

Pūkorokoro Miranda News

Journal of the Pūkorokoro Miranda Naturalists' Trust

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CELEBRATING  YEARS OF

Pūkorokoro Miranda Naturalists' Trust

Keeping the birds coming

Editorial



Wrybill NICK BECKWITH

In 1975 a Trust was born, though its arrival was not straightforward. It was possibly ahead of its time. Or it was a trailblazer. There was a major hurdle in establishing a constitution as there were no other examples of such an organisation. ‘The solicitors,’ recalls David Lawrie, ‘had great difficulty establishing wording that satisfied both the Registrar of Incorporated Societies and the inland Revenue Department.’ He also points out the PMNT constitution has been a model for many organisations since.

Well, that was 50 years ago during which the Trust has forged a remarkable path. *Pūkoro News* will chart that path over the next three issues, inviting reminiscences and stories from many of the people involved with us over the years. We have a series of events planned as well, with details to follow in due course. But we are open to any other ideas for celebrating this great milestone during 2025. If you have such an idea do get in touch.

Back in 2015, during the 40th anniversary of the Trust, we managed to get Bar-tailed Godwit voted Bird of the Year. We think it is high time the other fellow appearing on our logo gets a turn in the national spotlight. So, we have begun our commemoration by declaring 2025 to be Year of the Wrybill.

Why Wrybill?

First, it is that singular bill. In the avian kingdom there occurs a dazzling diversity of bills – shape, size, length, colour, structure. There are the improbable spoonbills, the bizarre toucans or the Far Eastern Curlew where the bill seems to go on forever, as but three examples. But only Wrybill have that bill curved sideways. Utterly unique and found only in Aotearoa New Zealand.

At Pūkoro it is their annual presence as a flock of several thousands, representing about 40 per cent

of the world population. Being the most accessible site for seeing so many of them lends, it must be said, a mercenary flavour for PMNT as they are a magnet for visiting birders. While they are, of course, on our logo for ecological and aesthetic reasons, they also generate income for the Trust.

Perhaps the feature that stands out most for the visitor, once one has taken note of the peculiar bill, are the flock dynamics. They erupt off the roost to perform prolonged aerial ballets. Painted across the sky, their twisting, undulating, swoops and spirals have captivated innumerable visitors. I have been privileged to witness such occasions many, many times, and it is an experience that is perpetually refreshed.

They are confiding. They may approach you to within a few metres, quietly watching. Photographers are known to complain they cannot focus their big lenses because birds are too close. For the keen birder the Wrybill flock provides an additional attraction. Some of the smaller Arctic-breeding birds that regularly reach our shores, such as a Curlew Sandpiper or Red-necked Stint, may choose to roost among the Wrybill. On their own they may be super wary, but among a bunch of relaxed locals, they too seem to relax. So might even rarer visitors such as a Broad-billed Sandpiper.

They breed in awesome landscapes, in the true meaning of that word, not the banality of its overuse. On the broad braided reaches of the Rakaia or Rakitata, or the Upper Waitaki system, those tumbling channels of water, milky green with glacial silt, against an alpine backdrop. Among the swathes of river gravel and ground hugging plants, is a nest that is impossible to see. Unless the incubating bird moves. The eggs and chicks are similarly cryptic, precisely adapted to that environment. Youngsters scarp and stumble over the stony flats, ready to freeze into invisibility if a parent alarms.

Like a Swiss army knife, it is a multi-purpose bill. Scraping around beneath submerged river stones for Caddis Fly or May Fly larvae. Good food out of reach of other more conventional bills. On northern tidal flats the distinctive flick of its head identifies a foraging Wrybill from a great distance, as it sifts through the biofilm layer on the mud surface, seeking micro-organisms such as diatoms. Yet also using the bill to yank a worm from the mud, like any other species on the flats.

Yet despite all this, Wrybill remain relatively unknown to many people in this country. Back to those riverbeds where birds breed, and the severe stress those habitats are under. Reduced natural flows through land use practices, that enable weed encroachment that in turn stabilises gravel bars and beaches, thus inhibiting the dynamic movement of channels and islands. The invasive vegetation also provides habitat and cover for predators. The ultimate outcome is modified riverbeds and degraded nesting habitat for Wrybill, and other species such as Black-fronted Tern/Tarapirohe, Black Stilt/Kaki, and Banded Dotterel/Pohowera.

As reported in *Pūkoro News 134*, and in this issue, much work is being done to address these major issues, and this needs to be supported. The resources need to be available for much more to be done, and sustained, if we want to secure a future for Wrybill. So, a year of national publicity for these endearing creatures is what we are after. And for Wrybill to be firmly placed on the radar screen of Kiwis.

Keith Woodley

Snippets



Birds NZ president Natalie Forsdick (left) visits the Youth Camp
KEVIN BARKER

Youth Camp

The Shorebird Centre hosted a camp for young birders in December. Organised by Ian Southey, and held under the auspices of Birds New Zealand, the six-day event attracted nine very keen teenagers. They filled the centre with a buzzy energy and enthusiasm, along with an already well developed knowledge of birds. The Findlay Reserve, Manukau Harbour, Kopuatai Peat Dome and the Kokako Management Area in the Hunua Ranges all featured in the programme.



Youth camp participants KEVIN BARKER

Taramaire signage

As reported in earlier issues of *Pūkoro News*, a multi-agency committee is working towards a greater level of protection for the Pūkoro Coast. While the working group is investigating the most appropriate legal means for achieving this, an initial step was the installation of new signage at Taramaire, aimed at educating visitors about why it is such a world renowned shorebird site, and why we all need to protect it.

Clearly there is still work to be done in getting the message across, especially the restriction of vehicle access to the shoreline. This SUV became stuck in late January, and remained so several weeks later.



Taramaire sign KEITH WOODLEY



Taramaire SUV in the tide
KEITH WOODLEY

Opening of new hide at Piako

Rationalising flood protection infrastructure was the primary reason Waikato Regional Council bought the flooded farm block at Piako. But as reported previously, the council commissioned PMNT to design and build a bird hide with interpretation panels. These facilities were officially opened in October 2024.



Floodgate Piako River KEITH WOODLEY



The gathering for the Piako Hide opening INGER VOSS



Waikato Regional Council Chair Pamela Storey at the Piako hide opening INGER VOSS



Michael Taylor Remembers

In March 2015 we held a commemorative lunch for members to celebrate the 40th anniversary of PMNT. One of the speakers that day, a year before his death, was long-time member Michael Taylor.

In the 1970s when I was new to the Ornithological Society, the Auckland meetings were held in the museum. Supper followed the main speaker. Aside from the general chat, a group would form a huddle rather the way sports

teams do when determining tactics. The group included the Regional Reps. Sylvia Reed and Beth Brown, Dick Veitch of the Wildlife Service, and of course Dick Sibson. What was being discussed? *Plans to establish a bird observatory in the Firth of Thames.* That scene of a posse of far-sighted people is my first Miranda moment.

My second scene is associated with Ronald Lockley and dates from 1975. Ronald was hosting Richard Adams, famous as the author of *Watership Down* who had used Lockley's book *The Private Life of the Rabbit* to get his facts. Ronald Lockley took up my suggestion that Richard Adams could give an illustrated lecture 'Watership Down – the Country behind the Book.' Hence the memory is of a full house at the museum auditorium, with the proceeds towards the Miranda Naturalists' Trust building fund.

Another scene from 1975 is of a working party at the limeworks site near the present car park. We are building a shelter of a sort using the remains of an old wooden building. John Brown was a leading figure in the construction work. What became of the hide? Never mind, just look at the splendid facilities we have now!

A very special memory from 1979 again involves Ronald Lockley. This time his visitor was none other than Sir Peter Scott. In my mind's eye I see Scott busily sketching the Wrybill flock, while his wife Philippa takes photographs. They were given afternoon tea. Scott drew a sketch in the Trust's log book. Anthea Goodwin had the presence of mind to acquire a signature in her copy of [Scott's autobiography] *The Eye of the Wind* (while I kicked myself for not bringing along my copy of the book.

My final scene is from two months ago. I am at the latest hide looking out on the flock of shorebirds and the colonies of terns and Black-billed Gulls. I am taking advantage of the Trust's telescope, and in the company of my nephew Steve Whittaker, here with his family from Toronto and staying at the Centre. We had not met for 18 years. Being able to share my enthusiasm for birds with my nephew was a high point of his visit, and recalling that occasion caps off my Miranda memories.



Sir Peter Scott sketching Wrybill 1979
GEOFF MOON

Can bird watching boost your mental health?

A recent study from the University of Exeter shows bird-watching significantly boosts mental health, reducing stress and enhancing well-being. Lead researcher Dr Daniel Cox explains, 'Birdwatching combines physical activity, cognitive engagement, and connection with nature, all contributing to improved mental health.'

Participants who spent just 120 minutes observing birds felt more relaxed and happier. Regular birdwatchers had lower stress levels and a more positive outlook on life, proving that this simple activity can have profound effects on mental health.

'You don't need special equipment or training, just a willingness to look and listen,' Dr Cox notes. This study debunks the myth that effective mental health practices are complicated or costly, highlighting birdwatching as an accessible way to boost happiness and well-being.'

Recent sightings at Pūkoro

7400 Bar-tailed Godwit
940 Red Knot
15 Turnstone
57 Pacific Golden Plover
4 Sharp-tailed Sandpiper
1 Curlew Sandpiper
1 Red-necked Stint
1 Semipalmated Plover
3 Australian (formerly Gull-billed) Tern
2 Arctic Skua
4100 Pied Oystercatcher
c.1600 Wrybill
35 Banded Dotterel
159 Royal Spoonbill

Chris Thompson recalls her time as PM News editor

In 1997 I became the second editor of *Miranda News* – the newsletter of Miranda Naturalists' Trust as it was known then. I was already on the PMNT Council and the incumbent editor, Stuart Chambers, had indicated he was stepping down. I recall going into one of our council meetings, led by then chairman John Gale, and coming out wondering how I had agreed to become the new editor. John had a very persuasive way of getting people to 'volunteer', making them almost believe they had come up with the idea in the first place. His style worked well for the Trust though, and he excelled at soliciting much-needed funding from various sources.

Taking over from Stuart Chambers was slightly daunting as he had been doing such an admirable job. His final issue changed the format from a folded newsletter to an A4 magazine that included colour. However, Stuart, and also Centre Manager Keith Woodley were very supportive in my new role.

As with many community group magazines, a working-bee was organised in someone's lounge four times a year to do the enveloping and labelling. One of my great pleasures was to open the boxes delivered from the printers and getting the first look at the final version. I recall one such evening. Des picked up a copy and quickly searched through for an article he had written. His face fell. "You've printed the photo of the bird upside-down!" I looked at the picture – bird in flight, wings out-stretched – and I had to admit that actually it did look better the other way round. If I felt bad then, I was about to feel a whole lot worse. Des grabbed another magazine, then another. "It's the same in all of them!" he exclaimed. Yes Des, all 800 copies are identical.

At a council meeting the topic of photo-shopping came up. The opinion was expressed that we should assure our readers that we categorically did not digitally alter any of our pictures in any way. Confession time from the editor. John Rowe had given me a great picture taken from the roof of the cottage when he was up there doing one of his innumerable Miranda repair jobs. I felt the picture was perfect – looking down on the Shorebird Centre and Coromandel in the background – apart from the telegraph pole stuck in the middle. So, I removed it. Because I could. I wonder how many people noticed.

I wonder how many people noticed my faux pas with a bird name. A frantic phone call from the Centre – "Late breaking news! We have to get this into the magazine! A rare bird has been seen at Miranda!" Not a bird I was familiar with, and in my haste, I did not check, I reported our new arrival as an 'Asiatic Dowager'. Keith quietly informed me that no, an elderly wealthy Asian lady had not taken up residence at Miranda.*

I thoroughly enjoyed my time as editor and thank all those people who sent me fascinating stories and pictures. I was sorry I could not include them all.

**As it happens, the Asiatic Dowitcher record was not confirmed.*

Kuaka

*So, there's this bird called a kuaka.
It's a kind of godwit—you know the ones,
Those spindly little jobs down by the marina,
Always knee-deep in still water as if
They have nothing better to do. Yeah, those.*

*Kuaka don't always stay here, mind you.
When the weather gets colder, they start
Ping-ponging along the shore, and every few steps,
Jam their faces straight down into the icy silt,
Probing for clams or worms. Seeds too.*

*After weeks of this, they double-in-size,
Expanding like lungs drawing sweet breath
While their gizzards cower-and-shrink, useless.
And then, like their feathered tūpuna before them,
They know it's time. Pretty neat, alright.*

*Do you know what it takes to get home?
They plunge into a pre-cyclone pressure system,
Which bombards the flock, buoying them forward.
Remember, they're land birds, so no fishing, no drinking.
Anyone who tries to rest will drown. Nonstop.*

*They follow their migratory desire for eight days,
Voyaging the 7,000 miles from Alaska to Aotearoa.
Every straining, sacred bird takes a turn leading the front,
And when they tire, a flockmate surges forward, lifting others.
Constant wingbeats a mantra in metronome. Moko.*

*When they finally, victoriously burst through
Those long white clouds, the beloved kuaka
Alight down the road from my marae, tūmeke!
Church bells peal joyously, kaumātua line the shore.
My iwi celebrates. Tihei, mauri ora!*

*My heart is full, to think of such a welcome.
But I, too, know the ache of having two homes,
Of knowing that no one has ever seen my tundra nest.
And that every savage, hard-won trek demands
A return trip, a re-wounding. Bon voyage.*

*But hey. It's not always a downer, eh?
Sitting on these sacred, salinated sandbanks,
I think of Kupe, watching kuaka and making plans.
One day, I'll set sail again, propelled by our Pacific pulse.
I'll meet the whānau, beaming, by the shore.*



Nicola Andrews (Ngati Paoa) is currently living in San Francisco where she wrote this poem during a Covid lockdown. She writes: 'I have donated my author payment from Antipodes to Pūkorokoro. Thank you for the work that you do to conserve our taonga and to educate the public on our wildlife.' The poem was originally published in *Antipodes*, Volume 36, Number 1, June 2022.



Mary Thompson, Otago Branch of Birds New Zealand, reports on the 2024 National Spoonbill Survey.

Kōtuku ngutupapa/Royal Spoonbill is a species that has naturally and successfully colonised New Zealand from Australia. It is a spectacular and enjoyable addition to our estuary birdlife throughout New Zealand, including at Pūkoro.

Last winter Birds New Zealand completed another coordinated nationwide census. A grand total of 4,593 spoonbills were recorded, nearly double the number 12 years ago (2,361). The numbers recorded in the South Auckland area had increased dramatically since the last census (1,107 now compared to 442 in 2012). The total recorded in the Firth of Thames area was 288, split between Pūkoro, Piako, Thames and Coromandel. This is a dramatic increase since 2012 when only 42 birds were recorded, all at Pūkoro. It is known that Royal Spoonbills over-winter in the north of the North Island before heading back south again by summer to nest. It looks like Pūkoro is becoming a more popular spot.

Royal Spoonbills seen in summer around Pūkoro are likely to be immature first and second-year non-breeding birds, which instead of returning to their natal locations disperse widely around the North Island. It would be interesting to count the number of Spoonbills still hanging out in the Firth of Thames during summer. Recording the numbers of birds seen at various locations around the Firth, including the number of immatures on eBird (www.ebird.org/home), would help gather important information about their movements. The juveniles can be identified by black tips to wing primaries, a smoother bill, and do not have the crest at the back of the neck.

It is likely that the increasing population is the result of successful breeding in New Zealand, though further influxes of Australian birds cannot be ruled out. There is a chance that Royal Spoonbill may have formed a nesting colony somewhere in the Firth of Thames area, so it is worth checking remote rock stacks, isolated trees, and near heron rookeries for evidence of nesting behaviour such as stick carrying, and courtship displays.

Please report any observations to the Shorebird Centre (admin@shorebirds.org.nz) or the survey coordinator nzmaryt@gmail.com

Spoonbill Counts Firth of Thames and Coromandel

General Location	Number of birds
Pūkoro/Miranda, Firth of Thames	59
Shorebird roost Shelly Beach Rd, Piako	94
Abbott Rd, Piako River	4
Orongo, Waihou River	7
Wharf, Kauaeranga River, Thames	36
Turua, Waihou River	34
Colville Bay, Coromandel	3
Kennedy Bay, Coromandel	3
Coromandel Water Treatment Plant	7
Matarangi Estuary, Coromandel	41
Total	288



Thanks to Jane Meiforth, Nelson Birds NZ, for making this location map.

Peter Fryer Shore Guide

For the 2024/25 season our shore guide is Peter Fryer. Although, as he reports, he contributes a lot more than just guiding.



If someone had told me when I did the field course in 2004 that 20 years later I would be walking back from the Poaka Hide, with a scope over my shoulder, discussing birding, building and life in general with Adrian Riegen, I would not have believed them.

Over those 20 years my birding knowledge has increased to the point where, in early 2024, I discussed with Keith my desire to volunteer as the summer shore guide. I had occasionally done it and enjoyed it. But I had to think hard about committing myself from October to April. Although I think of Pūkorokoro as my second home and the people here as family, for me it was a big challenge to be away from my first home (Waiongana, Taranaki) for such a length of time.

But in early October I packed up, kissed the cats goodbye, left my property in care of my daughter Nonnie and, on my 69th birthday, arrived at Pūkorokoro, settled in and commenced my duties.

I have found my niche. I have thoroughly enjoyed engaging with visitors at the hides. I have met people of all ages and nationalities, all interested in learning about the birds. Sharing with them the remarkable story of these birds is a joy. People who arrive with little or no knowledge, who maybe cannot tell a godwit from a Red-necked Stint (a what?), or even the New Zealand birds, leave knowing about the lives of these amazing creatures. I feel quite driven to pass on the knowledge I have accumulated.

Upon using a scope for the first time, those who thought the binoculars they carried were quite adequate, exclaim 'oh wow!' I try and ensure the children get a look through the scopes, which can be tricky at times. There are birders who carry a camera and want to learn, and there are photographers who just want the best photo, with less interest in the story of the birds. I tend to engage less with them. I often try to persuade people at some stage to put the camera down and just

live in the moment, especially when large flocks are in the air. The constant whirr of camera motor drives can be annoying.

From many visitors there is a common question: 'Where are the Wrybill?' During November it can be a hard task to show them, as the few dozen birds still at Pūkorokoro are not always on show.

I have also done a couple of guided tours, and one private tour, while Chelsea has had her head in the Cloud, working on the new point of sale system at the Centre. I never tire of being out there, walking from the car park to the Poaka Hide, with thousands of birds streaming in low above me. The chattering, the whirring of wings is an amazing experience, especially in the soft morning or evening light.

Occasionally I need to 'go bush' for a change from mudflats and godwits. Guiding is not 'work' but if it was, how many people have an office like I do? I am not obliged to be there every day, although I then think: ; 'But I might miss something!'

In between the tides I have been doing some maintenance on the Centre, including painting the building, made and installed some bench seats and, with Adrian's assistance, built a timber fence at the car park. But always, the birds are calling.

I have loved every minute of it, and am not thinking much about life after March. There are, however, various birding projects to be involved with back in Wainonaga. A huge thank you to all my family here especially Keith, Chelsea, Tansy, Adrian and all those birds. An experience that has enriched my life.

Now, where are my bins and scope, for there are birds out there I have yet to see, and people to meet.

Pūkorokoro Events Diary 2025

Sunday 2 March Autumn Migration Day

High tide is 09.48am, so birding first and the talk at 1pm after lunch

Guest speaker: Phil Battley.

What did we know about godwits and knots 50 years ago? What do we know now, and how did we get here? Phil will chart the unfolding story and the role played by the Trust.

Tuesday 4 March

An event commemorating PMNT's long involvement with the Flyway

Her Excellency the Governor-General, Dame Cindy Kiro will be attending, along with a delegation from China.

11am powhiri and welcome, followed by lunch at 12noon, then the bird hides.

Capacity will be limited so if you wish to attend, bookings are essential.

Friday 11 – Sunday 13 April Nature Journaling Course with Sandra Morris

Sunday 4 May PMNT AGM

Saturday 16 August Annual working bee and potluck dinner

Sunday 31 August 50th Anniversary Members Lunch

Details will be advised once they are finalised.TBC

Sunday 12 October Spring Migration Day – Welcome to the Birds

Speaker: Dr Dan Ruthrauff, US Geological Survey shorebird biologist based in Alaska.

Semipalmated plover ... or is it?

A Semipalmated Plover was reported on the Stilt Ponds in late December. It stayed around for the field course and was seen multiple times. But there emerged a question: was it in fact a Semipalmated Plover *Charadrius semi-palmatus*, or a Ringed Plover *Charadrius hiaticula*? And thus began the debate, for the two species are remarkably alike, perhaps only conclusively separated by their different calls. A more detailed account of the issue and the debate will appear in the next issue.

Bruce Postill 1945 -2025

In January the Pūkorokoro family lost a long-time member. For over 25 years Bruce Postill was actively involved with PMNT, first serving as DOC Waikato representative on the Trust council between 2001 and 2015. He then served as a full member of council from 2015 to 2024 when he resigned to move south. He was also active in Birds New Zealand serving, until a couple of years ago, as Regional Representative for Waikato. But elsewhere he was known and revered in another field entirely.

Bruce was born in Sydney, Australia in 1945 and spent his childhood in the suburbs of that sprawling city. But he was not a city child and as he grew older, he graduated from a bicycle to a motorbike so he could explore the area around the Blue Mountains, ultimately joining the local rock-climbing club. David Lawrie writes: 'He was considered to be a good, but not a hard climber. He was, however, active in the club's organisation and this was reflected at his funeral service in Christchurch when at least 10 Australian club members had come to New Zealand to pay their respects. While Bruce was the president of the rock-climbing club for only three and a half years, he acquired the nickname 'Pres' which stuck to him throughout the rest of his life, a reflection of the mana in which he was held.'

Rock climbing is a relatively dangerous activity, and Bruce was always safety conscious, instrumental in writing safety manuals and assisted in forming a rescue team. He also pioneered several new climbing routes on some of the rock pillars around Katoomba in the Blue Mountains. In 1973 he emigrated to New Zealand to take up a position as the ranger at Fox Glacier, later transferring to become

the ranger at Mt Cook. During those times he was an active leader of Search & Rescue teams and participated in the response to several traumatic aircraft and helicopter crashes in the rugged terrain of those regions. In 1980 he transferred to the Waikato and eventually was absorbed into the new Department of Conservation system. He was active in DOC's fire crews, one of the many tasks he performed for the department.

Will Perry recalls: 'Bruce was very particular about Health & Safety and making sure that people around him kept themselves safe. My personal memory of Bruce is that he noticed that one of the zips on my backpack was undone. He pointed out that, to him, this meant that I had either lost something or was about to lose something. I think of Bruce now every time I check the zips on my backpack.'

The first time I spent time with Bruce was at a flyway site manager's workshop on Phillip Island, Victoria in 2000. I was there on behalf of PMNT, and he was representing DOC. We roomed together and I began to learn about his active life in the back country, and his alpine experiences. Behind this quietly spoken person lay a wealth of anecdotes and stories, reflective of an adventure-filled life.



Bruce working in the mud in China WENDY HARE

Since 2000 PMNT has been active in the East Asian-Australasian Flyway, especially in China with shorebird surveys, school visits and public advocacy. Bruce participated in four of our expeditions to China. In 2008 he joined the team for the final year of the three-year Saemangeum Shorebird Monitoring Project, which documented the destruction of the most important migratory shorebird stopover site in the Flyway and its catastrophic impact on bird populations. In 2016 he joined our team in North Korea.

Adrian Riegen writes: 'I only knew of Bruce's alpine exploits from hours of reminiscences exchanged, and yarns told around hotel dinner tables in China, North Korea and South Korea, or on a stop-bank waiting for the tide to bring shorebirds close enough to count. He was a very valuable member of our teams in Asia, spending many hours peering into his spotting scope. On his first visit to Yalu Jiang, he succumbed to the perils of warm beiju served from a large kettle at lunchtime in a small village café somewhere in Kuandian County on a bitterly cold morning. By the next day he was fully recovered and back into bird counting, a real pro. In 2018 he helped ensure John McKinnon, then New Zealand Ambassador to China, got to see godwits and other waders at Yalu Jiang at the best possible location, when the driver was insisting on following the Chinese delegation to another, less impressive site. That he was this older, grey-haired bearded man, perhaps helped convince the driver. Nothing seemed to faze Bruce, and he was



Bruce Postill with fans, Dagushan School, China KEITH WOODLEY 2006

always ready for the next adventure. I will miss him and all his practical advice as well.

A DOC colleague described Bruce as the most cultured person in the office. He loved music and films, and went to numerous shows. He also showed an astute sense of marketing. In 2015 he represented PMNT at the Sydney Bird Fair, where our stall was beside one advertising the Broome Bird Observatory. "It is much cheaper to go to Pūkoro, was his advice to all visitors.

He was also an immensely practical man. Gillian Vaughan recalls when she moved into her house in Auckland a few years ago, a large heavy box was left on her doorstep. It contained a large selection of nails of all shapes and sizes. Bruce explained such items always come in handy for a homeowner. Gillian says in the ensuing years she has had occasion to use most of them.

Further evidence of this side of Bruce came last year when he moved to Christchurch. That this was a major upheaval became clear as he divested

himself of decades of accumulated tools and equipment. He said he had a 'few' things that could be of use at the Shorebird Centre, an idea welcomed by Tansy. There followed several car loads of stuff – tools of all description, tape measures, numerous jars of screws and nails and many other items. Our garage floor and shelves were inundated. Here was poignant evidence of an extremely active, practical life that was now entering a new phase.

Our condolences to his daughters Mardi and Fleur and their families

Keith Woodley

A Naturalist's Guide to the Butterflies & Moths of Aotearoa New Zealand

by Carey Knox. 2024 John Beaufoy Publishing.

Reviewed by Tansy Bliss.

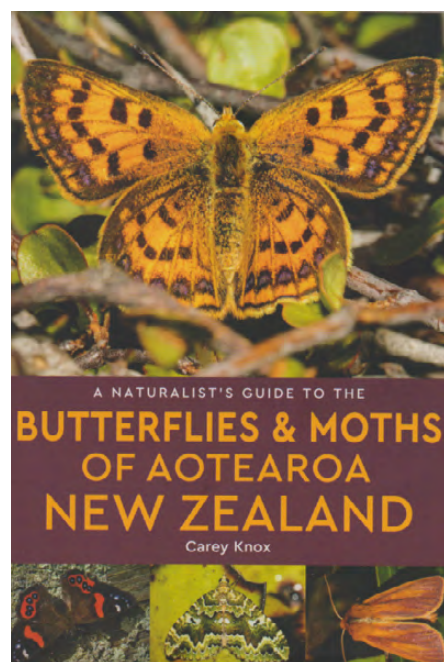
This is a great little book for anyone starting out on the exciting journey of learning about the moths and butterflies around us in Aotearoa New Zealand. The presentation is pleasing and follows the same format as the other two Naturalists' Guides by the same publisher*. In this third in the series, Carey Knox, both author and main photographer has illustrated the informative text with some inspiring images of butterflies and moths we may see on our windows at night, along with those we will certainly aspire to see, as addiction to moth identification and recording takes hold.

The use of some English names, and images of moths and butterflies as we might see them in the field, makes this guide user friendly for beginners unfamiliar with scientific names and pinned museum specimens with forewings and hindwings clearly displayed.

The text tells us most of what we want to know, including key identification features, distribution, and habits and habitats when known. While Knox encourages us to look for certain details to distinguish between species, moth identification can still be a very daunting task. Knox acknowledges this and points us in the direction of *iNaturalist* and other texts to supplement his own. He has provided two good sized annotated images of butterfly and moth anatomy and introduces the reader to some of the scientific terminology used to describe Lepidoptera body parts and appendages as well as notable features on the forewing of some moths.

For anyone living in, or travelling to the South Island, there is a welcome inclusion of less well-known southern species, not found in other guides.

I have moved a little way along the moth identification path myself with much help and input from scientists and ecologists including Dr Robert Hoare, Sean Clancy, Tony Steer and unmet moth identifiers on *iNaturalist*. They have instilled in me a certain scientific rigour in the process of moth identification. I was therefore surprised by the species being presented in alphabetical order of their respective families rather than their taxonomic order. It feels unsystematic and disconcerting to find the most primitive micro-moths in the Micropterigidae family sitting alongside the much later evolved and larger moths of the Noctuidae family. Equally, having scientific names un-italicised under some of the photographs, seems an unnecessary departure from convention.



While most of the images, all taken in the field, give a good representation of the moth or butterfly, some shot against a stark white background suffer from unhelpful shadows that sully the otherwise clean lines of forewings and antennae. Some of the specimens appear a bit worn and the moths a little drab or bland and while it may be what we encounter in the field, does not always show the moths at their best.

Despite these little niggles, the book is still a welcome addition to the existing guides on butterflies and moths in New Zealand and should inspire us all to observe, identify and care for these exquisite creatures.

The other two titles in the series, *A Naturalist's Guide to the Birds of New Zealand* by Oscar Thomas, and *A Naturalists' Guide to the Reptiles and Amphibians of New Zealand* by Samuel Purdie, are also in stock at the Shorebird Centre.

Robert Findlay Wildlife Reserve Update

Photos and text from Kaitiaki Ranger Tansy Bliss record progress with weed control, planting aftercare and facility presentation in the Robert Findlay Wildlife Reserve.

A beautifully constructed large wooden routed sign now indicates the entrance to the Robert Findlay Wildlife Reserve. Made by Adrian Riegen, in the same style as the Pūkoro Shorebird Centre signs, a connection between the two places is clearly established. The QEII logo sits alongside that of PMNT, indicating the protected nature of this Reserve. Thanks to Adrian for making the sign and to the QEII Trust for some financial assistance with materials.



Fennel bows its head and is gradually disappearing from the landscape. Large scale spraying, cutting back and endless removal by grubbing, with much assistance from keen volunteer Kevin Barker, has meant the towering fennel flower and seed heads are being replaced with elegant flax stems reaching skywards, providing ample perching and feeding spots for visiting passerines.



The 2024 plantings have established well around the carpark and Limeworks, no doubt aided by the high quantities of burnt lime in the vicinity. Various volunteers, including the monthly Reserve Releasers, have assisted with weeding the mulched plants.



Flax stems triumphantly emerge



Limeworks revealed. The Limeworks remains are now on display with public access discouraged by a wire fence on one side and wooden fence along the main pathway. Thanks to Bob Rigter, Adrian Riegen and Peter Fryer for their labour and skill and to the Department of Conservation Community Fund for covering the related costs. The path has a new layer of lime chip, keeping it wheelchair friendly. Thanks to Bob for organising this and to the Department of Conservation, Hauraki District Biodiversity team, for laying it on the track.



Visitors picnic amongst the plantings thanks to four new benches made and installed by Peter Fryer. Old Miranda Shorebird Centre signs were re-purposed and have been a welcome addition to the carpark and Limeworks.



Thanks to Peter Fryer, cyclists can now lock their bikes to a bike rail at the entrance to the Reserve. Luckily it was just the right size for the tandem and support crew visiting over the Christmas holidays.



The toilet block is gradually being encroached by a swirling mass of Muehlenbeckia, flanked by flowering Hebe. Adrian Riegen and Peter Fryer installed some substantial edging which tidied up this area tremendously.



Visitors can make a circular walk in the Reserve without disturbing the birds roosting on the Stilt Ponds, shielded by well grown 2023 plantings. Thanks to contractor, Alcon Bull, a well-cut path leads directly from the Stilt Hide back to the carpark.

Learning about Leucism

Several odd looking birds among the shorebird flocks this season prompted Kaitiaki Ranger Tansy Bliss to investigate further.

The presence of two ‘leucistic’ shorebirds on the mud flats at the Robert Findlay Wildlife Reserve in the later part of 2024 led to our summer Shore Guide Peter Fryer and myself regularly being asked “Why is that bird white? Is it an albino?”. We would usually answer, “No – not albino, it is leucistic.” Blank looks or an awkward silence would sometimes follow, so I thought it was about time I properly understood leucism myself. What better way to learn than by researching it and then explaining it to others.

Back in 2007, Gillian Vaughan, then magazine editor, was having similar conversations and thoughts. Unusually white or pale plumaged Oystercatchers and Bar-tailed Godwits were hitting the birding headlines. Her very informative article, “Why is that bird white?” in MNT News, Nov 2008, Issue 71, is illustrated with excellent images and is a good starting point to get to grips with plumage aberrations. At that time, Hein van Grouw (2006), had published an interesting paper “Not every white bird is an albino: sense and nonsense about colour aberrations in birds” and is referenced in Gillian’s article. Van Grouw has continued his research and in a more recent paper in 2021, “What’s in a name? Nomenclature for colour aberrations in birds reviewed”, sheds further light on why white and pale plumaged birds occur. I have used this paper and other articles to explain and hopefully correctly identify, which plumage aberration is being expressed in our recently sighted aberrant birds at Pūkoro.

Starting with the basics.

The colours in bird feathers are formed in two different ways. They come from pigments or from light refracted by the physical structure of the feather. Occasionally, colours can be the result of a combination of pigments and structural colour.

Melanins are the most common pigments. Additional pigments come from carotenoids and in parrots, psittacins. Melanins and psittacins are synthesised by the birds themselves but carotenoids are not and come from the birds’ diet. To better understand ‘leucism’, it is necessary to explore how melanin is formed and deposited in the birds’ feathers.

Melanins occur as tiny granules of colour in both the skin and feathers of birds. Depending on their concentration and location, melanins can produce colours ranging from the darkest black to reddish browns and pale

yellows. There are two types of melanin. Eumelanin is responsible for the black, grey and dark brown colours/pigments and pheomelanin produces the warm reddish brown to pale buff pigments.

When there are abnormalities or lack of deposition of one or both of the melanin pigments, unusual or aberrant plumage occurs. This can result in birds with all white plumage, irregular patches of white amongst normal plumage or pale or muted colours over some or all of the bird’s plumage. Often birds with abnormal melanin deposition are labelled as albino or leucistic. However, it is not that simple.

Delving a bit deeper.

In some birds, only eumelanin is present, and the birds are predominantly black and white: black coming from the eumelanin and white from a lack of melanin. Good examples are the Pied Oystercatcher and male European Blackbird. In most birds, both eumelanin and pheomelanin are present giving plumage a wide range of blacks, greys and browns.

Melanin production starts in melanoblasts which form at an early embryonic stage. These melanoblasts migrate to the skin and feather follicles and develop into melanocytes. Enzymes, including tyrosinase, kick start the production of melanin in the melanocyte, which then colours the feathers.

As the feathers grow, the amount of melanin produced changes giving different feather patterns. Abnormalities either in melanoblast migration or melanin synthesis can influence the final plumage pigmentation. The cause of the abnormality can be a mutation or an external factor.

Plumage aberrations.

There are lots of factors at play and exactly what we are seeing in birds with unusual plumage is often tricky to untangle. Hein van Grouw, 2021, lists seven aberrant plumage types in his article. He also acknowledges that identifying colour aberrations in the field can be extremely difficult and often impossible. However, after my research, I am prepared to give it a go.



Brown South Island Pied Oystercatcher XP3 KEITH WOODLEY

Looking at our Pūkorokoro aberrant plumage birds

South Island Pied Oystercatcher #1 XP3

Caught and banded in January 2023 during the annual field course, it has mainly pale brown feathers replacing the normally black feathers as seen in the photograph of the wing and body. The bill, legs and feet are reddish-orange. The eye is dark. I have seen it throughout 2023 and 2024 and it does not appear to have changed over time. I am confident it is the same bird because of the red engraved leg flag XP3.

Van Grouw separates plumage aberrations first by their cause and then by the effect. He starts with *defects in the development of melanin cells*.

Leucism (from the Greek 'leukos' for 'white').

Leucism is the partial or total lack of both melanin pigments in feathers and skin. The eyes retain their normal dark colour because the embryonic origin of eye pigments is different from that in the rest of the body. Leucism is an inherited trait and plumage colour does not change with age. The melanoblasts have not migrated to some or all of the skin and feather follicles and therefore melanin is not produced at these sites. The affected feathers and skin appear white. There may only be a few feathers affected, or all the feathers, producing an all-white plumaged bird with dark eyes.

XP3 has pale brown feathers so it is not leucistic.

Progressive Greying

This occurs as the bird ages. There is a partial or total lack of both melanins in feathers due to the progressive loss of pigment cells in some or all of the skin areas. This results in all white feathers randomly mixed with normal coloured ones and can eventually lead to all white plumage. It is very common in Blackbirds and House Sparrows.

XP3 has pale brown feathers where they should be black so it is not Progressive Greying.

Other forms of plumage aberration are caused by *defects in the melanin synthesis*.

Albinism (from the Latin 'albus' for 'white').

Albino birds lack both melanin pigments in all their feathers, eyes and skin. This is a hereditary trait. The enzyme tyrosinase is not present in the melanocytes and therefore no melanin is produced. This results in a completely white plumaged bird, unless some feathers are normally coloured by carotenoid pigments. These will remain yellow, red or orange. The red or pinkish hue seen in the eyes and skin of an albino bird is caused by blood that is visible through the colourless tissue. The red eyes are used as a diagnostic feature to distinguish albinism from leucism as all white leucistic birds always retain the normal dark colour of their eyes.

XP3 has brown feathers and dark eyes. It is not albino.

Brown

This is a reduction in the *quality* of eumelanin produced due to incomplete melanin synthesis. Hence, the normally black or grey feathers are affected and appear light brown. These affected feathers are also more prone to bleaching and can gradually become paler brown with exposure to sunlight. Eye colour does not change but bill and feet are slightly lighter than normal.

Our bird has brown feathers where there should be black feathers and the outer primaries look sun-bleached. Slight variation on bill and feet colour is hard to judge, especially when our Pūkorokoro bird has been feeding in muddy substrate.

We could call XP3 'Brown'.

Ino

This is when there is a reduction in the amount of melanin produced and the quality is also reduced as described above. The original black can be anything from brown to a very pale brown/cream. Original lighter brown feathers can also be slightly paler, though this is not important in XP3, which has no original brown plumage. The eyes, bill and feet can be paler, but may show very little difference.

XP3 also fits the 'Ino' description.

It is probably not possible to distinguish between the two, but we can definitely say that it is a reduction in the *quality* and possibly *quantity* of eumelanin that is causing XP3 to have pale brown plumage.

South Island Pied Oystercatcher #2

While writing this article, a new aberrant plumage Pied Oystercatcher arrived from the South Island. It was distinctly different to XP3. It had extensive white feathers where there should normally be black feathers. Its bill, legs and feet were reddish orange and it had a dark eye. These factors alone told me the bird could either be Leucistic or undergoing Progressive Greying. I was hesitant to identify it as a juvenile or adult, not knowing whether the lack of black in the bill was a result of maturity or a melanin abnormality. I recall a seeing a similar looking bird in early 2024, so it could be the same bird and therefore an adult. Without good photographs and better record keeping,



Aberrant and normal plumage SIPO PETER FRYER

I am stuck with diagnosing this bird as either Leucistic, i.e. a congenital defect in the melanin production and the white feathers would have been present

from hatch, or undergoing Progressive Greying, where the pigment cells are gradually being lost over time.



Aberrant and normal plumaged Bar-tailed Godwit PETER FRYER

Some concluding points

- Feather or plumage aberrations are caused by complex processes and can be difficult to identify correctly especially in the field.
- Good photographs and record keeping over time are needed to distinguish between certain forms of plumage aberration.
- White feathers are caused by the total lack of melanin. No pigment has been deposited.
- White feathers can be caused by melanin mutations, disease, dietary deficiencies and trauma.
- Albino birds rarely survive long in the wild.
- Irregular pale brown feathers can be caused when the process of melanin production is altered in some way. It may affect the amount of pigment produced, and/or the quality of the pigment produced.
- Feathers with less pigment are more prone to bleaching. It may therefore be impossible to distinguish older, 'bleached' pale-coloured feathers from those totally lacking melanin.

During my discussions and research for this article, I have been told about and shown various examples of plumage aberrations. Now, instead of assuming they must be either leucistic or albino, I am acutely aware of the other possibilities. I strongly recommend reading any of the listed references to help further explain this interesting and tricky phenomenon of plumage aberration.

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Looking at our aberrant plumaged Bar-tailed Godwit

This bird's plumage has definitely changed since it arrived from Alaska in mid-September 2024. We first noted a few pale feathers on its back. As it has gone through its moult, more white feathers have appeared. Could it be a candidate for Progressive Greying with white feathers gradually appearing amongst normal plumage?

Unfortunately, it is not so straightforward. It could also be another form of aberrant plumage called 'Dilution'.

Dilution

This is when there is abnormal melanin deposition into the feather cells.

Any black feathers become bluish or silver-grey, which would not show in our godwit. Any normally brown or reddish-brown feathers can become buff or cream or be unaffected. Eye colour and in most cases, bill and feet colour remains the same. Without having the bird in the hand to check if individual feathers are buffy cream and being bleached or if they are white feathers replacing normal brown feathers during moult, it is difficult to say which process is at work.

'Progressive Greying' with white feathers gradually replacing the brown feathers could be a good option.

What about the Welcome Swallow seen at Piako briefly during the summer of 2024?

It looks all white and seems to have some colour in the bill and eye. There also seems to be a bit of colour in the upper chin area. This could be some of the carotinoid pigment still present, or it could be just shadow.

Going back to van Grouw's table, I am ruling out albino as it looks like there is dark colour in the eye. In addition, albino birds have very poor eyesight, which would make it extremely difficult for the swallow to feed effectively on the wing. The near all-white plumage leaves us with Leucism or Progressive Greying.



Aberrant plumage Welcome Swallow SEAN CLANCY

I am not aware of any records of a Welcome Swallow with some white plumage showing prior to this sighting, so I am ruling out Progressive Greying.

I am calling this bird 'Leucistic'. I hope I'm right.

The Braided Rivers

Here at Pūkoro, our perspective of the great braided riverbeds of the South Island means one thing: Wrybill. For much of the year we host over 40 per cent of the world population. Of immense value to the Trust and featuring on our logo, they are a magnet for visiting birders. From early spring, the Wrybill flock – such a prominent feature here since January, begin moving south. By November all but a few dozen are gone. Now, they are dispersed as breeding pairs across vast stretches of those vast river valleys. Wrybills are a highly specialised species, and the riverbeds are the only place they can breed. Which is why the Trust is acutely interested in the status of those rivers and the health of the ecosystems they sustain.

Braided Rivers

The gravel bars and twisted channels cut broad swathes across the checkerboard land of Canterbury, and the McKenzie basin. From the air the scale and grandeur of these braided rivers are impressive: twisted tangles of shiny ribbon, tying together mountain and sea. Immense quantities of eroded material are carried away and deposited by the very rivers that flow across and through the landscape. Twisting streams of water separate and rejoin around islands, and channels are further divided by gravel bars – a system in continual flux. It is a land of water and wind: the river does its work, sorting and resorting, removing and depositing its load; and strong gusts of wind work on the fine sediment, carrying and distributing it as dust.

The Southern Alps provide the key ingredients for these rivers: a source of highly erodible material – the product of active mountain building and glaciation; and a physical barrier high enough to create its own weather. The material forming the uplifted Alps is mainly greywacke and argillite, sedimentary rocks that are highly prone to erosion. Great glaciers carved and shaped the mountains into the form we know today, and rock continues to be chipped away by smaller glaciers and frost action. But erosion is also continuous at lower altitudes below the permanent snowfields, where water is busily at work. Prevailing westerly weather systems lifted by the great barrier of the Alps can produce rain or snow at any time of year, though it may be unevenly distributed. Some of this annual precipitation is stored as



Main channel Upper Tasman KEITH WOODLEY

snow and ice from April to September and released from October to February.

Multiple river channels carry this debris further downstream, depositing it along the valley floors and over the floodplains beyond. Over thousands of years this alluvial and glacial outwash has built up the Canterbury Plain, hundreds of metres deep in places. It is a diverse and complicated three-dimensional ecosystem, a mosaic of connected aquatic habitats linking surface and subterranean areas – turbulent main braids, quiet side braids, groundwater, springs and spring-fed streams. Despite being glacial in origin, the rivers descend quickly into areas with a temperate climate that enables growth of invertebrate fauna populations sufficient to support birds such as Wrybill.

The flow regime itself is complex. A river may have one or more major channels flowing fast and deep all year, along with many side channels, rifles and pools, each with its own microhabitat and each subject to fluctuation at any time. Some are ephemeral channels, flowing only immediately after rainfall or snowmelt; or intermittent streams fed by seepage or underflow, but which dry up during drought. But large floods may cause large-scale modification to the entire riverbed, so even ‘perennial’ channels may be abandoned and the flow contained within a channel previously considered to be ephemeral or intermittent. Flood events may occur on any of the rivers at any time of the year, and this poses considerable challenges to any life form existing there.



Upper Rakaia KEITH WOODLEY



Mid-Rakaia KEITH WOODLEY

Invertebrates: shorebird food

If these rivers are subject to such frequent and dramatic changes, how can any invertebrate life exist? Waterflow over and through the riverbed creates a diversity of flowing water, standing or slow-moving water, and semi-aquatic habitat types, each at various successional stages. This variety in habitat conditions explains not only the high biodiversity found within river floodplains, but also how biological communities survive in highly unstable conditions: the key lies in the relative proportion of each habitat in any floodplain remaining roughly constant over time. A particular habitat may be destroyed in one place but will remain intact or be forming in other places, so there will always be habitat at different stages of development. This means mobile creatures will persist within the floodplain, and form part of a meta-population within the overall river system.

The food chain in the rivers begins with biofilm – an accumulation primarily of algae or periphyton, with fungi, bacteria, and organic and inorganic particles. A major food source for invertebrates, biofilm determines the structure of communities. The all-important periphyton is influenced by local physical and biological factors such as flow regime, wave action, nutrients, light, temperature, and invertebrate grazers. Even for biofilm it is a challenging environment, as fluctuations in river flow may cause physical abrasion during time of flood, or desiccation during prolonged dry periods. But importantly it is habitat for shorebird food – mayflies, chironomids and elmids beetles, typical creatures of fast-flowing, clean, gravel-bed rivers. Sandflies, stoneflies and caddisflies are also common.



Foundation stone of the braided river food chain: filamentous green algae provide habitat for the aquatic invertebrates that are staple food sources for birds on the riverbed. KEITH WOODLEY



Key food for shorebirds: a swimming mayfly, favourite foraging item for Wrybill, among others. ROD MORRIS

The composition of these communities varies widely across habitats. In one study, the main river and side braids of the Waimakariri had similar faunas, dominated by mayflies, worms and midge larvae; but the greatest diversity was found elsewhere on the riverbed, particularly in springs and spring-fed streams. Some invertebrates, including the mayfly *Deleatidium* and some chironomids, were ubiquitous throughout the study area, while others had restricted habitats.

Downstream, the physical character of the rivers change, as does the composition of biological communities. A wider floodplain and smaller and better-sorted stones create more heterogeneous habitats. Here the effects of flooding are mitigated, as high flows are less confined and there is less substrate movement. The result is increased species diversity and abundance in the lower reaches. Higher nutrient levels in central and downstream sections of the river, along with greater bed stability, allow green filamentous algae to succeed and dominate. Relatively stable habitats, such as spring-fed creeks that are rarely washed-out during floods, allow colonisation by invertebrates that do not tolerate the unstable, flood-prone environment of the active river channel. They also seem to act as repositories, collecting other life forms that migrate downstream from the wetlands, pools and creeks that feed the headwaters of the river.

At any time of the year there may be bank-to-bank flooding which affects every habitat within the riverbed and its margins. This complex, ever-changing environment has implications for the fauna and flora of the riverbed, especially for aquatic invertebrates trying to make a living in a world that could be upturned at any time. The moving churn of water and the material travelling within it directly affect both invertebrate abundance and community composition. Increased water velocity and movement of suspended material mean that some animals are just swept away. A big spring flood will strip periphyton and filamentous green algae from river stones, thus carrying off a major food source. Movement of the riverbed itself may cause catastrophic drift or physical damage to aquatic life forms. Some animals may be smothered by increased levels of suspended sediment carried in floodwaters.

Invertebrates display a range of adaptations to cope with these potentially disastrous conditions. For one thing, such events seldom last very long, and the river level may fall just as quickly as it rose. Invertebrate communities then bounce back with remarkable resilience. Quickly making up for losses and replenishing the population is key, and the diversity of habitats on offer facilitates this.

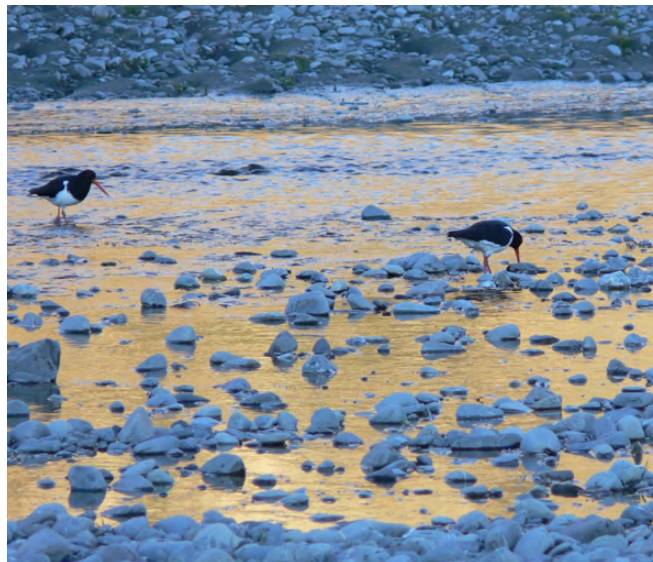
Which is where braided rivers differ from single channel ones. In a confined river channel, the full scouring force of a flood is concentrated within that channel, providing fewer refugia for invertebrates or internal sources of colonisers. On a braided river the flood water's energy is dispersed over a greater area, moderating the physical and biological effects of floods, while the presence of an extensive mosaic of habitats provides refugia and sources of recolonisation.

Invertebrates have different responses to increased river discharge. Cased caddisflies move down into the substrate, protected by their respective case or shell; while others, such as mayflies, use their low, flattened profile to cling to stones and are rarely dislodged from a stable substrate. But when substrate does move, the animals may move into the stream voluntarily: drifting downstream into areas of lower current

velocity is a very effective strategy for many. Once they find refuge – in stable substrate patches, spring creeks or tributaries – they not only avoid the flood but rapidly recolonize once it recedes; and as river levels drop, invertebrate communities can rapidly recover to pre-flood levels.

Along with good dispersal ability, producing multiple annual broods is another adaptation to an unstable environment. For some species an asynchronous (non-seasonal) lifecycle is one such strategy. Pupae attached to the underside of stones may be adversely affected by floods, but their annual cycle means the timing of a flood is not as important for them as for more seasonal fauna, because if mobile larvae are available through most of the year, there are always individuals at various stages of the lifecycle. This means there are always some individuals that not only survive a major disturbance, but they can also be present in the water at any time of year, and thus ready to re-establish themselves.

Keith Woodley

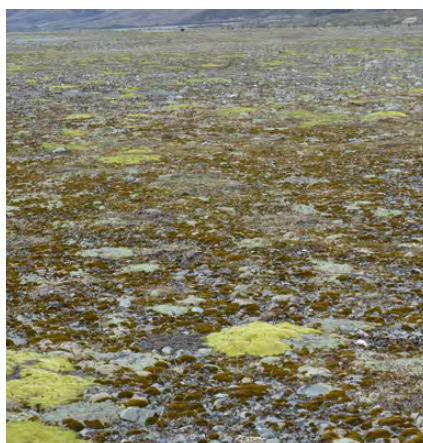


Foraging oystercatchers Upper Rakitata KEITH WOODLEY

Riverbed Invertebrate Surveys

Monitoring the health of our braided rivers, maintaining natural flows, and controlling the spread of weeds are all essential. In the last issue we featured weed control on the rivers. Here the focus is on riverbed invertebrates – pivotal biodiversity component of that landscape, and food for Wrybill and other shorebirds. Ongoing monitoring aims to establish the relative condition of the rivers, measure any changes over time such as climate related impacts, and to measure outcomes of any management activities. At the BRaid seminar at Lincoln in July, Dr Tara Murray, Senior Science Advisor in the DOC Fauna Science team, described how to conduct invertebrate surveys as part of measuring biodiversity values of braided rivers. This is an edited account of her talk.

So how do you measure biodiversity in an ecosystem such as braided rivers? If biodiversity is a key component of ecological integrity, bugs are rather important to that overall picture. Invertebrates are more than just bird food! They make up 80 per cent of all multi-cellular organisms and are in all ecosystems, so if we are not measuring invertebrates, we are not capturing most biodiversity.



Raoulia community Tasman riverbed KEITH WOODLEY

Our survey programme built on earlier work led by Susan Anderson in Twizel as part of DOCs Project River Recovery work in the Tasman Valley in 2005. Sue sampled invertebrates around Raoulia, just one of eleven vegetation communities identified from the upper Waitaki braided rivers in a 2011 report by Chris Woolmore. It found over 919 invertebrate species, which compares to around 113 plants, mosses, lichens, 30 birds, five native fish, and three reptiles known from the river. Analysis of the Tasman study gave an idea of how to set up standard monitoring programs for other rivers.

The current project set out to monitor invertebrate diversity and composition across three rivers: the Cass, a small upland largely pristine valley with few weeds; the Ashley, a more constrained and much weedier lowland river, and the Aparima, a much more constrained river in Southland.



Pitfall traps, Cass River. Malaise trap in far background. J HUGHEY



Close view of pitfall trap. J HUGHEY

The Tasman pilot study showed that using just malaise and pitfall traps could detect the bulk of biodiversity, while removing some of the complexity of trapping using a wider range of methods. Our sets of trap lines consisted of one malaise and five pitfalls and there were three lines in the Cass and six in the Ashley and Aparima.

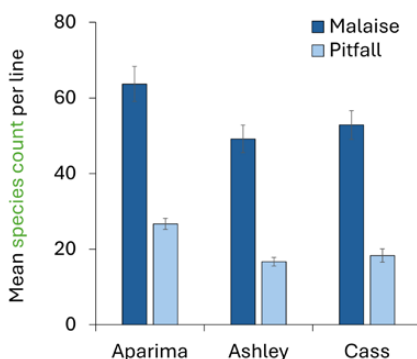


Malaise trap, Cass River TARA MURRAY

A malaise trap set on land will capture both terrestrial invertebrates and the adults of aquatic invertebrates. It captures more biodiversity than most other traps but also means many more specimens to count and they may be blown in from an unknown distance. Pitfalls detect fewer species, but you can be more confident you are detecting invertebrates from the local area.

As many individual invertebrates as possible were named down to species level, which gives the finest grain data. We intentionally didn't look at biomass because our interest is in biodiversity values. Biomass data does not necessarily tell you how healthy the community is. You could have large numbers of a few very common invertebrate species, but they might be species that do really well in unhealthy environments, they may or may not act as a food resource for other species of concern (e.g. threatened birds and fish), and their numbers can fluctuate wildly depending on exactly what day you sample.

Over 91,000 specimens in the bigger than 2 mm size class were captured with, predictably, more in malaise than pitfalls. In terms of diversity there were 1,099 morphologically distinct species (although many could not be named) with 700 on the Ashley, 662 on the Aparima, and 533 on the Cass. We know that the more samples you take the more species you will find, so we looked at per trap diversity and found the Cass



Riverbed diversity TARA MURRAY

had slightly higher biodiversity values than the Ashley and slightly more even distribution, indicating there were fewer dominant species affecting the counts.

Initial indications showed the three rivers have slightly different communities – but there is also a lot of overlap, so there are probably a lot of individual species common and abundant across all the river systems that are likely causing that. Yet half of all the species found were only found on one of the rivers – 218 only on the Aparima, 197 only on the Ashley and 129 only on the Cass.

We looked at the abundance of invertebrates at the order level and found flies (order Diptera) were overwhelmingly dominant in abundance (around a third) on all three rivers, which is kind of what we would expect as many flies breed in water. In both the Ashley and the Cass, we also found a huge proportion (~20%) of caddisflies (order Trichoptera) followed by moderate numbers of sucking bugs, bees and wasps, moths, spiders and beetles.

Looking at diversity, the number of species in each taxonomic order as a proportion of the total count were remarkably similar between rivers – suggesting the methods we are using are consistently picking up things in the same way. It also tells us that only looking at order level data is not going to tell you about the trends in biodiversity over time for your river because, for example, if ten species of fly decline, they might just be replaced by 10 other fly species, so you won't detect any change.

Data from the original pilot study in the Tasman has almost the same abundance and diversity patterns. Huge numbers of flies, quite a few bees and wasps, moths, beetles and spiders, all in reasonable numbers. In all four rivers we have sampled, we have also seen spatial and temporal patterns in species composition; as you go further up the river you often get a slightly different species composition, and you always get fluctuations in communities depending on what month you do your sampling and different species emerge as adults at different times.

We are now looking at refining our sampling design to work out the best number of samples to take to answer specific questions. We know that the more sampling lines you have the more species you will catch. For example, we found the probability of detecting any one species in any one of our

trapping lines on a sampling occasion was less than 10%. So, something rare is unlikely to show up. We found that if we wanted 50% detectability, a minimum of six trapping lines are required. But you could keep sampling forever and you won't see every single species. And I don't think you have to. You get a good chunk of your biodiversity in your first fifty to a hundred samples, and from there you can extrapolate out and project what is happening for biodiversity in general.

Of course, as with any such ecological survey, there comes the task of processing and analysing samples efficiently. Running a standard monitoring program - people balk at the idea of having to process samples; you catch a lot of bugs and now you must sit in the laboratory and do all this bug picking "for ever!" and it is a real limitation. There is a perception that it takes too much time. So, we tracked how long everything took and even including the learning hump at the beginning when every specimen encountered was new species, the malaise samples took about 4.5 hours to sort, and each pitfall took about 20 minutes. So, a whole line, one malaise trap and 5 pitfalls took 5 hrs 50 to process and identify all the different bugs. I was expecting it to be worse!

Sampling methodology has now been tested on four very different rivers over two to four summers. Next steps will be to determine answers to several questions. What is a big enough sample size to detect changes over time? What specific taxonomic or functional group could be monitored so we can understand if the state of biodiversity is changing on a river? What is the ratio of detritivores, herbivores, predators? Spiders are the top predators in the invertebrate world so what does the data say they are doing? Beetles are important because they cover all the trophic levels, so what are they doing? Can we find any particularly sensitive taxa that might be abundant enough to monitor over time, but sensitive enough to change that they are going to tell us some interesting stories about the health of the ecosystem? There are so many things we do not know about invertebrate communities on braided rivers which could profoundly affect these ecosystems. Establishing long-term standardised monitoring will be key to truly understating the state and trends in biodiversity in the future.

Pūkorokoro Miranda Naturalists' Trust



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Pūkorokoro Shorebird Centre
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Centre Assistant: **Chelsea Ralls**
Kaitiaki Ranger: **Tansy Bliss**

Pūkorokoro Miranda Naturalists' Trust Council

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027 527 6727
Treasurer: **Gillian Vaughan**
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09 817 9262
Council members: **Wendy Hare,**
Trudy Lane, David Lawrie, Bob Rigter
and **Olga Brochner**

Magazine

Pūkorokoro Miranda Naturalists' Trust publishes *Pūkorokoro Miranda News* four times a year, in print and digital editions, to keep members in touch and provide news of events at the Shorebird Centre, the Hauraki Gulf and the East Asian-Australasian Flyway. No material may be reproduced without permission.

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Layout and production: **Bernie Cornford**

See the birds

Situated on the Firth of Thames south of Kaiaua, the Pūkorokoro Shorebird Centre provides a base for birders right where the birds are. The best time to see the birds is two to three hours either side of high tide, especially around new and full moons. The Pūkorokoro high tide is 30 minutes before the Auckland (Waitematā) tide. Drop in to investigate, or come and stay a night or two.

Budget accommodation

The Shorebird Centre has bunkrooms for hire and two self-contained units: Bunks cost \$20 per night for members and \$35 for non-members. Self-contained units are \$90 for members and \$135 for non-members. For further information contact the Shorebird Centre.

Become a member

Membership of the Trust costs \$50 a year for individuals, \$60 for families and \$75 for those living overseas.

As well as supporting the work of the Trust, members get four issues of PMNT News a year, discounts on accommodation, invitations to events and the opportunity to join in decision making through the annual meeting.

You can join at the Centre, pay via our webpage (www.shorebirds.org.nz), by direct credit to bank account **02-0290-0056853-00** or call the Centre with your credit card details. Contact admin@shorebirds.org.nz for further information.

Bequests

Remember the Pūkorokoro Miranda Naturalists' Trust in your will and assist its vital work for migratory shorebirds. For further information contact the Shorebird Centre.

Become a Volunteer

There's always a need for volunteers to do a variety of jobs including helping in the shop, guiding school groups, meeting visitors at the hide, working in the Centre garden, joining in the restoration project at the Findlay Reserve, helping with the Shorebird Census and lots more. If you're interested chat with the team at the Centre to see what will best suit you.

PMNT's work is made possible by the generous support of our sponsors



Sean and Annie Wilson's
Miranda Farm
Shop • Cafe • Gallery



Ron & Edna Greenwood
Environmental Trust



Gifts from the Shop



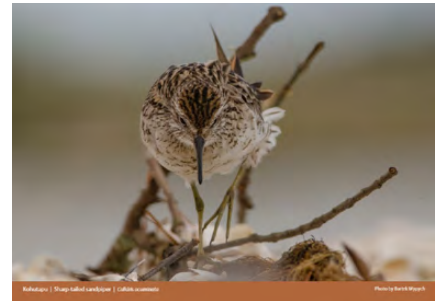
2025 Shorebird Calendar \$18 +Postage

Stunning photos of Pūkoro and its manu. A big calendar block with lots of room for notes. High tides for Pūkoro and dates of our events

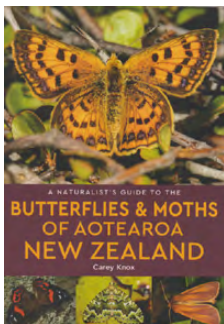
www.shop.shorebirds.org.nz/shop/2025-shorebird-calendar/

April Āpereira						CELEBRATIONS (50) 1975-2025
Ārahi	Ārahi	Ārahi	Ārahi	Ārahi	Ārahi	Ārahi
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

Pūkoro Shorebird Centre



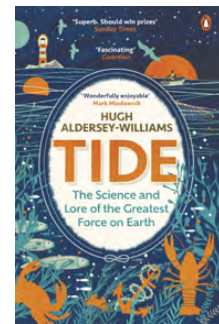
Great Reads from the Shorebird Centre Shop



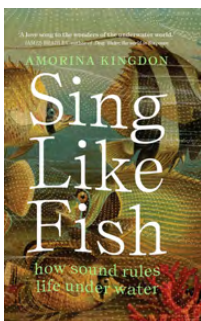
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Carey Knox – \$30
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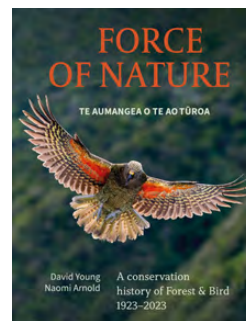
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The Complete Language of Birds
Randi Minetor – \$50
www.shop.shorebirds.org.nz/shop/the-complete-language-of-birds/

If you can't make it to the Shorebird Centre shop, visit our amazing online shop at www.shop.shorebirds.org.nz/
 Send an email to shop@shorebirds.org.nz. Ring 09 232 2781 and chat to the friendly team
We'll be happy to help

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