PRR Internal Report 2025/01

Project River Recovery Annual Report 2025

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Te Papa Atawhai

Te Kāwanatanga o Aotearoa
New Zealand Government

Summary

- This report summarises Project River Recovery's (PRR) progress towards its six key objectives as identified in its strategic plan for the period from the 1st of July 2024 to 30th of June 2025.
- PRR continues to give highest priority to preventing weed invasions of the near-pristine upper rivers above the hydro-lakes of the upper Waitaki basin.
    - In the Tasman River, Russell lupins and other weeds were controlled on the riverbed and in upstream sources including feeder streams.
    - In the Ahuriri River, Russell lupins were controlled on the Birchwood fan, and willows were controlled downstream of Birchwood station progressing work started in previous years.
    - PRR contributed $20,000 to ongoing joint weed control programmes with Environment Canterbury and LINZ in the Dobson River.
- Further down the catchment, PRR also controlled alder and silver birch in the Lake Poaka wetland, Russell lupins in the Forks Stream, and contributed $32,400 towards weed control in the Takapō River.
- This year was the twenty first year of trapping for the Tasman River Predator Control Project, a joint programme between TMAP, PRR and the Department of Conservation's (DOC) kakī programme.
    - For consistency with previous years, trapping data is reported from March to February each year. Over the year, target species catch included 539 hedgehogs, 356 stoats, 72 weasels, 61 possums, 52 cats, 52 ferrets and 29 rats. Non-targets caught were 30 mice and 29 rabbits. An additional two cats were removed over two nights of spotlighting.
    - The indicators of success of the trapping network measured this year included the annual walk-through river bird survey, and monitoring of black-fronted tern nesting productivity.
- The programme of intensive predator trapping around the black-fronted tern colony in the upper Ōhau River continued for the sixteenth year (the ninth year since the trapping network was reduced from a 1km radius to 500m).
    - For consistency with previous years, trapping data is reported from March to February each year. Over the year, 92 hedgehogs, 67 cats, 65 ferrets, 28 stoats, 27 Norway rats, 25 possums, and 2 weasels were caught in kill traps. An additional 8 cats and 4 possums were removed over 4 nights of spotlighting.
    - This season was the fifth consecutive year where chicks successfully fledged from Tern Island. It's estimated that a minimum colony size of 718 adult black-fronted terns/tarapirohe returned to the island for breeding this year. An intense snow event in late October resulted in widespread nest failure, necessitating colony-wide renesting. A total of 717 nest attempts (1,340 eggs) were monitored, and hatching success was lower than last year with 39% of nests hatching at least one chick.
    - Annual population monitoring of Lakes skink was completed in the upper Ōhau River for the ninth year. Individual capture rate was 8.7 per 100TN (over 7 days), the lowest recorded since the study began.
- PRR continued to support the development of methods to effectively control hedgehogs. A field trial for a potential hedgehog-specific toxin (Alphachloralose in a fish oil paste) was undertaken in late March and early April, with promising interim results.
- PRR also continued to support a study of the effectiveness of rabbit fences as hedgehog-proof fences. The learnings and recommendations from this study will be reported on this season to guide the implementation of this control method where appropriate.
- Walk-through river bird surveys were completed on the Pūkaki, Upper and Lower Ōhau Rivers. This year was the second of three years of surveys in these rivers. The Cass River, although scheduled for a survey this season, could not be accessed during the critical period due to lambing and high spring flows following a late snow event.
- This was the third season of flag banding black-fronted tern chicks in a project that seeks to better understand the species' natal site fidelity. A total of 62 chicks were flag banded in the Upper Ōhau River and three in the Tasman River.

- Annual population monitoring of robust grasshoppers was conducted across three key populations for the 8th year as part of a long-term study to better understand population trends.
- Robust grasshopper distribution surveys were conducted in the Forks Stream for the first time this year, and current distribution closely matched historic records. Section 4 of the Takapō River was intensively searched following no detections in the 2021 and 2022 surveys, and five individuals were located confirming their persistence through this portion of the river.
- PRR continues to maintain nine built trout barriers and monitor two natural waterfall barriers to protect native fish species in the basin. In March 2025, a new barrier was installed on the eastern side of Waterwheel Wetland, and PRR is working on an application to translocate lowland longjaws into the site.
- Research into the conservation requirements of *Lepidium solandri* continued this year, with both seed and cage trials starting, and monitoring of populations continuing for its fifth year.
- Lizard monitoring was conducted across two sites on the true left terrace of the Pūkaki River, and replicated surveys conducted by an external agency in 2019. Mackenzie skink capture rates were approximately double those of 2019, with 128 unique individuals captured over 10 days amounting to 13.3 individuals per 100 trap nights. Scree skink capture rates were 5.2 individuals per 100 trap nights, and high recapture rates were similar to 2019.
- Lizard surveys in Bog Roy Conservation Area (Lake Benmore) confirmed the presence of Lakes skinks.
- Wetland management has included weed control and water-level manipulation at Ruataniwha wetlands. PRR's focus is to benefit threatened ephemeral plants that occur in these habitats.
- PRR spent $776,000 in the 2024-25 financial year.

Cover image: The Godley River delta by Dave Murray ©

1. Introduction

Project River Recovery (PRR) commenced operations in 1991 following the establishment of a compensatory funding agreement between the Department of Conservation and electricity generators in the upper Waitaki Basin which recognised the adverse impacts of hydroelectric power development on braided river and wetland ecosystems. Since the programme was founded, it has focussed on maintaining the integrity of braided river ecosystems by protecting habitats and species from the impacts of introduced and invasive plants and mammals. These and other goals are set out in the current interim strategic plan (Nelson, Maloney & Gale, 2020) which replaces the 2012 – 2019 plan (Rebergen & Woolmore, 2015). This annual report summarises progress towards the six key objectives identified in the strategic plan for the year from the 1st of July 2024 to 30th of June 2025.

2. Staff

The project was managed by Dean Nelson with support from Jennifer Schori who was seconded into the Senior Ranger role for the second half of the year.

The project's biodiversity and outcome monitoring were delivered by Biodiversity Rangers Sam Turner, and Jamie Cooper who filled Jennifer's substantive role.

The project's predator control operations were delivered by Ranger Felix Keys.

Tom Goodman continued his role developing best practice methodology for hedgehog control and testing novel landscape-scale hedgehog control tools.

PRR also utilised members of the DOC Twizel team to support the delivery of weed control, predator control and threatened plant work this year.

3. Strategic Plan

The strategic plan outlining the work objectives of PRR normally spans consecutive seven-year cycles, allowing regular review, reporting, and realignment. The previous strategic plan spanned 2012 to 2019 (Rebergen & Woolmore, 2015), and PRR is currently working to an interim strategic plan (Nelson, Maloney & Gale, 2020) that was prepared to lead the project through until the expiry of the current mitigation agreement with Meridian and Genesis.

A new compensatory agreement has been formed between Meridian, Genesis and DOC as part of the generators' re-consenting process. DOC has been working with our Treaty Partner and the two generators to prepare a Strategic Action Plan that will guide the delivery of the new compensatory agreement.

4. Progress towards objectives of the strategic plan

PRR's progress towards achieving the objectives of the current interim strategic plan is summarised below. Detailed reports of seasonal results and outcomes from trials and analyses of data are recorded through PRR's internal report series and are available on request.

4.1. Objective 1: Maintain indigenous biodiversity; protect and restore terrestrial and aquatic river and wetland habitat and the ecological communities within it by controlling and where possible, eradicating invasive weeds

The total area of braided-river habitat in the large rivers of the upper Waitaki basin is approximately 32,000 hectares. PRR gives the highest priority to preventing new incursions of invasive weeds and removing newly established infestations at priority locations. Priority sites are generally still relatively 'clean' in terms of the number of weed species and the extent of their distribution.

Tasman River

In the lower Tasman River (between the delta and the power lines), predominantly Russell lupin was controlled by contractor ground crews. Other weeds encountered (e.g., broom, gorse, willow, false tamarisk) were also sprayed (Figure 1). False tamarisk is a relatively recent arrival in the Mackenzie Basin and strenuous efforts are being made to ensure that it doesn't establish. As per recent years, all the upper Tasman River, feeder streams and rivers (including Black Birch Stream, Kitchener Stream, Hooker River and Jollie River) were controlled by aerial spot spraying from a helicopter. This is more cost effective and allows greater accessibility to hard-to-reach parts of the riverbed than using ground crews. It also enabled large patches of Russell lupins to be identified for ground crews to control as helicopter spot spraying, while efficient on scattered plants, becomes much more expensive in large, concentrated patches. Of concern was the discovery of a large patch of lupins up near the Mueller Glacier Lake which is well above the previous known extent. The precise boundaries of the patch tend to suggest that seeds had been deliberately spread.

Figure 1. Russell lupin and false tamarisk are two of the target weeds in the Tasman River.

Fork Stream

Russell lupins and broom in Fork Stream below the general area of the Mackenzie District Council water intake for Takapō was sprayed by ground contractors. Follow up inspection of some of this area of control found rather poor coverage in places so either more rigorous auditing needs to occur, or DOC staff may be used in future.

Ahuriri River

Aerial spot spraying for Russell lupins was undertaken on the steep slopes above the Birchwood fan to complement staff ground based work on the flatter areas. Follow-up aerial willow control was carried out downstream of Birchwood using a helicopter, continuing the management efforts initiated in earlier years.

Other weed control

Additionally, PRR continued its ongoing programme of weed control in other areas including removal of all vegetation from Tern Island using a drone spray unit (to benefit nesting black-fronted terns, see Objective 2). This same drone was used to identify and spray five false tamarisk plants over an area of approximately 350 ha in the Godley River following sightings reported by kakī programme staff. The technology used also enabled the drone to identify and spray some gorse and willow within the same area.

At Lake Poaka, contractors were used to do some cutting and pasting of alder and silver birch at the western end of the lake. However, ongoing regrowth of these species and willow means that aerial spraying would be more cost effective for future control work.

PRR contributed $20,000 to the ECan led multi-year, landscape scale weed control project in the Dobson Valley. It aims to control elderberry, cotoneaster, buddleia, willows, and Russell lupin, as well as some miscellaneous garden escapees (such as raspberry, gooseberry, currant, and flowering cherry). The project outcomes align well with PRR's weed management objectives which include removing priority weeds from Mackenzie Basin rivers, eradicating Russell lupins from the Hopkins Valley, and improving wetlands through willow control. LINZ and the Glen Lyon lease also contribute funding to this project.

PRR also continued its contribution of $32,400 towards the weed control programme carried out by ECan in the upper Takapō River.

4.2. Objective 2: Test and where possible, improve the effectiveness of and implement experimental predator control for population recovery of braided river and wetland fauna

Tasman River Project

The Tasman River Project's goal is to reduce predation of braided river birds to a level where depleted populations are recovering, and large populations are in a stable state. The project takes a large-scale approach, using a wide variety of control methods that are applied throughout the year. Success of the project is assessed on achieving target increases in fledging success and population growth for a range of river birds. PRR and the Kakī Recovery Programme continue to implement the extensive predator network in conjunction with the Te Manahuna Aoraki Project (TMAP) which has extended trap lines in the side valleys surrounding the area.

Predator Control

The 2024-25 season was the twenty-first year of operation at the site, with a total of 2,092 kill traps active within the project. These are comprised of 429 DOC-150s, 217 DOC-250s, 269 Conibear traps, 76 Timms traps and 419 Leg hold traps run by PRR. PRR's trapping network is supplemented by an additional 493 DOC-150s and 189 DOC-250s that have been run and maintained by Aoraki volunteers and TMAP (Figure 2).

Approximately 330 traps are in the process of being removed from the portion of the trapping network that runs through Glentanner Station due to a termination in the access agreement. To reinforce this portion of the network, additional traps have been added to the PCL that lies between Glentanner Station and the Tasman River.

Aerial poison operations to control rabbits in the Tasman Riverbed in 2021 and the Tasman Flats around Aoraki Airport in 2023 have been followed up by regular night shooting to keep rabbit numbers at low levels. As rabbit numbers drive the populations of predators, recent trapping data indicates that this work to suppress rabbit numbers is having an influence by reducing the numbers of cats being caught (Table 1). There is also a significant recovery of native vegetation that was being severely impacted by high rabbit numbers. In particular, the *Raoulia haastii – R. australis* cushion field community with its associated *Carmichaelia australis* populations have had a dramatic recovery.

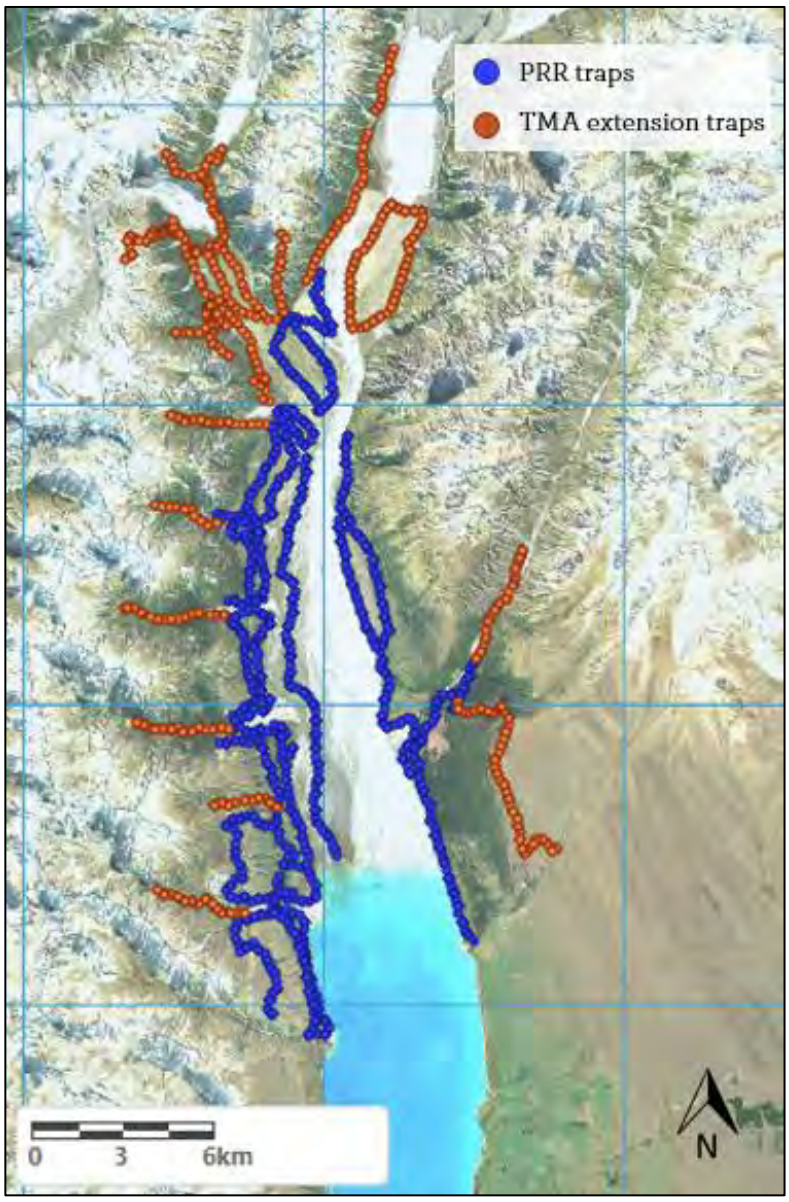


Figure 2. The trapping network in the Tasman Valley consists of traps managed by Project River Recovery (PRR; *n* = 1,124 traps, blue circles) and the Te Manahuna Aoraki Project (*n* = 709, orange circles).

Trapping data is reported between 1 March 2024 and 29 February 2025 (Table 1). Over this period, the trapping network, 2,117 traps in the Tasman Valley and side valleys, removed the following target species: 525 hedgehogs (*Erinaceus europaeus occidentalis*), 351 stoats (*Mustela erminea*), 71 weasels (*M. nivalis vulgaris*), 63 cats (*Felis catus*), 54 possums (*Trichosurus vulpecula*), 52 ferrets (*M. furo*) and 27 rats (*Rattus* spp). Non-targets removed include 51 rabbits (*Oryctolagus cuniculus*) and 42 mice (*Mus musculus*). An additional 2 cats were removed over 2 nights of spotlighting during June 2024.

Table 1. The number of target and non-target species caught in Tasman River predator control kill trapping network between 2017 and 2025. (Data excludes leg hold trap catches).

Species	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Target species								
Cat	117	82	123	101	93	47	72	63
Ferret	35	26	31	43	51	37	34	52
Hedgehog	672	488	525	708	409	245	492	525
Norway Rat	4	14	44	34	8	7	28	27
Possum	9	4	6	17	11	67	61	54
Stoat	334	476	366	470	362	228	421	351
Weasel	33	31	44	44	22	35	67	71
Total	**1204**	**1121**	**1139**	**1417**	**956**	**666**	**1175**	**1143**
Non-target species								
Rabbit	197	238	249	334	16	20	63	51
Mouse	26	41	28	19	15	4	17	42
Other	23	24	9	15	6	9	17	9
Total	**246**	**303**	**286**	**368**	**37**	**25**	**97**	**102**
Grand Total	**1450**	**1424**	**1425**	**1785**	**993**	**699**	**1273**	**1245**

Leg hold trapping to specifically target cats that may have become shy of entering the kill traps occurred again this year. Three-hundred-and-ten leg-hold traps were sequentially opened for 10 days over April-June. This season the leg hold network caught 4 cats, 3 stoats, 9 possums, 1 weasel and 3 hedgehogs. The number of cats caught was significantly lower than in previous years, likely due to the low numbers of rabbits in the river because of effective toxin control operations targeting rabbits within the past 5 years.

Peak predator catches on the Tasman River trapping network occurred March 2024 with hedgehogs (129 individuals), stoats (57) and weasels (18) making up most predators caught. April and May 2024 as well as January and February 2025 also yielded high catch rates of the same three species. Catches tapered of significantly during winter which was expected however stoats were caught throughout the year with an average catch of 29 individuals caught per month (Figure 3).

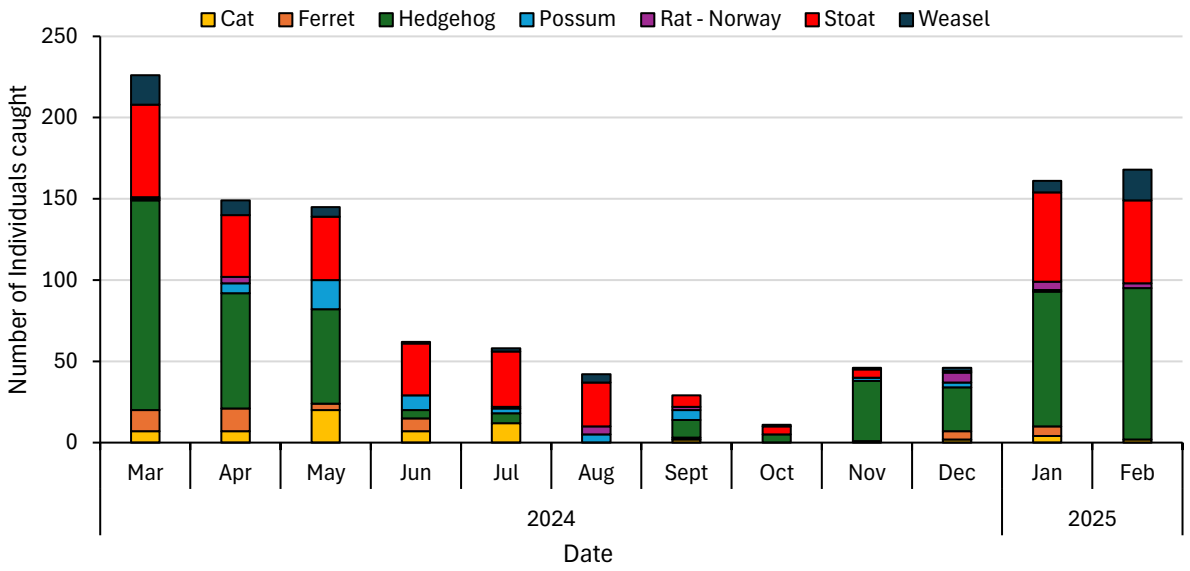


Figure 3. The number of individuals of predatory species caught in the Tasman River predator control trapping network between March 2024 and February 2025.

Outcome monitoring

Project River Recovery monitors the outcome of the predator trapping by conducting productivity monitoring of black-fronted terns/tarapirohe. A total of 24 colonies were found on the Tasman River this season, and of 420 nesting attempts, 378 of which had known outcomes (Cooper, 2025). Eleven colonies (86 nests, 31.7% of all nests followed this season) were destroyed by a snow event on the 26th of October 2024. Predation accounted for almost half (48.7%) of nesting failures, followed by flooding (not related to snow, 14%; Figure 4). Overall, the hatching success of eggs was 41%. Of the 384 eggs that failed, the three main causes were 1) snow and snow related factors, 32.3%; 2) predation, 29.4%; and 3) flooding, 20% (Figure 4). Hatching success per female was 61% however excluding the snow event it rose to 73%. The average fledgling success of chicks that hatched was 32% however average breeding success from egg to fledging was 12.7%. These results were quite a low compared to the highest fledgling and breeding success recorded between 2016-17 and 2017-18 seasons where fledgling success was >60% and breeding success was >50% respectively (Cooper, 2025).

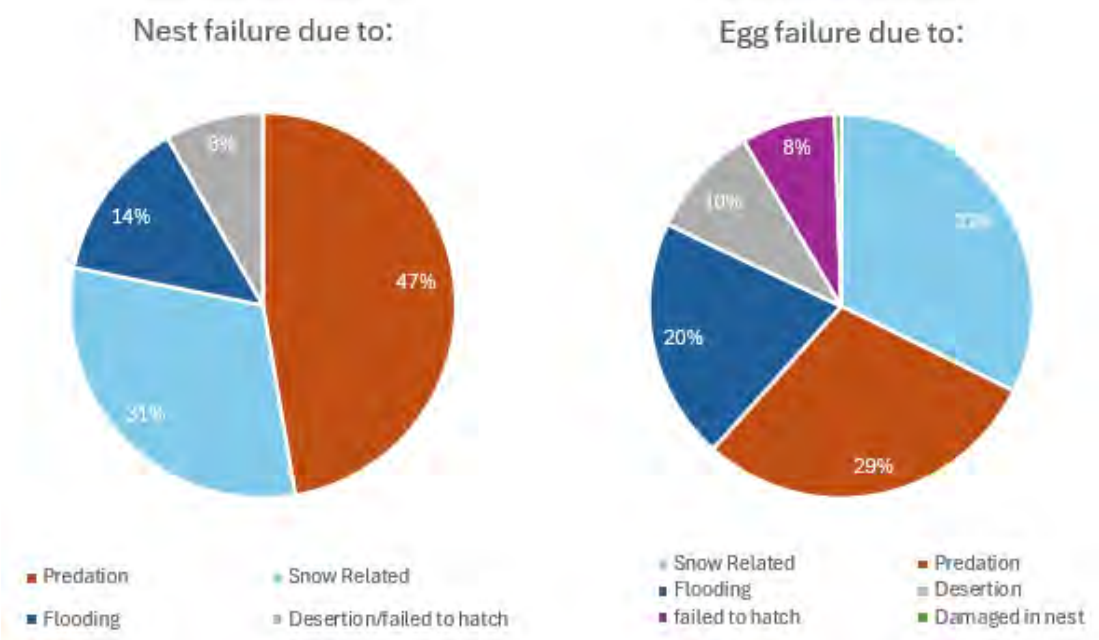


Figure 4. The predominant causes of known nest failures (left) and of individual egg failure (right).

A bird survey of the Tasman River is completed each year as another indicator of the success of the trapping network. The October snow fall event resulted in late reset of the birds in the river, and therefore the survey was conducted later in the season than normal. The results for this season's survey are compared with previous seasons in Table 2.

Table 2. Results of river bird surveys on the Tasman River between 1992 and 2024. Results from the three-year cycle from 1992 to 1994 and the first 11 years following commencement of the Tasman predator control project (2004-2014) are averaged, as is the 5-year period between 2017 and 2021. Results from the current 2024 season are highlighted in bold.

Species, threat ranking*		1992-94 (range)	2004-14 (range)	2017-21 (range)	'22	'23	'24
Banded dotterel/tūturiwhatu,	NV	565 (523-599)	658 (395-858)	721 (568-946)	729	785	**518**
Black stilt/kakī,	NC	2 (1-5)	11 (2-32)	8 (2 -17)	11	23	**17**
Black-backed gull/karoro,	NT	585 (537-609)	240 (95-413)	51 (29 – 64)	51	13	**45**
Black-billed gull/tarāpuka,	NC	13 (7-25)	25 (5-113)	129 (60 – 218)	226	505	**104**
Black-fronted tern/tarapirohe,	NE	121 (79-175)	137 (47-217)	388 (192 -648)	539	598	**353**
Caspian tern/taranui,	NV	2 (2-2)	1 (0-3)	2 (0 – 3)	5	2	**2**
Hybrid stilt,	n/a	4 (1-9)	4 (0-10)	1 (0 – 4)	0	6	**0**
Pied stilt/poaka,	NT	17 (12-21	11 (0-54)	5 (1 – 8)	7	2	**3**
South Island pied oystercatcher/tōrea,	D	60 (46-76)	72 (52-109)	89 (62 – 123)	108	128	**95**
Spurwing plover,	NT	19 (17-23)	20 (5-37)	15 (6 – 25)	16	19	**18**
Swamp harrier/kāhu,	NT	5 (0-11)	3 (1-3)	3 (0 – 9)	3	1	**0**
Waterfowl and shags,	n/a	366 (334-407)	406 (177-842)	286 (154 – 494)	249	269	**299**
White-faced heron/matuku,	NT	2 (1-2)	1 (0-3)	2 (0 – 7)	5	1	**6**
Wrybill/ngutu pare,	NV	133 (120-151)	110 (32-165)	147 (122 – 207)	192	129	**137**

*Threat rankings, from most to least threatened: Nationally Critical (NC), Nationally Endangered (NE), Nationally Vulnerable (NV), Declining (D), Not Threatened (NT).

Upper Ōhau River/Tern Island

In 2009, Project River Recovery initiated the Upper Ōhau Predator Control Project. It aimed to test the effectiveness of intensive localised predator control on improving tern breeding success and increasing colony size (Anderson, 2011). A kill trap and poison bait network were established within a 1km radius around Tern Island, which also benefited from extra predator protection from island effects. This design resulted in improved fledging success and achieving the target of similar or higher fledging rates than the best historic rates for three consecutive years. We report on the 16th year of predator control and outcome monitoring, and the ninth year since the trapping radius was reduced (Turner et al., 2025).

Mammalian predator trapping

The Upper Ōhau trapping network consists of 669 kill traps (Figure 5). Traps are set within a 500m radius around (and on) Tern Island and extended along likely animal movement highways such river and stream margins, and roads and tracks. In the 2024-25 season, trap check frequency was bi-weekly during the breeding season and monthly for the remainder of the year. To avoid black-front tern by-catch, island traps were closed once terns began to nest. Traps were lured with fresh rabbit that was replaced at each trap check. Trapinator Possum traps were lured with aniseed possum dough.

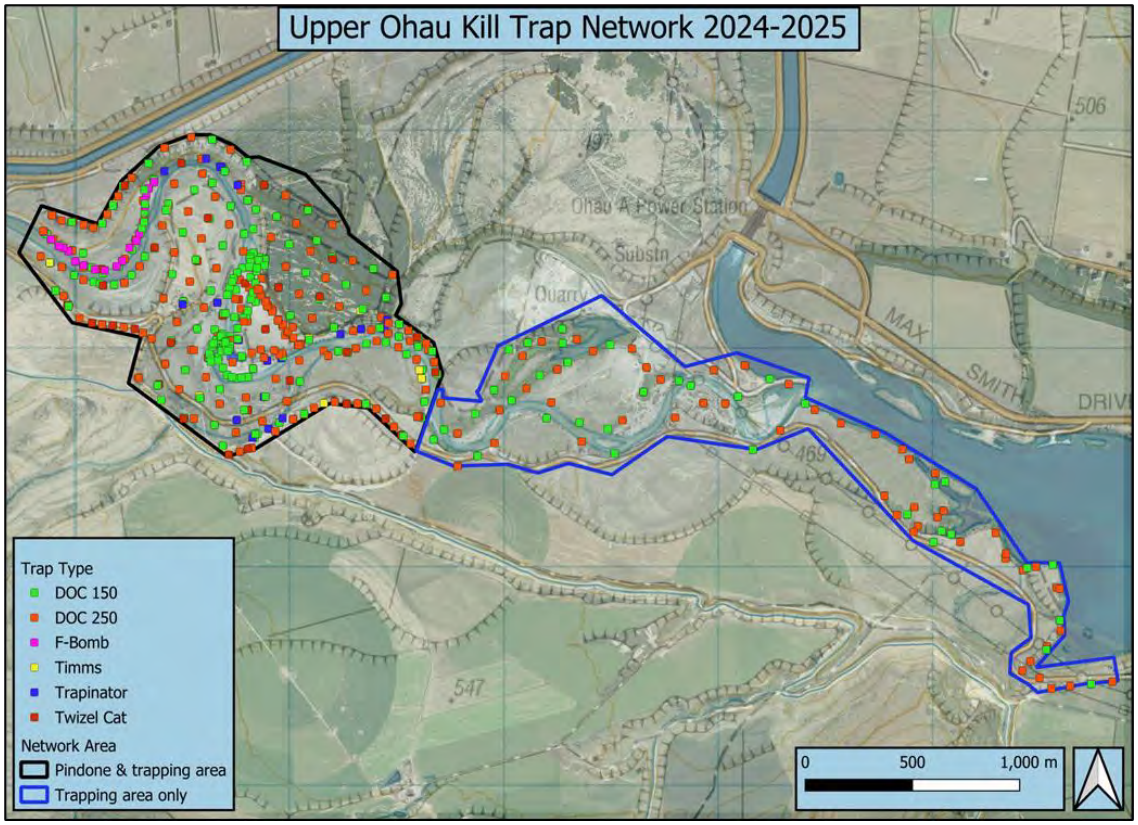


Figure 5. The kill trap network in the Upper Ōhau River in 2024-25 (*n* = 669 traps).

A total of 512 animals were captured in kill traps between 1st of March 2024 and the 28th of February 2025 (Table 3). Of those, 306 were target species (59.8%), and 208 were non-target (40.6%). Hedgehogs were the most captured predator species (92 individuals, 17.9% of total catch), but high numbers of ferrets (65, 12.7%) and feral cats (67, 13%) were also caught this season. Species with lower capture rates this season included possums (25 individuals, 4.9% of total catch), Norway rats (27, 5.3%), stoats (28, 5.5%), mice (11, 2.1%) and weasels (2, 0.4%). Rabbits were the most captured species this season, making up nearly third of all catches with 157 individuals (30.9%; Table 3, Figure 6).

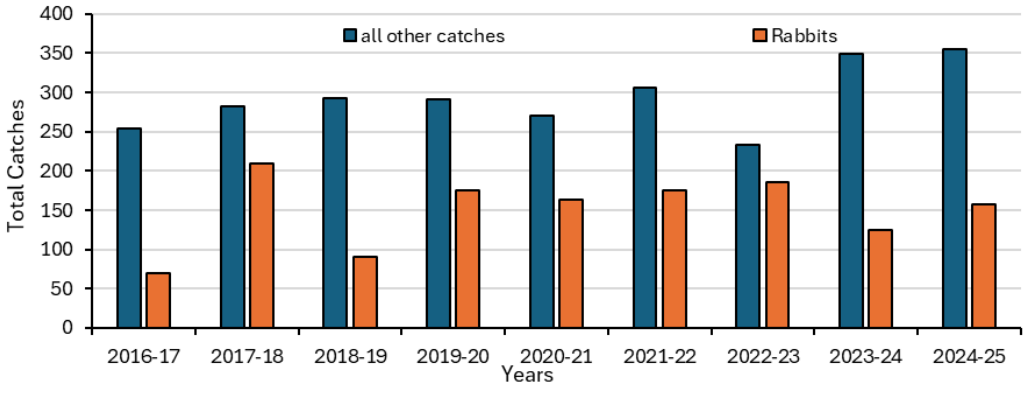


Figure 6. The number of rabbits (orange) versus all other species (blue) caught in the kill trap network in the Upper Ōhau River between 01 March 2016 and 29 Febraury 2025.

Table 3. Summary of total annual kill trap catches within the Upper Ōhau predator trap network from 2010 - 2024. Years begin from 01 March to 28/29 February. Trapping occurred across a was 1-km radius around Tern Island until 2016, when the network was reduced to a 500m radius.

Species	2010-16 (min, max)	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Trap checks		*36*	*17*	*15*	*22*	*24*	*26*	*12*	*23*	*14*
No. Traps		*365*	*365*	*365*	*365*	*371*	*371*	*499*	*499*	*669*
Target species										
Cat	76 - 94	60	65	58	38	36	43	22	59	67
Ferret	101 - 208	65	58	83	74	73	91	79	135	65
Hedgehog	157 - 205	88	106	109	127	99	71	55	48	92
Norway Rat	9 - 33	6	21	27	24	18	17	24	15	27
Possum	7 - 20	14	11	8	14	13	26	18	15	25
Stoat	16 - 29	16	16	4	6	9	11	4	26	28
Weasel	0 - 10	5	5	4	8	2	2	2	7	2
Total	**390 - 512**	**254**	**282**	**293**	**291**	**250**	**260**	**204**	**305**	**306**
Non-target species										
Rabbit	50 - 104	69	210	91	176	163	175	186	125	157
Mouse	20 - 199	-	-	-	-	20	9	8	8	11
Other	8 - 14	-	-	-	-	1	36	21	36	38
Total	**130 - 280**	**69**	**210**	**91**	**176**	**184**	**221**	**215**	**169**	**206**
Grand Total	**540 - 778**	**323**	**492**	**384**	**467**	**413**	**480**	**419**	**474**	**512**

Peak captures for cats occurred in autumn and early in the winter season (Figure 7). Hedgehogs and ferret catches peaked in December and remained high through to March. Rats were caught mostly in February and March, and stoats were caught in relatively low numbers over the year, peaking in March with 14 individuals caught. Weasels were only caught in March.

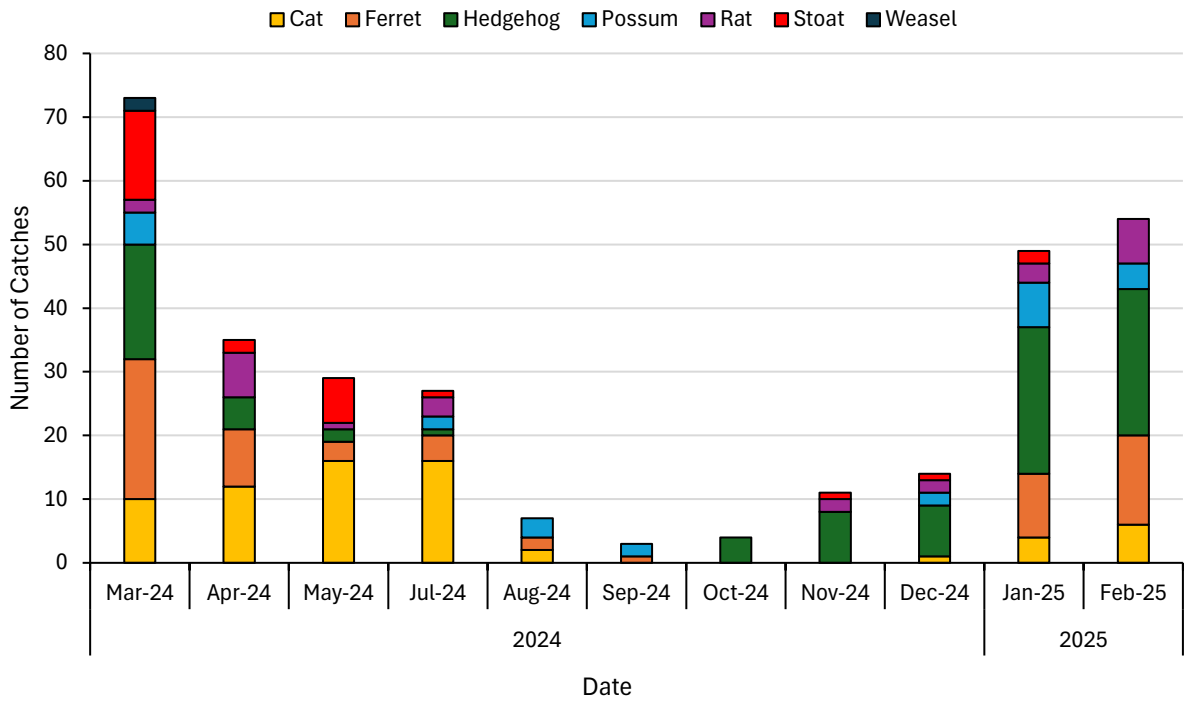


Figure 7. The total number of predators caught in the Upper Ōhau River trap network during the 2024-2025 season.

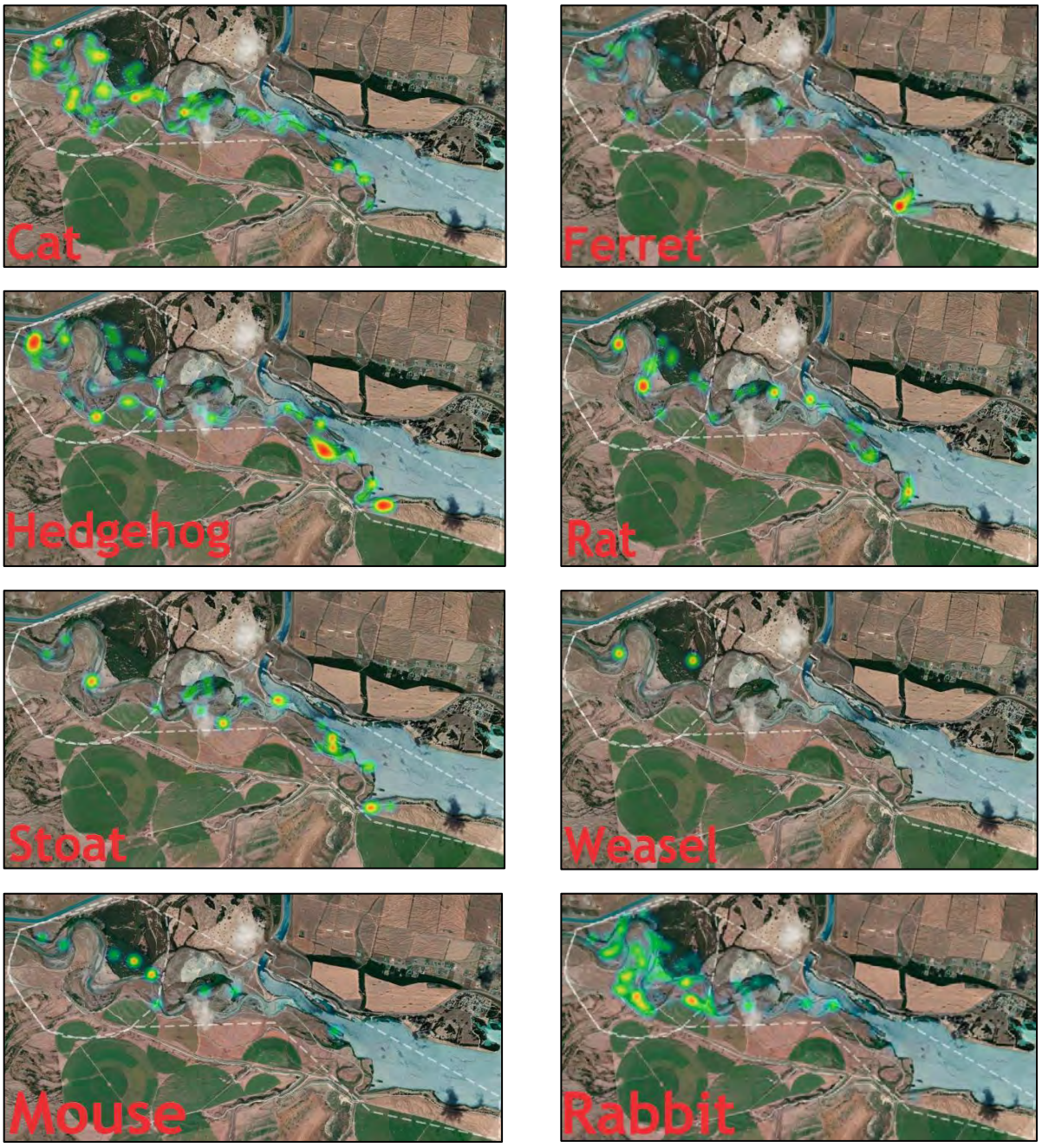
Spatial distribution of animal catches varied significantly per species

Cat, hedgehog and rat catches were spread across most of the network, with hedgehog catches concentrated at the opposing ends of the network (Table 4). Stoat, hedgehog, rat and ferret catches were more frequently caught in areas of swamp or along waterway areas, and many were caught in a trap line that runs adjacent to Lake Ruataniwha. Rats, cats and stoats were all caught near Tern Island and the river terrace on the true left where the terns nested this season. Rabbits along with being the most frequently caught species were also distributed widely across the upper network highlighting the need for additional future control measures.

Pindone to control Norway rats

Pindone bait stations (*n* = 152) were positioned 50m apart along river margins 500m up- and down-stream and around the perimeter of Tern Island (Figure 8). Bait stations consisted of tunnels (50-cm-long) constructed from unslotted black Novacoil® (110-mm diameter) with removable lids for accessing baits. Tunnels were secured on site using lengths of wire and rocks. To minimise the risk of moisture-contact, cereal bait was placed on ‘trays’ (24cm long) inside the tunnels. No bait stations are set in areas where livestock occasionally have access or in toxin-free buffer zones that were established around public roads, waterways and Nohoanga within the area in accordance with DOC’s best practice procedures and toxin consent conditions. Bait stations were set with 300g Pindone Possum and Rat cereal pellets (0.5 g/kg) from 20/08/24 until 27/02/2025. All bait stations were checked weekly during August and September and topped up as until they were closed and cleared on the 27th of February 2025. The laying of baits was done by PRR rangers this season.

Table 4. Heatmaps of species caught in traps on Upper Ōhau Network 2024-2025 (possums excluded due to limited spatial distribution of targeted traps).



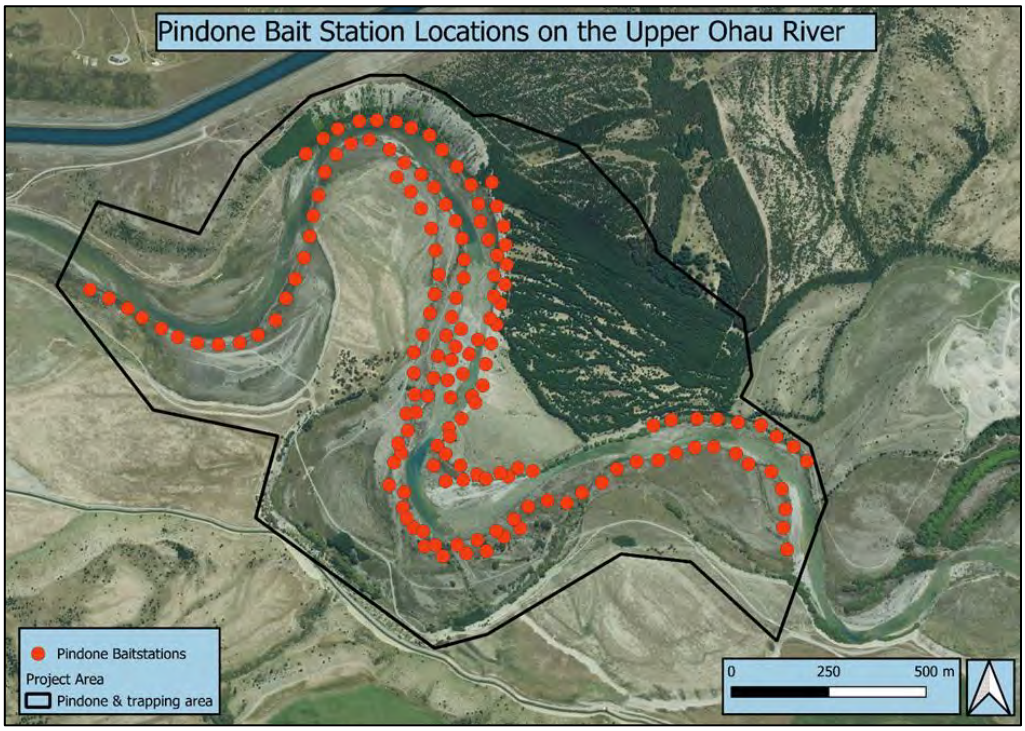


Figure 8. The Upper Ōhau River pindone bait station network in the 2024-25 season.

A total of 103.5 kg of pindone bait was deployed in bait stations during the toxin application, and 85.4 kgs (83.9%) of pindone was consumed from those stations. Pindone bait takes over the season peaked from mid-December to late January (Figure 11). Bait take from stations was highest on the true left of the Ōhau River directly above and below Tern Island (Figure 10). Bait take was also relatively high in the vegetated area near 'South Bend' (Figure 10). No dead animal carcasses were found by rangers over the season that suggested death from pindone. Low rat detection numbers from the two visits of the rodent detection dog team suggest reasonable uptake of Pindone within the local rat population supported by the fact most of the bait laid over the season was consumed (Figure 11). Carcasses were placed for monitoring on the 28th of February 2024 and considered completely biodegraded by the 6th of June 2025. Additional details of the operation can be found within the Carcass Monitoring report for 2024-25 (Keys et al., 2025).

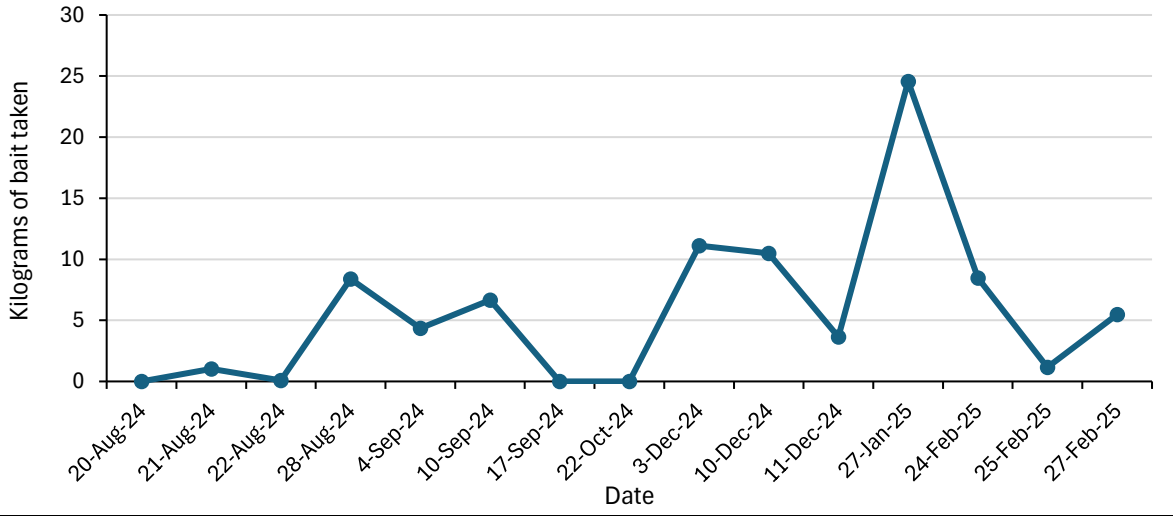


Figure 9. The number of kilograms of Pindone bait taken from bait stations across the 2024-25 season.

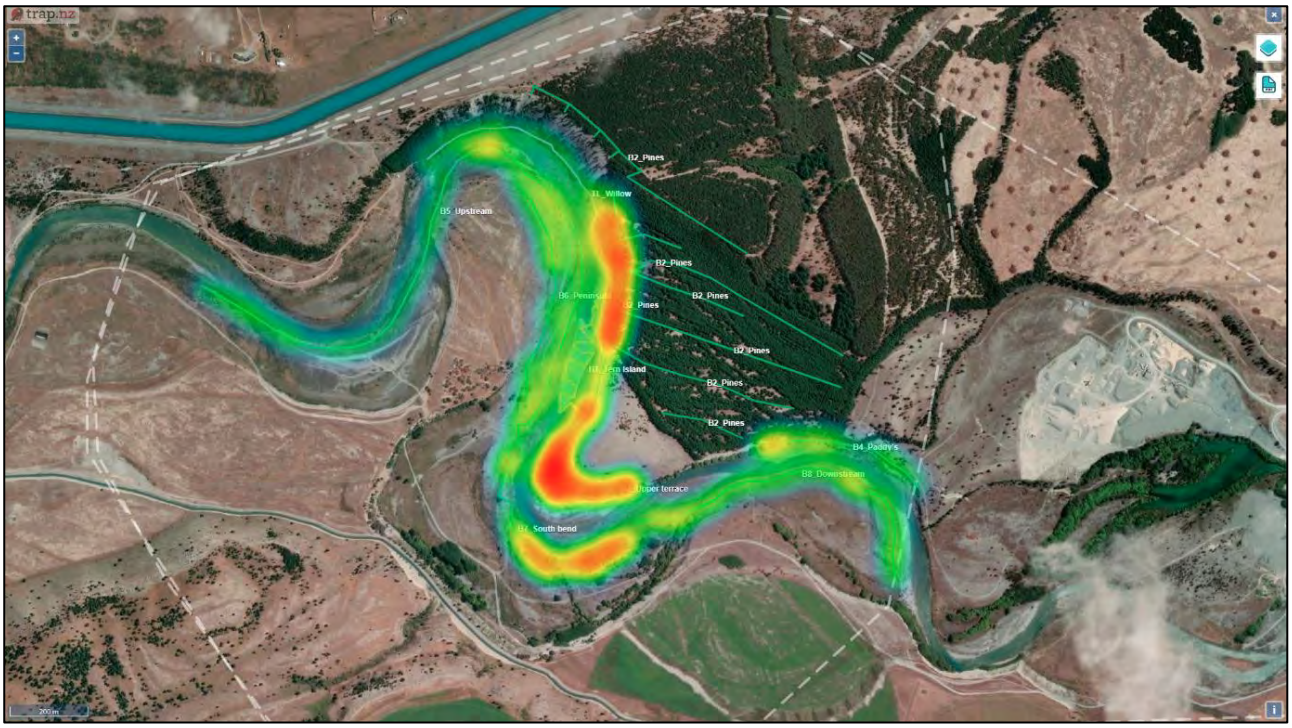


Figure 10. Heatmap showing Pindone bait take throughout bait station network in the upper Ōhau River 2024-25.

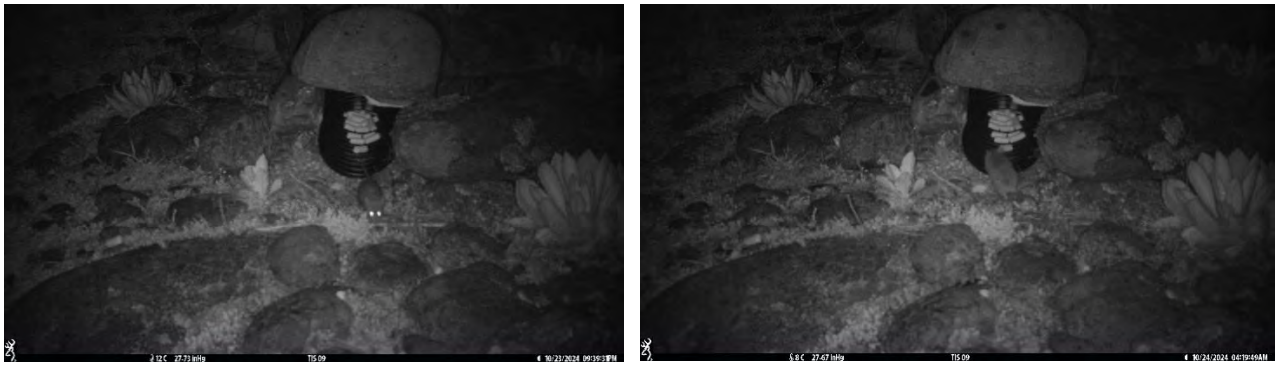


Figure 11. Evidence of rats consuming pindone ceral bait within a baitstation on the Upper Ōhau River, October 2024.

Rodent and mustelid detection using dogs

A rodent dog and handler team from Wildlife Protection Services assisted PRR by searching for rat presence and sign along the Upper Ōhau River and Upper Lake Ruataniwha. The river margins and banks above and below the tern nesting sites were searched for four days in total: Two days in September (12th and 18th) and two days in November (5th and 6th).

The dog detection team searched both sides of the Upper Ōhau River on the September visits. Rat presence in the areas was noted by the handler as being much lower than in previous years. Rodent scent was detected on both sides of Tern Island, but no nest or burrows were detected. Most scent detections, mostly mice, occurred above the island along both sides of the river. A possible rat nest was located on the river bend below the island, but no burrows or animals were found. The handler also noted high rabbit numbers in the area.

The rodent detection dog and handler returned in November and rechecked both sides of the river as well as a section of the Lake Ruataniwha shoreline which has historically held large populations of breeding rat dens. The handler noted very low numbers in the areas checked along the Upper Ōhau River, significantly less than in the September check. Mouse presence was detected on the true left bank close to the island,

but no nests or burrows were found. Two nests were discovered along the true left edge of Lake Ruataniwha, along with live rodent scent. No live individuals were detected.

Night shooting for cats

Department of Conservation night shooting operations killed a total of eight feral cats this season, five in September and three in October (Figure 12*)*. Most cats were shot downstream of Tern Island on the true right side of the river. One cat was shot up stream of Tern Island, on the true left side of the upper Ōhau River Four possums were also shot, two in September and two in October.

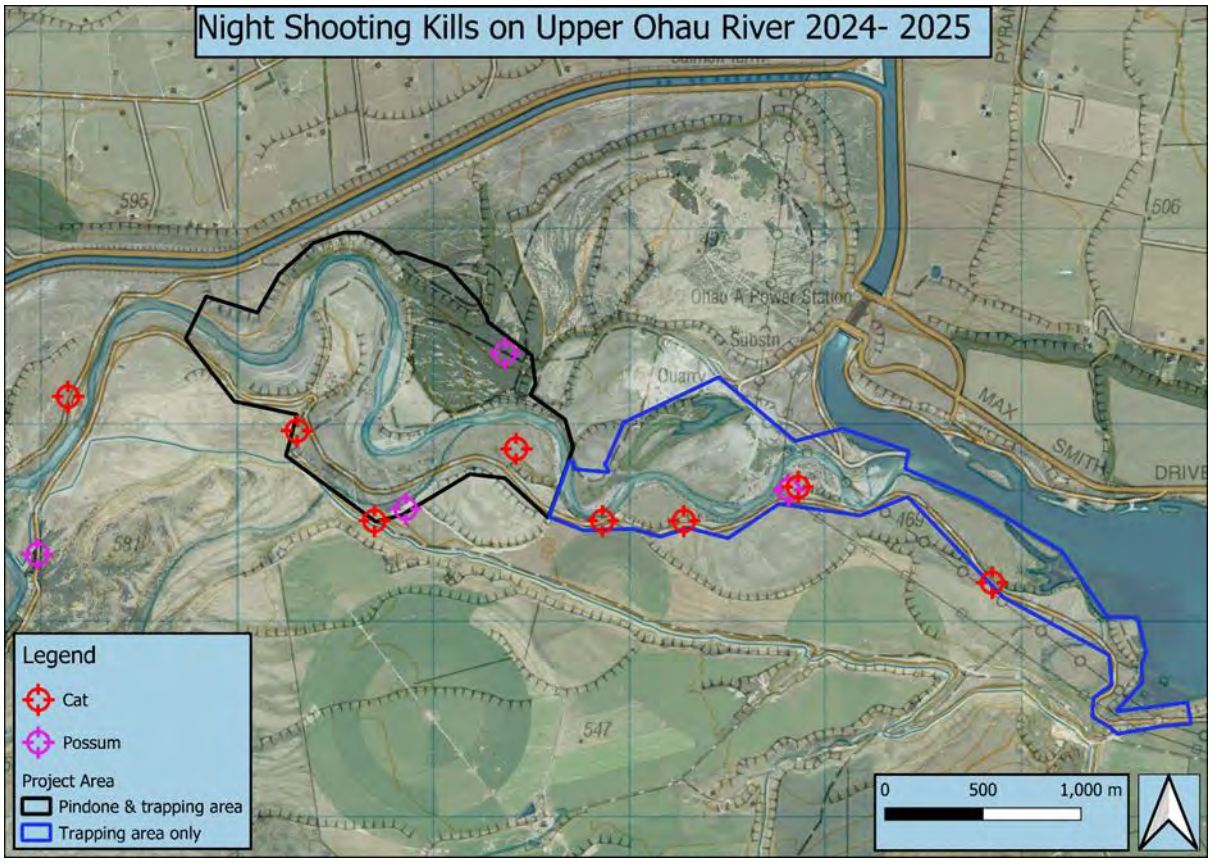


Figure 12. The locations of cat and possums killed during night shooting on Upper Ōhau River 2024-2025 season.

Vegetation control on Tern Island

This season aerial spray work was undertaken to control weeds on Tern Island and a small island located immediately upstream. The operation was completed by Provision on the 24th of April 2024 using a drone to apply 114L herbicide, with the water margins of the island being left as a buffer to stop spray entering the waterway. This is the first time in the project that drones have been used for herbicide application. The spraying was done to kill off vegetation on the island which, if left to grow, covers the river stones and sediments that the terns make their nests amongst. Targeted vegetation species prevalent on the island include Mullein (*Verbascum thapsus*), Viper's bugloss (*Echium vulgare*), Yarrow (*Achillea millefolium*), and Narrow-leafed Plantain (*Plantago lanceolata*).

Outcome monitoring of black-fronted terns/tarapirohe

This season marked the ninth year of nest monitoring on Tern Island since the trapping network was scaled down in 2016, and the 21st year overall (Turner et al., 2025). Two PRR rangers monitored nests weekly, tracking each nest's status from egg-laying to hatching or failure. Trail cameras were installed on nests with eggs throughout the season (*n* = 57 nests). These cameras captured the hatching rate and the causes of failed nests (e.g., abandonment, predation, etc.). Colony size was estimated by doubling the maximum number of active nests recorded per weekly nest check.

This season, chicks successfully fledged for the fifth consecutive year despite two main setbacks of heavy snow in October and interactions with black-billed gulls. The breeding season had a promising start with an estimated peak colony size of 718 adult terns (359 active nests) on October 23 (Figure 13). However, 3-days later a heavy snow (20-30cm) buried all the nests on the island. This resulted in mass nest failure as incubation was interrupted for >24 hours. Fortunately, many adults renested on the island and on the upper terrace on the true left (Figure 14). After the snow, the colony peaked at about half the size of the pre-snow colony at 382 adults with 191 active nests (Figure 13). The upper terrace became the larger colony with 60% of the total nests.

Nest cameras captured outcomes for 46 of 57 unique nests. The main causes of nest failure captured by cameras were snow, abandonment, exposure, and interactions with black-billed gulls. Up to 20 black-billed gulls were present on the island before the snow, with one nesting attempt. They excluded terns from nesting in one area of the island and harassed terns bringing in food. After the snow, the gulls scavenged abandoned nests and depredated active nests. In one case terns were divebombed by the encroaching gulls for up to 10 minutes. Black-billed gull predation of eggs and chicks was captured on camera on two occasions (Figure 15). The black-bill gull colony had increased to 150 individuals by January 2025.

Overall hatching success was 39% of nests with *known outcomes* (*n* = 629). The main cause of nest failure was the snow which accounted for 70% (*n* = 310) of all nest failures (Figure 14). Trail cameras captured parent birds attempting to incubating eggs as the snow accumulated around them leaving only their head or beak exposed, but the snow ultimately forced abandonment (Figure 15). Egg success was 98%, which is consistent with previous years. This suggests egg fertility was normal. We observed at least 324 hatched chicks, and 74 dead chicks were seen during nest checks, mostly at the downy chick phase.

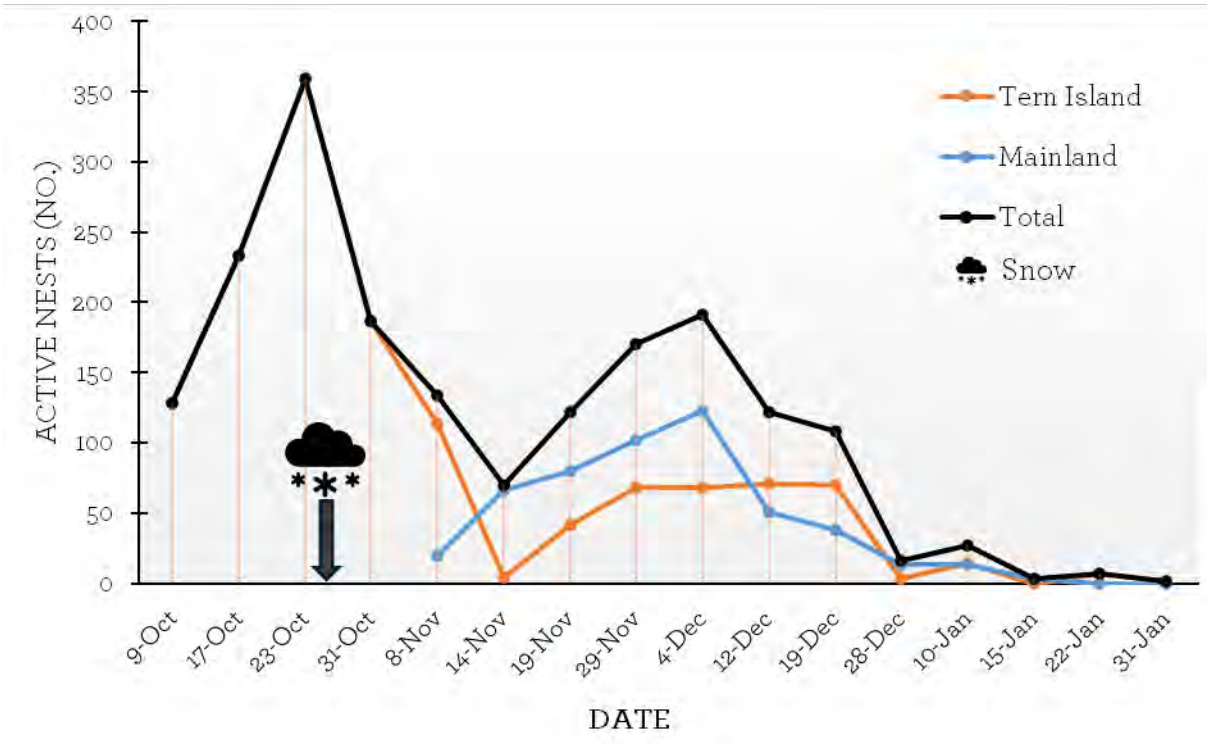


Figure 13. Total count of active black-fronted tern nests in the Upper Ōhau River over the 2024-25 Season. A snow event on October 23, 2024, resulted in terns renesting on the island and on the mainland both sides of the river, mostly upper terrace on the true right.

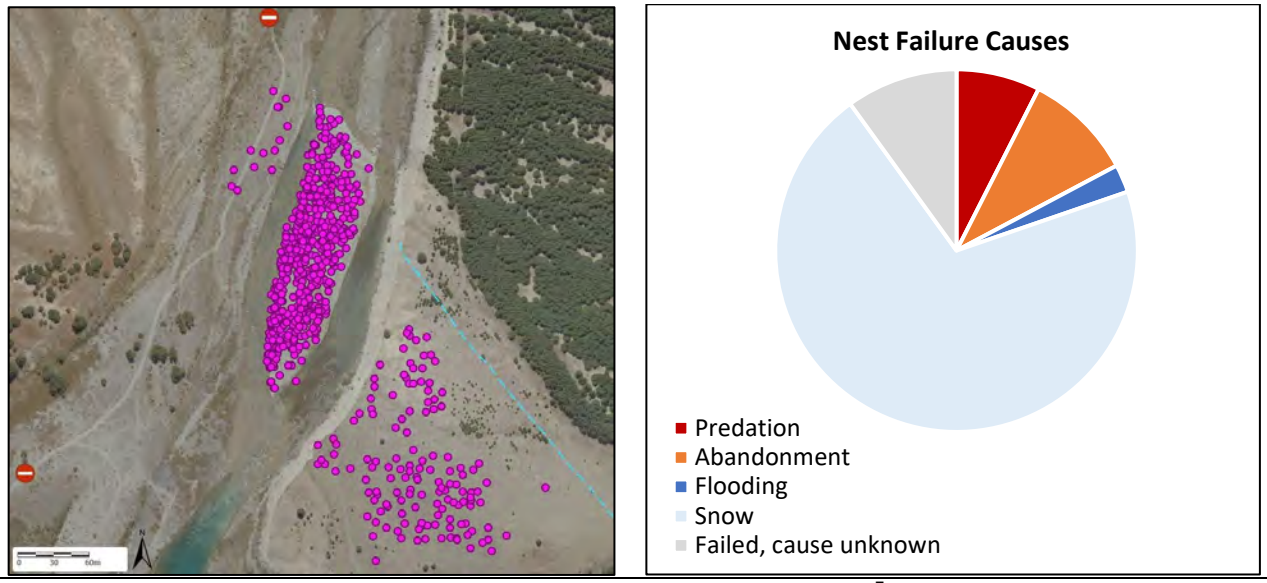


Figure 14. The location of all black-fronted tern nests monitored in the upper Ōhau River for the 2024-25 season (left). Management included a road closure on the true right and a temporary rabbit fence installed to create a barrier for terrestrial predators to protect the nests laid on the upper terrace true left of tern island. Causes of nest failures of black-fronted terns in the overall in the Upper Ōhau River (right).

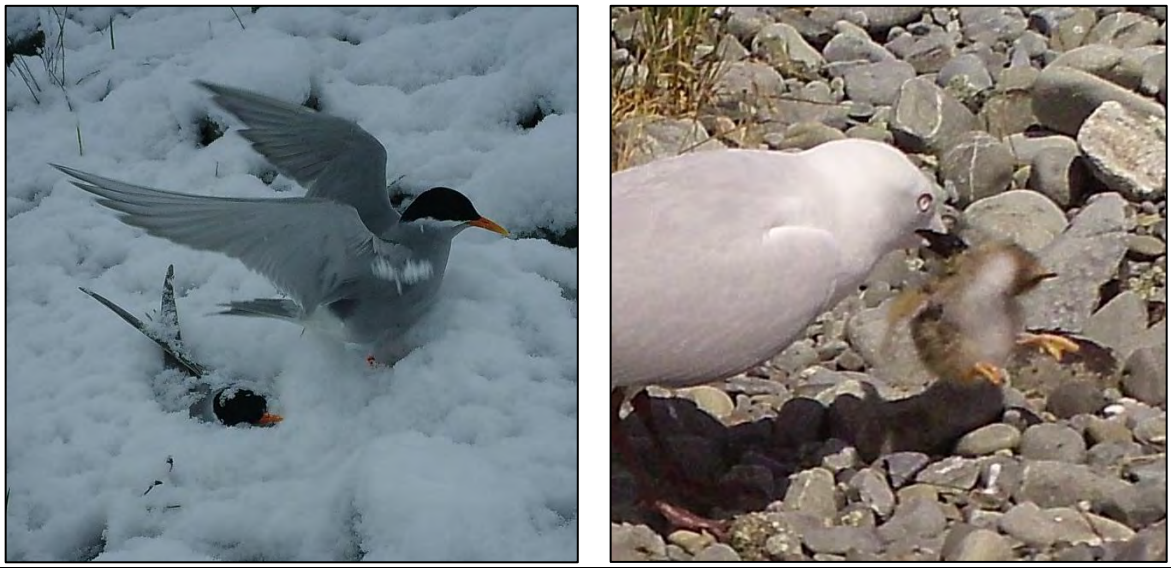


Figure 15. Snow event impact on black-fronted terns incubating eggs on Tern Island, Upper Ōhau River, October 26, 2024 (left). Black-billed gull depredation of a chick on Tern Island December 22, 2024 (right).

Outcome monitoring of lakes skinks

Lakes skinks (*Oligosoma* aff. *chloronoton* "West Otago") are a Nationally Vulnerable taxonomically indeterminate, large-bodied lizard that inhabit the area from the Eyre Mountains in the south to the Pūkaki River in the north (Hitchmough et al., 2021). They were discovered along scree terraces in the Upper Ōhau River in 2013. Population monitoring began in 2016-17 to determine whether the population benefits from predator control established for protection of a nearby black-fronted tern colony. It was intended that the monitoring of the lakes skink population at this site would reveal whether predator control benefits this species. However, the lakes skink population now occurs on the perimeter of the predator control grid (rather than near the core) following the downscaling of the Upper Ōhau River trapping network.

The population is monitored each season using an established line of 41 pitfall traps (spaced approximately 5m apart). Traps were opened during optimal weather windows (>12˚C, no rain) and checked daily for seven days. All captured skinks were given a temporary identification mark using a non-toxic permanent marker which allowed for easy identification of recaptured individuals. We recorded morphological measurements

and photographs of key features for each skink. Current research is being undertaken to determine whether natural markings can be used to identify individuals over multiple years.

This year was the ninth year of lakes skink population monitoring (Bourke et al., 2025). Over the first seven days a total of 31 lakes skink were captured, 25 unique individuals and 6 recaptures of 4 individuals (Figure 16). This season the survey was extended for 14 days by PHD student Scott Bourke. During the extension days another 11 unique individuals were captured, and 10 recaptured of 8 individuals. Total lakes skink captures were 52, 36 unique individuals and 16 recaptures of 9 individuals.

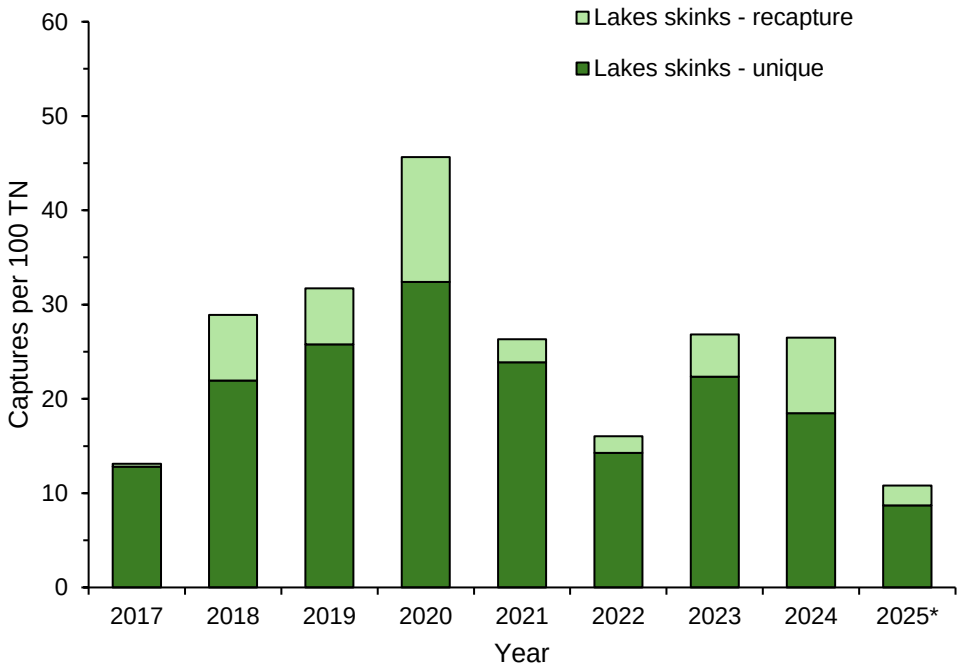


Figure 16. Annual pitfall trap lizard captures per 100 trap nights (TN) at the Upper Ōhau site of unique lakes skinks (*dark green*), recaptures (*light green*) from 2017 to 2025. Total monitoring days were 7 days except for 2017 (8 days) and 2023 (6 days).

Hedgehog Projects

Hedgehogs are a key predator of ground-nesting birds, lizards, and invertebrates on and adjacent to braided rivers in Te Manahuna/the Mackenzie Basin. Learning to effectively control hedgehogs will benefit many of the populations of threatened species that PRR and other national projects are working to protect.

Evaluating rabbit-proof fences as barriers to hedgehog reinvasion

Since 2023, Project River Recovery has been trialling hedgehog exclusion at four rabbit-fenced sites (>40 ha) within Tū Te Rakiwhānoa Drylands Public Conservation Land (PCL). This work tests the efficacy of using standard rabbit-proof fences to prevent hedgehogs from reinvading areas after they have been removed. Additionally, four smaller (~1-hectare) rabbit-fenced sites are being monitored to assess hedgehog presence/absence and track invertebrate community responses in the continued absence of hedgehogs. The trial aims to determine whether rabbit-proof fences can:

1. Utilise existing infrastructure to exclude hedgehogs and prevent reinvasion.
2. Be modified at low cost to achieve hedgehog exclusion.
3. Inform the design of new, cost-effective fencing to protect high-priority native species populations from hedgehogs and potentially other mammalian predators.

Progress and findings include:

- A total of 74 hedgehogs has been removed from the larger fenced sites to date.
- No hedgehogs have been detected within the smaller (~1-hectare) fenced sites.
- Hedgehogs continue to be detected at Lower Ruataniwha Wetlands, Spring Creek, and Twin Peaks. These detections are associated with:
    - Fence damage or deterioration (i.e., rusted sections at Ruataniwha Wetlands).
    - Design inadequacies (i.e., insufficient skirting width at Spring Creek).
    - Dig-under events, likely caused by rabbits (i.e., holes found at Twin Peaks).

Last season, a hedgehog was observed through a thermal imager squeezing under the Spring Creek fence, confirming the skirting was not adequately secured. Fence upgrades have since been completed at both Spring Creek and Ruataniwha Wetlands.

Preliminary results suggest that intact, well-maintained rabbit-proof fences can effectively exclude hedgehogs (Goodman 2025a). A formal report summarising trial outcomes and providing recommendations for the use of rabbit-proof fencing as a hedgehog control tool will be prepared later this season.

Development and field trial of hedgehog-specific toxin

Project River Recovery partnered with the Department of Conservation's Threatened Species Research Workstream (TSRW) and Manaaki Whenua – Landcare Research to continue the development of a hedgehog-specific toxin for broadscale application (Goodman, T. 2025b). Manaaki Whenua - Landcare Research successfully completed pen trials using a 2.5% alphachloralose paste combined with 10% fish oil to lethally target captive hedgehogs. Following this success, the PRR team led field trials in Te Manahuna/the Mackenzie Basin in late March and early April 2025. We selected three grassland sites—two treatment and one non-treatment—and established 100-hectare bait grids at each site, deploying bait at a density of one per hectare. We fitted 60 hedgehogs with VHF transmitters (20 per site) and marked an additional 11 hedgehogs with heat shrink tubing due to their small size. We installed:

- Ten independent monitoring cameras per site, spaced at 100 m intervals across each bait grid, and operated them during all phases of the trial (pre-monitoring, prefeed, toxin, and post-monitoring).
- Twenty-five additional cameras per site at bait stations to record animal interactions with both non-toxic and toxic baits.

We laid toxic bait daily from 25 March to 2 April 2025 and removed all bait from the sites on 2 April.

We recorded the deaths of 24 out of 26 VHF-tagged hedgehogs detected within the toxin grids at Mount Mary and Ōhau Downs (Goodman 2025b). We also recovered four of five carcasses from heat shrink-marked hedgehogs detected inside the grids. We retrieved two non-target carcasses—a ferret and a mouse—during the toxin period and observed no sick non-target animals. We removed all carcasses and collected liver samples for freezing and later analysis.

We observed bait uptake patterns as follows:

- Toxic bait uptake dropped below 5% by day four at both treatment sites.
- Non-toxic bait uptake rose above 75% on the same day and reached 100% by day seven.

We reviewed footage from monitoring line cameras and observed:

- A >93% decline in hedgehog detections at treatment sites between the prefeed and toxin periods.
- A >100% increase in hedgehog detections at the non-treatment site over the same timeframe.

We found no evidence that kāhu (Australasian harrier, *Circus approximans*) consumed the toxic paste. There were no kāhu detections on the bait station cameras during the prefeed or toxin periods at either site. Monitoring line cameras recorded kāhu feeding on rabbit meat bait at all three sites before, during, and after the toxin period. The consistency and green colour of the paste, as well as the placement of each bait under grass, were designed to discourage kāhu from recognising it as a food source.

Lake Alexandrina Southern Crested Grebe/ pūteketeke

Lake Alexandrina is known as a stronghold for the Nationally Vulnerable Southern crested grebe/pūteketeke (*Podiceps cristatus*; Figure 17). Pūteketeke generally create floating, or semi-floating nests made of aquatic weeds and sticks from around the lake's edge. Since the 20/21 season, a large proportion of the population of pūteketeke on Lake Alexandrina has nested in a short 50 metre section of stream at the lake's outlet. With active nests sometimes only one metre apart in this small area, territorial disputes and breeding displays occur in abundance.

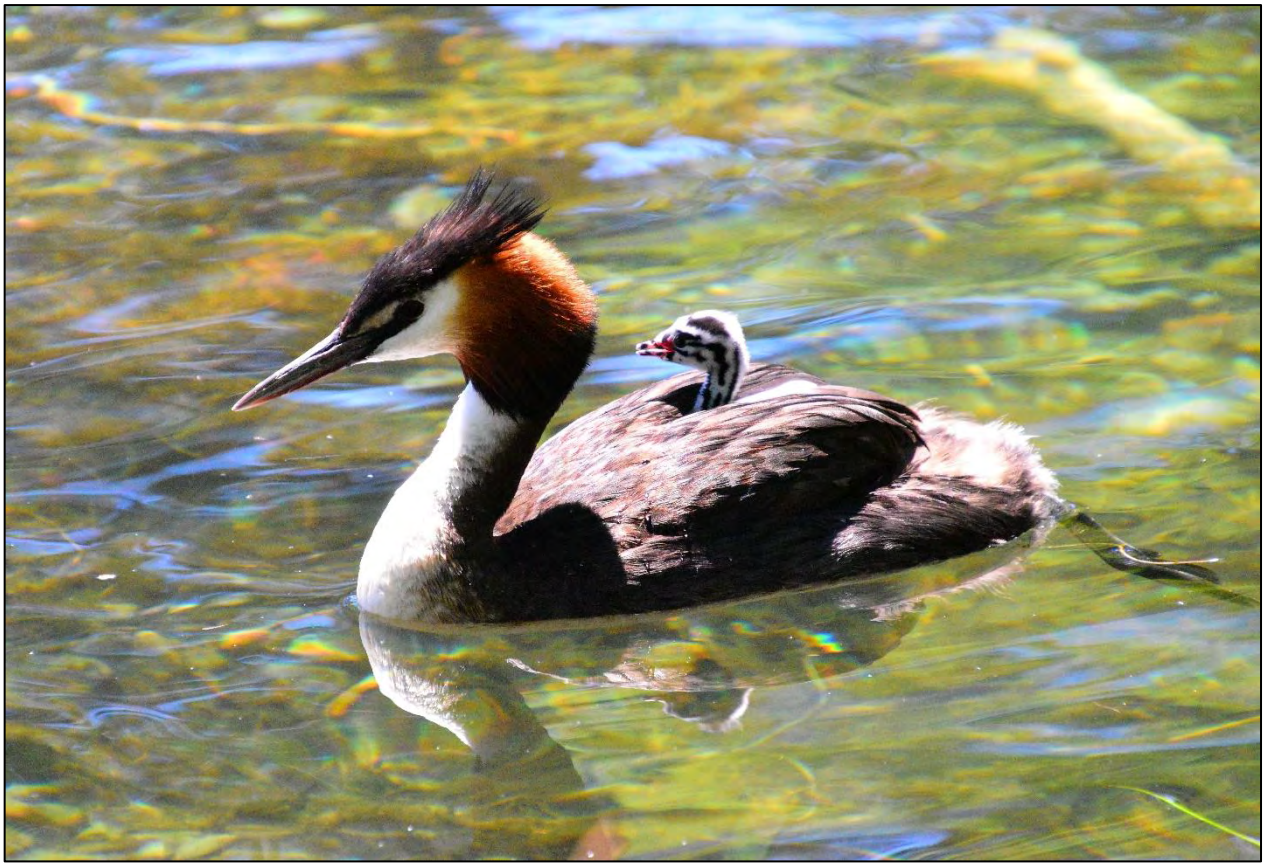


Figure 17. Crested Grebe/ pūteketeke parent with young chick.

PRR continues to supply bait to the Lake Alexandrina Conservation Trust volunteer trapping group, who service traps around the site. Due to concerns about people's behaviour disturbing the birds, PRR put up a permanent fence around the area to keep people at a suitable distance. Feedback from local people was that this helped manage behaviour.

Last year following concerns raised by bach owners about high lake levels and flooding due to willow root build-up in the outlet creek, the Mackenzie District Council engaged a contractor to remove several large willows and dig out their root systems once the pūteketeke breeding season had finished. Some Carex was planted in the affected area to try to create some suitable habitat for pūteketeke to nest in, however the nesting site is now much more exposed to the sun due to the removal of the trees. The work also lowered the water level in the lake and enables pūteketeke to swim under the small footbridge without having to dive. However, the modifications in the streambed have changed the current in the short section to the road bridge and while there were still plenty of nesting attempts, a significant number of them appeared to be abandoned and fledging success appeared to be lower than previous seasons. The maximum numbers of nests counted was 44 compared to 49 and 66 in the most recent two seasons.

Robust grasshopper predator exclusion fence

In 2018, the Te Manahuna Aoraki Project installed a mammal exclusion fence around a portion of the robust grasshopper habitat at Patersons Terrace with the aim of understanding whether excluding mammalian predators results in a population increase relative to unprotected populations (Murray 2022). Although the fence is short, no mammals have been recorded to breech the fence since it was installed. Project River Recovery has supported outcome monitoring for the trial since it began. After observing a large increase in skink numbers inside the fence in 2019-20, DOC Science Advisor, Dr Tara Murray advised evicting skinks from the fenced area to further reduce predation pressure on the robust grasshopper. The first eviction occurred in 2020-21 and removed 348 skinks from inside the fence (Lettink 2021). However, skink neonates were small enough to move relatively freely through the fence's mesh, and skinks re-established inside the fenced area. To prevent skink reinvasion, PRR installed a polyethylene membrane around the bottom third of the fence (Figure 18).

Figure 18. The predator exclusion fence that protects a portion of robust grasshopper habitat at Patersons Terrace showing the polythene membrane installed around the bottom third of the fence in early 2024.

This season, PRR continued work to evict lizards from within the fenced area. Thirty-nine lizards were removed from inside the fence using Artificial Cover Objects (ACOs) across 7 days between 10th October and 8th November (Figure 19). A further 32 lizards were captured and removed using pitfall trapping over 7 days between 6 November 2024 and 31 January 2025. All lizards that were evicted were marked with a small dot before release to identify whether they re-entered the fenced area. No marked lizards were detected inside the fence. Since evictions began in 2020, a total of 552 lizards had been removed from within the fence. The next step for this project is a translocation of robust grasshoppers inside the fence.

Figure 19. Jamie checking for lizards under an ACO (left) and marking a lizard before releasing it outside of the fenced area (right).

5. Objective 3: Increase public awareness of braided rivers and associated wetlands within a changing environment

This year, Project River Recovery gave several presentations. Dean reflected on the past 35 years of the project with a talk at the annual Braided Rivers conference run by BRAID. The talk was well received and attracted conversation with other braided river practitioners. Jen and Sam also gave a talk to the Twizel community during Conservation Week. The talk focussed on “all the biodiversity you can’t see” and drew attention to the highly cryptic species that inhabit the braided rivers, and the enormity of insect and plant diversity that can be found in these apparently barren looking ecosystems.

PRR continued to support University of Otago Wildlife Management students by introducing them to braided river management and giving them practical exercises. The students visited in April 2025 and PRR ran sessions including trapping for introduced mammalian predators and competitive exercise tracking hedgehogs using VHF transceivers (Figure 20). PRR received exceptionally positive feedback from the students.

Figure 20. Tom guides students to a tracked hedgehog (left) and Felix demonstrates how to use the suite of traps utilised by PRR (right).

A fish celebration day was held in the Corbies Creek lowland longjaw galaxias barrier protected site. PRR staff assisted ECan and consultancy staff with a freshwater education day for members of the Ahuriri Catchment group. A few Gee minnow traps were set out in the stream the night before and one was set below the barrier as a comparison. Numerous trout were caught in the lower trap and lowland longjaws and upland bullies in all the traps above the barrier.

Throughout the year, PRR met with various stakeholders including Fish and Game, ECan, various private landholders and volunteer groups and braided river managers from other districts.

PRR’s information resources continue to be updated and reprinted as necessary and distributed to schools, and other community groups, with the braided river multi-species poster, stickers and braided river field guide still proving to be popular. Copies of the book *Rivers Rare*, written by Neville Peat in 2016 to celebrate the first 25 years of operation for PRR is regularly used as an advocacy tool by giving it to appropriate visitors and associates.

Two new information signs were installed in the Upper Ōhau River, which is a popular fishing river, but also a significant nesting site for black-fronted terns and banded dotterels and has a population of minute grasshoppers. The signs are positioned to inform river users of the biodiversity values present as they approach key areas (Figure 21).

Figure 21. Two information signs installed in the Upper Ōhau River to inform river users of the biodiversity values at the site.

6. Objective 4: Gain ecosystem knowledge in upper Waitaki rivers and wetlands through research and monitoring

Braided river bird surveys

PRR seeks to better understand river bird distributions in the Upper Waitaki Basin, and how they are changing over time. In the early 1990s, PRR completed surveys of all the upper Waitaki rivers over three years. PRR sequentially re-surveys the rivers over three consecutive years on a rotational basis to record trends of threatened as well as more common braided river birds.

PRR uses standardised walk-through methodology to record counts of native (e.g., banded dotterels, wrybill) and non-native (e.g., Canadian geese) braided river birds and record GPS locations of nesting colonies and rare birds (e.g., black-fronted terns, kakī/black stilts). The standardised methodology allows the data collected to be compared directly with historic surveys, as well as other nation-wide braided river bird surveys.

This year, the Upper and Lower Ōhau Rivers and the Pūkaki River was surveyed for the second consecutive year (Table 5). The Cass River was scheduled for a survey but could not be accessed during the appropriate time for the survey due to lambing and a late snow fall that raised the river levels.

Table 5. Braided river bird species recorded in the current round of walkthrough surveys of the Pūkaki and Upper and Lower Ōhau Rivers compared to the most recent previous round of surveys. Data shows the minimum and maximum number of birds observed during the previous survey rounds.

Species, threat ranking*		Pūkaki River			Upper Ōhau River			Lower Ōhau River		
		1992-94	2023	2024	2008 /10	2023	2024	2008-10	2023	2024
Australasian bittern	NV	0	0	0	0-1	0	0	0	0	1
Australasian crested grebe/pūteketeke	NV	0	0	0	0-1	0	0	0	0	0
Australasian shoveler/kuruwhengi	NT	0	0	0	0	0	0	0-9	0	2
Banded dotterel/tūturiwhatu	NV	28-60	18	21	0	7	13	51-91	14	10
Black-billed gull/tarāpuka	NC	0-2	0	0	0	0	13	0-3	0	0
Black-fronted tern/tarapirohe	NE	3-43	41	10	124-125	474	206	40-108	9	15
Black shag/kawau	NU	0-2	0	0	1-2	0	2	1-3	0	2
Black stilt/kakī	NC	0	0	0	0	0	0	0	0	0
Black swan/kakīānau	NT	0	0	2	0	0	0	0	0	0
Canada goose	I/N	5-20	20	15	0-2	0	3	46-86	51	148
Caspian tern/taranui	NV	0	0	0	0-1	1	0	0-5	0	0
Grey duck/pārera	NC	0-2	0	0	0-2	0	0	0-9	0	0
Grey teal/tētē	NT	0	0	0	0	0	0	0	0	0
Hybrid stilt	n/a	0-1	1	0	0	0	0	0	0	0
Indeterminate duck species	n/a	0	2	0	0-4	5	0	0-25	4	0
Little shag/kawau paka	NT	0	0	0	0-2	0	0	0-8	0	2
Mallard/rakiraki	I/N	0-2	0	2	0-16	0	17	1-10	14	23
New Zealand scaup/ pāpango	NT	0	0	0	0	0	4	0	0	0

Paradise shelduck/pūtakitaki	NT	0-3	7	3	2	16	9	6-8	0	10
Pied stilt/poaka	NT	3-11	1	8	0	0	0	11-16	0	0
South Island pied oystercatcher/tōrea	D	3-4	7	2	0	0	0	3-11	1	1
Southern black-backed gull/karoro	NT	6-50	0	2	1-3	1	16	3-32	3	6
Spur-winged plover	NT	0-5	2	3	0	4	0	1-11	2	3
Swamp harrier/kāhu	NT	1-19	0	1	1-4	2	1	1-5	0	3
White-faced heron/matuku	NT	0-3	2	0	0-1	3	2	5-13	6	12
Wrybill/ngutu pare	NV	0-1	0	1	0	0	0	0	0	0
Total number of species		**16**	**10**	**12**	**13**	**9**	**11**	**18**	**10**	**12**

Black-fronted tern / tarapirohe natal site fidelity study

Project River Recovery seeks to better understand natal site fidelity of black-fronted terns. This is important for understanding whether investment in predator control at one colony can contribute to an increase in total population size for the species. If protected colonies are productive, but their offspring nest elsewhere in unprotected rivers and fail to produce offspring of their own, that indicates that more widespread predator control is required to benefit the species. PRR began flag banding birds in the Tasman (blue flag/white text), Cass (black flag/white text) and Ōhau Rivers (green flags/white text) in 2018, and continues to band and observe for banded birds at these and other sites. In the 2024-25 season, PRR rangers flag banded 65 chicks in total, 62 in the upper Ōhau River and three in the Tasman River (Figure 22).

Figure 22. Sam and Jamie put a band on a black-fronted tern chick at Tern Island.

Robust grasshopper population and distribution study

The Nationally Endangered robust grasshopper (*Sigaus robustus*) is a braided river specialist, found only on the gravels of riverbeds and their associated terraces in the Mackenzie Basin (White 1994). This large, flightless grasshopper camouflages among the rocks of the braided rivers. It is a generalist herbivore that feeds on lichens, mosses, and other leafy vegetation of the braided riverbeds. PRR seeks to understand the population dynamics of the threatened braided river invertebrate, and how its distribution has changed over time.

In 2017, PRR began annually monitoring population density at six key populations of robust grasshopper located in the Ōhau River, Forks (incorporating the gravel pits and military land), Patersons Terrace, Pūkaki River, Snowy River, and Takapō River. Population density monitoring occurs each spring and focusses on monitoring the breeding population, recording only large adult females (Cooper & Schori 2025).

Low staff capacity during the spring period meant that annual population monitoring was reduced significantly this season. Only Patersons Terrace, Snowy River and Forks site were surveyed, and each site was only surveyed twice rather than the standard survey effort of three replicates. Overall, the population density surveys yielded high densities of adult female robust grasshoppers this season, and Snowy River yielded the highest mean density on record (2.3 ± 0.2 adult female grasshopper per km; Figure 24).

During the distribution surveys this year, the lower Takapō River was resurveyed with higher monitoring effort. The lower Takapō River was surveyed in 2021 and 2022, but no grasshoppers were found in the southern-most section, “section 4”. This section was resurveyed this year with higher observer effort. Five robust grasshoppers were found within section 4 confirming that the robust grasshopper continues to occupy the lower reaches of the Takapō River above the gorge. Distribution surveys were conducted at Fork Stream for the first time this year. Grasshoppers were observed through the Fork Stream and along the road confirming that the current distribution closely matches that of historic observations (Figure 23).

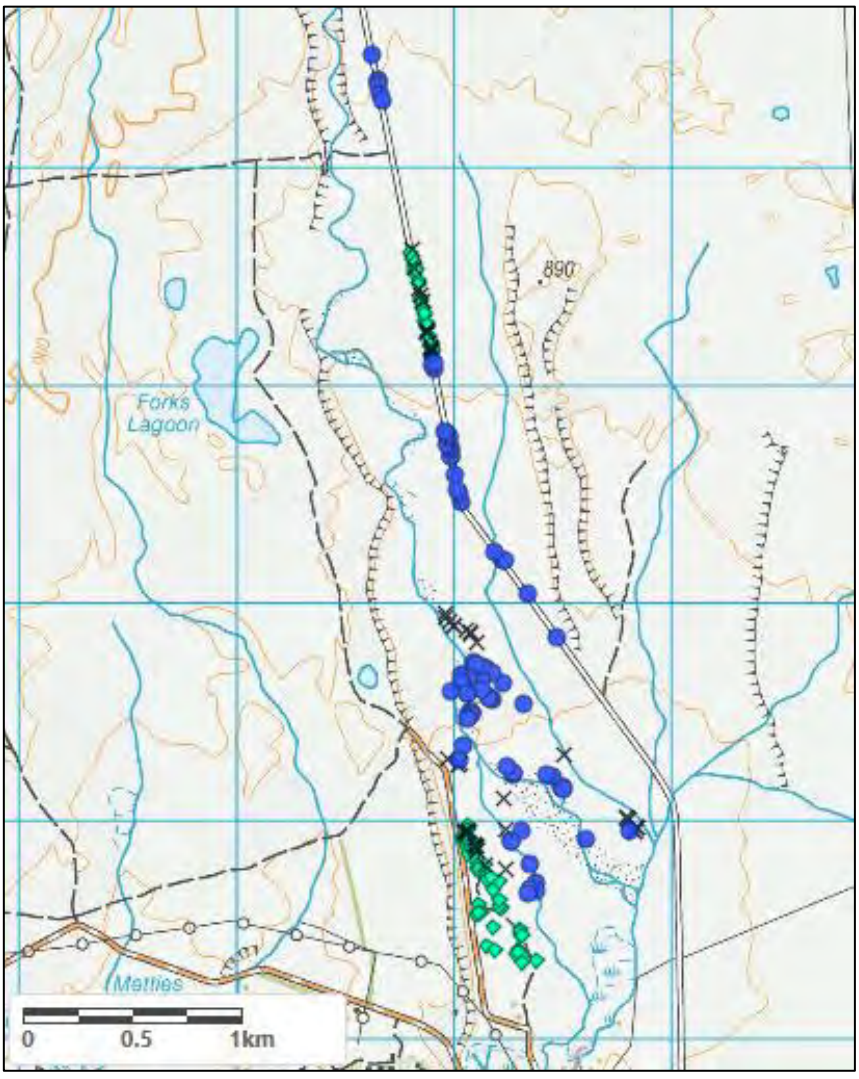


Figure 23. Observations of *Sigaus robustus* (blue dots) at the Forks River, road and gravel pits compared to the 2023 population survey (green diamonds) and historic observations (black crosses).

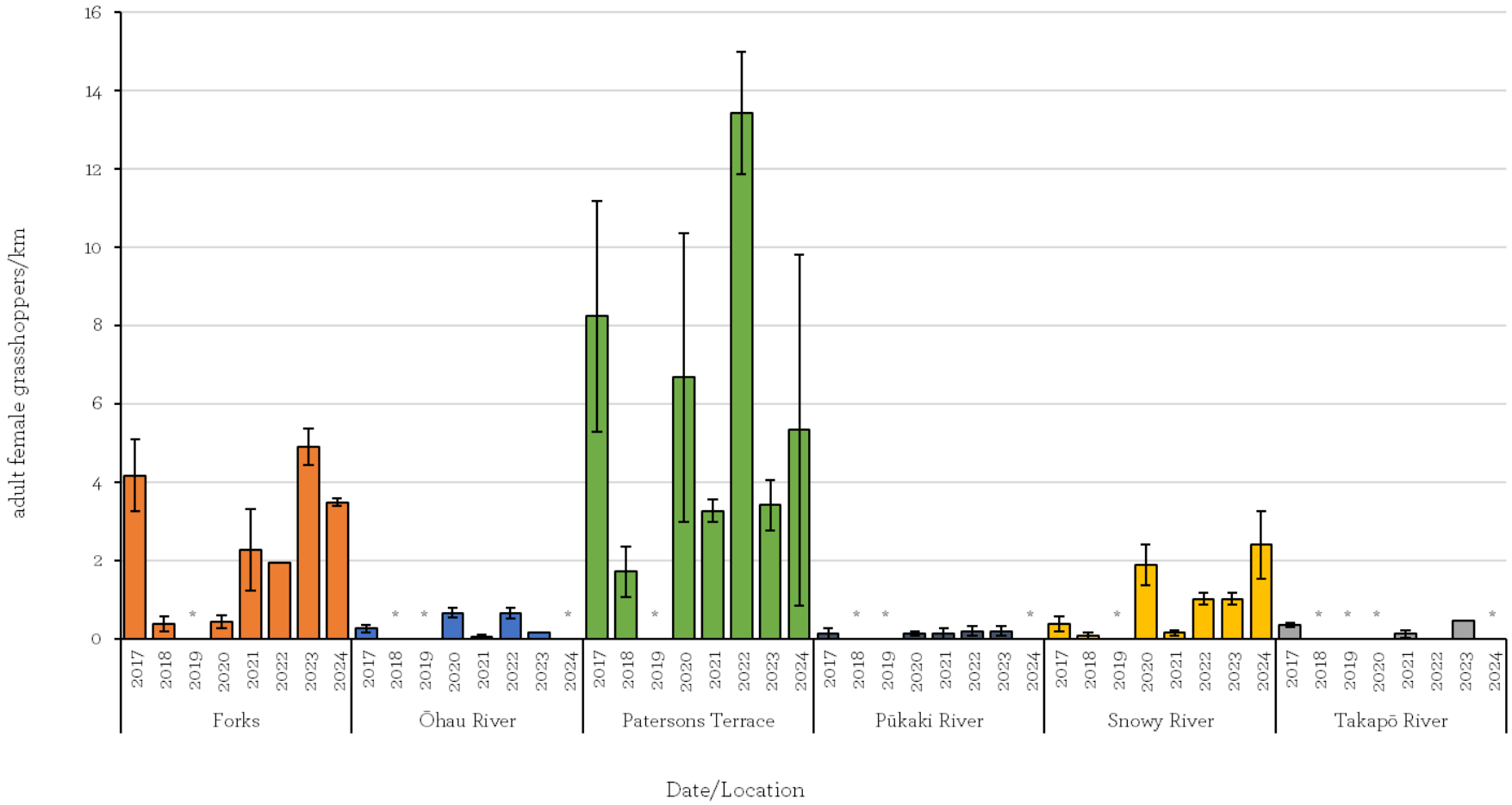


Figure 24. The mean (± SE) number of adult female Sigaus robustus grasshoppers per kilometre (km) during surveys of six populations from 2017 to 2024. Data from 2017 sourced from van Eyndhoven and Murray 2017. Data from 2018 sourced from surveys conducted by Murray and McIver (DOCCM-6704288). Forks includes data from Forks Gravel Pits and Forks Military Road. *Indicates that site was not monitored in that year.

Freshwater fish

Objectives 4 and 5 include undertaking freshwater fish distributional surveys, monitoring fish populations and protecting fish species by appropriate installation and maintenance of trout barriers and removal of invasive fish species. There are three threatened fish species in the Te Manahuna Twizel district, and they are the focus of all work carried out (Nelson et al., 2024). The non-migratory, “pencil” (so-called due to their uniformly slim bodies) galaxiid species are *Galaxias* aff. *cobitinis* “Waitaki”, the Nationally Endangered lowland longjaw galaxias (hereafter referred to as ‘lowland longjaw’); *Galaxias macronasus*, the Nationally Vulnerable bignose galaxias (referred to as ‘bignose’); and *Galaxias* aff. *prognathus* “Waitaki”, the Nationally Vulnerable upland longjaw galaxias (referred to as ‘upland longjaw’; Dunn et al., 2017).

Other species found in the district include *Anguilla dieffenbachii* (longfin eel, Declining), *Galaxias brevipinnis* (kōaro, Declining), *Galaxias vulgaris* (Canterbury galaxias, Declining), *Galaxias paucispondylus* (alpine galaxias, Naturally Uncommon) and the Not Threatened *Gobiomorphus breviceps* (upland bully) and *Gobiomorphus cotidianus* (common bully). Galaxiids, particularly the “pencil” species and juveniles, are prey of introduced species such as trout. PRR continues to maintain nine built trout barriers and monitor two natural waterfall barriers to protect threatened native fish species across the basin. In March 2025, a new barrier was installed on the eastern side of Waterwheel Wetland (Figure 25) to complement a similar structure installed on the western side of the wetland in 2021. An application is being made to translocate some lowland longjaws from Fraser Stream into this newly protected site to create an additional population.

Figure 25. New trout barrier in Waterwheel Wetland.

Annual monitoring shows that lowland longjaw and bignose galaxias continue to thrive in the Fraser spring-fed stream. This year one rainbow trout and seven kōaro were removed. Prior to the monitoring, a large aluminium addition was made to the kōaro lip of the trout barrier so it will be interesting to see if that makes a difference to kōaro incursions.

The Corbies Creek site had a large flood through it in 2022. In March 2024 lower than expected numbers of lowland longjaw galaxias were found when a full survey was undertaken and two brown trout (330 and 98mm) were subsequently removed. A full survey of the site above the barrier in April 2025 showed significant population recovery with 69 lowland longjaw caught.

PRR staff assisted with Te Manahuna Aoraki's ongoing Runanga Project efforts to remove trout from above a barrier on the true left of Fork Stream. Staff helped during two separate weeks in December and January, and then another two days in March. A total of 553 brown trout and 235 rainbow trout were removed during these operations.

Maniototo peppercress conservation requirements study

Maniototo peppercress (*Lepidium solandri*) is a perennial dioecious herb that occurs in various dryland sites throughout the Mackenzie basin. However, all populations are small, and less than 1,000 plants are known in the wild. The species is therefore assessed as Nationally Critical (de Lange et al. 2024). Maniototo peppercress occurs in a range of often poorly vegetated habitats. In the Mackenzie basin it is found in dryland environments and dried riverbeds. Various pressures have contributed to the species decline, but changes in land-use management is the most significant. Cultivation and irrigation have altered vast areas of habitat and introduced edge effects where these areas border less modified drylands. Weed incursion and animal browsing are also pressures that impact all sites where Maniototo peppercress occurs. Various workplans are in place to trial different management regimes to enhance known populations and mitigate threats. Management trials include the propagation in a nursery near Twizel (Figure 26), seed germination trials, caging plants against browsing, and planting of specimens from the nursery to nearby populations. This work occurs alongside monitoring of five wild populations within the Mackenzie.

Between 2021 and 2023, 29 of the 57 potted Maniototo peppercress plants in the nursery died. However, most had already flowered and produced abundant seed before dying. As the nursery's primary purpose is seed collection—and seedlings readily germinate in the potted gravel—this turnover is not a concern.

Figure 26. The nursery in Twizel with potted Maniototo peppercress plants.

Cage trials, to identify 1) whether browsing of the whole plant or the flowering plant is occurring, and 2) if caging plants results in a higher rate of survival and/or more prolific flowering and seeding, were set up across four sites in 2024: Takapō Scientific Reserve, Pūkaki River terrace, Maryburn outwash plain and Ruataniwha Wetlands (Figure 27). While more time is needed to detect trends in stem count and flowering between caged and uncaged plants, early observations from the first year show higher rates of browsing and plant mortality in uncaged plots compared to caged ones. (Figure 28).

Figure 27. A male Maniototo peppercress in flower (left), and a Maniototo peppercress protected from browsing by a cage (right). Photos: T Hooker.

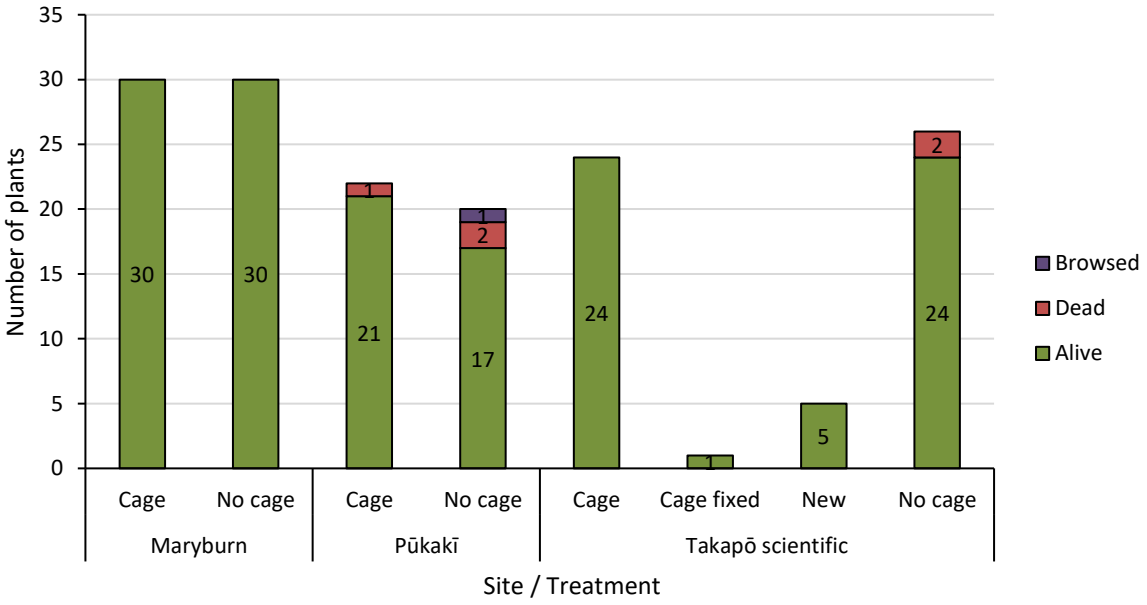


Figure 28. The outcome (browsed, dead, alive) of Maniototo peppercress individuals after the first year of cage trials at Maryburn Conservation Area, Pūkaki River terrace and Takapō Scientific Reserve.

Monitoring of wild populations of Maniototo Peppercress occurs in plots at five sites: Takapō Military Reserve, Takapō Scientific Reserve, Maryburn Conservation Area, Pūkaki River terrace, and Ruataniwha Wetlands. The Maryburn plot supports the densest population of Maniototo peppercress, with a maximum population of 19 individuals in 2023. Since monitoring began in 2020, three out of the five sites have had a population increase: Maryburn increased from 12 plants in 2020 to 19 in 2024, Takapō Scientific Reserve increased from 10 plants to 13 in 2024, and Pūkaki River Terrace from 5

plants to 7. Populations at Ruataniwha Wetlands (5 plants in 2020, 3 in 2024) and Takapō Military Reserve (10 plants in 2020, 7 in 2024) have declined since monitoring began (Figure 29).

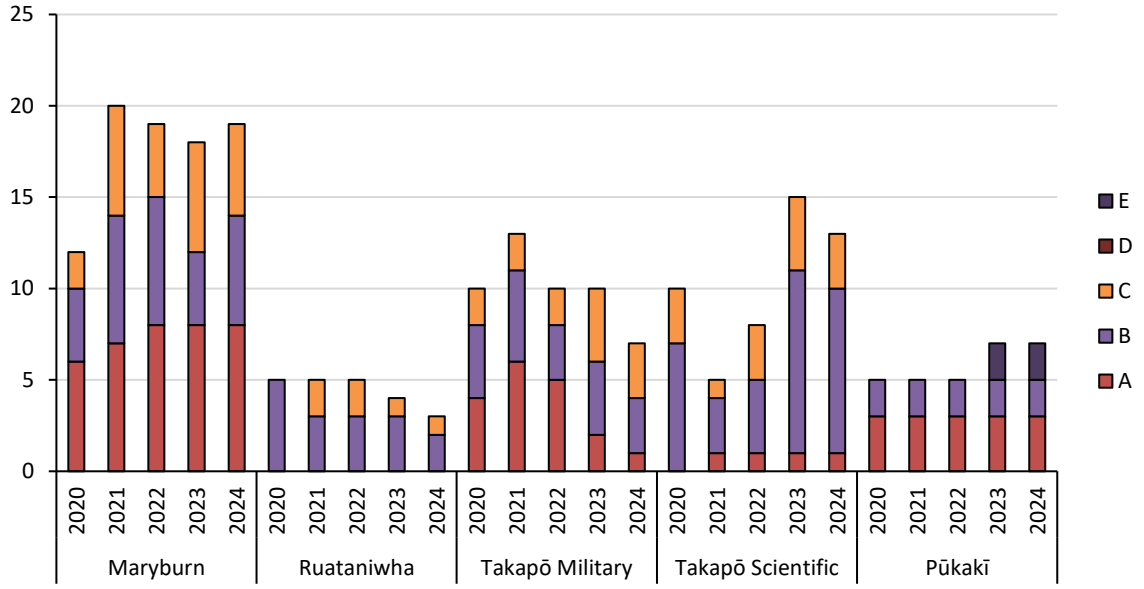


Figure 29. The number of Maniototo peppercress individuals recorded in monitoring rows (A-E) each year (2020 – 2024) at five populations in the Mackenzie Basin (Maryburn Conservation Area, Ruataniwha Wetlands Takapō Military Reserve, Takapō Scientific Reserve, Pūkaki River terrace).

Simons Pass lizards

Project River Recovery conducted monitoring of threatened lizards at Simons Pass Conservation Area and the Pūkaki-Takapō River Confluence Dryland Recovery Area, repeating baseline surveys from 2019 (Turner, 2025a). Over a 10-day period (Feb 20–Mar 2), rangers deployed 192 pitfall traps across both sites. At Simons Pass, 138 Mackenzie skinks were captured (128 unique and 10 recaptures), with a capture rate more than double that of 2019 (13.3 vs. 5.31 individuals per 100 trap days) and estimated densities ranging from 300–1,125 skinks/ha (**Figure 30**). At the Pūkaki-Takapō site, 115 scree skinks were captured (49 unique and 66 recaptures), with a capture rate of 5.2 individuals per 100 trap days and densities of 20–70 skinks/ha. Six Mackenzie skinks were also recorded at this site. Tail tips from ten scree skinks were collected for a University of Otago research project investigating species complexes. Habitat management completed this season included wilding pine removal along the terrace lizard habitat.

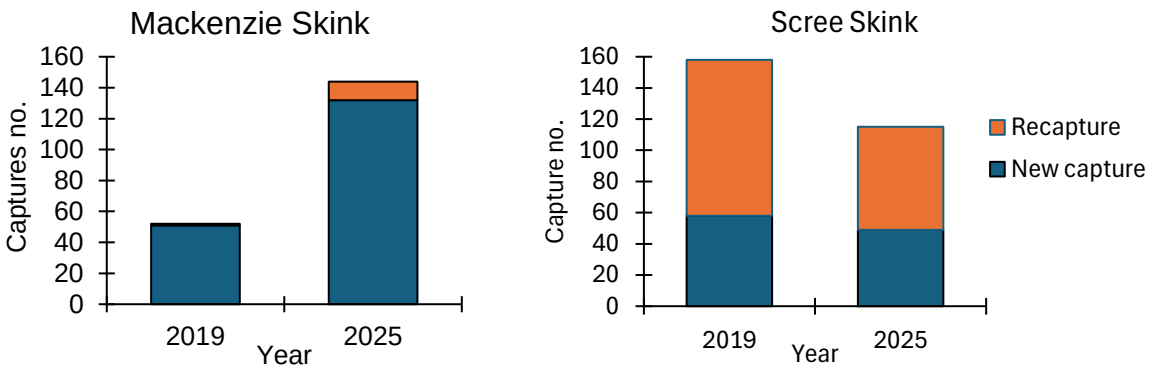


Figure 30. Total lizard captures during a 10-day pitfall survey at Simons Pass for Mackenzie skinks at (*left*) and at Takapō Flats for Scree skinks (*right*). February in 2019 and 2025 (repeat survey).

Bog Roy lizards

Nearly 25 years ago, suitable lizard habitat was identified at the Bog Roy Conservation Area (CA), Lake Benmore (Harding, 2003). In 2018, six islands in Lake Benmore were surveyed for lizards as historic records of scree skinks (Nationally Vulnerable) were recorded on Black Jacks Island, which is near Bog Roy CA (Hitchmough et al., 2021). Given the proximity to historic scree skink site and available habitat, this year we surveyed Bog Roy CA to assess the lizard values present and to improve our understanding of threatened lizard distributions and potential management sites in the Mackenzie Basin (Turner, 2025b). Visual searches were carried out by two observers over two days (January 20–21, 2025) in fine weather. We confirmed the presence of three individual lakes skinks (*Oligosoma aff. chloronoton "West Otago"*), another Nationally Vulnerable species, on the western side of the peninsula.

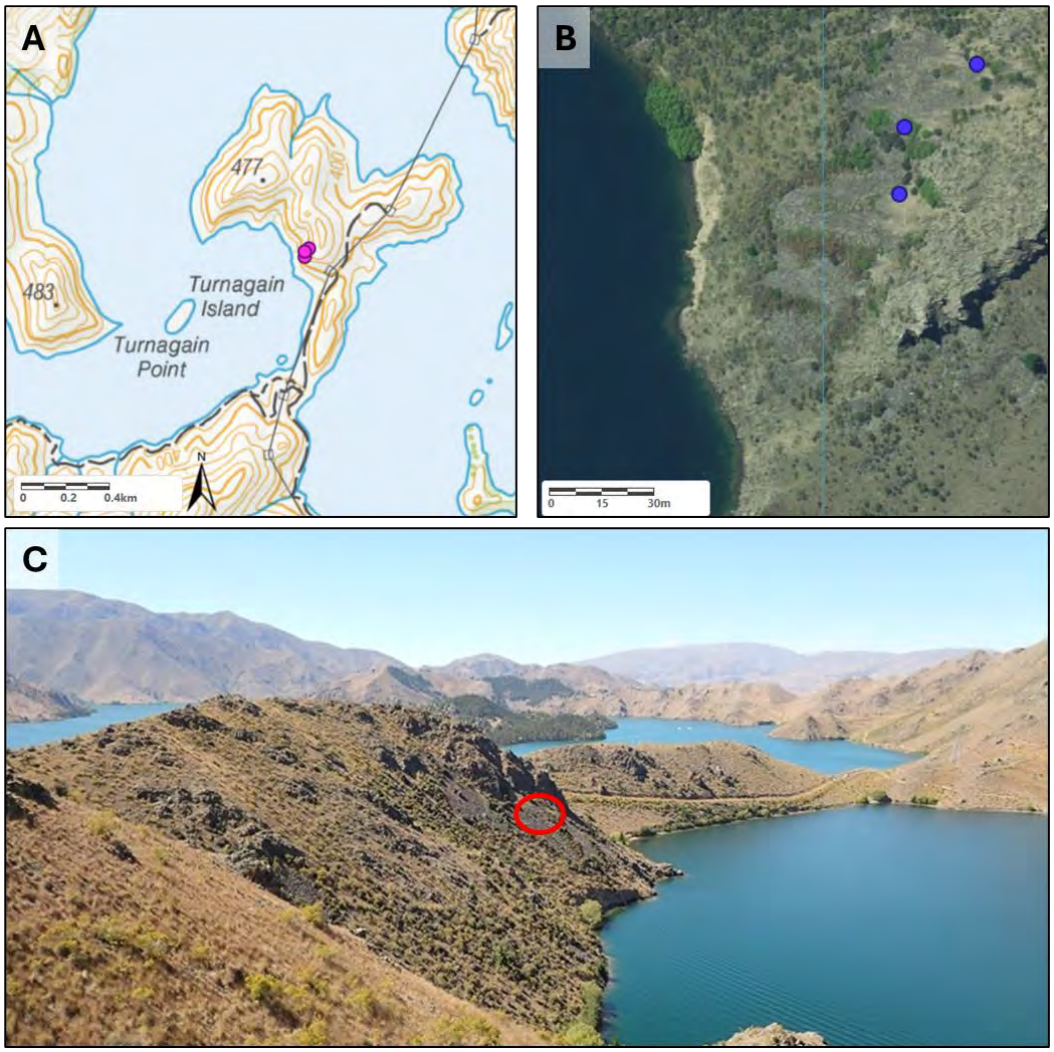


Figure 31. A) Map showing location of Lakes Skinks found at Bog Roy Conservation Area during a visual search by Project River Recovery, January 20-21, 2025. B) Satellite view of locations in the scree habitat. C) Photo: southeast view of sighting locations (red circle) from a distance. Photo: Sam Turner, Project River Recovery.

7. Objective 5: Protect and manage upper Waitaki wetlands

The Ruataniwha wetlands (Figure 32) were created in the 1990s to compensate for wetland habitat lost during the development of the hydro-electric scheme. The intention was to provide habitat for kakī (*Himantopus novaezelandiae)* and other wetland bird species. However, management now focuses on benefiting several Nationally Threatened ephemeral plants (Gale & Hooker 2025). Ephemeral plants are specialised to live in habitats that cycle through being dry and inundated with water, such as the margins of ponds where water levels fluctuate throughout the year. Water levels within the Ruataniwha ponds are controlled by PRR who adjust the height of weirs at the outlet of each pond to manipulate its water level, thus manipulating the duration of dry and wet events at pond margins.

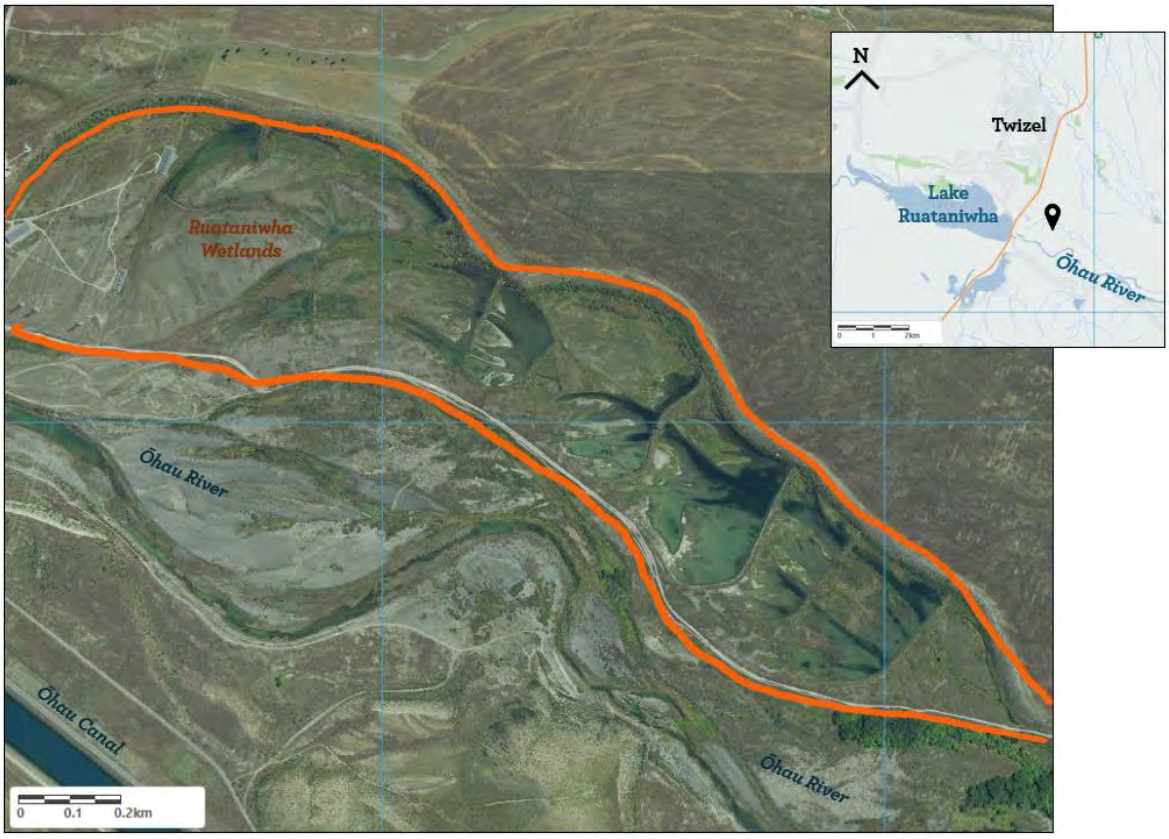


Figure 32. Satellite imagery of the Ruataniwha Wetlands (circled in orange) located adjacent to the lower Ōhau River.

Project River Recovery continues to build understanding of how the water level manipulations impact the occurrence and abundance of native ephemeral species by monitoring percentage cover of vegetative species at a high, mid and low water levels during March of each year. This season was the fifth season of monitoring. So far, monitoring indicates that ephemeral zones that are flooded for the longest period have the greatest availability of substrate, lowest densities of non-native species, and the highest cover of native turf species (Gale & Hooker 2025).

8. Objective 6: Facilitate research by various agencies, including universities, to improve our understanding of the ecology of braided river systems

In 2016, PRR determined that funding should be used to facilitate research by University students or other researchers to investigate relevant management issues associated with braided rivers and wetlands or the ecology of their fauna and flora. Research topics that are selected for support must align with PRR's six strategic goals.

In February 2025, we collected scree skink tail tips from the Conservation Area Takapō-Pūkaki Confluence for master's student Angus Davis (University of Otago). Part of his research aims to resolve the scree skink (*Oligosoma waimatense*) complex, collecting samples from scree and alpine rocks skinks across the South Island. PRR also funded some research for PhD student Scott Bourke.

Additionally, Project River Recovery worked in partnership with Department of Conservation's Threatened Species Research Workstream (TSRW) and Manaaki Whenua – Landcare Research to develop a hedgehog-specific toxin developed for broadscale application as described under Objective 2.

9. Project River Recovery's relationship with the Te Manahuna Aoraki Project

Te Manahuna Aoraki Project (TMAP) a landscape scale conservation project focusing on restoring the natural landscapes and threatened species of the upper Mackenzie Basin and Aoraki/Mt Cook National Park, officially launched in 2018. The project aims to enhance biodiversity across 310,000 ha of land including braided river systems and alpine habitats. As such, there is some overlap with PRR on the rivers, wetlands, and lakeshores in the project area from the Ben Ōhau Range in the West to the Two Thumb Range in the East. This includes some of our major lakes and rivers including Lakes Pūkaki and Tekapō and the Tasman, Cass, Godley and Macaulay Rivers and Fork Stream. PRR works in collaboration with TMAP to gain ecosystem knowledge and maintain weed and predator control in overlapping areas.

10. Project River Recovery's financial support for the Kakī programme

Traditionally kakī have not been part of the PRR programme; however, over recent years, PRR has become more involved by funding the operational cost of the Tasman Predator Control programme which was fundamentally driven by the need to secure and increase the kakī population. Results of the Tasman Predator Control programme are reported in the PRR Annual Reports. Kakī are seen as the flagship species for the protection and recovery of braided rivers in the Mackenzie Basin and if kakī are increasing in the wild, this reflects better survival of other populations of braided river bird, lizard, and invertebrate species.

11. Project River Recovery's financial statements 1st July 2024 – 30th June 2025

Project River Recovery spent $776,000 in the 2024-2025 financial year. PRR's revenue and expenditure for the 2024-2025 financial year is itemised in Table 6.

Table 6. Project River Recovery statement of financial performance for year ending 30th June 2025.

	2025 ($k)	2024 ($k)	2023 ($k)	2022 ($k)	2021 ($k)	2020 ($k)	2019 ($k)	2018 ($k)	2017 ($k)	2016 ($k)	2015 ($k)
REVENUE											
Stakeholder Transfers from revenue in advance	688	647	656	588	465	554	544	539	513	528	495
Other revenue	0	0	0	0	16	0	0	0	0	0	10
TOTAL REVENUE	**688**	**647**	**655**	**588**	**481**	**554**	**544**	**539**	**513**	**528**	**505**
EXPENDITURE											
Personnel costs											
Salaries	314	129	132	139	104	113	83	44	80	125	117
Wages	0	17	33	37	13	57	15	50	51	48	39
Other Personnel	0	0	3	3	0	0	0	0	0	-3	0
Total personnel costs	**314**	**146**	**168**	**179**	**117**	**170**	**98**	**93**	**132**	**170**	**156**
Administration costs											
Accommodation	0	20	0	20	0	20	20	22	20	20	27
Total administration costs	**0**	**20**	**0**	**20**	**0**	**20**	**20**	**22**	**20**	**20**	**27**
Operating costs											
Professional fees/contracts	6	2	0	7	32	5	8	5	1	11	1
Travel	0	0	1	0	2	2	1	3	1	1	3
Vehicle expenses	26	6	2	28	4	36	34	35	36	36	35
Field operations	430	472	480	351	325	319	382	371	321	289	281
Information and publicity	0	1	0	3	1	2	1	1	2	1	2
Grants and miscellaneous	0	0	5	0	0	0	0	8	0	1	0
Total operating costs	**462**	**481**	**488**	**390**	**364**	**363**	**426**	**424**	**361**	**338**	**322**
TOTAL EXPENDITURE	**776**	**647**	**656**	**588**	**481**	**554**	**544**	**539**	**513**	**528**	**505**
NET SURPLUS (DEFICIT)	-88	0	0	0	0	0	0	0	0	-1	0

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