

Flight



ISSUE 181

JUNE/JULY 2021



**Zealandia calling
Wairio guided tour
Planting for ponds**

FROM THE PRESIDENT

The duck shooting season is upon us so I would like to share some observations I have made.

Some long-term hunters (50-plus years) say the season has been one of the worst they can remember.

Fish & Game has been telling us that the bird counts are 15 per cent better than last year. Frankly, I do not believe it.

The paradise duck numbers appear to be doing OK, along with the grey teal, but the mallards seem to be in real trouble.

Fifteen years ago, the pond in front of our house was crowded with ducks when the duck shooting season was on; that is not the case now with fewer than 20 birds there at any one time.

I was talking to Anne Richardson at Peacock Springs last month and she said there used to be hundreds of ducks camped there during the season; now there are hardly any.

I have three reasons why I think this is:

- **The introduction of steel shot**

Steel does not have the same killing power of lead. This leads to a lot more wounded birds that fly away and die

elsewhere and do not get counted in the daily bag.

- **The unpinning of semi-automatic shotguns**

This allows five shots to be fired and creates many more wounded birds because they are much further away.

- **The season is too long**

When I first started shooting, the season was the month of May – four weeks and then it was over. I would like to see it reduced back to that again.

The birds are pairing up now and to give them the best chance, they need to be left alone.

Curiously, the major decline of the mallard population started about the same time as steel shot and unpinned shotguns were allowed.



Ross Cottle

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Cover: A young black swan at Anderson Park, Napier.

Back: Wairio in the springtime.
See story, p4-5. Photos Alison Murray.

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Editorial:

Contributions, including photographs and letters to the editor, are welcomed. Please send these to the editor before the next deadline, September 24, 2021 in time for the October/November issue.

The editor reserves the right to edit articles for content, length, grammar, style, and readability.

Zealandia calling



A kaka swoops in to feed at Zealandia. Photo Bridget Sloane

It's time to send in your registration for DUNZ's 47th Annual Conference and Dinner, which will be held in Wellington on August 20-22.

The conference venue, the James Cook Hotel Grand Chancellor on The Terrace, has direct access by lift down to the shops on Lambton Quay.

Saturday's field trip to Zealandia promises a glimpse of some of the 40 species of wildlife thriving within the predator-free fence of the 225-hectare urban sanctuary.

A silent auction will be held as usual in conjunction with the Saturday evening dinner.

The James Cook has agreed to hold rooms for DUNZ members until July 20, so if you wish to stay in the hotel, make sure you register for the conference before then.

Contact Mary and Paul Mason at info@ducks.org.nz for more information, or post your registration form to PO Box 165, Featherston 5740.

Boardroom above the clouds



From left, Jim Law, Ross Cottle, past president John Cheyne, Marilyn Law, Neil Candy, Anne Michel, John Bishop, Adrienne Bushell-Longuet, Will and Jan Abel, John Dermer and Dan Steele.

DU Director Dan Steele hosted a DUNZ Board of Directors meeting at his place – Blue Duck Station on the banks of the Whanganui and Retaruke rivers – over Queen's Birthday Weekend in June.

The visit included the formal board meeting and a tour of the station, including a trip up by ATV to see The Chef's Table, the restaurant that Dan co-owns with acclaimed English chef Jack Cashmore.

The restaurant's hilltop location has spectacular 360-degree views of Tongariro and Whanganui national parks, and though Mt Taranaki was shrouded in cloud on the Saturday morning, Mt Tongariro, Ruapehu and Ngauruhoe more than made up for the no-show.

Other ports of call on the tour of the station included the old homestead perched on the bank of the Whanganui

River where Dan's parents live, and, up the Retaruke, the remnants of the ill-fated Berryman bridge, which collapsed in 1994, killing beekeeper Ken Richards.

Dan's colourful warts-and-all commentary on the history and characters of the region was eye-opening and capped off an entertaining and educational weekend.

IN BRIEF

Fish & Game review

Fish & Game NZ faces a serious makeover after a critical review of the organisation's governance.

Its national chair Ray Grubb says it will modernise and implement the 35 recommendations of a ministerial review released in late April.

The investigation was ordered last year after a series of scandals and suggestions that the organisation was no longer fit for purpose.

The review found Fish & Game and its 12 regional councils lacked good governance at all levels, in particular with the management of conflicts of interest.

The full review can be found at: [www.beehive.govt.nz/sites/default/files/2021-04/FINAL Report - Review of Fish and Game New Zealand 2020_0.pdf](http://www.beehive.govt.nz/sites/default/files/2021-04/FINAL%20Report%20-%20Review%20of%20Fish%20and%20Game%20New%20Zealand%202020_0.pdf)

Rescue plan for lake

The Government has bought a dairy farm beside Lake Horowhenua and plans to turn it into a wetland.

Environment Minister David Parker said Horowhenua was one of the most polluted lakes in New Zealand and the wetland project would help restore it. The lake is listed as unsafe for swimming and is often plagued by algal blooms.

The Lake Horowhenua Water Quality Interventions Project received \$11.2 million from the Government's Jobs for Nature programme, towards a total project cost of \$12.5 million.

The 142-hectare farmland was bought for \$6.7 million, with Horizons Regional Council contributing \$1 million and the rest coming from Jobs for Nature funding.

The project is a collaboration between Muaūpoko, Lake Horowhenua Trust, Ngāti Raukawa ki te Tonga, Horizons Regional Council, Horowhenua District

Council, dairy farmers, horticulturalists and the wider Lake Horowhenua community.

Horizons Regional Council will own the land and wetland once the project is completed.

How to count crakes

DUNZ Director Emma Williams, a senior adviser at DOC, has written a report looking at the use of call-count methods for surveying and monitoring crake and rail species worldwide to see if they could form the basis for developing monitoring techniques in New Zealand.

Published in May, the report entitled *Potential factors affecting the calling rates and detectability of crake and rail species: a review* is part of a DOC research and development series.

The report is available at www.doc.govt.nz/globalassets/documents/science-and-technical/drds365entire.pdf

Wairio on show



Jim Law takes the visitors to the proposed site of the viewing hide.

About 30 people braved squally rain on Sunday, May 9, for a guided tour of Wairio Wetland led by Ducks Unlimited NZ President Ross Cottle and Director Jim Law.

The event was a Rural Women New Zealand annual event to raise money for the Associated Country Women of the World to help fund community projects in developing countries.

Before setting out, Ross and Jim told the visitors about DU's long involvement with the wetland – from Stage 1, its initial project about 17 years ago through to the latest development in Stage 4.

Ross said the wetland's only water source in 2005 was courtesy of high wind dumping water into it from Lake Wairarapa to the west, but it didn't retain it, and the water flowed straight back into the lake.

DU put in a bund wall, which was moderately successful, holding the water through the bird breeding season, but by December, it had dried out.

The next step was to dig down to a lower level to keep the water there longer, which was more successful, holding the water till the birds had bred and fledged. At the same time, DU planted out native species and these are now well established in Stage 1.

From there, it was on to Stage 2 and 3, and every low spot was fenced off with a bund wall.

Stage 3 was handed over to Victoria University because "we wanted some science behind it", Ross said. It was envisaged that the project would provide a template for wetland restoration.

"Next thing, someone had a bright idea to put in a bund wall" between the three stages and the lake. About two weeks later, a mighty wind blew water in from the lake and "we had 100 acres of water".

After that success, DU extended the bund all the way back to Stage 1. This was "amazingly successful" and has created a wetland of more than 250 acres of water.

"We were successful beyond our wildest dreams," Ross said.

Jim said Wairio had been a ground-breaking project, with the Department of Conservation handing over the wetland's management to DU – at the time it was unheard of for DOC to hand over restoration of its land to a local group.

"It only took us two years to convince DOC to let us spend our money on their land."

DU has spent more than \$200,000 in the past 17 years. About half of this has come from donations, which began rolling in once people saw how Wairio was being transformed and the return of wildlife.

On the 4.2km walk, Jim led the visitors along the bund wall track through Stage 4 of the wetland, where he described DU's vision of the future – when stands of kahikatea would replace the current open areas of fescue.

With a rainbow in the background, and Ross bringing up the rear in his side-



Jim Law describes DU's plans to plant kahikatea in Stage 4, in the area to the right.



The hide waiting for final resource consent before it can be moved to its proposed site on Stage 4. Right, a pied stilt, one of the few birds in evidence on the rainy Sunday in May.

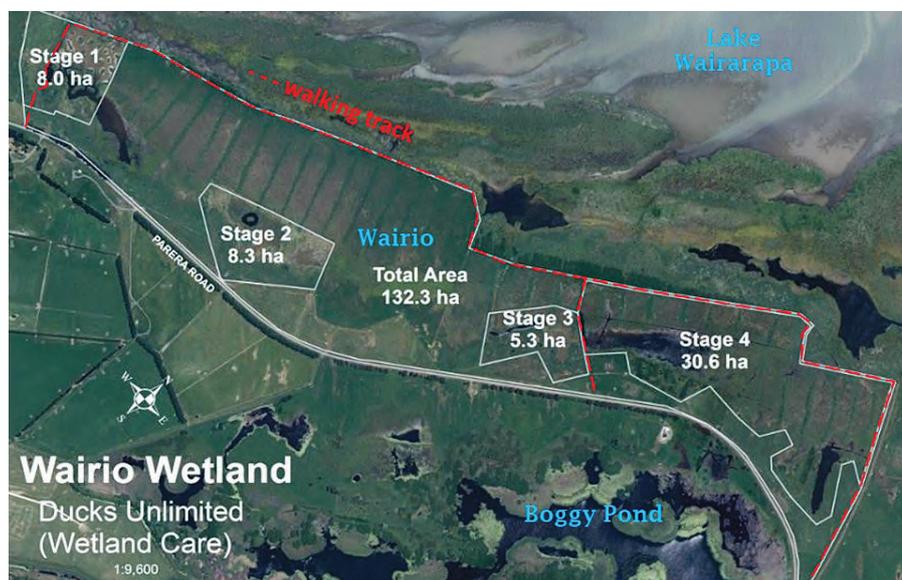
by-side to assist any stragglers, the tour covered Stages 3 and 2 before reaching its conclusion at Stage 1.

On a small detour from the main track

to the water's edge at Stage 4, the group had a preview of the proposed site for a viewing hide which DU has built. It is now waiting for a resource consent to place it on the site.

Birdlife has flourished at Wairio since DU took over, and the number of royal spoonbills, which previously had not been seen for 30 years, have surpassed 100, and they are breeding there. Bittern numbers have remained stable in the past four or five years, despite a continuing decline throughout the rest of New Zealand.

Over a hot cuppa back at the cars, the visitors said the tour had been a revelation and they were highly impressed with their tour guides' continuing passion and enthusiasm for the project.



Rare carnivorous plant found

A **seldom-seen** carnivorous species has been found during a survey of rare plants at Waikato's Whangamarino Wetland.

It's been more than a decade since threatened plants have been surveyed at Whangamarino Wetland, with the last survey in 2009.

Waikato District biodiversity rangers Lizzie Sharp and Kerry Jones, and plant expert Britta Deichmann waded into the boggy wetland for 12 days between September 2020 and April this year.

"We were particularly excited when we found *Utricularia australis* or yellow bladderwort, an aquatic carnivorous plant," Lizzie Sharp said.

"We had several ID books out and a lively debate about whether it was yellow bladderwort or the invasive weed *Utricularia gibba* or humped bladderwort."

The difference between the two plant species is the number of divisions in the

leaves, and closer inspection revealed it was yellow bladderwort, which is known only in the North Island.

"Yellow bladderwort was found at one site in the 2009 survey, and prior to that, at 11 sites based on historic data.

"By 2009, 10 of those sites had been infested with humped bladderwort, and as more than 10 years have passed since that survey, we expected the worst ..."

The bog in the Whangamarino Wetland is treacherous so visits by the public are discouraged. There are no tracks into the swamp, but people are permitted on the Maramarua and Whangamarino rivers and Reao Stream.

For more information about Whangamarino Wetland and its biodiversity, visit: www.doc.govt.nz/our-work/freshwater-restoration/arawai-kakariki-wetland-restoration/sites/whangamarino/about-whangamarino-wetland.

Wairio Strategic Plan 2021-2030

In 2005 DU and DOC signed a five-year Land Management Agreement whereby DU would manage the restoration of the wetland. This agreement has now been extended twice, the current period running through to the end of 2021. A new strategic plan has been finalised with the following vision and objectives:

VISION

In 100 years Wairio will be a pristine and self-sustaining wetland supporting abundant native flora and fauna that filters incoming water before it reaches the wider Wairarapa Moana complex, and is a place people can visit for recreation and to appreciate a natural ecosystem.

OBJECTIVES

Restore a pristine and sustainable wetland ecosystem that provides high-quality habitat for indigenous plants and animals.

Increase the filtration of water run-off from the surrounding area before it enters the lake.

Provide an environmental education experience for primary and secondary school students and a site for scientific research into cost-effective restoration practices by tertiary students.

Provide a space that connects people to nature, with recreation and educational value for stakeholders and general visitors, in addition to cultural values for local iwi.

Ensure sufficient financial and human resources are available to complete the restoration of the Wairio Block.

'It's a long road that doesn't have a turn in it'

Farmer and conservationist Russell Langdon is philosophical about the recent flooding that swept through his property.

Russell Langdon, 89, has had his share of challenges at the wetland reserve he has established on his farm in Mid-Canterbury, near the South Branch of the Ashburton River.

The May floods were the latest hurdle.

"The river broke out and came right through here. It flattened a few fences and damaged aviaries, but it's nothing we can't handle. The birds survived all right."

He said the clean-up at Riverbridge, however, would take a long time.

Riverbridge Conservation Park is an 8.3ha wetland habitat with half-a-dozen ponds and enclosures for native wildlife on Russell's farm at Lagmhor, near Westerfield, southwest of Ashburton.

Among the birds he breeds are brown teal/pāteke and kākāriki. He used to breed whio but a freak snowstorm in 2010 put paid to that.

The whio enclosure was destroyed and the ducks were gone. The Department of Conservation removed Riverbridge from the whio breeding programme, and now it says Orana Wildlife Park and the Isaac Conservation and Wildlife Trust fulfils the requirements.

Russell has had plenty of run-ins with bureaucrats over the years – "they weren't raised under a hen like me" but he takes it all in his stride. As he says, "It's a long road that doesn't have a turn in it".

His land sits on top of an old river bed and the natural water level lies only a metre or so down, making it ideal wetland country. The land slopes east towards the sea "about 30 feet to the mile" so if you dig down and plug up both the eastern and western sides of the hole, a pond will form naturally.

Russell grew up on a farm at Westerfield that his father bought after World War I, and so he only moved a short distance when he bought his farm at Lagmhor 40 years ago "when sheep were king".

Russell's stock numbers soon grew from 800 to 4000 and, along with a stint in



The old schoolmaster's house and, below, the big pond.



the farm machinery business which involved a lot of travelling, selling mainly Case headers, he led a busy life.

Riverbridge was just farm paddocks when Russell started transforming it into a habitat for waterfowl and other birds. It is now a fully formed wetland with ponds and native forest, mostly unplanned and planted to encourage

wildlife to thrive.

Russell says his family were all great tree planters and he has planted 1000s of trees over the years.

Riverbridge started taking shape 21 years ago when Russell planted trees as a millennium project. "We made a lot of mistakes but who hasn't."

Among the trees on the property are matai, kahikatea, totara, cabbage trees, olearia, coprosmas, flax, kowhai and lacebark.

He says he still has a lot more trees to plant, with a hand from his brother John, two years his junior.

Just inside the entrance to Riverbridge is the old Westerfield schoolmaster's house, built in 1888. Russell bought it in 1964 and relocated it to host school groups and tourists.

At the time, DUNZ had a South Island chapter, and Russell had had plans to use it as accommodation for DU members and other groups.

The walls are lined with information about wetlands, posters on endangered species and newspaper clippings about the park.

The wetlands start and stop in the property, so there's no predatory trout, making it a safe environment for the critically endangered Canterbury mudfish. Russell also has plans to introduce freshwater crayfish/koura into the wetland.

The biggest pond is quite shallow, making it ideal for wading birds including pied stilts, spoonbills, and scaups and shovelers are also happy there. There's marsh crakes too but they are hard to spot, and some buff weka.

Sharing the kākāriki enclosure at Riverbridge are a pair of Reeves's pheasants though the male needs to be moved and Russell is not looking forward to that task. "If you go in there, he takes to you," he says.

The lower part of the pāteke enclosure is covered in aluminium mesh which allows bugs in, but no predators.

The park is protected by a QEII covenant and it receives funding through grants applied for through the Riverbridge Native Species Trust.

These days, Russell, who was awarded a QSM in 2006 for his services to conservation, says he potters around Riverbridge, leaving the farming to his nephew – and for now his focus is on cleaning up after the floods.

Russell Langdon with one of several fossil-encrusted limestone rocks brought to Riverbridge from Cavendish in the Surrey Hills that he shows visiting school groups; one of a pair of mute swans at Riverbridge; the pāteke enclosure with aluminium mesh.

Photos Shane Wilson, Alison Murray



Guide to planting a pond

By John Dyer
Northern Gamebird Manager
Auckland Waikato Fish & Game
Council.

Nearly 50 years ago I started planting around my pond on a lifestyle block.

There has been plenty of time since to observe and reflect on which trees and shrubs lived up to my expectations and what I might do differently if I started again. These same observations should be of use to anyone in the same situation.

Firstly, many people overplant a pond. Waterfowl like to warm themselves on a cold day and shade themselves on a hot day, much the same as humans.

Sunlight drives many of the food chains they are relying on and a pond that is too shaded will inhibit this.

One group of ponds I can think of epitomised this and the owner said they were better off before he planted them. Eventually the chainsaw came out and his pond cover was radically thinned, with a great deal of effort.

Sunlight is also important to maintain ground cover for ducks to nest in and a generally open pond is much more inviting and easier for ducks to fly in and out of. A gap cut in the trees can also direct them when they exit the pond.

If you are thinking about this, note where the sun comes from to shine on a pond and not just today but as it swings around the horizon at different times of the day or year.

If planting large trees, their shade would be better falling away from the pond and save the up-close stuff for shrubs.

For instance, flax flowers attract tūī and the small shiny seeds are eaten by pheasants. It is most useful when its leaves fall over the edge of the pond.

This provides good cover from hawks which will wait for ducklings to emerge to pick them all off. With lots of edge cover, the hawk is left watching the spot where the brood went in, while they more safely relocate further along.

When providing shade, it should be relatively open. If you look at ducks sunning themselves on a log that you have supported in place for them, (because otherwise, like the iceberg, much of it will sink out of sight), you'll notice they are all spaced in such a way that if they get a fright, they can easily take off without all their wings clashing.

So trim back trunks at ground level to allow this quick getaway and leave



A beech tree – it's important to fence trees off from stock, and left, a pheasant fossicking for pin oak acorns under the leaf litter.

down toward the pen floor, it was every duck for itself as they raced to get their 'manna from Heaven'.

Pin oaks are another good variety to plant and I sometimes hear that "mine don't fruit". I thought this true of mine too until I put a game camera there to watch a trap. In the background I wondered why pheasants kept turning up.

A scratch in the pin oak leaf litter told me what I'd overlooked, the acorns were there all along but covered up. The birds certainly knew they were there. Pin oaks are water tolerant (flooding, for instance), but not if it is year-round saturated.

Relocate that tree and watch it pull away.



higher branches to provide leafy shade.

Native plants are in these days but unfortunately no one has really studied which ones are of value to waterfowl, compared with some very good information about which exotic trees and shrubs to plant for waterfowl.

Many a hunter has shot a mallard full of acorns, for instance, and you can often see ducks looking for newly fallen acorns and racing to be head of the queue.

Some years ago, I was at a Tauranga DU member's aviary, which had English oaks shading his cages. When each acorn audibly hit the iron roof and rolled



A roost log in use, and, inset, what lurks underneath: supports for two more roost logs.

Another scenario is when oaks line a farm drive. Passing vehicles crush and kibble the acorns and that makes them even more attractive for many waterfowl including pūkeko. Conversely, if your oak is planted in thick grass, the acorns are probably only really available to rats.

Any tree needs to be fenced off from stock, of course, but you could perhaps put oaks on the edge of the fence and eventually overhanging it, so their acorns fall in the open.

Some oak species produce acorns that may be too large, though I have seen mallards carefully work turkey-oak acorns (the largest of acorns), until the point is facing outwards before they swallow it. Turkey oaks are one of those self-sterile species that will not fruit unless there are two of them.

Water oak (*Quercus nigra*) is a rare tree in New Zealand but there's one that I have collected seed from each year as it is a proven performer overseas. Same with water hickory (*Carya aquatica*).

Holm oaks are very salt tolerant, if you are near the coast. They have lots of useful sized acorns in April/May, especially if sourced from one parent tree by the main road at Pūkekohe Golf Club.



Water hickory, a rare tree in New Zealand. This will one day be a seed source.

The value of native puriri timber as fence posts means these trees are not nearly as common as they once were. As a wildlife tree they have much to recommend them as they have some sort of flower or fruit much of the year and so probably help various critters through lean months.



The Poly Logic sleeves confuse pūkeko.

They are very water tolerant and I know of a number growing right on the Waikato River's edge, being covered by each tide. Grey ducks, and I am sure mallards also, love the epiphytes (the flax-like plants) that grow on puriri branches.

If there is a branch growing over water with any gap in the epiphyte root mass that will support a nest, then it will be used year after year, provided you keep possums under control as they compete for these spaces.

How do the ducklings get down? They jump and regardless of the height of the fall, they bounce, pick themselves up and off they go. When the peeping from the nest stops, the mother duck assumes she has the lot and into the pond cover she takes them.

I have seen a grey teal gathering her brood this way under a nest box. They make a special quiet quack to call to those still in the nest.

Hearing this, a hawk straight away flew into the nearby tree and two pūkeko came running like the dinner gong had just been sounded.

This brings me to the next planting project, planting overhead cover in the water. Willows will establish, of course, but grey willow can be extremely invasive, and I can think of ponds, which used to be wonderful, but are now completely hidden by willows.

A similar species that is much better behaved is weeping willow. The cascading branches hanging in the water make good hawk cover, but be careful not to crowd a pond. One or two of this species on the edge might be ample.

All you need is a small pole to start it off. Make sure the pole is the right way up! If twisty willows are on sale at the nearby nursery, look away. I have never seen this species provide any benefit.

Swamp cypress is a tree that will actually grow in standing water and the "knees" it produces will make good places for ducks to climb out and roost on. It might tend to spread in the South Waikato downwards, but north of this it seems well mannered.

Climate will influence your choice of plants. For instance, I notice rowan trees in Rotorua thrive and are laden with fruit that birds love, but in Auckland and north, they're misshapen and of little value.

Conversely, monkey apple trees (*Acmena spp.*) will thrive and produce abundant berries in Auckland and north that wood pigeons love, but frost will kill them off south of the Bombay Hills.

Both rowan and monkey apples are now regarded as pest species, so there's another thing to be mindful of.

Coprosma (karamu) is a native shrub that has orange berries, sometimes in profusion. If you have a green thumb, why not take cuttings from the most fruit laden examples you see. Everything from quail upwards likes Coprosma seeds, especially *C. robusta*.

Be careful that nurseries like to crossbreed new varieties and prostrate shrubs, which might be great in the garden, but will soon be overcome by weeds in your fenced-off pond area.

Continued next page



Spectacular Rakatu

With international travel off the agenda for now, it may be time to check out some of New Zealand’s public-access wetlands.

One such gem can be found on the Southern Scenic Highway between Manapouri and Tuatapere.

If you are heading south from Manapouri, take a right after the sign for Rakatu Wetlands and at the end of a 1km gravel road, there’s a car park with information boards.

There are four main walks, from 15 minutes long to two to three hours. It’s a spectacular setting with Fiordland National Park as its western backdrop,

and no less impressive are the flush toilets up the track to the lookout.

Complete with toilet paper and soap, they are an unexpected bonus to visitors expecting the usual pongy long drop.

The 270-hectare wetland complex was created for the benefit of fish and waterfowl as well as protected bird species to mitigate and remedy the adverse effects of the Manapouri Hydroelectric Power Scheme.

It is administered by the

Waiau Fisheries and Wildlife Habitat Enhancement Trust.



From previous page

A native plant nursery is much more likely to have the uncorrupted parent plant.

To establish trees, talk to your friendly carpet outlet. What you’re wanting to do is to raid their skip for the old woollen (not nylon) carpets they’ve pulled up and thrown away.

You can quickly cut these into say 0.5-metre squares with a sharp skill-knife. Then cut a slot from one edge to slip around the tree truck.

If you have pūkeko, I strongly suggest you get a green plastic Poly Logic sleeve which you can put around the tree using three or four scrounged bamboo stakes. Pooks will walk past these and not realise the young tree is inside.

Otherwise, they are very likely to pull it out. Water and weed your trees well in their establishment years.

Thereafter they will look after themselves with perhaps a bit of pruning to get the good central bole you want. Don’t let the cattle in even for a short while. They will go for the trees before the grass and set you well back.

At any rate, if the grass is allowed to grow rank in spring, the ducks will have a much safer place to nest compared with a mowed or grazed pond paddock.

Likewise, be sure to set a Timms trap for possums as these can ruin a tree in just one night by breaking that tender young apex shoot.

A well planted pond is a joy to reflect on. Good luck.



A possum caught red-handed.

Leading predators up the garden path

Mammalian predators rely primarily on smell as their main cue, enabling them to detect food from a distance. Smell is usually a reliable strategy for food location.

As part of long-running research into the behaviour of introduced mammalian predators in New Zealand and Australia, researchers from Manaaki Whenua – Landcare Research and the University of Sydney asked whether it might be possible to manipulate predator behaviour by using misinformation.

Could we use unrewarded prey odour cues to fool predators, and make them ignore real prey cues? If we could make predators less efficient at hunting, might we also make them miss real prey?

Over two nesting seasons, the researchers tested the response of cats, ferrets and hedgehogs to false odour cues at nesting sites for three shorebird species – the banded dotterel, wrybill and South Island pied oystercatcher.

These native bird species nest on the ground on braided rivers in Canterbury and are highly vulnerable to predators.

The researchers made odorous pastes from bird carcasses and feathers – and tested whether repeated exposure to these odours would affect the predators' behaviours.

They set out the pastes at 300 to 400 points across nesting sites before the birds arrived to nest, and also during the nesting season. Predators' behaviour was then compared to that at testing sites without paste.

Camera traps were used to monitor predators' interest in the paste, and to monitor the survival of nests with and without odour paste.

In the second nesting season, the paste/no-paste sites were swapped to increase the reliability of the results.

All three types of predator were attracted by the paste odours, but ferrets and cats, in particular, quickly lost interest when there were no prey associated with the scent cues.

Thus, when the birds arrived to nest, the predators had already altered their behaviour by ignoring bird odour, including that of the real birds.

The effects on nest survival were striking for all three bird species: compared with non-treated sites, odour treatments resulted in a 1.7-fold increase in chick production over 25 to 35 days and doubled or tripled the odds of successful



Above: The study area with the invasive predators (inset); native ground-nesting birds (inset) and the camera trap monitoring one of their nests. Left: A hedgehog feeds on a pied oystercatcher's eggs. Background photos Grant Norbury, Manaaki Whenua – Landcare Research

hatching.

For banded dotterel, the researchers estimate that this intervention could result in a 127 per cent increase in the population size in 25 years of annual odour treatment.

The method is best suited to small areas of vulnerable biodiversity where lethal control methods are difficult to implement.

Lead researcher Dr Grant Norbury of Manaaki Whenua – Landcare Research

worked with colleagues at the University of Sydney, Dr Catherine Price and Prof Peter Banks, who developed the idea.

Dr Norbury says that this field experiment provides clear evidence of altering predators' perceptions of prey availability on a landscape scale, and "could significantly reduce predation rates and produce population-level benefits for vulnerable prey species at ecologically relevant scales, without any direct interference with animals".

Wetland restoration under the microscope

Restored wetlands on private farms deliver ecosystem services and increase diversity, with varied results, a recent study has found.

Shannon Bentley, a master's student at Victoria University and the first recipient of a Wetland Care Scholarship funded by Ducks Unlimited NZ, is studying how wetland restoration on farms changes plant, soil, and microbial characteristics.

In 2018-2019, as a part of the research group, Wetlands for People and Place, she sampled 18 privately restored wetlands and paired unrestored wetlands on farms in the Wairarapa.

For her master's thesis, she analysed the wetland plant communities, soil physiochemical characteristics, and soil microbial communities to understand how they change with restoration.

She found that wetland restoration on private property shifts plant, soil, and microbial characteristics towards desirable remnant wetland conditions. She also showed that the outcomes of wetland restoration varied within and between wetlands.

More than 40 per cent of New Zealand is held in private ownership, and private property holds huge potential for wetland restoration, containing 259,000km of stream length (Daigneault, Eppink, & Lee, 2017).

Additionally, wetland degradation is extensive in lowland environments which are primarily in private ownership.

The outcomes of wetland restoration undertaken by landowners' own prerogatives are poorly tracked.

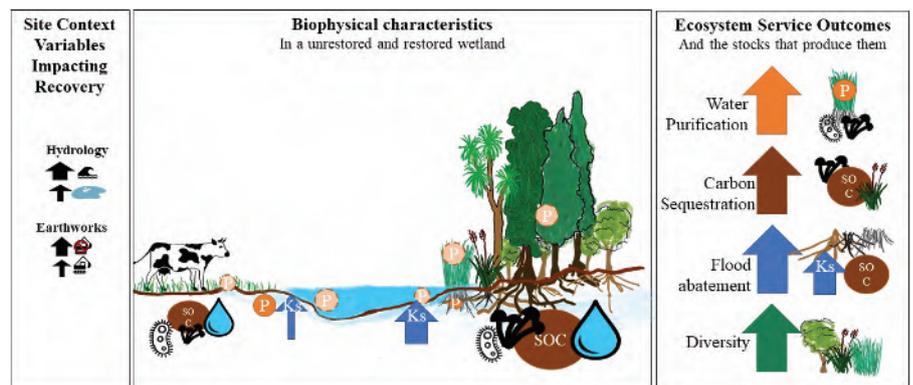
Private restoration is driven by personal preferences and finances, so the extent and form of restoration are varied.

For example, the 18 wetlands sampled in Shannon's study were restored in many different contexts and using many different techniques.

Wetlands differed in time since initial restoration (6 months to 42 years ago), size (0.4ha to 33.7ha), upstream watershed area (4ha to 2,263ha), dominant plant community (woody v herbaceous), and the number of restoration techniques used (2 to 8).



Shannon Bentley, right, and a colleague, Nicki Papworth, taking plant measurements in one of the wetlands.



Unrestored wetlands (left) have less ability to store carbon, contain more phosphorous in their soils, have reduced capacity to store water, and contain less plant biodiversity. Restored wetlands (right) have more plant diversity, contain less phosphorous in soils, hold more water, soil organic carbon (SOC), and microbial biomass in their soils. After restoration, the ecosystem services' water purification, carbon sequestration and flood abatement are increased.

Wetland restoration is beneficial for a number of reasons, but particularly for regaining wetland ecosystem services and increasing native biodiversity. Ecosystem services are ecological processes and functions that have beneficial outcomes for humans.

Compared with all other ecosystems, wetlands produce the highest levels of ecosystem services per unit area.

This high production of ecosystem services is due to wetlands' unique biology and geology resulting from their position at the interface of water and land.

Wetlands are particularly effective at producing the ecosystem services of water purification, flood abatement and climate regulation through carbon sequestration.

Shannon found that with restoration, soils regained wetland traits, providing more ecosystem services.

The restored soils had higher carbon content, lower bulk density, and lower plant-available phosphorous. Increased soil carbon content shows the carbon sequestration potential of soil expands with restoration.

Additionally, reduced plant-available phosphorous indicates restored wetlands can take up phosphorous and improve downstream water quality.

And finally, with increased carbon and reduced bulk density, water moves through the wetland soils slower to reduce peak flood heights.

Shannon found wetland soil microbes increased in biomass and fungal

dominance after restoration. These changes, in part, explained the increase in capacity for wetlands to deliver ecosystem services.

Soil microbes are responsible for decomposition and nutrient cycling. A greater mass of microbes means restored wetlands have more capacity for biogeochemical cycling and decomposition, which can accelerate processes such as carbon burial, as seen with the increased carbon in restored wetland soils compared with unrestored soils.

The presence of arbuscular mycorrhizal fungi (AMF) also increased after restoration. AMF help plants survive and reduce phosphorous in soils, thus contributing to cleaner waterways.

Each restored wetland showed a lot of variability of soil and microbial responses within and across wetlands.

Because wetlands are found along a hydrological gradient between saturated soils and drier, upland soils, the microbial and soil properties differed according to the landscape position.

Soils close to the water's edge, as a result of being saturated, had more carbon, microbial biomass, and more fungal biomass, and were less dense.

By examining the plant communities, Shannon found that, after restoration, plant diversity increased within the plot and across the landscape.

This means that with restoration, habitat heterogeneity increases, a beneficial outcome that increases ecosystem stability and the number of ecosystem services produced.

Additionally, she found that wetland soils and plant and microbial communities showed different levels of recovery that were not consistent with the length of time that they had been restored.

Some projects' soil and microbial characteristics recovered faster than others. The main difference between fast and slower-recovery wetlands was the hydrological regime.

Restoration projects that occurred on isolated hydrological systems such as depressional, rainwater-fed wetlands took far longer to re-establish remnant wetland conditions.

Projects undertaken on flowing hydrological systems such as springs and streams underwent successional processes faster to establish wetland conditions that have a higher production of ecosystem services.

The study has shown that restoring wetlands on private farms increases the



Some of the biodiversity at the wetlands. Clockwise from top left: Growling grass frog, fungus, a nursery web spider, tuna (New Zealand eel), sundew (a carnivorous wetland plant), and water fern.

ecosystem's ability to simultaneously produce multiple different ecosystem services and support more biodiversity.

As food production demands continue to rise simultaneously as land becomes more scarce, agricultural systems are becoming more industrialised and intensive.

This is placing pressure on natural ecosystems, as seen by reduced water quality, native habitat, and changing landscapes from carbon sinks to sources.

There is increasing recognition that we need mixed agroecosystems so food production does not compromise other ecosystem services.

Wetland restoration is gaining significant traction as a solution to issues surrounding water quality, climate regulation, flooding, and loss of native

habitat, and this study has shown that private restoration is effective tool to do just this.

Shannon concludes her report by saying: "I would like to thank all the landowners that generously allowed us to sample their wetlands; each site we visited was so beautiful and unique.

"I thank Ducks Unlimited for the funding that allowed me to do this research. I also thank the Holdsworth Foundation, the Sir Hugh Kawharu Foundation, Wairarapa Moana Trust, and Victoria University for the financial support I have received.

"Finally, I would like to thank my supervisors Dr Julie Deslippe and Dr Stephanie Tomscha for their guidance and help in producing this research."

IN BRIEF

Boom times are nigh

Although bitterns/matuku disperse throughout the year, the booming of the male matuku defines a site as a potential breeding territory. Males boom from early spring through to summer. John Sumich, of Matuku Link, is asking observers to record when they first hear a boom; the time of day; where it was (GPS co-ordinates, if possible) and any later confirmatory booms, to see if there is any regional difference in the onset of booming, and population stability or decline. Send your observations to matukulink@gmail.com or fill in the form at www.matukulink.org.nz.



Fight for the wild

Fight for the Wild is a four-part film and podcast series that documents the battle to protect New Zealand's wildlife. It explores the concept of Predator Free 2050 and asks if it is achievable and if so, how? Each episode is 45 minutes and can be viewed on YouTube, TVNZ On Demand or the RNZ website.

She ‘lived life to the full’

Diana (Diny) Dermer, a long-time DUNZ member and wife of Director John Dermer, passed away, aged 75, at her home on March 1.

Diny played an active part in running their farm at Cheltenham, 15 kilometres north of Feilding, before the couple retired to Palmerston North in 2019.

She was born in Pahiatua, as her parents, Kit and Dombey Beetham, farmed at a little place called Pori, near Makuri, a small village about 30 kilometres east of Pahiatua.

John said: “She went to the Makuri School when she was seven because her parents reckoned she was too small at five (she always described herself as a little runt), and there she learnt very little, she thought.

“They moved to a farm near Waipukurau with a lovely old homestead and a climate that meant you didn’t need a raincoat on the horse’s saddle all the time. (Farm bikes were still in the future).

“Her mum died of breast cancer when Diny was 21. Her parents had sent her off to England at the time, but her mum’s death had a huge effect on her.

“We met when we were 15, again when we were 21 and she somehow didn’t get married till I turned up again nine years later,” John said.

She worked as a waitress at Expo 70 in Japan and talked about that experience a lot. She also worked at the British High Commission and remembered sleeping under the desk after a boozy lunch. Sometimes waking up to see the boss’s shoes very close, John said.

“We got married in 1975 and I dragged her back to Waipiko, our little farm near Cheltenham, where we did all sorts of things, including having two daughters.

“Diny loved the vege garden, her bantam hens and Pekin ducks, plus all sorts of other plants. She was a natural partner when we started to plant out Waipiko and develop the wetlands.

“She spent lots of time with a spade in her hands helping with actual planting. We had many discussions about what to plant and where.

“Both of us learnt a hell of a lot from our membership of New Zealand Farm Forestry Association, and all the areas – in the North and South Island – we visited as a result of this.



Diny and John Dermer, and, below, an earlier photo taken after a successful day of hunting.



“She always seemed to manage a fruit tree or two into our plantings and as a result, I could pick an apple or a plum while cruising round the farm.”

Camping and tramping were other loves. She completed many of the South Island’s major tramps – the Milford, which she reckoned was the best, and the Abel Tasman, Kepler and Heaphy tracks.

Diny was always a friendly face at DU’s conferences. Tributes to Diny spoke of her joie de vivre, laugh and honesty, and described her as a special person who

was a lot of fun.

“Diny was such a vibrant and outgoing lady who lived life to the full,” one tribute said.

“She was always full of energy, bright and cheerful and never afraid to say what she thought!! Her warm character and zest for life will be sadly missed by many,” said another.

Diny is survived by John and their daughters Ana and Kate and four grandchildren.



Wetland Care Scholarship

*Interested in studying wetland birds or wetland restoration?
A Wetland Care Scholarship could be for you!*



BACKGROUND/PURPOSE

Wetland Care Research Scholarships are Ducks Unlimited-sponsored scholarships applicable to any student currently enrolled or affiliated with a New Zealand university.

Funds are aimed at encouraging and supporting students who wish to push the boundaries of what is known about wetland restoration and conservation.

Up to \$20,000 is available annually to cover up to four separate scholarships of \$5000 each.

Funds can be used to support student living costs or cover the costs of equipment purchase, logistics and consumables.

CRITERIA

Applications will be accepted from students/researchers affiliated with universities interested in making a difference through wetland conservation.

Funding is aimed at student projects

designed to facilitate better management of New Zealand wetlands or their environment. The student project must be based in New Zealand or be of direct benefit to New Zealand based on current wetland conservation issues.



Preference will be given to applications that demonstrate some of the following criteria:

- projects of direct benefit to New Zealand based on current wetland conservation issues
- innovative thinking that pushes the boundaries of what is known about New Zealand wetland conservation

- research on native threatened wetland bird species
- research with clear objectives and measurable outcomes
- research with a strong wetland management and conservation applications.

VALUE

Wetland Care will award up to four scholarships annually in two funding rounds.

Funds will be paid in one lump sum to successful candidates upon completion of the milestones agreed at the time the scholarship is accepted.

INTERESTED? WANT TO KNOW MORE?

Please email swampbird.research@gmail.com with your questions or to request an application pack.

Terms and conditions are also available on the Ducks Unlimited NZ website, www.ducks.org.nz.

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We deliver and advocate for effective wetland restoration, development, research and education; and support the preservation of threatened waterfowl and the ethical and sustainable use of wetlands.