarapa region. Over the past 30 years, there has been a corresponding 25% increase in the mean winter count of black-fronted dotterels at nearby Lake Wairarapa, although recent winter counts only account for 9-10% of the black-fronted dotterels now breeding on Wairarapa rivers.

How is the black-billed gull population doing?

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Black-billed gulls are endemic to New Zealand, and are listed as Nationally Critical. There has only been one attempt at estimating a national population, and that was done in 1996-98 by the Ornithological Society of New Zealand (OSNZ). However, it was not a full census as some regions were completely omitted (i.e. West Coast), and several rivers were not surveyed in certain regions. Thanks to support from Fruzio, a full census of the South Island was possible where all braided sections of all rivers were flown. Funding for Canterbury was provided by Environment Canterbury. Individual observers played a huge role in surveying the North Island, and some rivers were flown with the support of Hawke's Bay Regional Council. Additional support was provided by Greater Wellington Regional Council. This joined effort resulted in a full nationwide census being successfully completed during 2016/17. This has allowed for an up-to-date population estimate, and will help to determine future threat classifications as well as management decisions. In this talk, I will discuss what the census showed. I will also touch on numbers and sizes of colonies in different regions, and what it all may mean for the future of the gulls.

Colony movement patterns in black-fronted terns

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Black-fronted terns (*Chlidonias albostriatus*) are one of six endemic bird species that breed in New Zealand's braided river ecosystems. Black-fronted terns have a small, declining population and are classified as globally endangered, primarily due to introduced predators. Unlike many other endangered species in New Zealand, the terns cannot be translocated to offshore, predator free islands as braided river habitat exists only on the mainland. Current management activities primarily include predator control, at varying scales, and habitat enhancement, with further investigation being conducted on the use of artificial islands and social attraction techniques. Effective management of black-fronted terns is challenging, not only due to the dynamic and unpredictable nature of the braided river environment, but also the behaviour of the terns themselves. Black-fronted terns have a reputation for being 'fickle' nesters in braided rivers as they can frequently change their breeding colony locations both within and between years. The location and size of black-fronted tern breeding colonies have been recorded from braided river bird surveys conducted over the last 13 years. We used this data to explore the movement and dynamics of black-fronted tern breeding colonies between breeding seasons. Black-fronted terns are believed to have low site fidelity due to the instability of their breeding habitat, small colony sizes and exposure to high predation rates. We suggest that, when conditions allow, black-fronted terns demonstrate greater site fidelity than expected, which may have implications for future research and the management of this species.

Managing black-fronted terns in their dynamic landscape

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Endemic to New Zealand, black-fronted terns (*Chlidonias albostriatus*) are highly adapted to nesting on clear shingle areas of the braided rivers in the South Island. They are nationally and internationally classified as Endangered as populations are in strong decline. Ongoing threats, primarily predation and habitat degradation or even loss, and the interaction of those threats appears to have caused the decline. Currently no successful tools are available to reverse this trend. Using the Lower Waitaki as a case study, we created clear shingle islands to provide high quality breeding habitat for black-fronted terns. We wanted to assess the breeding success of black-fronted tern colonies in a lowland river, identify the causes of nest failure, and determine if breeding success was higher on cleared islands compared to vegetated islands. We found that breeding success was highly variable, with on average only half of the pairs having at least one chick hatch and contrary to many upland rivers, the prime cause of nest failure was due to predation by Southern black-backed gulls. Breeding success was highly dependent on the size of the breeding colony and timing within the breeding season, with large colonies and earlier established nests being more successful. Breeding success was marginally higher on cleared islands. We will explore our findings in the context of developing tools for managing migratory species in a highly dynamic landscape and the challenges that are involved.

Adverse effects of proposed sand mining on kororā (little penguins) and other seabirds in the South Taranaki Bight

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The Environment Protection Authority (EPA) is currently conducting hearings to consider an application for iron sand mining in the South Taranaki Bight (STB). The proposal is to remove 50 million tonnes of sand and deposit approximately 90% of this back to the seabed each year for up to 35 years.
The STB is within the Cook Strait Important Bird and Biodiversity Area. Reports of kororā tracks indicate that kororā are likely to breed along the STB coastline, and the STB may also be an important feeding area for kororā from the Marlborough Sounds. Twelve species of threatened and at risk species of seabirds have been seen in the STB and the available information indicates that very large numbers of seabirds use this area.
Sand mining would reduce light intensity and visibility in the water over hundreds of square kilometres of the STB and hence would reduce seabird foraging opportunities. There is also the potential for significant mortality of seabirds attracted to lights at an iron sands vessel. The full extent of the adverse effects of sand mining on seabirds cannot be accurately predicted as we do not have a comprehensive knowledge of the use of the STB by seabirds.
I provided evidence to the EPA hearings as an expert witness. Articles and reports in Notornis and other OSNZ publications provided important information for this evidence, highlighting the need for continued publication of observations of the presence and breeding biology of New Zealand birds.

Saving the Southern New Zealand Dotterel

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The Nationally Critical southern New Zealand dotterel population is in trouble again 25 years after a low point of just 62 birds. The previously successful feral cat control regime on Rakiura which allowed the population to recover to 290 birds in 2009 is no longer effective with the population falling to 126 birds in 2016. The annual decline rate was accelerating and functional extinction was predicted in just two to three years.

With time rapidly running out for the sub species there is an urgent need to find out what has changed and how to best target recovery. Find out how a broad alliance of conservationists are responding to the challenge by focusing on adaptive management, filling knowledge gaps and the encouraging results so far.

Revised distribution and population estimate of great spotted kiwi in NW Nelson

Robin & Sandy Toy (Nelson branch)

We have compiled records of great spotted kiwi distribution in NW Nelson made during 2009-2017. Nearly 5000 h of acoustic recordings and kiwi call counts have been made and processed. The distribution shows substantial changes since the last survey which covered 1983-1994. In particular, the population appears to have split with a gap from the Karamea River south to the Mokihinui River. Based on call rates and detailed study of four sites we estimate the NW Nelson GSK population at about half that estimated in 1983-1994.
Fieldwork is ongoing to determine with greater precision the extent of the decline.

Incubation in difficult conditions: The kiwi paradox

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Kiwi (genus *Apteryx*) are very unique group of birds endemic to New Zealand. *Apteryx* are nocturnal, insectivorous, extremely precocial and have one of the biggest eggs in proportion to the body of the bird. This egg is also different from other eggs as it has a proportionally very thin eggshell. Incubation in this group is very perplexing with evolutionary novelties arising to successfully incubate during wet winters leaving the egg unattended at night. Kiwi is for example the sole ratite to build a proper nest inside burrows. However it does not seem that these nests are enough to sustain incubation in the harsh climate of New Zealand, as often the superficial temperature of the egg drops down to 24˚C. Using energy dispersive spectroscopy we have found that in the innermost layers of the calcified portion of the eggshell iron is an abundant element for Rowi and Tokoeka; other unusual elements were found such as nickel, aluminium and silicon in important amounts. Using scanning electron microscopy we have compared the physical structure of four kiwi species finding differences in pore shape and size as well as the proportion between the thickness of the shell and the size of the egg. We hypothesise that the iron is present in the form of compounds that either will aid with heat conservation, as antimicrobial agents or/and with the physical strengthening of the shell to endure such ecological circumstances.

The circadian cycle of oocyst shedding of *Eimeria* spp. affecting brown kiwi

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Operation Nest Egg is an important tool for kiwi conservation however as hatcheries and rearing centres result in a high density of young, immunologically naive kiwi being reared in semi-captive conditions, environmental build up of pathogens, such as coccidia, occurs with a resultant increased risk of disease. Coccidia are protozoal parasites that cause weight loss, diarrhoea and death and significant morbidity and mortality from coccidia has been reported in numerous populations of kiwi, in particular at crèches. At present much of what we base testing and treatment on is extrapolation from the extensive knowledge of *Eimeria* spp. in commercial chickens, however with the kiwi's unique evolutionary history and drastically different biology and ecology differences in parasite interactions are likely too. Understanding the host/parasite interaction is key to developing effective management plans and it is imperative that our understanding improves to enable appropriate disease management to reduce coccidia's detrimental impact on kiwi and ensure the success and sustainability of ONE. It is well documented in other bird species that coccidial oocysts are shed in the faeces at different times of the day in order to maximise the potential for intra-specific host ingestion. Due to the nocturnal lifestyle it is likely that this pattern is different for kiwi, thereby impacting the accuracy of faecal oocyst counts depending on the time of the day the sample was collected. Here I will share the outcomes of research into the shedding cycle of coccidia spp. in kiwi and discuss the practical implications of what we found.

Landscape-scale trapping of stoats benefits Northern Fiordland tokoeka in the Murchison Mountains

Jane Tansell, Hannah K. Edmonds and Hugh A. Robertson

A 15,000 ha low intensity stoat trapping network was established in the Murchison Mountains in 2002, primarily to protect the last natural population of the critically endangered takahe. Between 2003 and 2009, we compared the productivity and survival of threatened northern fiordland tokoeka living in 3 valleys that were covered by this trapping network with those in a nearby valley that was left untreated. Chick survival was significantly higher in the trapped areas than in the untrapped area, which was sufficient to change the population trajectory from a projected decline to a projected increase. While this result is encouraging, it comes with a caveat, as this study concluded before determining whether in the longer term trapping resulted in selection for trap shy stoats, a result that has been found in longer term studies in the north island.

Save Our Iconic Kiwi – Establishing landscape scale management for Fiordland tokoeka

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In recent years the government announced significant funding allocation to a programme that would aim to reverse the ~2% average population decline of 5 taxa of kiwi, to a long-term goal of 2% increase.
Fiordland tokoeka are one of the first kiwi taxa this programme focuses on. As part of this SOIK programme, the Department of Conservation are establishing a BACI chick survival study based on Southern Fiordland Tokoeka. As well as gaining an understanding on what management is required to achieve a 2% per annum population increase, the programme will obtain information and observations on the morphology, biology, and behaviour of Southern Fiordland Tokoeka which until now has had limited attention.

Whole genome insight into Kea's alpine lifestyle

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Kea and Kaka are both native threatened parrot species in New Zealand. The two species are thought to have evolved about 5 million years ago, when the uplifting of the Southern Alps created a new alpine niche that allowed for their ecological differentiation. While the Kaka remained a forest specialist, the Kea is the only alpine parrot in the world and as such is particularly exposed to the effects that the current climate change scenario might have on its preferred habitat. Given the relatedness of the two species and the high degree of conservation in avian genomes in general, it is possible to investigate the Kea's adaptations to an alpine lifestyle through a genome comparison with Kaka.
Using NGS techniques for this study we sequenced and constructed a Kaka whole genome assembly. We used it in conjunction with the already available resources for the Kea[1] to identify the genomic differences between the two species. This whole genome approach enables us to recognize neutral and adaptive variation and to find potential candidate genes that might explain how this species copes with such different habitat and resources. The functional variation identified will offer an insight on the Kea's resilience to the warming climate and may help to inform management decisions for the future conservation of this and other species linked to the alpine environment.

[1] Zhang G, Li C, Li Q, Li B, Larkin DM, Lee C, *et al.* (2014). Comparative genomics reveals insights into avian genome evolution and adaptation. *Science* **346**: 1311–20.

Return of the Chatham petrels – an overview of a successful recovery programme

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The Chatham petrel (*Pterodroma axillaris*) (220 g), a little known pelagic seabird endemic to New Zealand, was for more than a century confined to 218 ha Rangatira Island in the Chatham group. From the 1980s, research and management activities have sought to understand the reasons for the species rare status and instigate recovery actions. It was discovered in 1990s that nest competition with broad-billed prions (*Pachyptila vittata*) seriously reduced breeding success and the species was in decline. Since 1992, the use of burrow blockades over winter, installing artificial nest boxes and the introduction of burrow flaps in 2001 have greatly improved breeding success and pair bond and site stability. Translocations of chicks to predator exclusion sites on Pitt and Chatham Islands occurred during the 2000s. Additionally, a sound attraction system was set up on Rangatira in 2001 to concentrate nesting activity. The success of these measures has led to the species status changing from Nationally Critical to Nationally Vulnerable by 2016. There are now an estimated 1500 birds in the total world population and 150-160 pairs under annual protection on Rangatira Island. This talk will briefly summarise the various successful recovery measures adopted. I will also show some results from an at-sea tracking study, update the translocation projects, and provide a summary of the sound attraction project and the implications of this technique for seabird attraction projects elsewhere.

The challenges of seabird monitoring by local government and what Auckland Council is doing about it

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Auckland is a well-established seabird hotspot with both coasts identified as Important Bird Areas. Auckland Council has been working to establish a regional seabird monitoring programme to understand where seabirds are, what the key threats are, and what management actions can be taken with the goal of improving the conservation status of seabirds. Seabird monitoring is logistically and economically difficult with most breeding locations on offshore islands where pest animal densities are low or non-existent, and thus we have been using two methods for improving our detection of seabirds: 1) seabird detection dog and 2) the development of an acoustic recognition tool to allow us to productively use acoustic field recorders to survey for seabirds. Dog surveys on Auckland's west coast have identified active Grey-faced petrel (*Pterodroma macroptera gouldi*) and Northern little penguin (E*udyptula minor iredalei)* nests on the mainland at Bethells and Muriwai beaches. Our first recognition models have successfully been developed and used to identify vocalisations from five seabird species from recordings made on Burgess Island (Mokohinau group). In this talk we will discuss our latest seabird survey work, the challenges along the way and moving forward, and what our next plans are for seabird monitoring in Auckland.

Plastic Ingestion in Australasian Seabirds

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Australasia, the territory including Australia and New Zealand is considered the seabird capital of the world, home to 66 Procellariiforme seabird species; including albatross, petrels, prions and shearwaters. Procellariiforme seabirds are the world's most threatened group of birds, with nearly half of the world's species experiencing population declines, and almost 40% of Australasia's seabirds are threatened with extinction. The ingestion of plastics and other marine debris have been highlighted as a rapidly increasing threat to seabirds worldwide. Unfortunately for Australasian seabirds, recent marine debris risk modelling has highlighted the oceanic region between the Southern Ocean and the Tasman sea as the highest risk region for marine debris and seabird interaction globally. Despite the potentially significant conservation issue that marine debris ingestion poses to Procellariiformes globally, very little is known of extent of plastic ingestion among Australasia's 66 Procellariiforme species.
Here we will present the largest study of plastic ingestion globally in Procellariiforme seabirds to date. The data collected results from autopsies conducted over the past four years on over 1700 individual seabirds of 53 species. Over half of the birds examined have been collected across New Zealand's beaches and waters; aided by the considerable contribution by members of the Ornithological Society of New Zealand and the OSNZ beach patrol scheme. We will discuss the findings of the study, and discuss the implications for seabirds, and make predictions about the incidence of marine debris ingestion among seabirds globally.

Birds fly underwater – yeah right! - diving and foraging behaviour of petrels and shearwaters

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Seabirds have developed specialized sensory mechanisms that allow them to find productive areas at sea, detect prey through the air-water boundary of the ocean surface, and then see amphibiously during extensive underwater foraging. Foraging at sea is how species are sustained, it is how they survive, find their food, and raise their chicks. Some petrel and shearwater species are attracted to fishing vessels, and within that group, some more than others. Baits and the smell of fish are attractive to them. They can dive in pursuit of prey and sinking baits on hooks on lines are just another potential food source. As a result, birds can become hooked, resulting in injury and or death. For petrels, shearwaters and other Procellariiformes, locating foraging areas from distances likely incorporates olfactory cues. In addition to excellent olfactory sensing, seabirds that catch prey amphibiously have evolved highly specialized visual anatomy for locating and catching prey underwater. The depth-diving capabilities of petrels and shearwaters have been well documented with shearwaters capable of diving to astonishing depths. In our study, we show that the use of a multi-frame camera apparatus and high resolution underwater camera is effective in better understanding the behaviour of petrels and shearwaters underwater, especially their interactions with bait and fishing lines. Quantitative experiments, designed and conducted to combine the use of different bait types and bait depths answer questions: 1) Are seabird species more attracted to certain types of bait? 2) Do seabird species have different abilities or tendencies to obtain prey at different depths?

Preliminary results of an automatic identification of seabird calls from multispecies field recordings

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Recent technological advances in sound recording have placed passive acoustic monitoring (PAM) as an important tool for species conservation. Acoustic sampling can be performed for extended time periods at different places simultaneously. Automatic identification helps researchers to analyze the big amount of files produced by a PAM approach. However, high false positive rates still are a common limitation when using PAM associated with automatic identification, which decreases acoustic techniques' utility for wildlife surveys. In order to decrease the false positive rates and increase the utility of PAM we created the Assemblage of Recognition Models' Summary – ARMS. ARMS consists in performing different and independent recognition models and in summarizing their results into one final output by following a specific set of rules. This allows us to disregard any segments of the recordings that are prone to generate misidentification. The ARMS method has shown to be capable of indicating the presence of five seabird species with high precision and low false positive rates from recordings made in a seabird breeding colony on Burgess Islands. PAM associated with automated identification can be an important tool for detecting and monitoring the process of the re-establishment of seabird breeding colonies in islands after pest eradication. The use of ARMS is suitable for being applied not only in seabirds breeding colonies on islands, but also on multiple species from different animal communities and diverse ecosystems monitored by a passive acoustic monitoring approach around the world.

Breeding and nonbreeding foraging behaviour by common diving petrel

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Behavioural flexibility is critical for seabird populations breeding at different sites who are exposed to variation in marine resources and must travel in different directions and distances to access prey. We examined flexibility in the non-breeding and breeding foraging ecology of differing populations of common diving petrels (CDPs) from northern New Zealand using a combination of geolocation loggers, global positioning devices and stable isotope analysis. During non-breeding, CDPs occupying separated breeding season ranges on Auckland's west and east coasts made an unpredicted migration south-east to shared habitats at the Antarctic polar front (covering 3000-5000 km in 3-13 days). Here birds exhibited a dramatic shift in behaviour by spending 95 % of their time on (and under) the surface of cold (~4°C) sub Antarctic water and associating with high productivity habitats within this frontal system. In contrast to the shared non-breeding habitats, during the breeding season CDPs simultaneously tracked from the Hauraki Gulfs Burgess and Tiritiri Matangi Islands with global positioning devices, showed divergent foraging distributions and diets not clearly linked to oceanographic features. Inter-seasonal differences in the foraging strategies of Northern CDPs will be discussed in the context of central place foraging theory.

Comparing the foraging locations and stress physiology of Common Diving Petrels between colonies in the Hauraki Gulf

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Within the Hauraki Gulf, northern or common diving petrels (*Pelecanoides urinatrix urinatrix)*, are an important species; forming breeding colonies on outer Gulf islands, and are tagged for extensive restoration to the inner islands. However, diving petrels are better designed for underwater performance than long-distance flight, and yet must make daily foraging trips feed, meaning a significant daily physical effort which may be compounded if translocating populations to less productive habitats. This may be especially problematic over the breeding season, when eggs must either be constantly incubated by one member of a pair, or chicks must be fed on top of an adult bird's own nutritional requirements. We conducted the first ever haematological study of this species across the breeding season, also comparing two island populations; Tiritiri Matangi Island in the inner Gulf, and Burgess Island in the outer Gulf. We tracked the foraging locations and trip distances between the two diving petrel populations, finding that both populations had very different foraging patterns, in different locations. We also investigated the physiological differences, both between the two populations and across the breeding season. Differences in weight, stress, and other blood haematological factors paint a picture of differences between the two populations, and how they cope with different foraging locations.

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Captive supplementary feeding of underweight yellow-eyed penguin chicks

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The yellow-eyed penguin or hōiho has a declining mainland population and an 'Endangered' conservation status. In recent years, underweight chicks from the Otago population have been removed from their natal environment for intensive supplementary feeding at DOC-approved rehabilitation centres at age c. 90 days. The practice of removing chicks from the wild is thought to improve adult survival in years of poor food supply, and to prevent chick mortality through starvation prior to fledging. Supplementary-fed chicks were released from the Penguin Place rehabilitation centre on the Otago Peninsula. We investigated the relationships between asymptotic chick mass, ordinal hatch date, and reasons for rehabilitation of 270 pre-fledge chicks over a 10-year period. Mass starvation events, assumed to be driven by fluctuations in sea surface temperature, were the primary reason for high numbers of pre-fledge chicks being underweight. A lagged relationship between recovery from a poor season and onset of breeding in the following year was also found.

Tools to conserve our biological heritage - The evolution of Wildlife tracking

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Measuring movement and behaviour is essential for the conservation and management of species and their habitats. For three decades VHF radio tracking has offered a much deeper insight into New Zealand's cryptic fauna than binoculars and a notebook can offer. It continues to help understand distribution, habitat utilisation and reproductive success, as well as survivorship and the efficacy of relocation and eradication programmes. Radio tracking also makes it considerably easier to locate study animals and to observe their breeding and foraging behaviour. In the last decade, new technologies have reduced in size and power consumption to the extent that they are becoming suitable for use on an increasing number of New Zealand native and non-indigenous species. Remote telemetry via radio, cell phone or satellite removes or reduces the need to recapture animals. The cost and difficulty of fieldwork in remote areas is dramatically reduced, often only needed to deploy the technology. Tracking highly-migratory species becomes a reality where it was difficult-to-impossible using radio tracking. Improved location accuracy and reduced power consumption allow much finer spatial and temporal scale studies to be carried out. However, the challenge of a wider range of options is the difficulty in selecting the most appropriate technology for a particular study. Wildlife tracking is all about trade-offs and compromises. Everybody wants the tag or collar that weighs nothing, lasts forever, provides infinite data and is free. In this talk we look at the different technologies and discuss how they can be used for wildlife management and conservation which is so much of our New Zealand identity.

Investigation of fallout events in Kaikōura's Hutton's shearwaters.

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The endangered Hutton's shearwater/Kaikōura tītī to date has only two breeding colonies remaining in the wild at altitudes between 1,200 and 1,800 m above sea level **in the Seaward Kaikōura Ranges.** Chicks fledge the nest from early March to early April, departing the colonies at night to undertake their maiden flight down to the sea**.** The **Kaikōura township lies within the species estimated flight path and each season fledglings have been found grounded, an event known as fallout. Affected bird numbers appear to have increased in recent years, causing concern for population impacts.** The Hutton's Shearwater Charitable Trust (HSCT), which was formed to encourage and promote the conservation, research, public education and sustainable management of the species, has been instrumental in raising public awareness to rescue grounded birds, to investigate the factors causing fallout events, and to liaise with local authorities with regards to the implementation of mitigation measures. Our poster will report the results of a recent study run by the University of Canterbury in collaboration with the HSCT, aiming to a) establish a reliable estimate of the overall magnitude of fallout in and around Kaikōura, b) estimate mortality rates and corresponding population effects, c) investigate the effect moon phase and weather conditions have on local fallout events, and d) assess the spatial distribution of fallout in relation to the presence of artificial lights.

The population and breeding success of Buller's Shearwater

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Buller's shearwater is an endemic seabird to New Zealand. It nests only on the Poor Knights Islands group, north-eastern North Island, also known as the 'New Zealand Shearwater' in North America. Despite it being a commonly-seen species in the Hauraki Gulf during the breeding season, the overall ecology of this species remains little studied. A thorough population estimate has never been completed on Buller's shearwaters and recent visits to the Poor Knights Islands (Aorangi Island) (2011-2012) during breeding indicated that previous population estimates may be too high or the population has declined significantly. Evidence collected at the same time suggested foraging times of Buller's shearwaters during the incubation period may have increased in the past 40 years from 4 days up to 14 days. Our work in 2016-2017 has aimed to create a baseline population estimate and investigate the breeding biology for this species at the Poor Knights Islands. This has been achieved by using controlled site burrow checks, acoustic surveys, and population models. We are also investigating the fledging success of eggs laid, the first stage of a long-term research programme aimed to identify if changes at-sea are affecting the success of chick survival for this species. During the non-breeding season, Buller's shearwaters migrate to the North Pacific Ocean.

Do grey-backed storm petrels breed in Fiordland?

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At least 20 grey-backed storm petrels were recorded from inland Fiordland between 1961 and 2016. The region is hundreds of kilometres distant from known New Zealand breeding sites, and so there has long been speculation over where these birds were from. Nine of the birds were seen between August and November and 8 birds (including 2 confirmed fledglings) between February and April. The first pulse corresponds with the courting and early egg-laying period, while the second pulse aligns with the estimated fledging period for grey-backed storm petrels in New Zealand. We suggest that the temporal spread of Fiordland grey-backed storm petrels records is the pattern that would be expected if there was a local breeding population, with the August to November pulse likely to be predominantly pre-breeders, and the February to April pulse mainly or entirely locally-reared fledglings. The relatively low number of birds recorded in February to April may reflect small population size and low reproductive success. We would expect occasional large pulses of fledglings if there was a substantial breeding population near an artificial light source in Fiordland. Attempting to locate grey-backed storm petrel breeding colonies within Fiordland would be a daunting challenge. It is perhaps more realistic to hope that some of the grey-backed storm petrels that attempt to breed in Fiordland will benefit from the landscape-scale predator control already in place around Resolution Island/Dusky Sound and further north around Secretary Island.

Comparing haematological condition between Grey-faced petrel colonies

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Grey-faced petrels (*Pterodroma gouldi*) have been recognised as a distinct and endemic New Zealand species, and are one of the few seabirds not threatened under the NZTCS or IUCN classification systems. As such they provide a robust model species on which to study physiological mechanisms that will broadly contribute to seabird conservation management. Of increasing importance in a rapidly changing climate, conservation physiology is vital in guiding the management of threatened species and populations.
The cryptic oceanic life of petrels makes monitoring their environment difficult. However, by using physiological proxies, we can understand more about the conditions that birds are exposed to during both the breeding and non-breeding seasons and how these impact their body condition. Haematological variables offer a wealth of information about the condition of individuals and populations. By comparing these variables across seasons and between locations, we can determine how environmental conditions impact the survival and breeding success of Grey-faced petrels. This study reports on preliminary data gathered for a comparative study of east and west coast populations of Grey-faced petrels in the Auckland region, in relation to differential breeding success. Haematological parameters are compared between the east and west coast, and between years for the west coast population.

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