Seasonal-movements and site-loyalty of radio-tagged Australasian bitterns: Some insights into what bitterns might consider as 'prime real estate'?

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Most wetland conservationists manage sites as systems that provide life-supporting ecosystem services. To do this they often focus on reducing potential threats and providing habitat for a few species considered to be good indicators of wetland health.

The Australasian bittern, an endangered wetland specialist species, has often be touted as a great flagship or indicator species for wetland restoration projects. Indeed the rarity, charismatic nature and quirkiness of this species mean that it has great potential to fulfill these roles. Yet little is actually known about the needs of this species - something that is partly due to difficulties in finding and following individual birds across years and seasons. Here I present preliminary data on the dispersal of 5-10 radio-tagged male bitterns over an 18 month period. During this time, birds caught on Lake Whatumā (during the breeding season) moved across a complex network of wetlands, within a 15 km radius, before returning back to Whatumā in time for the subsequent breeding season. Each wetland that was visited varied in its characteristics suggesting it may be possible to examine whether factors such as wetland connectivity, size, approximate water depth, presence of stock, availability of cover and historical land-use can explain movements and bittern presence over a longer timeframe.

Such information would be useful for anyone looking to attract this secretive, weird and wonderful bird to their wetland, as well as those who wish to understand more about what the presence of a bittern may (or may not) 'indicate'.

Winter habitat use of New Zealand falcons in a pine plantation: impacts of 1080 and timber harvesting

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New Zealand falcons occur in managed timber forests, where forest management practices have the potential to affect the viability of the species. Pest control using 1080 poison and large-scale clear-cutting are prevalent practices in plantation forests due to their cost-effectiveness. Hence, knowledge of winter falcon activity in relation to forestry operations is critical to improving conservation schemes. We radio-tracked non-migratory adult falcons (n = 37) during three winters (2012–2014) in Kaingaroa pine plantation in the North Island. We assessed falcon survival though 1080 poisoning operations, used tracking data to establish the extent and habitat composition of winter home ranges, and surveyed potential avian prey with line transects. All falcons survived the 1080 operations. Falcons selected young pine stands and their borders with mature stands, despite limited availability. Young pine stands, which are created by clear-cutting, provided prey in the form of both native and introduced birds. Mature forest was additionally used as shelter in heavy rain. Home range sizes averaged 26 km^2. Home range sizes were positively correlated with the available area of young pine stands but were negatively correlated with the area of mature edge habitat. Thus, the availability of mature habitat edges is a determinant of winter home-range size. This indicates that the large-scale clear-cuttings promote increased space use of falcons, which may be disadvantageous for winter survival.

We recommend that forestry practices harvest in ways that generate consistent availability of young/mature borderline habitats.

Wintering areas and activity patterns of brown skuas from the Chatham Islands

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Brown skuas (*Catharacta antarctica*) are large predatory seabirds that are uncommon in New Zealand. However, they have been subject to intensive research at their major breeding site, the Chatham Islands, for decades. While this research has focussed on breeding success and mating systems, little is known about their distribution and behaviour outside of the breeding season. Because the skua population on the Chatham Islands is thought to be declining, such information is crucial for effective species management and conservation. Technological advances and miniaturisation of tracking devices enabled us to follow skua movements during the non-breeding season. We deployed archival geolocation loggers on 30 nesting birds during the 2014/15 breeding season. Based on ambient light levels these devices estimate two locations per day and also record daily patterns of activity via a saltwater immersion sensor. During October 2015, we were able to successfully retrieve 13 geolocators covering a year's worth of data. Here, we present the first insights into migration routes, wintering areas and activity patterns of brown skuas from the Chatham Islands. Our findings suggest that skuas winter on the open ocean southeast of their breeding grounds.

Are male hihi firing blanks? Inbreeding and male fertility in a threatened bird species

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Threatened species that have experienced extreme population bottlenecks often exhibit low genetic diversity and an elevated risk of inbreeding and inbreeding depression, all of which contribute to extinction risk. In New Zealand, multiple species have experienced population bottlenecks as a result of invasive predators and habitat loss, but also via founding new populations using conservation translocations. Hihi *(Notiomystis cincta)* are an excellent example of this paradigm, having been translocated to Tiritiri Matangi in 1995-96, at which point they experienced a population bottleneck, with only 16 of the 51 birds translocated (including just four females) actually contributing to the current population of ~150. Recent research suggests that inbreeding in hihi is linked to poor hatching success, but it is not yet clear exactly how much of this hatching failure is due to male infertility. We collected sperm motility (swimming speed) and morphology data for 82 male hihi on Tiritiri Matangi Island using a mobile laboratory designed especially for this project. We have combined this data with pedigree and genetic data to seek out links between inbreeding and male fertility in this species. We will discuss the implications of our findings for species management and explain how the techniques implemented here could be extended to provide data for a wide range of bird species. This work is funded by the BNZRF and is part of a larger study involving several endemic and introduced New Zealand bird species.

Winds of change: an inter-annual investigation of factors affecting breeding success in mottled petrel

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Gadfly petrels (genus *Pterodroma*) are a group of small to medium sized seabirds with a broad distribution throughout the world's oceans. The endemic mottled petrel (*P. inexpectata*), once ubiquitously distributed throughout New Zealand, is now limited to breeding on predator-free islands around the Southland region. Analysis of movements gathered through telemetry and $\delta^{13}C$ values from the whole blood of adult mottled petrels provide evidence of a novel high-latitude foraging niche during chick-rearing, atypical of *Pterodroma* species studied to date. During four consecutive seasons experiencing very different environmental conditions (La Niña, El Niño, neutral) this study tracked the spatial ecology, provisioning regimes and diet of breeding mottled petrels during the chick-rearing period, and documented chick growth from hatching to fledging of mottled petrel breeding on Codfish Island (Whenua Hou).

Data indicate that La Niña conditions during 2013 resulted in poor chick condition and slow growth, likely a result of lower provisioning frequencies and low value prey sources, when compared to other seasons. Conversely, preliminary evidence from 2016 indicates that El Niño conditions were associated with greater chick condition and growth rates, likely attributed to higher provisioning frequencies during this season. Differences in spatial distribution of breeding adults during these seasons will be discussed. These findings highlight the value of inter-annual studies and provide

evidence to suggest that mottled petrel may act as proximate indicators of ecosystem functionality in the Southern Ocean.

Can you hear me? Using acoustic monitoring to determine the presence and range of black petrels on Great Barrier Island/Aotea, Te Hauturu-o-Toi/Little Barrier Island and the Moehau range.

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Nocturnal seabirds are ideal candidates for acoustic monitoring because they are highly vocal at their colonies, particularly in the breeding season. Seabirds have distinct calls, and the signature of these calls can be distinguished to species using acoustic analysis software and archived for future use. A number of automated acoustic recorders were deployed across Great Barrier Island/Aotea, Te Hauturu-o-Toi/Little Barrier Island and the Moehau Range to record calls of black petrels (*Procellaria parkinsoni*) in the air and on the ground through the 2014/15 and 2015/16 breeding seasons.

The recorders were deployed at selected locations at all three sites from late-November and were retrieved before the end of May covering the egg-laying, incubation and early chick rearing period of the black petrel breeding season. Black petrels call on the ground when trying to attract mates to their burrow between October and February with most activity being in November and December. Calling continues through the night, with peak activity occurring in the first few hours after dark. The acoustic recorders were programmed to record for one hour each night during the peak period of activity (with times varying at different locations), logging any calls within the range of the microphones.

Over 5000 hours of recordings have been collected between December 2014-April 2015 and November 2015-March 2016. Acoustic software has been used to start the analysis of this long recording series with the aim to detect and catalogue calls by species and determine when and where the calls were made. This will provide data on the presence and range of black petrels and other seabirds (and species) across the three sites and provide locations that could be ground-searched for black petrel burrows using random transects and seabird-dogs in the future. Preliminary results have identified a number of species on the acoustic devices at all three locations and suggest black petrels are present across Great Barrier Island/Aotea in any suitable habitat type and are concentrated on the main high altitude ridgeline on Hauturu/Little Barrier Island and could be prospecting on the Moehau Range.

Down but not yet out: the status of the red-billed gull in New Zealand, 2014-2016

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The red-billed gull, *Larus novaehollandiae scopulinus*, is classed as Nationally Vulnerable in New Zealand because of apparent declines in numbers nationally, especially at some of the largest colonies, and despite some reported regional increases, such as in Otago. A synthesis of known breeding colonies from the late-1800s to the mid-1960s, published in 1965, estimated a national breeding population then of around 40,000 pairs. To update this figure, Birds New Zealand, in conjunction with the Department of Conservation, carried out a national survey during 2014-2016 to establish the current size of the red-billed gull breeding population. Observers were asked to find and report all breeding colonies of the species, starting with a check of previously reported breeding sites. Standardised means of conducting these surveys were developed, publicised, and largely applied. Making allowance for some sites for which information is still being sought, the results to date indicate a national total of around 26,200 pairs (South I. just under 14,800 pairs; North I. about 11,092 pairs; and the Chatham Is, at least 268 pairs), substantially less than the previous estimate. Other than colonies on the Three Kings Is (at least 1063 pairs) and Takapourewa/Stephens I. (1250 pairs) there no large concentrations on offshore islands. The largest mainland colonies are at Kaikoura (3300), Taiaroa Head (2145), Rotorua (2277) and Marsden Point (1190), some of these close to human habitation. The situation and size of the colonies nationally is described, and possible reasons for the decline in numbers discussed.

Here be birds: An update on the New Zealand eBird database

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Birds New Zealand's eBird database was launched in 2008 to provide members with an easy-to-use tool for recording, storing and sharing bird observation data. Since then, eBird has become one of the largest and fastest-growing biodiversity databases in the country, with 1,900 registered users contributing over 81,000 checklists containing 750,000 bird observations to date. Ninety percent of New Zealand's extant bird species are now represented with records in eBird. By aggregating and improving access to large quantities of verified bird observations, eBird has the potential to be used by other agencies to make better-informed decisions regarding the management of indigenous birds and their habitats in New Zealand. In this way, eBird has the potential to act as a powerful tool to help Birds New Zealand meet a number of its constitutional aims.

To illustrate this point, we provide several examples of how Greater Wellington Regional Council has been using eBird data to improve and prioritise the protection of important bird habitats in the Wellington region and to monitor local patterns in bird distribution. At present, the use of eBird by both the Society's members and professionals in the conservation and resource management sectors is limited by eBird's relatively low profile in New Zealand and a shortage of training opportunities for eBird's potential users. Here we introduce a new project being initiated by Birds New Zealand to bridge this gap by providing eBird training opportunities to the Society's members and to potential 'end-users' of eBird data.

Nest-site selection in South Georgian Diving Petrels on Codfish Island (Whenua Hou): implications for conservation management

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The South Georgian Diving Petrel (*Pelecanoides georgicus*) has experienced local extinctions throughout New Zealand and is currently considered "nationally critical". Historic declines are primarily attributed to unsustainable predation from introduced mammals. The sole remaining colony of *P. georgicus* in New Zealand is now restricted to a single site, the Sealers Bay dunes on Codfish Island (Whenua Hou). Despite the eradication of all introduced predators on Codfish Island, the colony is showing little to no population growth. To better understand potential factors preventing population recovery, we assessed dune parameters critical to the nest-site selection of *P. georgicus.* To achieve our objective, we determined burrow occupancy using toothpick fences, play-back, remote cameras, hand capture, and burrow traps during the 2015/16 nesting season. Based on our methods, we identified 74 active nests of *P. georgicus*, 6 active nests of Common Diving Petrels (*P. urinatrix*) and 4 active nests showing mixed occupancy. Subsequently, we measured five physical and six biological variables at known nest sites as well as 131 random sites in the dunes. Results based on logistic regression analyses showed that *P. georgicus* avoided forests, scrubland and introduced vegetation and clearly preferred front dune habitats. More surprisingly, we also found *P. urinatrix* to be actively competing with *P. georgicus* for nest sites. We discuss the nest-site selection of *P. georgicus* in detail and the implications of our findings for the conservation management of this threatened species.

Tititipounamu: taking these tiny taonga to new territories.

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The long term vision for ecological restoration of A'Deane's Bush Scenic Reserve is to create a wildlife sanctuary where native plants and animals flourish, through controlling pests and re-establishing native flora and fauna characteristic of a North Island lowland podocarp ecosystem. The goal of establishing a viable population of Tititipounamu / Rifleman at A'Deane's Bush over the next 5 years began with a transfer of 59 birds in autumn 2014. Translocations into small fragments such as A'Deane's Bush have not been undertaken before and a large part of the proposal to was to trial and document these translocations. I present results from our monitoring which show initial dispersal, subsequent breeding territories and survival rates over the first two years.

Spectral response of Pohutukawa to seabird nutrient inputs

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Predator eradication on New Zealand's offshore islands is an effective tool for seabird conservation. However, limited resources and the remoteness and number of these islands pose considerable challenges to achieving long-term monitoring and research objectives. Therefore, economical and effective monitoring tools are needed. Advances in remote sensing tools have improved the quality and reliability of applying this technology to evaluate ecological systems, for example, leaf nutrient concentrations can be detected using remote multispectral imaging. Seabirds alter island ecosystems through chemical and physical disturbance, via the deposition of marine derived nutrients and burrowing activity. Concentrations of ammonia in soils have been positively correlated to seabird burrow density. The aim of our study was to determine if the relationship between burrow density, soil nitrogen (N), canopy level N and the spectral reflectance of pohutukawa (*Metrosideros excelsa*, a common island canopy species) can be detected using remote sensing technology. In a controlled experiment, we compared the spectral reflectance of pohutukawa treated with three levels (high, medium and low) of simulated seabird guano. Here, we present the results of our controlled experiment and discuss the implications of our results for monitoring remote seabird islands using remote sensing tools.

New Zealand Fairy Tern conservation management

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The New Zealand fairy tern is our rarest seabird. It is closely managed each season to optimize the number of chicks produced during the management of 4 breeding sites, Waipu, Mangawhai, Pakiri and Papakanui. The population management has aimed a manipulating breeding sites, and reducing the impacts of weather and predation at breeding. Birds New Zealand members have been key in understanding post breeding season area use, and when mortality is occurring in the population. This paper covers the historic impacts on habitat for fairy tern leading to its current distribution, the range of historic and existing management and how this has impacted recruitment, the temporal composition of the population and likely future changes in population management.

Breeding biology of the New Zealand storm petrel

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The first New Zealand storm petrel (*Fregetta maoriana*) (NZSP) nests were discovered on Te Hauturu-o-Toi/Little Barrier Island in Feb-May 2013 after a telemetry operation and a dog search. Four active nests were located in the Parihakoakoa Valley and at least three of these nests had eggs laid in them. All nests were several 100 m inland, on 40 to 70 degree rocky slopes, under 20-30 m kauri and hard beech canopy. In 2013 two chicks were raised in these nests; in 2014 one chick was raised; in 2015 no successful nesting occurred; in 2016 one egg was laid. Estimated breeding parameters are: laying from mid-February to early March; hatching from late March to mid-April; fledging during June with a late chick on 10 July. Nest failure and abandonment was probably partly due to interference from Cook's petrels (*Pterodroma cookii*). NZSPs have now been recorded in northern New Zealand in all months except August. Very little is known about the breeding biology of any *Fregetta* species. Black-bellied storm petrels (*F. tropica*) (BBSP) breed c.2-6 weeks earlier than NZSP and migrate northwards from their nesting grounds in the non-breeding season for c.6 months. The breeding season of the white-bellied storm petrel (*F. grallaria*) (WBSP) varies hugely throughout its range and appears to be more protracted. Most WBSP populations breed earlier than NZSP but a

Kermadec Islands' fledgling was found in August. WBSP populations are generally thought to migrate northwards in the non-breeding season but some apparently remain near the breeding islands.

Seabird research in the French subantarctic (Crozet and Kerguelen Islands)

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Many seabird species that breed in the southern Indian Ocean visit New Zealand waters between breeding seasons, or have populations that breed on New Zealand's subantarctic islands. Three island groups in the southern Indian Ocean are managed as part of Terres Australes et Antarctiques Françaises, namely Crozet, Kerguelen, and Amsterdam and St Paul Islands, all of which have permanently staffed scientific bases. The bases are serviced by ship from Reunion Island, with the *R.V. Marion Dufresne* typically visiting each island group 4-5 times per year. Establishment of the bases on Grande Terre, Kerguelen Islands in 1950, and on Ile de la Possession, Crozet Islands in 1963 led to long running research and monitoring programmes on many seabird species, including wandering albatross (*Diomedea exulans*), king penguin (*Aptenodyptes patagonicus*), and several species of burrow-nesting petrels. The proximity of a large king penguin colony to Alfred Faure Station on Ile de la Possession has resulted in this being the most intensively studied penguin colony in the world, with six different research teams present during our visit in December 2015. At Iles Kerguelen, we extended an existing study on foraging ecology of macaroni penguins (*Eudyptes chrysolophus*), and undertook a pilot study on comparative foraging and breeding ecology of common diving petrels (*Pelecanoides urinatrix*) and South Georgian diving petrels (*P. georgicus*).

Conservation physiology of New Zealand seabirds: haematological biomarkers of El Nino impacts?

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New Zealand is considered the seabird capital of the world, with many species breeding only in NZ. Like many of our species, seabirds in NZ face multiple threats with much conservation effort being directed to persistence of populations in the face of an uncertain future. Whilst NZ is a leader in hands-on restoration efforts of seabird populations, to date these have not been guided by a mechanistic understanding of seabird physiology. We highlight our group's current conservation physiological work on NZ seabirds. A key finding is that post-migration macrocytic anaemia in post migration Sooty shearwaters (Puffinus griseus). This species undertakes annual 60,000 km migrations between hemispheres to take advantage of high polar summer productivity. However, in the years 2013-2015 an increasingly strong El-Nino weather pattern developed in the North Pacific which saw many birds return to NZ with low body weights and higher than usual post migration mortality. Furthermore, haematological examinations revealed a strong relationship between increased macrocytic anaemia and high North Pacific sea surface temperatures, potentially offering a useful biomarker of stress in post-migration birds. Such a finding suggests that the effort of migration in poor years can be substantial and results in a reduction of haematopoiesis over the migration period.

Diving physiology and anatomy of sooty shearwaters: What makes them such exceptional athletes?

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Sooty shearwaters (*Puffinus griseus,* Procellariidae) are exceptional aerobic athletes, annually flying over 40, 000 km and foraging to depths of up to 93m. Our aim was to investigate adaptations that allow this seabird to dive to depth and compare these to those of flesh-footed shearwaters (*Puffinus carneipes*), a pursuit diver, and grey-faced petrels (*Pterodroma macroptera gouldi*), a non-diving species, each being endemic to the Auckland region of New Zealand. To study whether these birds can remain aerobic during a dive, total oxygen stores were calculated from the measurement of blood, muscle and respiratory oxygen stores, and the theoretical aerobic dive limit (tADL) was calculated. This is the first reported use of Magnetic Resonance Imaging to quantify the volume of an avian respiratory system. Wing-loading was measured and compared against diving variables and muscle oxygen stores.

The muscles of the shearwaters carry twice as much oxygen as the non-diving petrel and contribute to over double the oxygen storage seen in northern diving birds. The respiratory system accounted for proportionally less storage than that in other diving birds, including penguins. There is a positive relationship between muscle oxygen stores, wing-loading and diving ability, and this correlates physiology and anatomy with diving ability. The tADL was 29.0 s and was 10 s less than observed mean dive durations. It is likely that other mechanisms contribute to conserve oxygen during a dive. Sooty shearwaters have evolved with adaptations that support their diving ability and these differ from those found in other flying, diving species.

The world's oldest penguin brain and what it tells us about the evolution of diving birds

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We used the digital reconstruction of CT scans of the brain of the oldest known fossil penguin collected in the Waipara River in North Canterbury. This fossil is considered to be mid-to-late Paleocene (c. 58 million years old). Data from early diverging species of major avian subclades can provide key information on ancestral morphologies in birds and shifts in gross neuroanatomical structure that have occurred within those groups. Here we describe the gross morphology of the brain from of the earliest-described endocast of a clade of birds still extant today. Limited dorsal expansion of the wulst in the new fossil is a feature seen in outgroup waterbird taxa such as Gaviidae (Loons) and diving Procellariiformes (Shearwaters, Diving Petrels, and allies), indicating that loss of flight may not drastically affect neuroanatomy in diving taxa. Wulst enlargement in the penguin lineage is first seen in the late Eocene, at least 25 million years after loss of flight and co-option of the flight stroke for aquatic diving. Similar to the origin of avian flight, major shifts in gross brain morphology follow, but do not appear to evolve quickly after, acquisition of a novel locomotor mode. Enlargement of the wulst shows a complex pattern across waterbirds, and may be linked to sensory modifications related to prey choice and foraging strategy.

What is a New Zealand Fairy Tern?

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There has been some difficulty understanding just how different the Fairy Terns from New Zealand, Australia and New Zealand are. Taxonomic work done to date has been suggestive but inconclusive due to the limited material available but field observers have also suggested some points of difference. Looking at both museum skins and living birds I have attempted to evaluate these features to reach a firm taxonomic conclusion and will show that the New Zealand Fairy Tern is a well-defined and distinctive species.

Are Grey Ducks changing, or is it just our perceptions of them

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OSNZ's *Atlas of bird distribution in New Zealand 1999-2004* depicts grey duck in almost half of all grid squares surveyed in North, South and Chatham Island. Its distribution recorded therein is twice as extensive as those of grey teal and shoveler, about half that of paradise shelduck, and 2-3rds that of mallard. On that basis one could hardly call it uncommon. However, the DoC's 2005 version of its triennial C*onservation status of New Zealand birds* listed grey duck as "nationally endangered", and its last 2 iterations have declared it "nationally critical", the most parlous category of all. On that basis grey duck has been assessed as being rarer than brown teal, blue duck and Auckland Island teal and akin to Campbell Island teal and black stilt. Meanwhile grey duck remains a legal gamebird and in 2015 hunters reported shooting almost 7800 of them in Northland, 4500 in both Auckland/Waikato and the Rotorua-Bay of Plenty regions, 1500 on the West Coast and 48 in all of Southland. There seems to be a bit of numerical contradiction here…….or is it that perspectives of "what is a grey duck" have changed. I will refer to historic and contemporary waterfowl trapping and hunter records, a deliberate grey duck x mallard breeding experiment of the late 1960s, and to published images of grey ducks to offer a comment about why "grey ducks" appear to be so widespread, and (possibly) changing.

Migratory Shorebird Conservation: An update on progress on work along the flyway.

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New Zealand is contributing to the conservation of red knots and bar-tailed godwits (ssp. baueri) through active engagement in the key stopover sites in the Yellow Sea. Working with the data supplied by Birds NZ members counts, intensive banding and research by Pukorokoro Miranda Naturalists Trust and Massey University and and multi country analysis from University of Queensland and support from NZ Ministry of Foreign Affairs and Trade we have been leading work to engage with a similar range of counterparts in the People's Republic of China and the Democratic People's Republic of Korea.

This presentation is update on progress and outlines the complexity of working at this scale with the multiplicity of players and the biological complexity of the East Asian- Australasian Flyway. We will seek to show the merits of a loose cooperative approach in a complex biological and political context. We will also discuss what the next steps could be and how we will progress this.

Evidence of vocal matching in a seabird species: examining acoustic responses in grey-faced petrels

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Many bird species have evolved complex vocal structures and call types for communication. The ability to vocally match other individuals has been shown to be important in territorial defence, predator avoidance, and garnering an individual's attention or bonding. Highly cognitive species, including some parrots and songbirds, exhibit the ability to match aspects of vocal elements displayed by the initiator. Procellariiformes (including petrels, shearwaters, and albatross) contain many species that are reliant on vocal communication for mate attraction, identification, and in aggressive displays. Petrel vocalizations are often categorized as simple calls compared to other avian species. In spite of the simple repertoires that many seabirds are known for, here we demonstrate evidence that the grey-faced petrel replicates call frequency of a heterospecific sound, indicating the ability of a seabird species to perform vocal matching. We recorded the responses of individuals to a human produced stimulus (heterospecific) and also to conspecific calls. We found that grey-faced petrels match frequencies of heterospecific calls and match conspecific calls to a lesser extent. This information is critical to our understanding of the breadth of vocal matching in avian taxa, and provides implications of the use of vocal communication and complexity in seabirds.

Can you teach an old parrot new tricks? Cognitive development in wild kaka

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Despite recent efforts to characterise innovative individuals within a species we still know very little about the ontogeny of innovation ability. A number of studies have found that innovation rates are correlated with personality traits such as neophilia and exploration. Juvenile birds are frequently more neophilic and explorative, yet few studies have found evidence of age-related differences in innovative problem-solving success. Here we show consistently higher innovation efficiency in juveniles of a wild, omnivorous parrot species across a variety of tasks and contexts. We tested 104 kaka (*Nestor meridionalis*), ranging in age from four months to 13 years. Twenty four individuals participated in all three of our problem-solving tasks, two of which involved a familiar feeder and one an entirely novel apparatus. Juveniles were the most efficient problem-solvers in all three tasks. By contrast, the adults' success was context-dependent and limited to the novel apparatus, which did not require modification of a pre-learned behavioural response. This suggests greater behavioural flexibility in the juvenile birds, who also showed higher persistence and exploratory diversity than adults. These traits may enable young kaka to discover efficient foraging techniques, which are then maintained throughout adulthood.

Looking at genomic variation in hihi (stitchbird)

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Hihi (stitchbird, Notiomystis cincta) are an endemic New Zealand passerine last seen on the North Island mainland in 1883. They have been undergoing intensive conservation management since the 1980s. Through this program hihi are moved to predator-free sanctuaries and there are now five such populations around the North Island in addition to the last remaining remnant population on Hauturu (Little Barrier Island). In particular, the birds translocated to Tiritiri Matangi Island have been monitored each breeding season since they were moved there in 1995. Monitoring includes bird banding, collection of morphological data on each bird at day 21 (e.g. weight, leg length etc.), survival data from bi-annual surveys and nest monitoring, and reproductive data. Blood and tissue samples have been collected from the population since 2005 and have been used to create a pedigree of the population based on a microsatellite study. For our study we have used whole genome sequencing data to identify areas of the genome that show variation in a small number of individuals. These target regions were then used to design probes to genotype a large number of the bird blood samples. This will result in a large dataset of the nucleotides at thousands of variant positions for each of ~1,500 birds. We will use this data to determine the regions of the genome that cause differences in the bird's morphological and reproductive traits. It is hoped that a better understanding of the genomic basis of traits important for survival and reproduction of this population will help identify birds with favorable potential for breeding and translocation.

Tales from the A frame: a summary of insights from the first 12 years of research of the Burgess Island seabird community.

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New Zealand's reputation for globally significant seabird science is grounded in the incredible diversity of seabird communities available for study and in stories of man/woman versus wild; arduous field expeditions to isolated islands where field conditions challenge the very fabric of the human psyche. In 2004, a group of seabirders, of advancing age and or aversion to discomfort, realised studies of a diverse northern seabird community were possible from relative comfort of the Burgess Island (Mokohinaus) A frame and set about pursuing this endeavour with great enthusiasm. Here we report on the results of the first 12 years of this project including: the expansion of the breeding procellariform species list for the Mokohinaus to seven species, making the islands a nationally significant seabird site; the census of burrowing seabird populations which are expanding rapidly following rat eradication and stock removal; insights into the breeding biology of northern white-faced storm petrel and

fluttering shearwater through intensive post graduate student projects; and studies of the comparative at-sea ecology of Burgess Island seabirds through logger based technologies and studies of species blood isotope and tissue physiology.

E koekoe te tūī, e ketekete te kākā, e kūkū te kererū: Indigenous methods of naming native and introduced bird species of Aotearoa

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Naming in Māori society is a relationship of mana. It is a relationship formulated on establishing and reinforcing connections, identity, and place through whakapapa, between the person or group doing the naming and the thing being named. Our names narrate our lives both lived and living and tapa ingoa is a strong, entrenched branch of mātauranga Māori. For Māori, there is much more to names than a word. Over the past 7 years we have been investigating naming protocols and Māori classificatory systems for flora and fauna. In this talk, we discuss indigenous methods of naming native and introduced bird species in Aotearoa /New Zealand and the development of a possible protocol for the naming of birds in Aotearoa/New Zealand.

The role of tourism in driving little penguin research at Oamaru, New Zealand

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Nature-based tourism can provide benefits for both the local economy and the environment at the central focus of operations. Benefits to the environment arise from educational opportunities, encouraging an awareness of the nature environment, and the conservation of ecosystems. However, seldom does the revenue gathered from nature-based tourism directly fund research on focal species. At the Oamaru Blue Penguin Colony, monitoring and protection of little penguins (Eudyptula minor) began after the establishment of the colony in 1992. The penguins are protected from introduced mammalian predators and disturbance from people, and subsequently monitoring has found no impact on reproductive performance or survival. Breeding habitat for the penguins has been provided at the site. These measures also occur at other penguin breeding colonies, however, in addition (and in contrast to many sites), the Oamaru Blue Penguin Colony has provided all necessary funding towards a scientific research programme that began in 2009. The programme first provided funding for research towards a doctoral degree which examined the foraging behaviour of the penguins. The research also investigated variation in demographic parameters and determined environmental influences on those parameters. The outcome of the project is a greater understanding of how the penguins use the marine environment and how they are affected by changes within it. The research programme will continue to increase at the colony, incorporating the penguins outside of the colony and potentially other species, all as a direct result of funding from tourism.

POSTER: Ecology of Pterodroma petrels in New Zealand, behavioural insights from geolocation tracking and activity data

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Three large *Pterodroma* species (Chatham Island taiko/Magenta petrel *P. magentae*, n=34; white-headed petrel *P. lessonii*, n=12; and soft-plumaged petrel *P. mollis* n=13) were tracked from three New Zealand islands between 2008 and 2014. This poster describes the similarities and differences in their breeding biology, colony activity patterns and foraging ecology. All have characteristic long pre-laying exodus periods (1-2 months), long incubation shifts (typically 2 weeks or longer) and extended chick rearing periods (over 90 days). The adults return to the colony 2-3 months before egg-laying and males can spend long continuous periods ashore by day (up to 2 weeks in *P. lessonii*). At-sea, the species utilise quite different foraging areas. *P. lessonii* is a subantarctic specialist staying in colder water (<15 C) throughout the year and reaching sub-zero seas off Antarctica in mid-summer. After breeding these birds travelled long distances west into the Indian Ocean. Both *P.magentae* and *P. mollis* use cool water zones between the sub-tropical convergence and the Antarctic convergence in summer and autumn. In the austral winter, *P. magenta*e forages in warm (>20 C) sub-tropical seas between Australia and South America, whereas *P. mollis* forages in temperate seas in the central South Pacific between 30° S and 45° S. All these species are annual breeders with the exception of *P.lessonii* which appears to breed biennially if successful in rearing a chick.

POSTER: Nobody suspects the teal: mortality events in burrow nesting seabird chicks as a result of attacks by Campbell Island teal

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To safe-guard a population during the predator eradication on Campbell Island, 30 Campbell Island teal were released on Codfish Island (Whenua Hou) in 1999. Apparently enjoying the rich invertebrate offerings, abundant territory choices and lack of predators there, and they quickly set about breeding. Following the success of the eradication, 25 of the original 30, plus numerous offspring, were shifted back to Campbell Island. The remaining population on Codfish Island continued to flourish, with teal now found all over the island, including the summit (320m).

The ongoing study of mottled petrel breeding biology during 2012 – present has shed light on a previously unreported interaction: Campbell Island teal attacking mottled petrel chicks in their burrow nests. These attacks have resulted in the death of all bar one chick, either as a direct result of the nature of the injuries, or humane euthanasia. It is speculated that the attacks are not a predation event, but instead a defensive response of the teal. During some seasons, as many as 6% of study chicks were lost to teal attacks, and here we report on the potential impacts of this 'unnatural' mortality on the population of mottled petrel on Codfish Island.

POSTER: Foraging behaviour of little penguins with differing corticosterone responses at the Creek and Quarry colonies in Oamaru

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Little penguins in Oamaru are dispersed between two distinct colonies: Quarry and Creek. Despite these colonies being only 1km apart birds usually return to the colony they were fledged. There is also evidence that timing of breeding varies between colonies, and that the Creek colony may fledge larger chicks. Foraging patterns of Quarry colony birds has been studied, but no information is available for Creek colony birds. Foraging patterns of birds from each colony will be recorded simultaneously using data loggers to determine whether they show distinct differences. We will also examine details of foraging patterns with regard to corticosterone response. Oamaru little penguins show individual variation in corticosterone responses. We will determine whether foraging patterns vary between birds that have reactive personalities (high corticosterone response) and proactive personalities (low corticosterone responses). This will be the first study relating corticosterone responses to foraging behaviour in seabirds.

POSTER: Individual variation and the time course of corticosterone responses in little penguins

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Little penguins, like other birds, secrete corticosterone when they detect that a situation is threatening. We have shown that corticosterone responses in little penguins vary largely between individuals; some individuals show relatively large responses whilst others show little response to the same stimulus. Such variations in corticosterone responses also imply variation in birds' sensitivity to changes in environment. The standard protocol for measuring corticosterone responses is picking up a bird, collect initial blood sample and put in a bag or a box. Further samplings are taken within one hour from the time of capture; lastly, the bird is released. We have measured little penguins' corticosterone responses at 0, 15, 30 and 60 min after picking them up from the nest boxes. Corticosterone concentrations generally increased and remained high 60 min after the initial sample. However, we lack knowledge of the rate of which corticosterone responses switch off and how long it takes for corticosterone to return to initial concentrations. In this study, penguins will be sampled following the standard protocol at 0, 15, 30 and 60 min and after they have been returned to their nest boxes. We will measure the complete time course of corticosterone responses and determine whether the rate of corticosterone increase is related to rate of corticosterone return to initial values.

POSTER: Reaction norms and phenotypic plasticity of corticosterone responses of little penguins

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All birds respond to threatening stimuli by secreting the stress hormone corticosterone. Likewise, little penguins exhibit an increase in plasma concentrations of corticosterone when they encounter perceived risk in their environment. Such responses to the same stimulus may differ greatly between individuals within a species with birds showing difference in the magnitude of the hormone response. Variation in corticosterone response also occurs in the same individual exposed to different stimuli. Thus, a single trait may express a range of phenotypes across varying environmental conditions. This is called phenotypic plasticity. A reaction norm describes all the phenotypes generated by an individual in a given set of environments. The slope of a reaction norm can be used to determine the degree of plasticity of a trait. Reactions norms therefore allow the quantification of within-individual plasticity of corticosterone responses. Variation in the slope of reaction norms for corticosterone responses between individuals would suggest the existence of varying degree of plasticity of this trait within a population of birds. We will determine reaction norms for corticosterone response to different stimuli in little penguins. The stimuli will include handling, novel object in nestbox, moving novel object in nest box, predator model at nestbox entrance, and sound of predator call (dog barking). An initial blood sample will be collected (0 min) for each bird. The bird will be exposed to a stimulus for 15 min, at the end of which a second blood sample will be collected. The third and fourth sample will then be collected at 30 and 60 min, respectively, from the time of capture. Corticosterone concentrations at15 min can be compared between birds exposed to different stimuli. Our findings will deliver knowledge on the degree of plasticity of corticosterone response in little penguins in response to different stimuli.

POSTER: Behavioural responses of little penguins in the presence of humans at two sites in Oamaru

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Little penguins come ashore at the Oamaru Blue Penguin Colony (OBPC) most nights of the year to return to a set of more than 300 nest boxes. The arrival of the penguins is a popular tourist attraction. Penguins also come ashore around the Oamaru harbour to use natural nest sites under shrubs and in rock crevices. Tourists gather to watch these penguins coming ashore without paying the entrance fee for the OBPC. One site where birds come ashore is a boat ramp just outside the OBPC and this has become a well-known, unsupervised area to see the penguins come ashore for free. There are increasing problems at this site with people approaching and disturbing the penguins. Observations were made of penguins arriving at the OBPC and at the boat ramp to determine if the behavior of the birds differed between the two sites. Rafts of little penguins were timed from when the birds emerged from the water to the time they reached safety at the gated entry to their nestbox area at the OBPC or across a road and into cover at the boat ramp site. The time spent in the open was shorter and there were more interactions with people at the boat ramp than at the OBPC. It appeared that when in close proximity to a threat, people in this case, the penguins spent less time vulnerable, in the open than when people were further away. The results from this study support the need for an alternate route for the penguins to cross the road at the boat ramp site as there are safety concerns for the little penguins if they continue to come ashore here and encounter increasingly large groups of people.

POSTER: Spoilt for choice - foods of the black-backed gull in urban Auckland

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Although a top predator, the black-backed gull is also an adept scavenger, and where better to put this skill to work than in the urban environment. We examine regurgitated pellets to identify the foods of the gulls from an inner city communal roost site in Auckland, and compare this with contents of pellets collected outside of the urban environs. This is a preliminary study, a component of a wider study of the species' urban ecology.

POSTER: Review of taxonomy and development of genetic assignment testing for Northern Buller's albatross

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Buller's albatross are an endemic species to New Zealand and is currently divided into two subspecies, Northern (Thalassarche bulleri platei) and Southern (Thalassarche bulleri bulleri). These taxa have nonsynchronous breeding seasons, but their identification using morphological methods is challenging. Distinguishing between the two taxa is crucial as Buller's are a significant bycatch in commercial fisheries and the relative impact on each population is unknown. Long breeding cycles, low fecundity and late sexual maturity potentially slow the recovery of populations from disturbances that reduce the number of breeding individuals. The overall objective of this study is to use a set of DNA markers to determine the degree of genetic differences between Northern and Southern Buller's albatross. This information could be used to help resolve the taxonomic status of the subspecies. Mitochondrial DNA and microsatellite DNA will be used to determine the levels of genetic variation and differentiation within and between the Northern and Southern Buller's populations. The specific aims of this study are: 1) to develop molecular methods, mtDNA sequencing and microsatellite genotyping for Buller's Albatross, 2) to use these tools to determine levels of genetic differentiation between the northern and southern groups, and 3) to develop a method for determining the provenance of individuals.