

THE ORNITHOLOGICAL SOCIETY OF NEW ZEALAND (Inc)

Wellington OSNZ—Birds New Zealand

December 2021

www.birdsnz.org.nz and www.notornis.org.nz



Tēnā koutou, tēnā koutou, tēnā koutou katoa.
Nō Tiamana ōku tipuna.
Nō Hōrana ahau.

Kei te Whanganui-a-Tara taku kāika ināiane.
Kō Te Ātiawa ratou, kō Taranaki Whānui, kō
Ngāti Toa, te iwi mana whenua o kōra.
Kō Johannes tōku ingoa.
Kei te tino koa tōku ngākau.
Nō reira, tēnā koutou, tēnā koutou, tēnā tātou
katoa

Greetings, greetings
to you all.

My ancestors come
from Germany.

I grew up in Holland. I live in Wellington.

Te Ātiawa, Taranaki Whānui, and Ngāti Toa are
the iwi over there.

My name is Johannes and I am very pleased to
be here.

Therefore, greetings, greetings, greetings to
you all.

It's now been a couple of months since I have taken over from Geoff de Lisle as the new Wellington Regional Representative. What a great couple of months has it been! There is so many exciting things going on in our region! From lots of interesting sightings (with my personal favourite, a breeding attempt of a Common Diving Petrel on the Miramar Peninsula) to fascinating talks covering a range of great topics, including Prion systematics, seabird surveys in Fiordland, and 50 years of Wellington harbour surveys! I am truly humbled to be the Regional Representative of such a great and influential BirdsNZ region and I am learning lots of new things every month. However, there is always room for improvement and growth and we can certainly extend our membership, especially among the younger demographics, so I would like you all to consider to give your younger friends and family members the perfect Christmas gift: a BirdsNZ membership (<https://www.birdsnz.org.nz/news/the-perfect-christmas-gift/>). That way, our fantastic society can grow even more and become even better! Thank you all for already making the society what it is today and continuing to support it into the future.

Meri Kirihimete/Merry Christmas and Hari Tau Hou/Happy New Year!
Johannes Fischer

Greetings

At the December Zoom meeting there was a request for the details of our morepork nest boxes which have recently been occupied. While these details have been included in the newsletter, Dallas and I make no claims of any deep knowledge in making and erecting nest boxes for morepork. We welcome those who have experience with nest boxes for morepork to share them with members. Having nesting morepork has been a fascinating experience and well worth the wait for them to move into their new accommodation.

Good birding for 2022.

Geoff de Lisle

Wellington Birds New Zealand Monthly Meetings

Meetings are held on the first Monday of the month starting at 7.45pm. **There will not be a meeting in January.** In the latter half of 2021 due to Covid restrictions meetings were only hosted on Zoom. Members will be informed later as to the arrangements for meetings held in 2022.

Speaker: Lara Shepherd (Te Papa Tongarewa). October 4th.

Topic: Prion evolution - new insights from DNA

Prion species look very similar and have long confused ornithologists. Now DNA is helping answer some long-standing questions including the number of species and how they are related to one another. For example, DNA analyses have shown that Salvin's prion is a genetic mix of Antarctic and broad-billed prions. Gough's prion was shown by DNA analysis to be a different species from broad-billed prions. Gough's prion was under serious threat from mice on Gough Island. Very recently the extensive project to eradicate mice from Gough Island has not been successful. Footage from a camera trap showed that at least one mouse had survived a hugely complex effort to remove them. DNA analyses have been carried out on the massive prion wreck in 2011 where it is estimated over 250,000 birds died. These analyses showed that the most-commonly affected species, broad-billed prions did not come from the major population on the Chatham Islands. The exact location has not been conclusively identified but indications are that they came from southern New Zealand populations.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6657733/pdf/msz090.pdf>

Speaker: Colin Miskelly (Te Papa Tongarewa). November 1st.

Topic: Lessons from 217 islands: birds and predators on Fiordland islands

Between 2016 and 2020, Te Papa and DOC staff searched for seabirds and counted landbirds on more than 200 islands between Milford Sound and Preservation Inlet. When compared with survey data from the 1970s and 1980s, our surveys revealed insights into predator ecology and impacts, the effects of predator removal, and the role of competition in the structure of forest bird communities. In this talk Colin presented information from the final year of the survey (Milford Sound to south of Doubtful Sound, in November last year), and major findings of the now completed series of surveys. The results from the Fiordland expeditions have been presented in a number of publications including Te Papa blogs (see below) and Notornis.

A plethora of islands – surveying breeding seabirds in Fiordland, 9th December, 2020

<https://blog.tepapa.govt.nz/2020/12/09/a-plethora-of-islands-surveying-breeding-seabirds-in-fiordland/>

Storm petrels in the spotlight

<https://blog.tepapa.govt.nz/2020/12/02/storm-petrels-in-the-spotlight/>

Speaker: Hugh Robertson (Department of Conservation). December 6th.

Topic: Harbour city highlights

Hugh Robertson gave a presentation highlighting some of the changes in the numbers and distribution of coastal birds around Wellington Harbour, since 1975. Thanks to the efforts of many Birds NZ/OSNZ members from the Wellington region, a very valuable insight has been made into the changes to bird populations around the harbour and south coast of the city. Over 500,000 birds, representing 79 species have been counted over 5 series of counts. The big losers (% decline) over the years have been giant petrels (-12.8%), reef heron (-3.3%), red-billed gull (-3.2%), fluttering shearwater (-3.1%), black shag (-2.8%), black-backed gull (-2.3%) and Caspian tern (-2.2%). The winners (% increase) were pied shags (17.4%), welcome swallow (10.4% low numbers), variable oystercatchers (2.7%) and kingfisher (2.3%). The changes in bird populations in the harbour are likely due to multiple factors including cessation of discharging raw sewage and meat works effluent and extensive reclamation.

Regional Representative: **Johannes Fischer** birds.wellington@birdsanz.org.nz

Regional Recorder: Peter Hodge peter.hodge@gmail.com

Birds New Zealand Regional Roundup: Geoff de Lisle & Dallas Bishop (04) 527 0929

osnzwelly@gmail.com

Mist netting – Matu Booth, manager@ngamanu.co.nz Nga Manu, Waikanae

Wellington Atlas Progress

The Wellington Atlas region which includes the Wairarapa, continues to make good progress. In late December a total of 25,476 checklists had been submitted by 301 Atlasers. This is a creditable 242 checklists per square and includes 135 species. The Wellington region submitted the highest number of checklists for the New Zealand October Big Day. This number of checklists was greatly boosted by the inclusion of the 5-minute bird count data from Kapiti Island. Fortuitously, October 9th fell on the date of the quarterly counts on Kapiti Island.



Kaka Mana Island

On the 25th of October Colin Miskelly reported a kaka on Mana Island. A kaka, most probably the same bird, was seen on the following day by Colin, Dallas Bishop and Geoff de Lisle. There is a previous record in eBird of a kaka on Mana Island on the 20th of November, 1998 by an Anonymous eBirder. There is no additional information on this 1998 record.

Kaka bones have been found on Mana Island but the forest is not yet sufficiently developed to provide an adequate supply of fruit, nectar and woodboring insects to support their re-establishment. The source of the kaka observed in October 2021 could be either Kapiti Island or Zealandia both of which are approximately 22km away from Mana. While there has been extensive predator control in the Wellington region the records from eBird suggest the spread of breeding populations kaka beyond the sanctuaries of Kapiti and Zealandia has been slow.

Mana Island ecological restoration plan Technical Report · January 1999. Colin Miskelly

<https://www.doc.govt.nz/globalassets/documents/parks-and-recreation/places-to-visit/wellington/mana-island-restoration-plan.pdf>

Mana Island ecological restoration plan review Colin Miskelly May 2010

<https://www.doc.govt.nz/documents/conservation/land-and-freshwater/offshore-islands/mana-is-restoration-plan-review.pdf> #

Pukorokoro Miranda Shorebird Centre

The following was posted on Pukorokoro Miranda Facebook page. This Webinar is well worth viewing.

Thank you to everyone who joined us for the WEBINAR yesterday. Well done Adrian, Keith, Gillian, Trudy and Chelsea for such an awesome presentation. If you missed the show or if you would like to watch again or share with others here is the link: <https://www.youtube.com/watch?v=k301EX7XKLs>

Now that you know how amazing our gob smacking godwits are please vote GODWIT in the Bird of the Year competition. You can vote from anywhere in the world as long as you have a valid email address. GO GODWIT!!

*<https://www.birdoftheyear.org.nz/bar-tailed-godwit> This from Keith Woodley, Godwit campaign manager
"We are based at Pūkorokoro Shorebird Centre on the Firth of Thames. We have been following godwits for over 30 years, and have assisted with research projects that have unfolded the amazing story of these birds and their epic migrations. What inspiring and uplifting stories they have provided all of us i*

Takahe

Takahe in the Wellington region are present on Mana Island, Kapiti Island and in Zealandia. They are currently in the middle of the breeding season with chicks present on Mana and Kapiti Islands. The bird pictured was observed on the Kapiti Island deco tractor on the Paraparaumu beach.

Photograph, Dallas Bishop.



Matiu Somes Island Sooty Shearwater / Titi, Shane Cotter

In July this year, when adding more diving petrel calls to the sound system, I also added Titi calls for the first time. I had previously heard one calling on the west side of the island on 25 January 2016. On 5 November 2021 at around midnight, I heard a Titi on the ground calling from down the steep bank on the other side of flax bushes towards Wellington from the Wellington speaker. Due to it's location I did not attempt to locate it. During the day on 30 November while checking fluttering shearwater burrows I found a Titi in a burrow in the flax (see photo). It was unbanded and as I did not have any Titi bands it remained unbanded. I am in the process of obtaining bands for Titi from the DOC banding office. Later that night at around 2am, I saw a Titi on the main colony's grassed area. Unfortunately, there was no way to tell if this was the same bird or another one. The burrow where the first Titi had been was empty throughout the night whenever it was checked.



Photo -Shane Cotter.

Fluttering shearwaters and fairy prions are nesting on Matiu Somes Island and Mana Island. A summary of their breeding will be summarised in a future newsletter.

Whiskered Tern

Three subspecies of which *Childonias hybridus javanicus* breeds inland in Australia and is a vagrant in New Zealand. A small tern with a shallow, forked tail.

<https://www.nzbirdsonline.org.nz/species/whiskered-tern>

On the 13th of October Jan Keast reported seeing a whiskered tern at the Pharazyn Reserve, Waikanae.

<https://ebird.org/atlasnz/checklist/S96052666>

"Small white tern with shallowly forked tail, black band from eye area around back of nape. Buoyant flight, working upwind over pond, picking insects off surface."

Jan is to be commended for rapidly posting this observation of a rare bird in New Zealand on eBird Atlas and following it up with an Unusual Bird Report*. The observation was reported on BirdingNZ.net and has generated a considerable amount of interest and discussion. There were a number of visits to the reserve to look for this bird. Alan Tennyson and his brother came closest to re-sighting this bird.

"My brother and I saw the tern for literally 1 second this evening just as we reached the ponds, then spent the next hour fruitlessly searching for it. I've been to these ponds heaps of times and never seen a tern here before, so surely it was the bird seen yesterday. Brief impression (compared with white-fronted) was a bit smaller, darker dorsally, a more compact tern with a proportionately larger head and beak - flying purposefully northwards. The beak looked dark. It was definitely larger than a white-winged black or little tern. "BirdingNZ.net

An important aspect to this sighting was the location, Pharazyn Reserve, Waikanae which is inland and where there are no previous observations of terns on eBird.

*Unusual Bird Report, this report has yet to be assessed by the Records Appraisal committee.

Photographs: **Top**, An adult in breeding plumage, Lake Rotoiti, Rotorua, December 2017. Les Feasey, NZBirdsOnline.

Bottom, An adult in flight, non-breeding plumage, Kakadu National Park, Northern Territory, Australia. Duncan Watson. NZBirdsOnline.

New Zealand records

There have been about 15 sightings of whiskered terns in New Zealand. The sightings include: Lake Horowhenua (2 birds, August-October 1977, May to September 1978), Lower Waikato River (August-September 1978), Pukekohe (March 1980), Lake Rotorua (May 1987), Bromley Oxidation Ponds, Christchurch (December 2005), Blenheim Sewage Ponds (January 2006), Lake Grassmere (February 2006; the last three records probably refer to the same bird), Travis Wetland, Christchurch (May 2007), and North Kaipara Head (October 2009), Invercargill (October 2017), Rotorua 2017), Lake Taupo (January 2018), South Otago (January 2020), Te Anau (January 2021). NZBirdsOnline. & UBR database.



Pair of Falcon Electrocuted at Whitireia Park

On the 29th of August there was a report on the Whitireia Restoration Facebook page of finding two dead falcon which had been electrocuted. The Restoration group raised their concerns with the electric lines company, Wellington Electricity who have agreed to put insulator caps on all 19 electricity poles in Whitireia Park which will prevent any further electrocutions of falcon in the park. This pair of electrocuted falcon may have been the birds that had been observed on Mana Island.

Electrocution of falcon has been recognised for many years as a significant cause of death in this species (Fox & Wynn, 2010). Wingspan report that there are two primary situations in which electrocution occurs:

1. *When a bird perches on an un-insulated transformer box and bridges the live wires coming out of the top of the box*
2. *When a bird perches on a crossarm that is grounded and made of conductive materials (including wet wood) and bridges the gap between the crossarm and any live wires*

Wingspan proposes that electrocution hazard can be phased out by:

1. Concentrating effort into retrofitting transformer boxes in high-risk areas during routine line maintenance operations
2. . Only erecting safe power pole and transformer box designs from this point on

Wingspan are actively working with electricity companies to reduce the problem of electrocution of falcon.

Fox NC, Wynn C (2010) The impact of electrocution on New Zealand falcon (*Falcon novaeseelandiae*) Notornis 57:71-74. <https://notornis.osnz.org.nz/impact-electrocution-new-zealand-falcon-falco-novaeseelandiae>
https://www.wingspan.co.nz/PDF/falcon_electrocution_fact_sheet.pdf



<https://www.wingspan.co.nz/>

Help Wanted

Members are asked to keep an eye out for banded birds and report them to the Banding Office. This can be done electronically using the following link <https://www.doc.govt.nz/our-work/bird-banding/reporting-a-bird-band/>. Note, the banded dotterel breeding season is coming to a close and the birds from the East Harbour study sites will be starting to disperse. If you see a banded dotterel with a white flag please report it, even if you cannot read the 3 letter individual code. Earlier this year a flagged banded dotterel was observed at Moa Point which had been banded on the Eastbourne beach. Other species to keep an eye include little penguins – chicks and adults on Matiu Somes Island have been marked with flipper bands.





Te Papa Blogs

Whose head is that? The case of the missing penguin bodies

Lara Shepherd, 4 Nov. 2021

How does a penguin head end up in the stomach of a deep-sea Antarctic toothfish?

This mystery is one that our researcher Lara Shepherd, vertebrate curators Alan Tennyson and Colin Miskelly, and French marine expert Yves Cherel recently examined. The birds were recovered from the Antarctic toothfish. They were identified as Royal Penguins that breed on MacQuarrie Island. The Te Papa team think the penguins were initially killed by either killer whales or Leopard seals and the less desirable bits (heads, flippers, feet) were scavenged by the toothfish at depths of 1-1.5km where these fish feed.

<https://blog.tepapa.govt.nz/2021/11/04/whose-head-is-that-the-case-of-the-missing-penguin-bodies/>

Shepherd LD, Miskelly CM, Cherel Y, Tennyson AJD (2021) Genetic identification informs on the distributions of vagrant Royal (*Eudyptes schlegeli*) and Macaroni (*Eudyptes chrysolophus*) Penguins. Polar Biology

Why did male and female huia have different beaks?

Rodrigo Salvador, 7 Dec 2021

The beaks of male and female huia are so different that the two sexes were originally described as two separate species. But what is the reason behind that

difference? Natural History Curator Rodrigo Salvador takes us through recent research.

Huia had the most extreme male/female difference in beak shape known in all birds. Accordingly, many naturalists at the time tried to figure out why.

While both males and females fed on herbivorous insects and on plant material (berries and seeds), the females would have a more specialised diet, feeding on a smaller variety of food items when compared to the males. Isotope results indicated a partial dietary segregation between males and females.

<https://blog.tepapa.govt.nz/2021/12/07/why-did-male-and-female-huia-have-different-beaks/>

What are the cuttlefish bones found on our beaches?

Rodrigo Salvador, 23 Nov 2021

Our curators and researchers worked together with colleagues from NIWA and the Australian Museum to solve this century-old mystery. Rodrigo Salvador takes us through what they found.

If you ever went for a walk on a beach, chances are you've come across cuttlefish bones. Bird pet owners are also familiar with those because they are used as a calcium supplement.

DNA analysis of cuttlefish bones revealed that the most prevalent specimens found on New Zealand beaches was the Australian giant cuttlefish *Sepia apama*.

A subset of the Te Papa cuttlefish species contains marks, some of which are likely to have been caused by large seabirds such as white-capped mollymawks.

<https://blog.tepapa.govt.nz/2021/11/23/what-are-the-cuttlefish-bones-found-on-our-beaches/>

Fernbird Updates

In April 2017 22 fernbirds were translocated from Rotokare Scenic Reserve in the Taranaki to the Pauatahanui DOC reserve. The project was led by Kevin Parker for Forest and Bird. The following year a similar number of birds were transferred to Pauatahanui. All translocated fernbirds were individually colour banded. In April 2019 40 fernbirds were translocated from Rotokare to Mana Island in a project managed by Kevin Parker for Friends of Mana Island. An essential part of translocation projects is post-transfer monitoring.

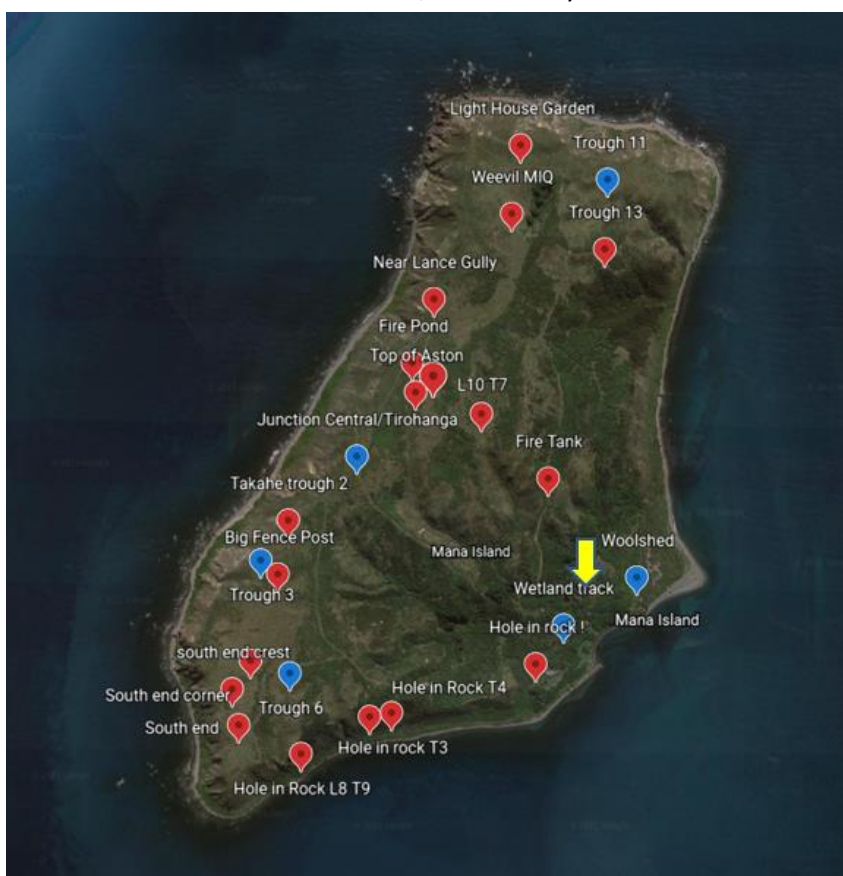
In 2021 there were two remaining translocated fernbirds, both males, at Pauatahanui Wildlife Reserve. YB – RM which was translocated from Rotokare in 2017 and has been in the same territory on the track to the Thorpe hide since then. Heather and Robertson (2015) recorded that the oldest fernbird in New Zealand was 6.5 years. RY – KM was translocated the following year and in its first breeding season was in the raupo on SH58. In subsequent years it has been on the other side of the Pauatahanui stream around the board walk to the Estuary hide. The majority of the fernbirds at Pauatahanui are unbanded, locally bred and number in the order of 20 pairs. During the last two breeding seasons there has been a pair of fernbirds at Horokiri Wildlife Reserve, the first bay west of the Pauatahanui Wildlife Reserve.

During two stays on Mana island in October Dallas and Geoff mapped (left) fernbirds observed while volunteering for DOC. The yellow arrow marks the location of the site where the fernbirds were released in April 2019. The blue markers are the location of banded birds and red markers unbanded birds. The area of the east coast north of the woolshed was not visited in October but where fernbirds have previously been found. A total of 32 birds were seen during their recent stay.

The results from Pauatahanui and Mana Island are most encouraging and have all the hallmarks of two successful translocations.

A small number of fernbirds are present at the Waikanae Estuary.

David Cornick, Dallas Bishop, Geoff de Lisle



Heather D, Robertson H, Onley D. (2015) The Field Guide to Birds of New Zealand, Penguin Books, 2015 revision.

Bird Snippets

Diving Petrel, Miramar Peninsula

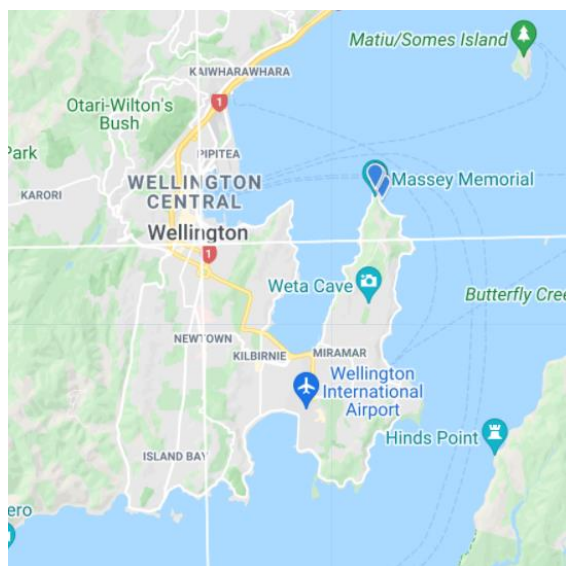
8th August, 2021

The finding of a diving petrel burrow was reported on the Facebook page of Te Motu Kairangi-Miramar Ecological Restoration. *"We are stoked to have found a burrow of a common diving petrel (Pelecanoides urinatrix) on the peninsula!"*

This could potentially be the first nesting attempt of this species on the Wellington mainland in the last 100 years!

The burrow was made by a an apparently single male, that has been calling for a mate."

This finding has been recorded in eBird and includes a recording of the diving petrel (see map).



Major progress has been made on the pest eradication on Miramar Peninsula. However, Te Motu Kairangi Miramar Ecological Restoration is concerned that ground nesting birds such as the diving petrel will be predated by domestic cats. They are investigating this challenging problem.

Dabchick, Maoribank duck pond, Upper Hutt

28th November, 2021

A pair of dabchick with two recently hatched chicks. Note, the nearest population of dabchick to Maoribank is over 10km away.



Dallas Bishop & Geoff de Lisle

Tomtit, Waiorua, Kapiti Island.

30th November, 2021

A pair of tomtit were seen on the ridge of the Waiorua public track. The pair was first heard by Dallas and then attracted with a playback call. While tomtits are relatively common on the mainland in the Wellington district they are now rare on Kapiti Island. In addition, during our two day stay on Kapiti we did not see or hear any grey warblers on the public tracks at Rangatira and Waiorua. Dallas Bishop & Geoff de Lisle

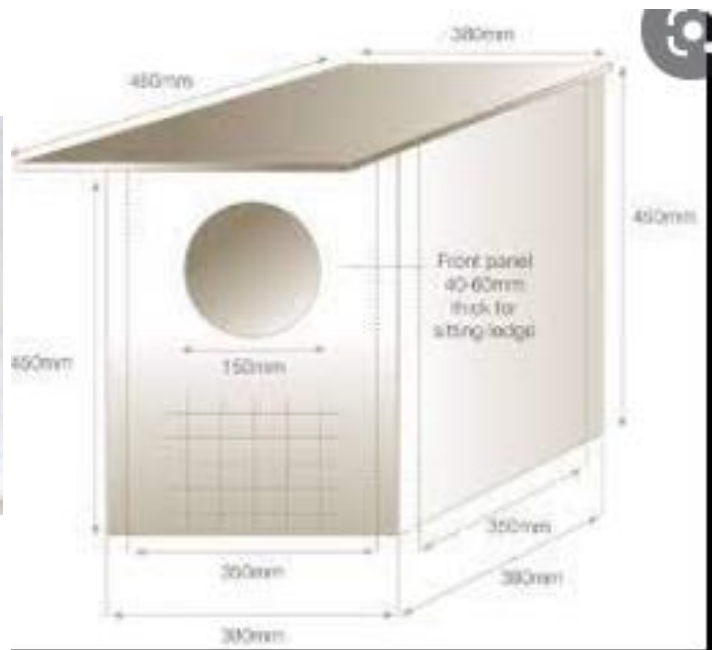


Nest Boxes for Moreporks

The following article is Dallas and my experience with nest boxes for morepork. When we started this project back in 2015 we did not have any experience or expertise in making accommodation for them. After consulting the internet our design was based a vertical type box similar to the following boobook design (Top right).

http://www.graniteborderslandcare.com.au/admin/files/projects/1587514097_southern_boobook.pdf

We used 25mm thick, treated timber. The entrance hole is 100mm, rather than 150mm. There is a drainage hole in the bottom of the box. Plastic netting was placed inside the box (photo) as an aid for the birds to exit the box. The lid is hinged and extra pieces of wood were used so that the boxes could be nailed to the trees.

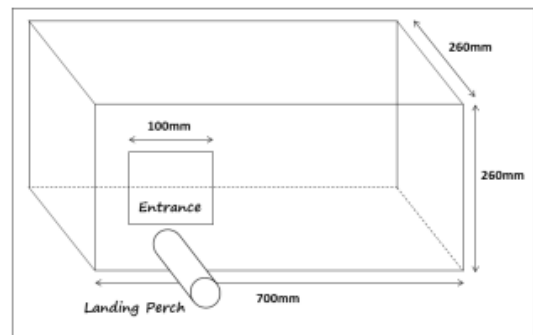


Wingspan Morepork Nest box Design

https://www.wingspan.co.nz/PDF/how-to-build-morepork_nest_boxes.pdf

Box design

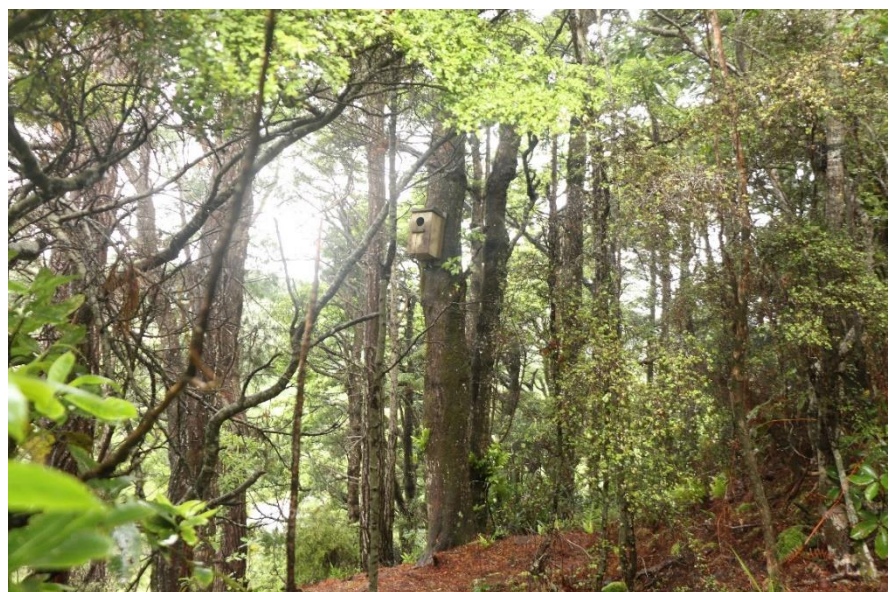
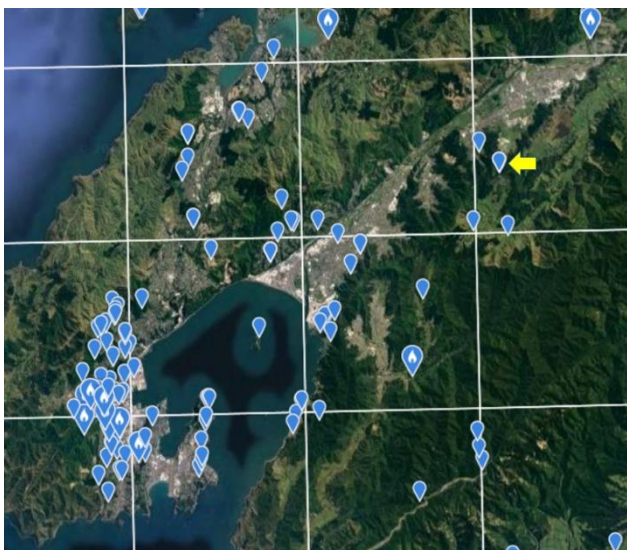
1. We use plywood to construct the box, which can then be painted to provide waterproofing and to make the box last longer.
2. The entrance can be a round or square hole 100mm wide.
3. The floor of the nest box should be filled with small bark chips at least 5cm deep.
4. A large piece of dowel, or a suitably sized branch should be placed underneath the entrance hole to act as a perch aiding entry.
5. At the right-hand end of the box or part of the lid, should be made into a viewing entrance. This allows the box to be cleaned annually and checked to see if it is being used by owls.



Installing a nest box for morepork

One of the reasons for us installing a nest box was that morepork were resident near our property in semi-rural Upper Hutt. The map is a summary of the eBird Atlas checklists of morepork with the yellow arrow marking the location of our home. Most certainly morepork are more widely distributed than shown and this is a prompt for more nocturnal checklists.

We erected two nest boxes for morepork. The picture (below right) is of the occupied box which is in a small grove of beech trees. Both boxes were nailed on the shady side of black beech trees, approximately 4m from the ground. The following tips from Wingspan are a good guideline for installing a nest box.



Tips for the best site to install the box:

1. Choose a dark, quiet, sheltered area in a stand of trees, or up near the roof of a shed or barn, to position the box.
2. The nest box should be situated well off the ground.
3. If placed in a tree, a metal strip around the tree trunk will protect any nesting morepork from pests such as stoats, cats and possums.
4. Cleaning the box annually will eliminate the risk of disease. This is best done during winter when morepork are not breeding.
5. Trapping for rats, stoats and feral cats in the area will further reduce the risk of any morepork getting predated (note if using rodenticides then check the labels and only select those products that do not cause secondary poisoning)

Monitoring morepork nests

After installing the boxes in 2015 we kept an eye on the box for any sign of nesting activity. After a few years we concluded that the accommodation we built for morepork was a failure. This year we alerted to activity by the one of the boxes by upset tui and blackbird. Access to the box requires a ladder. To avoid disturbing potentially nesting birds we set up a trail camera which detected adult morepork leaving the box. We subsequently learnt that the morepork were flying directly to the box and entering the nest before the trail camera was activated. The microphone on the trail camera indicated the presence of chicks. Activity was recorded each day at the nest at about 8.30pm and this was the time when we noticed harassment of morepork by tui and alarm calls from blackbirds. We have also directly observed the nest at dusk and early evening. Our relatively inexpensive, night vision binoculars have been most useful in observing morepork at the nest. These binoculars have a feature that allows taking videos.

Pictures. Top right, morepork roosting during the day not far from the nest. Bottom right, at dusk while being harassed by a tui. Following page, Left, entering nest box; Right, about to exit box.

Geoff de Lisle, Dallas Bishop





Morepork Eggs

A feature of the eggs of owls is that they are round.

Scientists have long hypothesized about the reasons for eggs to have the shapes they do. Even Aristotle had a theory: “Long and pointed eggs are female; those that are round, or more rounded at the narrow end, are male,” the Greek philosopher wrote in “The History of Animals” in the fourth century B.C.



Morepork Clutch (NMNZ OR.021334, collected by Thomas Cockcroft). Gollans Valley

Source: NZBirdsOnline Photographer, Jean-Claude Stahl, Te Papa Museum

A recent study (Stoddard et al., 2017) on the shape of eggs produced the following finding, *“we show that egg shape correlates with flight ability on broad taxonomic scales, suggesting that adaptations for flight may have been critical drivers of egg-shape variation in birds.”*

Stoddard, MC et al., (2017) Avian egg shape: Form, function, and evolution. Science 356:1249-1254.
<https://pubmed.ncbi.nlm.nih.gov/28642430/>