Ashley Rakahuri
RIVERCARE GROUP

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Ashley Rakahuri river Tarapirohe/black-fronted tern 2025/26 nesting season report.

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Definitions:

Nesting period: The period between where the first and last nest was located

Isthmus: A narrow strip of land connecting a peninsula or island to the mainland, often providing intermittent access for terrestrial predators during low flows.

Peninsula: A gravel landform extending into the riverbed that is connected to the mainland by a narrow strip of land and bordered by water on multiple sides.

Mainland: Land adjoining the riverbed that is continuously connected to surrounding terrain

Island: An area of elevated gravel or sediment within the active braided riverbed that is surrounded by water for all or part of the year

Abbreviations:

BFT: Tarapirohe/Black-fronted tern

BBG: Black-billed gull

ARRG: Ashley Rakahuri Rivercare Group

1. Executive summary

This report summarises the results of the 2025/2026 Tarapirohe/black-fronted tern monitoring at the Ashley Rakahuri River in North Canterbury, New Zealand. The extent of the monitoring area stretches from the Okuku junction to State Highway One. Black-fronted tern (BFT) nesting outside these areas, while minimal, were noted but not monitored.

Active nests were first detected on the Ashley Rakahuri in early October by conducting river walk-throughs. Over the course of the 2025/2026 breeding season, 247 nests were located and monitored across 6 colonies. Of these nests, 84 (34%) hatched at least one chick and there were 38 fledglings (15% productivity per nest).

Nest failures were predominantly attributed to abandonment (30%) and depredation (22%). Although it is worth noting that a large proportion of this abandonment can be attributed to nocturnal predator presence within the colonies. Through the deployment of trail cameras at 58 different nests, we were able to determine that cats and hedgehogs were the predominant predators, although incidents of rats, stoats, little owl, and black-billed gulls were also observed. Trail cameras assisted in accurately determining nest outcomes. However, there were 37 nests in which, while signs of a depredation event were evident (shell fragments, residual yolk, missing eggs), it was not possible to determine predator species. These nests were marked as 'unknown predator'. Twenty-three nests were marked as 'outcome unknown'. This is when a nest was observed as failed but there was no clear evidence for causation.

The majority of the monitoring area is considered a treatment zone, a continuous stretch of river that is under predator control. Permanent trap lines run on both the north and south banks of the Ashley Rakahuri, stretching approximately 12.5km. In total about 160 sites had temporary traps during the nesting season from August – February. Bait stations were also used at the Groyne 9 colony, which had significant rat presence. Traps used on the river consisted of Timms, DOC200, DOC150, Fenn, SA2, Victor, Sentinel and live capture cat traps. Total catch was 41 predators within the BFT nesting areas; this includes 11 hedgehogs, 21 Norway rats, 8 cats and 1 stoat. For the purposes of this report, only the temporary traps on the river in the BFT nesting areas will be analysed, as these are specific to the BFT breeding season and have reliable data.

The most significant observation from this season was the first documented depredation of black fronted tern by the little owl. Weeks prior, a little owl was also documented depredating a wrybill chick and egg. These were the first documented occurrences of any endangered New Zealand birds being depredated by the little owl.

The second most significant observation is that this season saw the largest ever recorded BFT colony on the Ashley Rakahuri, with Groyne 1 having 93 nests. However the size of the colony was almost certainly a result of renesting.

All mapping and spatial analysis in this report were completed in QGIS using drone and/or satellite imagery.

2. Introduction

The Tarapirohe/black-fronted tern (BFT) is one of 6 endemic bird species that rely on braided river ecosystems to breed. Currently classified as nationally endangered by the Department of Conservation, there are thought to be between 5,000-10,000 individuals (Hamblin, Paterson, & . Ross, 2019).

The declining population of BFT is largely attributed to the introduction of introduced predators with European settlement, as well as habitat modification and destruction. As is a recurring theme for New Zealand shorebirds, the primary cause of braided river bird mortality is depredation (Gurney, 2022). However, loss of habitat quality and quantity though weed infestation, channelisation and water abstraction have a profound impact on these birds' survival (Keedwell R. J., 2002). No weed control was done this season on the Ashley Rakahuri as it was not deemed necessary.

Canterbury is a stronghold for both braided rivers and the BFT. Almost 64% of braided rivers nationally are found in Canterbury (BRaid, 2026), estimated to support 60% of the breeding population (Connor-McClean, Lamb, & Bell, 2023). From August to February, braided rivers such as the Ashley Rakahuri in north Canterbury provide a suitable habitat for this rare endemic bird.

The Ashley Rakahuri is a medium sized river, dwarfed by the Waimakariri to the south. While the Waimakariri is snow-fed, the Ashley experiences relatively low flow rates as it is rain fed from the foothills. From the Ashley Gorge, the river flows east, entering the sea 25km north of Christchurch. Its major tributary, the Okuku River, joins halfway from the hills to the coast. Although smaller than the Waimakariri, the Ashley Rakahuri may be more significant than is recognised. Breeding on the Waimakariri is often precarious due to constant floods and high numbers of southern black-backed gulls (SBBG).

The Ashley Rakahuri Rivercare Group has been, to some extent, working on the river since 2000. Entirely a volunteer organisation until this season, work has been done to monitor and report on the bird life, as well as trap lines on both the south and north banks of the river. They also work on habitat restoration, anthropogenic disturbance and a large amount of advocacy and education. Recent funding obtained in 2025 enabled more monitoring work to be done, predominantly focusing on the BFT breeding season.

This report therefore provides a summary of the 2025/2026 BFT breeding season, highlighting the importance of this river as an ecosystem, and of the continuing need to monitor this species.

3. Methods

Methodology used in this work was as developed over several years on the Ashley – Rakahuri.

3.1 Tarapirohe/black-fronted tern monitoring

3.1.1 Roosting locations

Prior to the nesting season, regular river visits and checks at previous roosting sites revealed large numbers of more than 100 BFT at Okuku Junction, Smarts and Groyne 2. Only the latter was actually used as a nesting site. Repeated counts from photos showed 15% of these to be non-breeding. Without banding, it is impossible to say if these non-breeding birds are the result of the previous nesting season, but the numbers match with the 56 chicks that fledged last season.

3.1.2 River surveys

A full walk-through river survey was completed on November 22nd and November 23rd, 2025. This walk through was not specifically for BFT, but rather an annual bird count with volunteers and members of the Ashley Rakahuri Rivercare Group. To conduct these river surveys, multiple observers spaced themselves evenly across the riverbed and walked downstream, noting all birds observed. 251 BFT were recorded in this bird count. A comparison graph is shown below (Figure 1). ARRG believe that the main influence on bird numbers observed is weed cover, where increased weed presence results in less birds.

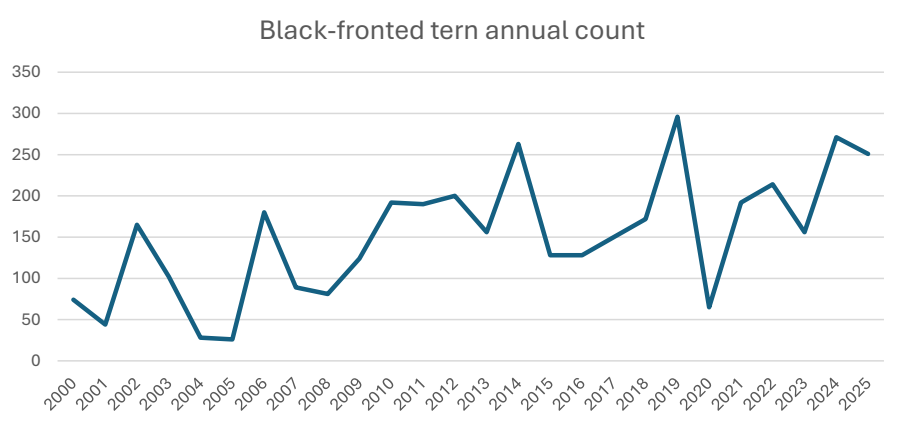

Figure 1: Black-fronted tern annual count numbers

As the breeding season progressed, smaller walk throughs were done of sections of the river deemed to have favourable nesting characteristics i.e. high gravel islands. Once a

concentration of BFT has been sighted, and defensive behaviour was observed, the observer would walk through and attempt to locate nests. Once a nest had been located, a grid search was completed.

3.1.2.1 Grid Searching

A 6-metre spaced grid was created on QGIS and exported to QField, a cell phone data gathering app for QGIS. The grid covered an area considerably larger than that of the suspected extent of nests, to account for birds nesting away from the main colony.

The observer then walks the 6-metre grid slowly, checking 3 metres either side of them for nests. Once located, the nests are logged into QField, which gives them an individual number and has a GPS accuracy usually of around 2-3 metres. Small stone cairns are built approximately 1m away from each nest to aid rediscovery.

While this practice is time consuming, done correctly it gives a high degree of certainty that majority of the nests have been located. Subsequent nests (re-nesting after failure or late nesters) can either be found with further grid searches or often are located by chance as regular checks of known nests are done.

3.1.2.2 Signage

Once the extent of the colony was determined, temporary signage was installed at key river access points and at either end of the colonies to inform river users of active nesting colonies and discourage disturbance during the breeding season.

3.1.3 Nest and chick monitoring

Once a nesting colony has been located and a grid search completed, colonies were visited 3 times per week, usually on alternating days. This was undertaken until all nests had hatched or failed, hence upon colonies were visited 2-3 times per week to count chicks and fledglings. Fledgling counting was done using counts from multiple visits, where the highest reliable number was used.

During each visit, the observer walks to each logged nest, and the contents/status of the nest is recorded into QField. This kind of intensive monitoring was continued until the nest had either failed or the chicks have moved away from the nest.

3.1.3.1 Best practice for monitoring

In days of extreme heat, monitoring was either done early in the morning or not undertaken. Temperature regulation in the incubation period is seen to be a key factor in hatching success with plovers (Yasue´ & Dearden, 2006). Although this study examined a different species, temperature regulation is seen as broadly important, so we therefore assumed similar heat sensitivity with BFT.

While in incubation phase, colonies were walked carefully but as quickly as possible, to minimise time birds were disturbed off their nests. As clutches begin to hatch, monitoring must be done with significantly higher levels of caution. Once chicks have moved away from the nest, they tend to be seen close to the water's edge. Care must be taken to not inadvertently chase these chicks into the water, as there is a risk of them being swept downstream.

When in the stage where some nests are hatched and others not, extreme care is taken and the colony was walked very carefully. Best judgement was used on when to leave traps/nests unchecked if they were near chicks seeking cover. If at any point chicks were seen rushing towards water, the observer must back off and reassess.

Where possible, once all nests have hatched/failed, high ground was found with a good eyeline to the colony, where chicks and fledglings could be counted through a camera and/or binoculars.

3.1.3.2 Chick Shelters

Chick shelters were initially deployed at selected sites to provide shade and protection from heat exposure. However, their use was discontinued after concerns were raised that the shelters increased the visibility of nesting areas and could attract public attention, increasing the risk of disturbance. This decision reflects an ongoing challenge of operating an effective monitoring programme within a highly recreational river environment.

3.1.4 Trail camera monitoring

At each of the colonies, a selection of nests was chosen to place cameras to accurately identify causes of failures and observe bird behaviour. Of particular interest was observing nocturnal depredation. Nests were arbitrarily selected; however, 2 egg clutches were favoured. A selection of cameras was also placed at a mix of different types of traps. This was to get a better gauge of what predators were present on the river.

Cameras used were a mix of Browning Dark Ops and Moultrie A900. Although the best results would come from installing cameras on stakes, due to the public nature of the Ashley Rakahuri, cameras were placed on the ground and concealed with stones. When possible, cameras were facing north or south, as facing east or west leaves the images over exposed with the sunrise/sunset.

Cameras were checked at the same rate as the nests, 3 times per week. Cameras remained at the nests until they had either hatched or failed, whereupon they were moved to a new nest. Throughout the season, cameras were temporarily pulled from the river when large amounts of rain were forecasted.

3.1.5 Quantifying nesting success

Nesting success was defined as the proportion of clutches that resulted in one or more chicks hatching. This was done through observed hatching success on the regular nest checks.

As soon as one chick is observed, the nest was marked at hatched, even if the other egg fails to hatch. If the nest is vacant, but there are strong signs of chick presence e.g. bird poo at nest, the nest was marked as hatched.

In the case where the nest hatches, and then the chicks are subsequently predated or found dead at the nest, the nest remains as being marked 'hatched'. This classification is, however, somewhat uncertain, as we can rarely ascertain which chicks belong to which nest.

3.1.6 Calculating nest density and trap per nest ratio

Nest density in ha was calculated on QGIS by mapping the extent of the outermost nests. If nesting crossed the braid plain, 2 areas would be mapped separately and added together so that the river did not influence the area calculated. The number of nests present was then divided by this area to get nest density.

Trap per nest ratio was calculated as number of traps present/number of nests present.

3.2 Predator control

3.2.1 Trap network overview

The Ashley Rakahuri Rivercare Group operates 2 different trapping networks. The first is composed of a continuous series of permanent traps stretching 12.5km on both the true left and true right side of the Ashley Rakahuri River. There are about 270 traps, mainly DOC200 and Timms, set at 100m intervals, maintained by volunteers. For the purpose of this report, only the second trapping network, the temporary traps installed over the breeding season at BFT colonies, will be analysed.

At full capacity, 127 temporary traps were installed on the river, around or in BFT colonies (Figure 2) These traps consisted of 66 DOC 150s with a run through configuration (referred to as RunThrus), 14 Timms, 33 Fenn's, 6 Live capture, 4 Sentinel, 1 Victor and 2 Steve Allen traps. RunThrus are DOC150 traps with a mesh or metal cover – designed to make them lighter to transport on and around the river.

Of these traps, 76 traps were positioned on the gravel islands within the active braid plain, 50 were placed on the 'edge', classified as situated on the margins of the active riverbed that are neither on islands nor on the berm, and 1 trap was placed on the berm.

Wherever possible, traps were hidden under vegetation or driftwood. This allowed traps to be tied down in the event of a flood, hidden from the public and perhaps most

importantly, placed where animals are likely to be travelling through, breeding or taking cover.

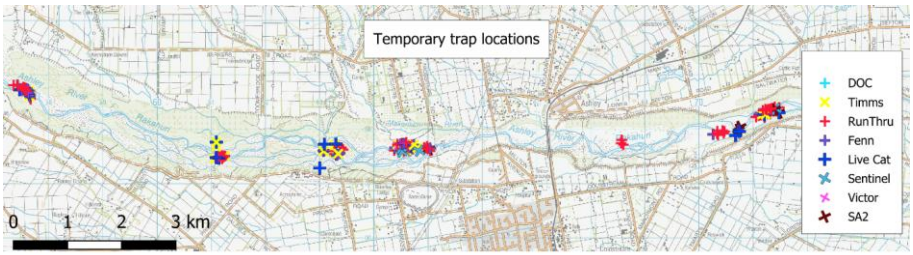

Figure 2: Temporary trap locations around the Black-fronted tern colonies

3.2.2 Trap regime

During the 25/26 season, traps were deployed as soon as possible after nesting activity was identified along the river. Because we cannot reliably predict colony locations, few traps are able to be put out prior to nesting. Traps at both Groyne 1 and Tulls were shifted mid-way through the season as birds began to renest. Traps were checked 2x per week and rebaited as and when necessary. Bait used was predominantly peanut butter, cat biscuits, sheep nuts and fresh meat.

In addition to recording and reporting a catch total per trap/species, the amount of standardised trapping effort is also reported. Trapping effort is calculated as number of catches per 100 nights (Equation 1: Trapping effort equation). We don't adjust for trap nights for triggered traps.

$$Catch\ per\ 100\ trap\ nights = (number\ caught\ /\ number\ trap\ nights) \times 100$$

Equation 1: Trapping effort equation

4. Results

4.1 Tarapirohe/black-fronted tern monitoring

4.1.1 Population size and distribution of colonies

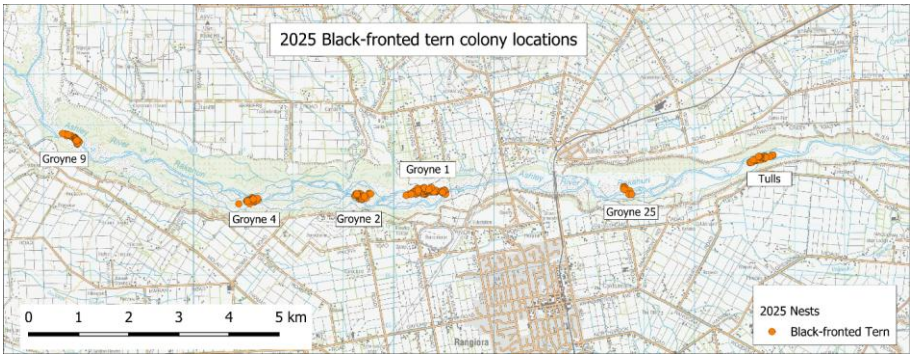

Figure 3: Nesting locations for the 2025/2026 breeding season

A total of 6 BFT nesting colonies were observed and monitored on the Ashley Rakahuri this season (Figure 3). Colony sizes varied from 93 nests to 9 nests, with an average nest number of 41. This season, the biggest colony on record since monitoring with the Ashley Rakahuri Rivercare Group began was found, with 93 nests being monitored at Groyne 1. This was significantly higher than the previous largest of 56 in the 2024 – 2025 season. The record number of nests and largest colony size is interpreted as being due to re-nesting, mainly due to depredation – rather than more birds. However, we can't confirm this without bird banding. A total of 247 nests were active throughout the 2025/2026 breeding season (Figure 4)

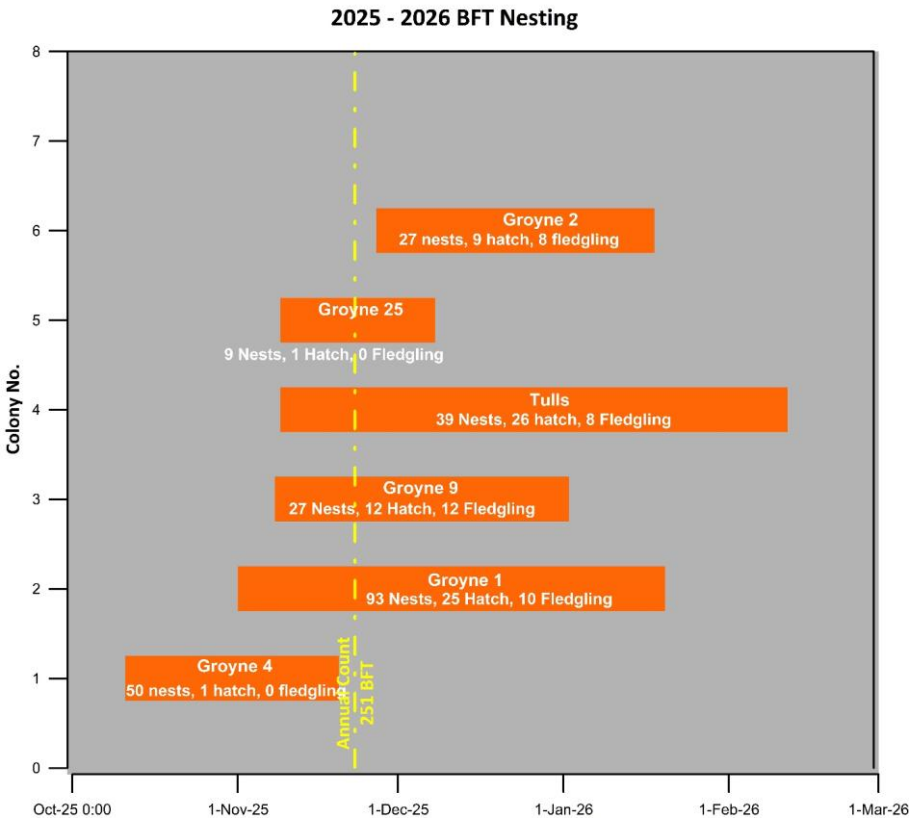

Figure 4: Nesting timeline

4.1.2 Overview

Of the 247 monitored nests 34% hatched one or more chicks. Overall, the leading cause of nest failure was abandonment at 30%. Depredation was the second highest leading cause, at 22%. In most cases, particularly with the abandonment seen at Groyne 4 and Groyne 1, mass scale abandonment was linked to nocturnal predator activity within the colony.

5% of nest failure was attributed to flooding, much less than previous years. Flooding had minimal impact on the nesting success, as the major fresh events happened only both early and at the tail end of the breeding season, therefore losses were minimized (Figure 5). Previous experience is that approximately 80 cumec flow at the gorge results in major nest loss.

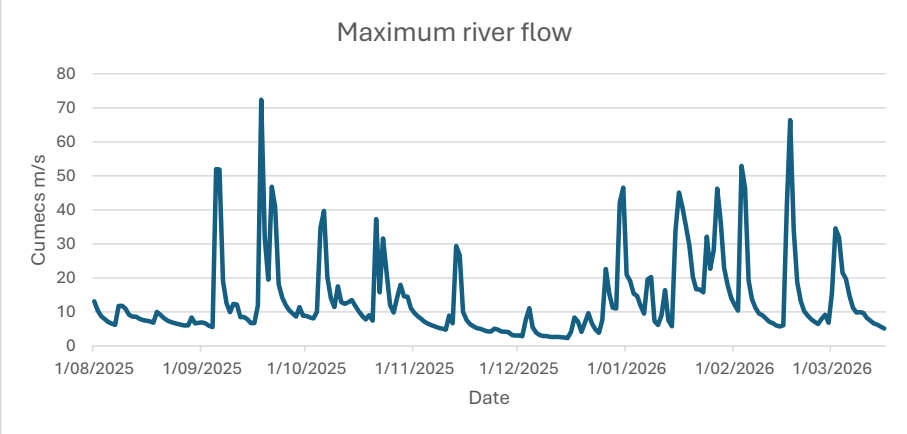

Figure 5: Maximum daily flow for the Ashley Rakahuri River

Below is a breakdown of outcome per colony for the entirety of the Ashley Rakahuri River (Figure 6).

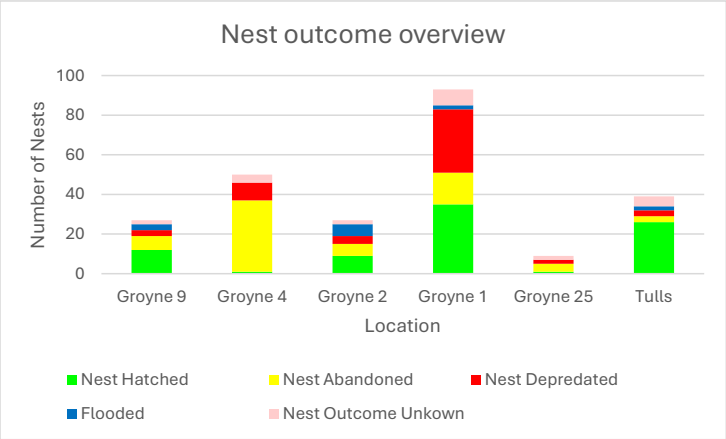

Figure 6: Nesting outcomes per colony

This season, 58 nests were monitored by trail cameras, and 5 cameras were positioned at traps on the river. This equates to approximately 23% of nests being monitored via trail camera.

Thirty-eight fledglings were successfully produced from 247 nests. This is considerably lower than the 56 reported from the 2024/2025 season. The most successful colony in

fledging chicks was Groyne 9, with 12 fledglings. Followed by 10, 8 and 8 again from Groyne 1, Groyne 2 and Tulls respectively.

It should be noted that accurately establishing the fledgling success for BFT can be highly challenging. Chicks move away from the nest after a few days, and are well camouflaged, freezing when sensing danger. Even with considerable searching, it is highly likely some will be missed. Double counting can occur as they are often airborne during counts and are not easily distinguishable, especially with none of the BFT on the Ashley Rakahuri being banded. If nesting is reasonably contemporaneous, chicks will usually stay in or close to the natal colony until some time after they have fledged. If the nesting period is long, some chicks will leave the natal colony before others have fledged. For the above reasons, chick and fledgling counts should be treated with caution.

Colonies will be addressed individually below in order from west to east. Note that north is up on all maps.

Note: Below there is reference to the 'nesting period'; the period between where the first and last nest was located. It is important to note that this is not an exact science, rather observational approximations.

4.1.3 Groyne 9 Colony

The majority of nests at Groyne 9 were located on a gravel peninsula connected to the riverbank by a narrow isthmus. An additional five nests were situated on a small island immediately east of the peninsula (Figure 7). The northern margin of the peninsula was bounded by the main braid channel, which maintained year-round flow. To the south, a smaller braid channel was present that typically only carried flow during flood or fresh events. For most of the nesting season, the peninsula remained connected to the river edge; however, from January onwards, consistent flow developed in the southern braid channel.

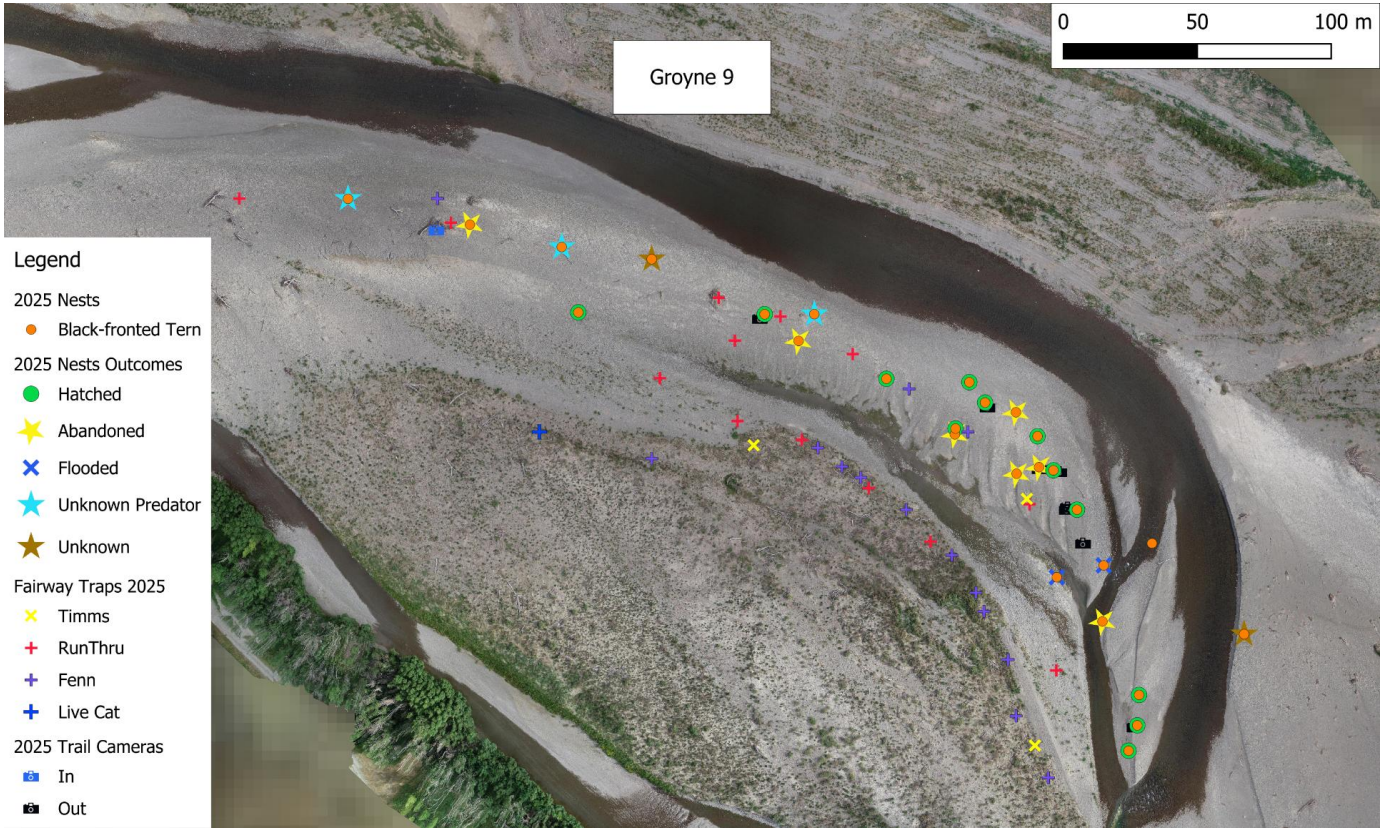

Figure 7: Groyne 9 map

4.1.3.1 Breeding Success

Groyne 9 was the most successful breeding site for the 2025/2026 season. Twenty-seven nests were recorded, of which 12 (44.4%) hatched one or more chicks.

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The first nest was located on November 24th, and the final nest located on December 29th, a 35-day nesting period. Of the 27 nests, 5 were classified as on islands, 16 on peninsula and 6 on the mainland. Hatching success rates were 60%, 50% and 16.7% respectively.

There was an overall nest density of 40 nests/ha.

4.1.3.2 Causes of nest failure

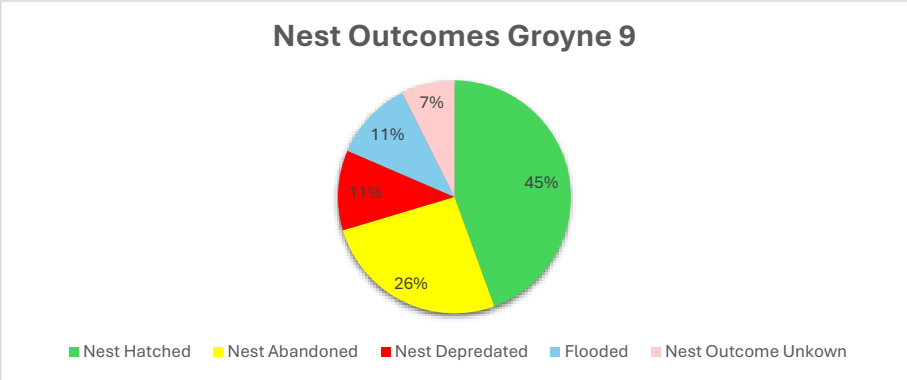

Figure 8: Nest Outcomes Groyne 9

The leading cause of failure at Groyne 9 was abandonment with 7 nests thus lost (26%). Three nests were lost to flood (11.1%), the same to unknown predators. With a high Norway rat concentration and catch near this colony, they were likely responsible for this depredation. A further 2 nests were lost cause unknown (Figure 8).

4.1.3.3 Camera Monitoring

Seven nests were monitored at Groyne 9 this breeding season. Proof of rat activity was evident, as was the presence of hares, however these seem to cause very little disturbance. A feral cat was seen at a trap camera but not observed on any of the nest cameras. Significantly, a black-billed gull was seen killing a BFT chick at the nest. These animals are all shown in Figure 9.

Figure 9: Predators seen at Groyne 9 throughout the 2025/2026 nesting season

4.1.3.4 Fledgling success

Groyne 9 had the highest fledgling to hatching production rate of all colonies. 12 hatched nests produced 12 fledglings, significantly better percentages than other colonies on the river.

4.1.3.5 Predator Control & Trap regime

Groyne 9 had 1.19 traps per nest; the highest level of per-nest protection recorded this season. This was done in response to early indications of Norway rat presence. This indicates that predator-control effort was strongly concentrated relative to the number of nests, providing intensive coverage for this colony

Fourteen Norway rats were caught at Groyne 9, the only predator type caught. They were caught in close proximity to the colony, which under usual circumstances, should have

been disastrous to BFT success. However, only 3 nests were depredated, highlighting the extreme unpredictability of predator behaviour.

It must be noted that Groyne 9 was the only colony which was located outside the extent of the permanent trap lines on the banks of the Ashley Rakahuri, however, was the most successful. This has been a theme for the last 4 years, higher success rates outside of permanently trapped areas.

4.1.4 Groyne 4 Colony

All but one nest at Groyne four was located on a raised gravel island with permanent flow to the north and south (Figure 10). This island was successfully used by BFT in the previous nesting season, where there was minimal evidence of predators, and we therefore had high hopes for this colony.

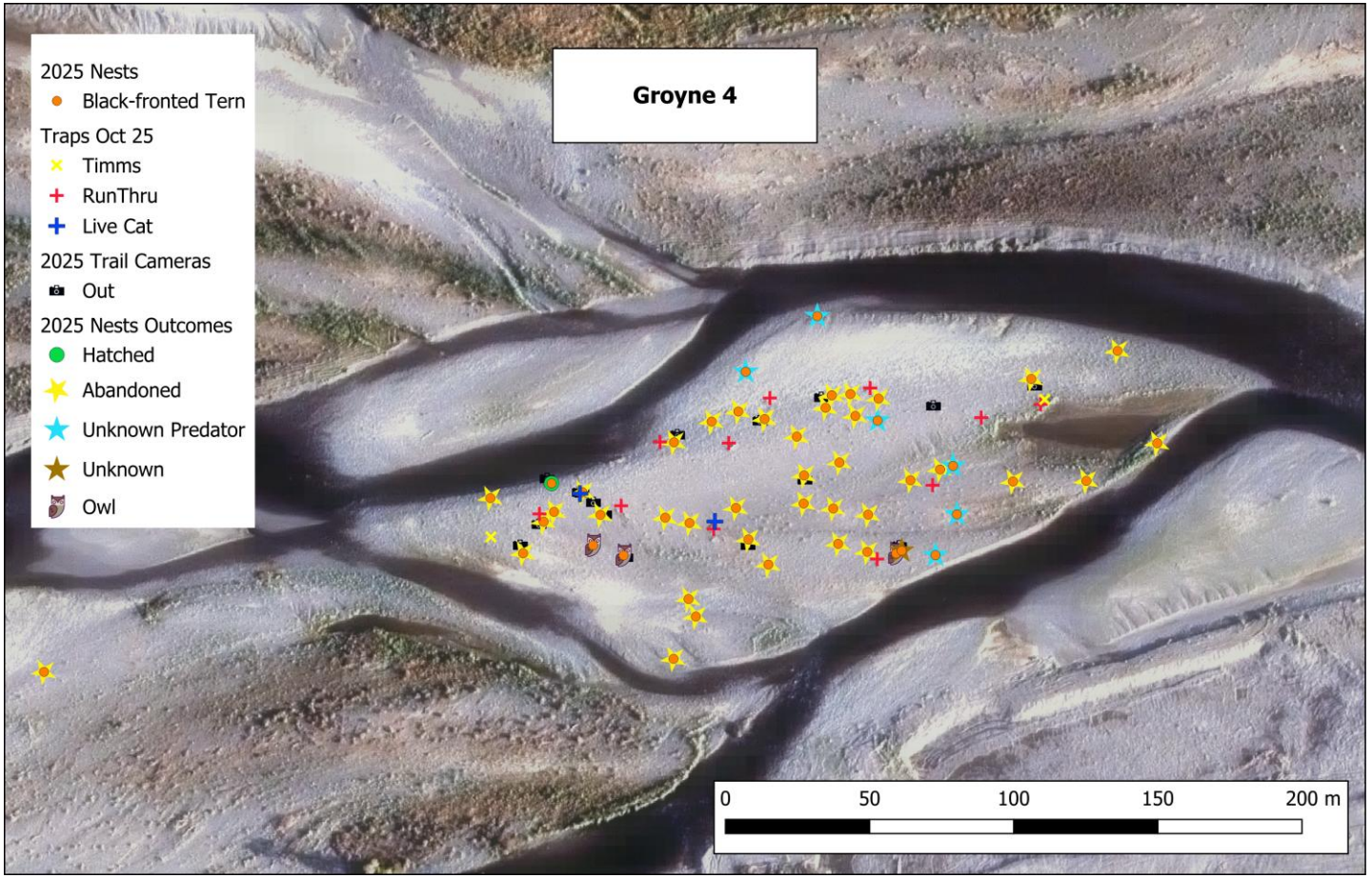

Figure 10: Groyne 4 map

4.1.4.1 Breeding Success

Forty-six nests were recorded at Groyne 4 this season. Of which, only 1 nest successfully hatched one or more chicks (2%).

The first nest was located on October 11th, and the final nest was located on November 10th – a nesting period of 30 days. Of the 51 nests, 50 were located on an island and 1 was located on the mainland. The one nest that was successful at hatching was located on the island.

There was a nest density of 44 nests/ha.

4.1.4.2 Causes of nest failure

The leading cause of failure at Groyne 4 was 36 nests lost to abandonment, accounting for 78% of nest failure here. Three nests (6%) were confirmed as depredated by the little owl, which was almost certainly behind the mass abandonment of almost the entirety of the colony. The remainder of the colony (14%) was lost to an unknown predator (Figure 11).

There was no evidence of other predator presence in either trail camera images or traps throughout the entirety of the nesting period, the numbers of which should have been sufficient to capture any predator presence. It is likely therefore, that the nests lost to an unknown predator can also be attributed to the little owl.

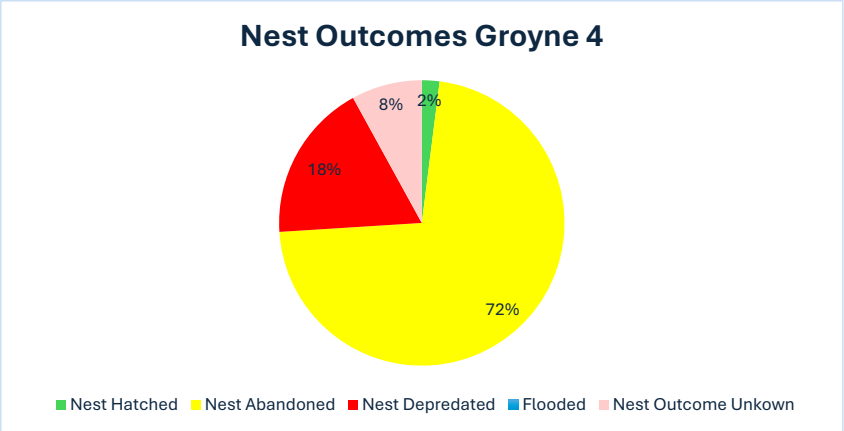

Figure 11: Nest outcomes Groyne 4

4.1.4.3 Camera Monitoring

Fifteen nests were monitored at Groyne 4 this season. The deployment of cameras provided evidence of depredation of both adult BFT and eggs by the little owl, the first documented instance of braided river bird depredation by this species (Figure 12).

Figure 12: Observed nest depredation of both adult Black-fronted Tern and egg by the little owl.

4.1.4.4 Fledgling success

No fledglings were recorded from Groyne 4.

4.1.4.5 Predator Control & trap regime

Groyne 4 had 0.29 traps per nest, the lowest per-nest protection of all colonies. In hindsight, trapping effort here was minimal but if the colony had continued its course, more traps would have been added if predator presence was observed. While there was no evidence of predators prior to the little owl, it serves as a lesson for being proactive - getting trap to nest ratio higher earlier.

No predators were caught at Groyne 4, and no predators seen on trail cameras bar the little owl. After the little owl depredation, a live capture trap baited with rat carcass was installed, but to no avail.

4.1.5 Groyne 2 Colony

Nests at Groyne 2 were predominantly situated either on a low-lying gravel island in the middle of the braid plain, or on a higher, narrow peninsula to the north of the island with a narrow isthmus (Figure 13). While the island was surrounded by consistent, protective flow, its low-lying nature made it susceptible to flooding. This is the most braided part of the river and over time has been a major nesting and feeding area for most of the braided river bird species ARRG monitors.

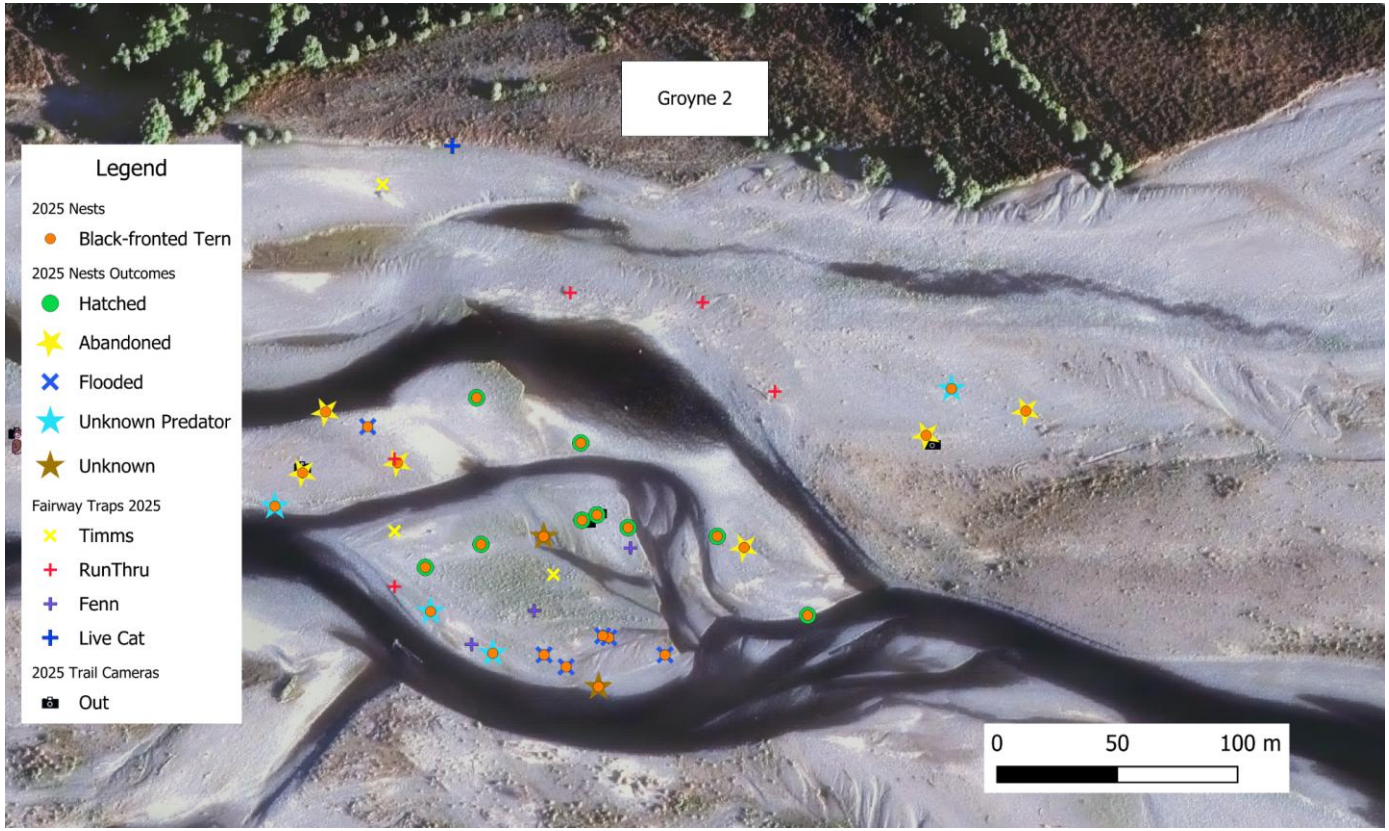

Figure 13: Groyne 2 map

4.1.5.1 Breeding Success

Twenty-seven nests were recorded at Groyne 2 in the 2025/2026 season, of which 9 (33%) hatched one or more chicks.

The first nest was located on November 27th and the last nest found on January 14th – a nesting period of 48 days and the latest nesting onset. This pattern suggests that it may reflect re-nesting by birds following nest loss elsewhere, or re-nesting at the same location after nests in lower-lying areas were lost to flooding.

Of the 27 nests, 14 were located on the island, 10 on the peninsula and 3 on the mainland. Hatching success was 35.7%, 40% and 0% respectively.

There was a nest density of 16 nests/ha.

4.1.5.2 Causes of nest failure

The leading cause of failure at Groyne 2 was shared between flooding and abandonment at 6 nests (22%) apiece. 4 nests (15%) were lost to an unknown predator and 2 nests (7%) to cause unknown (Figure 14). Six hedgehogs and one norway rat were captured here; other than this there was no predator presence observed.

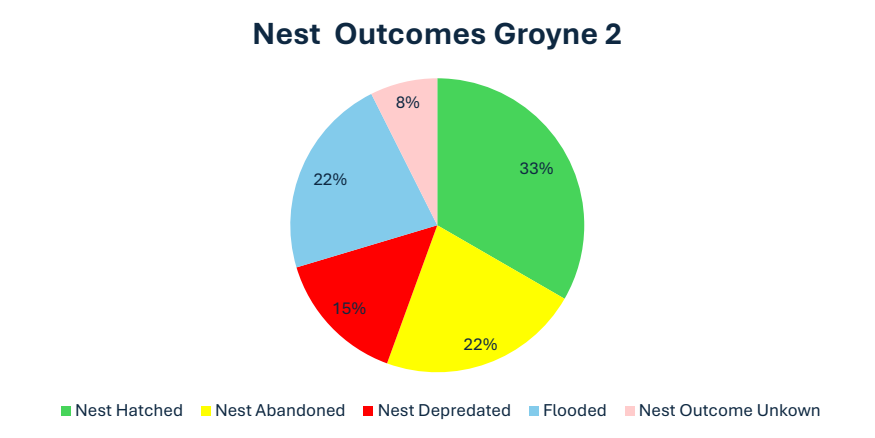

Figure 14: Nest outcomes Groyne 2

4.1.5.3 Camera Monitoring

Four nests were monitored at Groyne 2, nothing of significance was recorded. Fewer cameras were placed here due to flood risk.

4.1.5.4 Fledgling success

Eight fledglings were recorded from 9 hatched nests, making Groyne 2 the second most successful colony of the 2025/2026 breeding season.

4.1.5.5 Predator control & Trap regime

Colony 2 had 0.37 traps per nest, indicating moderate-low predator-control coverage. Trapping effort provided some level of protection but was relatively light – in part because of the risk of losing traps to flood.

Six hedgehogs were caught, all in traps on the north bank, across the channel from the main colony. One Norway rat was caught within the confines of the main colony.

4.1.6 Groyne 1 Colony

At 93 nests, Groyne 1 was the largest colony ever recorded on the Ashley Rakahuri, and 80% larger than the second largest colony for the 2025/2026 season. The majority of nests were located on a long gravel peninsula, connected to the mainland by a narrow isthmus. Further nests were on the south and north banks and on an island to the east. November saw low rainfall, drying the southern shallow braid channel - allowing easier access to the peninsula for terrestrial predators.

The first nest was found on November 11th and the last nest on January 16th, a nesting period of 66 days – the longest period of the season. Throughout the nesting period, birds occupied four distinct areas, with the timing of occupancy likely reflecting re-nesting activity.

The first nests were found were on the central peninsula on November 11. Six days later November 17th, nests were found on the south bank. 16 days after this, nests were located on both the island to the east, and the mainland to the north (Figure 15).

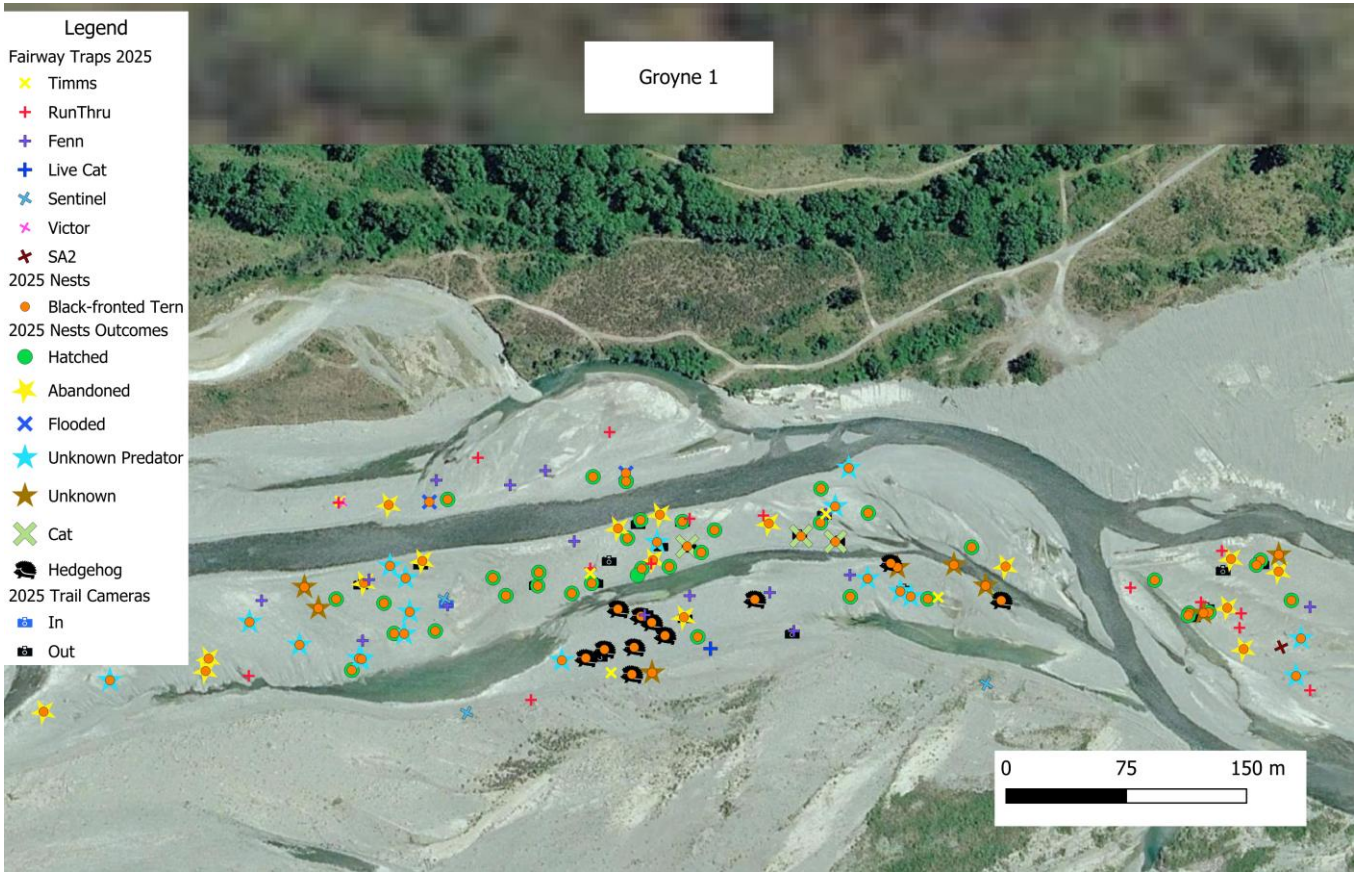

Figure 15: Groyne 1 map

4.1.6.1 Breeding Success

Ninety-three nests were recorded at Groyne 1 in the 2025/2026 season, of which 35 (38%) hatched one or more chicks.

Of the 93 nests, 15 nests were located on an island, 47 on the central peninsula and 31 classified as mainland. Hatching success rates were 46.7%, 46.8% and 19.4% respectively.

There was a nest density of 19.5 nests/ha.

4.1.6.2 Causes of nest failure

The leading cause of failure at Groyne 1 was depredation, with 32 nests lost (34%). Sixteen nests were abandoned, 2 lost to floods, and 8 lost to outcome unknown (Figure 16).

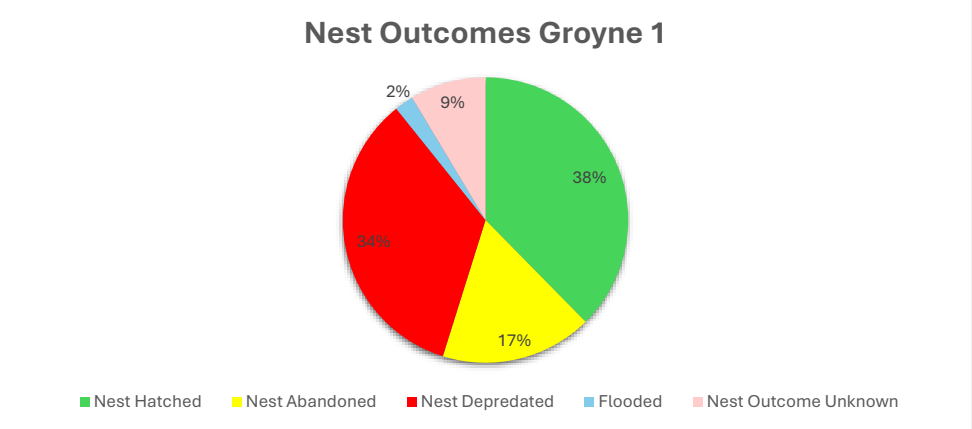

Figure 16: Nest outcomes Groyne 1

4.1.6.3 Camera Monitoring

Twenty-four nests were monitored with trail cameras. Proof of elevated predator presence at this location was evident. At least 3 different cats, Norway rats and hedgehogs were regularly detected on trail cameras. At 3 nests, these cameras allowed us to definitively attribute nest failure to cats (Figure 17).

Figure 17: Cat visiting a Black-fronted tern nest. Note: chick shelter

4.1.6.4 Fledgling success

A total of ten fledglings were recorded at Groyne 1, equating to 10.8% of nests producing a fledgling. Despite high hatching rates, low fledgling success is likely attributable to cats.

4.1.6.5 Predator Control & Trap regime

Groyne 1 had 0.44 traps per nest, reflecting moderate predator-control intensity. Although this colony supported the highest number of nests, trapping effort per nest was perhaps not proportionally scaled to the nesting load.

It is important to note here however that getting high trap per nest ratios is not possible across the entirety of the river as ARRG is predominantly a volunteer group, with limited manpower to check and set traps.

Groyne 1 saw a myriad of different terrestrial predators. Two cats and 4 hedgehogs were caught, post significant nest damage attributed to both. Five Norway rats were caught, as well as 1 stoat late in the season. The stoat had not been previously seen on any trail cameras.

4.1.7 Groyne 25 Colony

Groyne 25 comprised three different nesting sites. Two nests were located on a raised gravel area on the mainland side of an inlet, while a further four nests were located on the adjacent, small peninsula. A further 3 nests were located on a large peninsula to the east of the main channel with a wide isthmus further downstream (Figure 18).

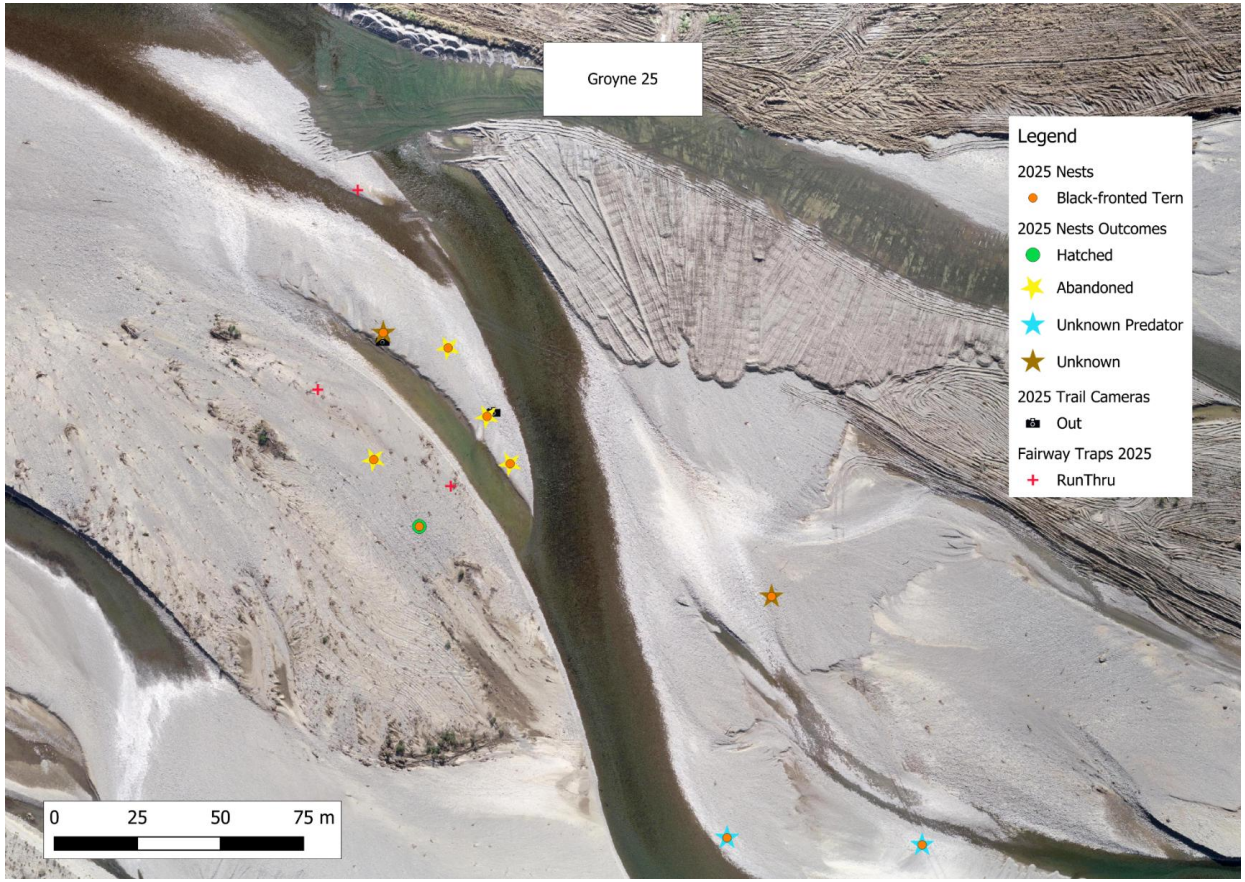

Figure 18: Groyne 25 map

4.1.7.1 Breeding Success

Nine nests were recorded at Groyne 25 this season. Of which, only 1 nest successfully hatched one or more chicks (11.1%).

The first nest was located on November 11th and the last nest on December 11th – a nesting period of 30 days.

Two of the nests here were located on the mainland, with the further 7 on different peninsulas. Hatching success was 0% on peninsulas and 50% on the mainland. This is the only colony in which nests on the mainland have a higher hatch rate than island or peninsula. However, this is a very small dataset so results can be distorted.

There was a nest density of 10 nests/ha.

4.1.7.2 Causes of nest failure

The leading cause of failure at Groyne 25 was 4 nests lost to abandonment, accounting for 44.4% of nest failure here. 2 nests (22.2%) were lost to an unknown predator, and 2 nests lost with cause unknown (Figure 19).

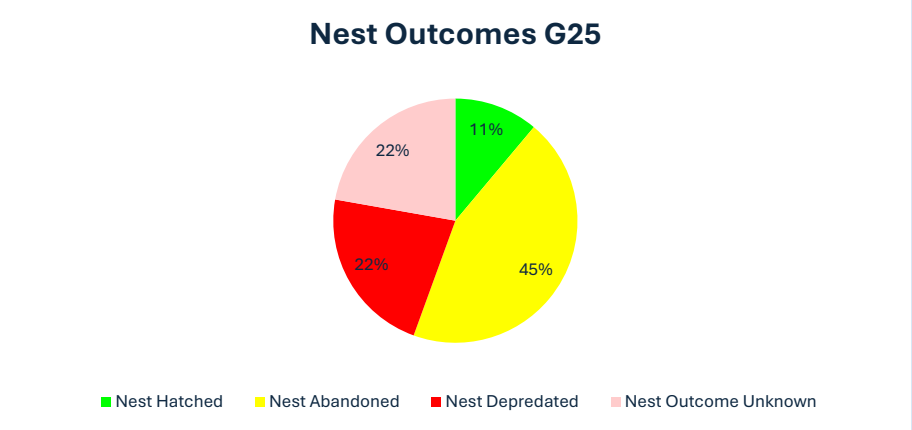

Figure 19: Nest outcomes Groyne 25

4.1.7.3 Camera Monitoring

Two nests were monitored this season at Groyne 25. No predators were observed at either nest to explain either the eggs lost to unknown predator or to cause unknown.

4.1.7.4 Fledgling success

No fledglings were recorded from Groyne 25.

4.1.7.5 Predator control & Trap regime

Colony 25 had 0.33 traps per nest, representing low-moderate protection. This level of effort is consistent with the colony's small size but still reflects relatively light per-nest coverage.

Nothing was caught at Groyne 25

4.1.8 Tulls Colony

Throughout the nesting period the 39 nests at Tulls were predominantly in two distinct areas, with the timing of occupancy likely reflecting re-nesting activity due to both flooding and displacement by black-billed gulls (BBG).

A significant amount of BFT displacement occurred here with encroaching BBG. BFT nesting was originally confined to the western end of the below map, a raised gravel peninsula. However, increasing pressure from BBG forced the BFT east, to less desirable, lower nesting sites (Figure 20). While flooding events later in the season resulted in some nest loss, impacts were limited compared to the substantial losses that would have occurred had flooding coincided with peak nesting. In addition, some nests were abandoned following BBG occupancy.

At 2.05 pm on 22 November there was an incident of stoning BFT on a nest – picked up by a trail camera. Two young teenagers appeared to be attacked by the birds near the nest and retaliated by throwing stones and almost stepping on the eggs. Afterwards the nest was again occupied, and the eggs were later hatched. Unfortunately, the camera lens was foggy and faces of the teenagers couldn't be clearly seen. This is the first such incident documented on the Ashley – Rakahuri in recent years.

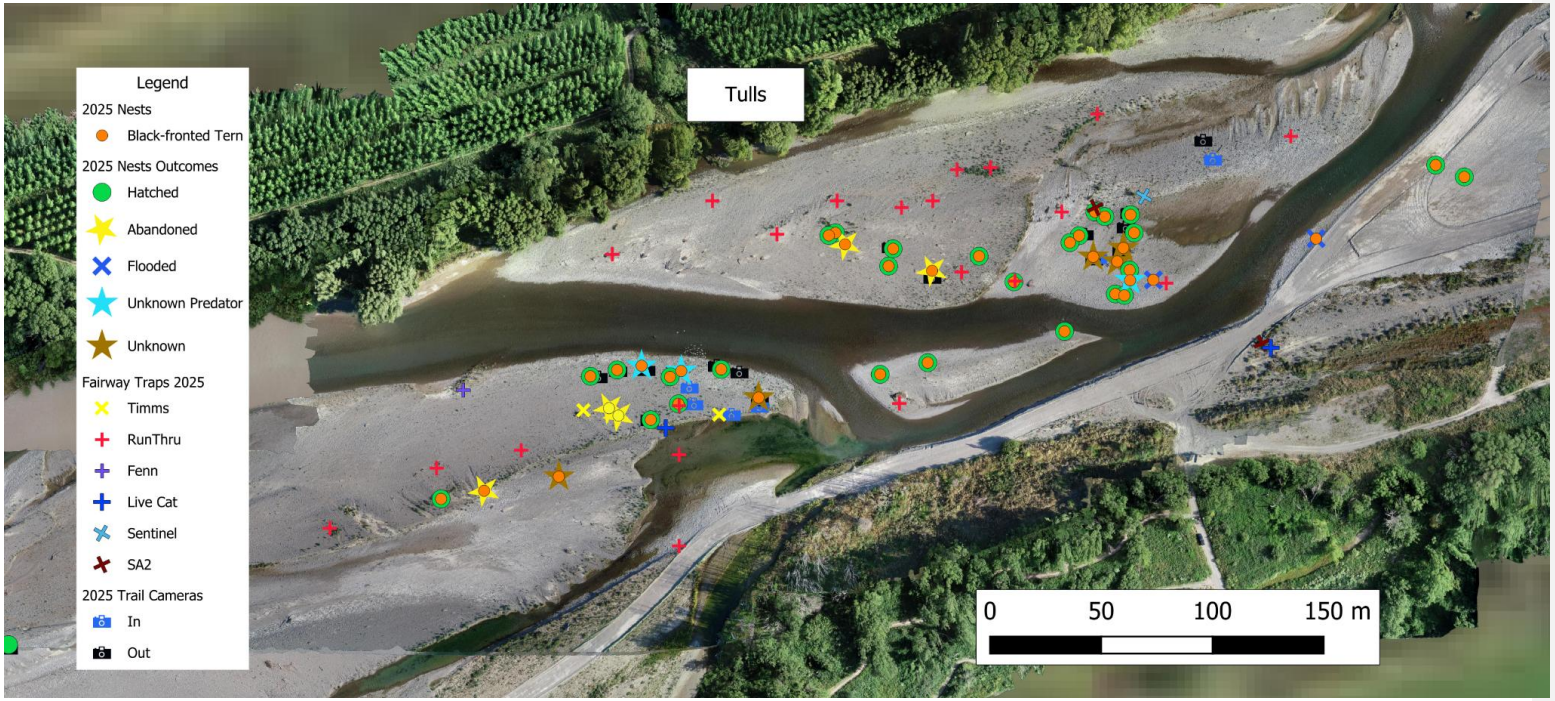

Figure 20: Tull's map

4.1.8.1 Breeding Success

Thirty-nine nests were recorded at Tulls, of which 26 (66%) hatched one or more chick. This was the highest hatch rate of all the colonies by a significant margin.

The first nest was located on November 18th and the last on January 12th – a nesting period of 55 days. Three of the nests were on an island, 12 on a peninsula and 25 on the mainland. Hatching success rates were 100%, 58.3% and 68% respectively.

Nest density was 41 nests/ha.

4.1.8.2 Causes of nest failure

The biggest cause of nest failure was shared between depredation and abandonment, with 3 nests each. Two nests were lost to flood, and 5 nests were outcome unknown (Figure 21).

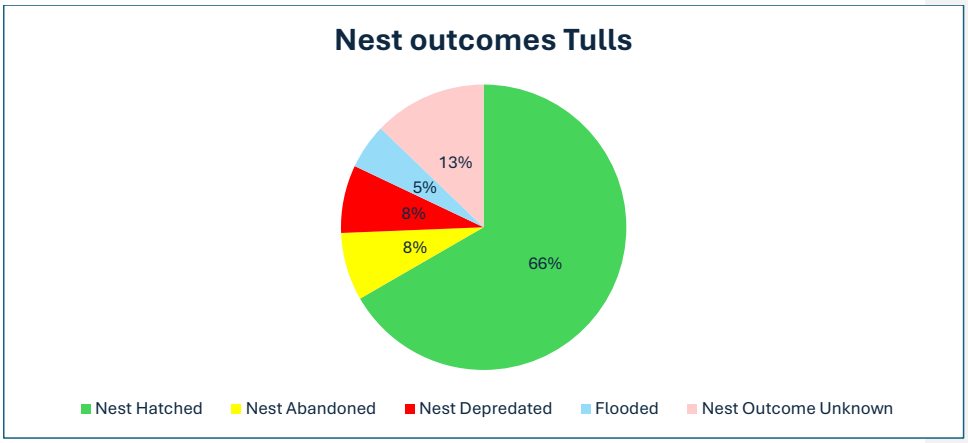

Figure 21: Nest outcomes Tulls

4.1.8.3 Camera Monitoring

Fourteen nests were observed with trail cameras at Tulls this breeding season. No predator presence was observed. However cats were observed at a BBG colony within the BFT nesting area.

4.1.8.4 Fledgling success

Eight fledglings were recorded from Tulls, which is a 20.5% fledgling success rate. Likely due to the pressure of BBG nesting in proximity, fledglings moved away from the natal colony earlier than other locations. Eight fledglings, attributed to the Tulls colony, were seen in a flock about 1km upstream.

4.1.8.5 Predator Control & Trap regime

Tulls had 0.73 traps per nest, representing a high level of predator-control effort relative to nesting load. This was the second most intensively trapped colony relative to nest numbers – partly because traps were also protecting BBG colonies.

Six cats were caught here, all in live capture traps strategically placed after presence was detected on trail cameras. Five of the cats, an adult and its four kittens, were caught very close to a BBG colony. One hedgehog and 1 Norway rat were also caught.

Manaaki Whenua Landcare Research was also operating 15 cameras here over the nesting season as part of a cat detection study. Early results from this study (as yet unpublished) indicate that the Ashley Rakahuri has very high cat density in comparison to other braided rivers in the region.

4.2 Predator control overview

4.2.1 Summary

A total of 41 mammalian predators were caught along the Ashley Rakahuri during the 25/26 field season. This included 8 cats, 11 hedgehogs, 21 Norway rats and 1 stoat (Figure 22). Each trap type caught a range of predator species, however once effort was expressed as catch per hundred trap nights, live capture traps are seen to be the most effective (Figure 23).

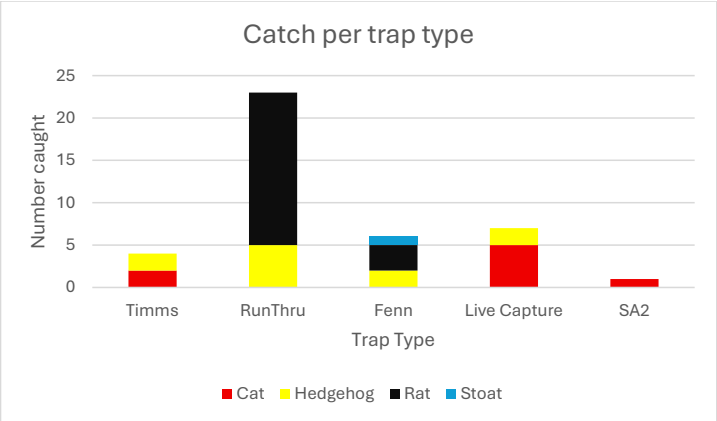

Figure 22: Total catch

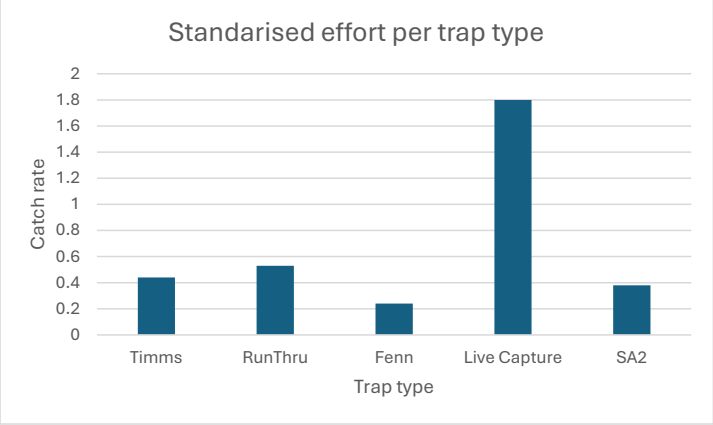

Figure 23: Total catch with standardised trap effort

4.2.2 Target Species overview

4.2.2.1 Cats

Eight cats were caught across 3 of the 5 trap types present on the river. Live capture traps were the most successful, catching at over double the rate of Timms or SA2. However, interpretation of this result should consider a potential data bias. Live-capture traps were positioned based on known cat presence and rebaited and checked more frequently, whereas the other trap types remained in fixed locations. Tulls (the most eastern colony) was a hotspot for cats, with 6 of 8 being caught here, including a breeding female and her 3 kittens.

4.2.2.2 Hedgehog

Eleven hedgehogs were caught in all but the SA2 traps this season, with Runthru traps proving the most successful. The majority were caught at Groyne 2 and at Groyne 1, where hedgehogs were responsible for depredation of at least 14 nests. This is the first season since detailed nest monitoring began in 2019 where hedgehogs have caused significant damage.

4.2.2.3 Norway Rat

Norway rats were the most frequently caught predator this season at 21; once again Run-throughs overwhelmingly had the highest catch rate for this species. Fourteen Norway rats were caught along a berm only a stone's throw from the BFT colony at Groyne 9. Incredibly, only 3 nests were predated here, indicating there was potentially a food source elsewhere. This is a unique situation, in previous seasons, BFT colonies this close to rat colonies were decimated.

4.2.2.4 Mustelids

Only 1 stoat was caught this season, at Groyne 1 in a Fenn trap. It had not been seen on any trail cameras prior, and it is unknown how much damage can be attributed to it. Historically, stoats have not been a major problem on the Ashley Rakahuri, perhaps due to high cat density.

5. Discussion

5.1 Historical tarapirohe/black-fronted tern breeding success

5.1.1 Fledgling counts

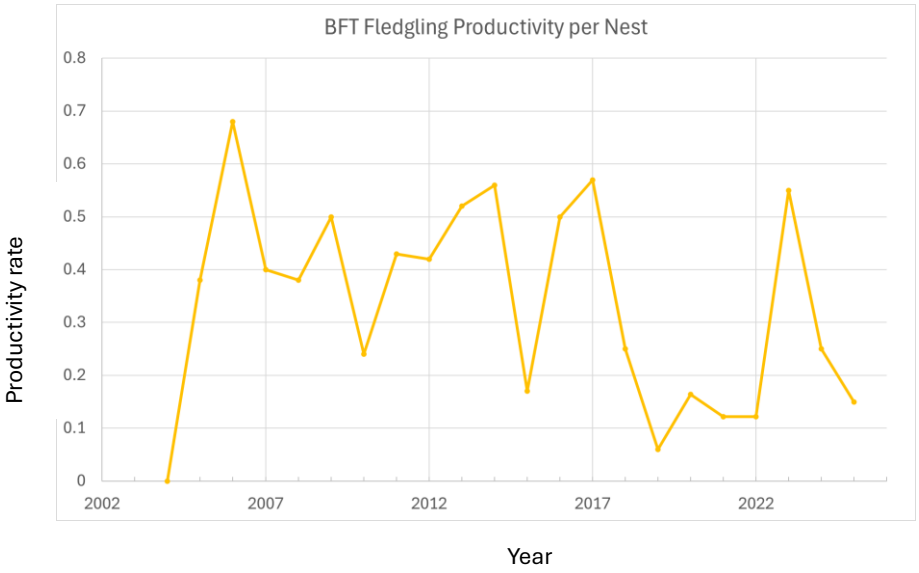

Figure 24: Historical BFT fledgling counts on the Ashley Rakahuri

Figure 24 above shows the annual fledging counts for BFT since 2004. We are seeing very poor fledgling numbers from the Ashley Rakahuri River. Average fledgling productivity since 2018 (when intensive monitoring began) is 21% per nest. This season the productivity per nest was 15%. As this figure does not account for fledgling mortality, actual recruitment is likely lower.

Population viability analysis for BFT indicate that approximately 1.0-1.2 fledglings per pair are required to stabilise the population (Keedwell R. , 2004). It is important to note here that this is represented in productivity per pair, and pairs can re-nest multiple

times, but regardless, productivity is currently well below what is needed for a self-sustaining population.

An attempt was made to estimate the number of breeding pairs on the river. From multiple counts of roosting birds just before the nesting season started, 15% were adjudged to have non-breeding plumage. Flocks sometimes in excess of 100 were consistently present over weeks in the Okuku Junction, Groyne 2 and Smarts areas. Overlapping photographs from good vantage points were stitched together and each bird was closely examined. We will be continuing with this methodology in future. It assumes that the birds counted in our November annual survey are the only BFT on the river – that we aren't getting movement between rivers.

Multiplying the annual BFT count of 251 by 0.85 and dividing by 2 gives 107 breeding pairs. Dividing this by the number of fledglings (38) results in a fledgling per pair ratio of 36% - still perhaps half of what is required for sustainability.

5.1.2 2024/2025 to 2025/2026 comparisons

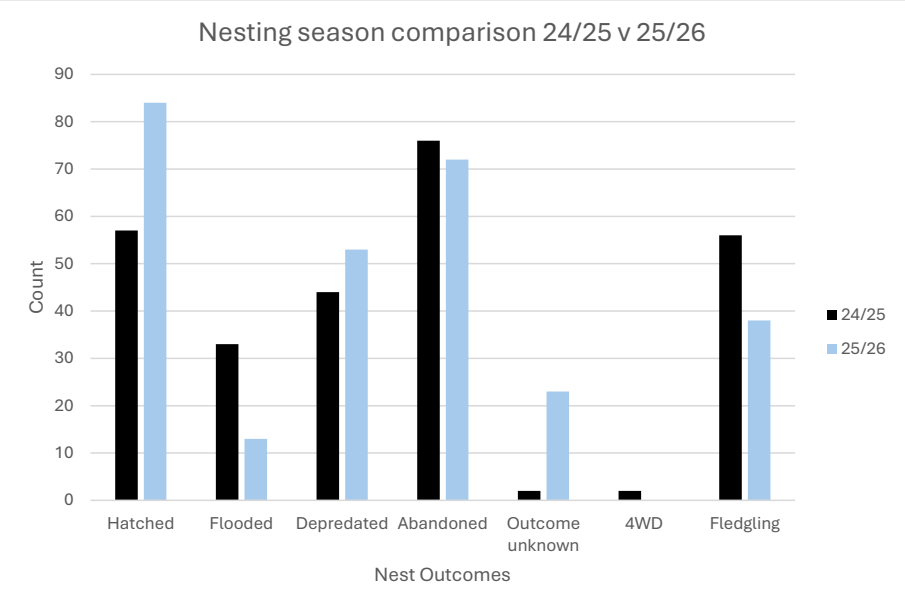

Figure 25: 2024/2025 v 2025/2026 nesting success

As in 2024/2025, intensive monitoring was undertaken for the 2025/26 season, with 50% more temporary traps deployed onto the river in comparison to the 2024/25 season. Despite this - fledgling success was higher in 2024/2025 (Figure 25).

Flood-related nest loss differed sharply between the two seasons, reflecting contrasting river-flow conditions. This year's flood/large fresh events occurred late in the breeding cycle, after most nests had already hatched. No nests this year were lost to 4WDs, in comparison to 2 lost last season.

The most striking pattern in this comparison is that, despite increased effort during the breeding season, overall outcomes were lower. This suggests that our current trapping regime may not be reducing predator pressure as effectively as required. It is important to note here that data such as this should be treated with a degree of caution - annual variation in weather, river flows and food availability can have a strong impact on breeding outcomes independent of any management actions. Furthermore, a single highly effective predator can cause disproportionate nest loss so breeding outcomes can also be strongly influenced by chance. In seasons where such predators are absent or do not encounter colonies, hatching success may appear high regardless of management effort.

Figure 26 further puts 2025 – 2026 BFT nesting in context with previous years. In this season there were a large number of colonies which lasted longer than usual. This was almost certainly due to loss of nests or chicks from predation and the resultant renesting. However, we have no BFT banded on this river, so cannot test this assumption.

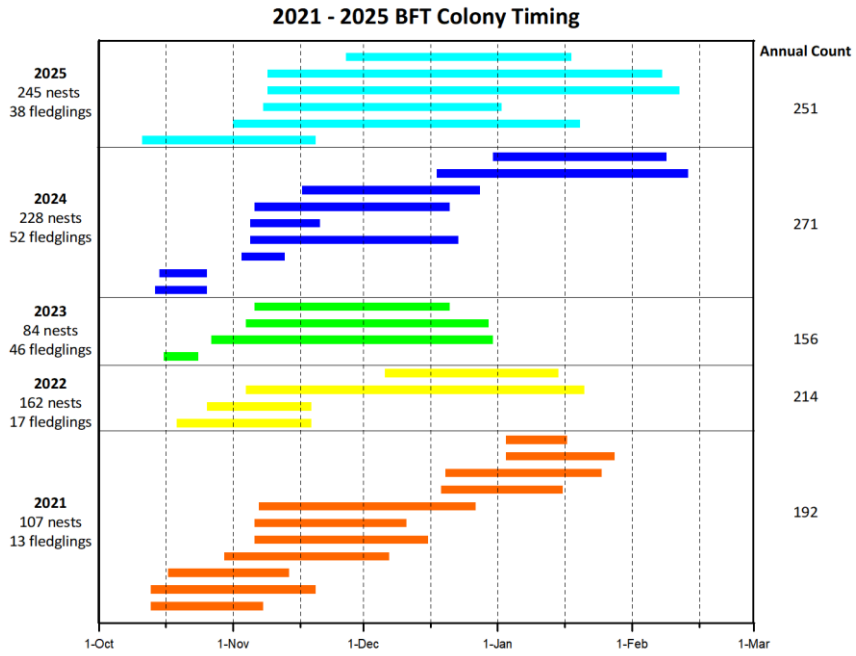

Figure 26. BFT colony timing since 2021

5.1.3 Chick vulnerability

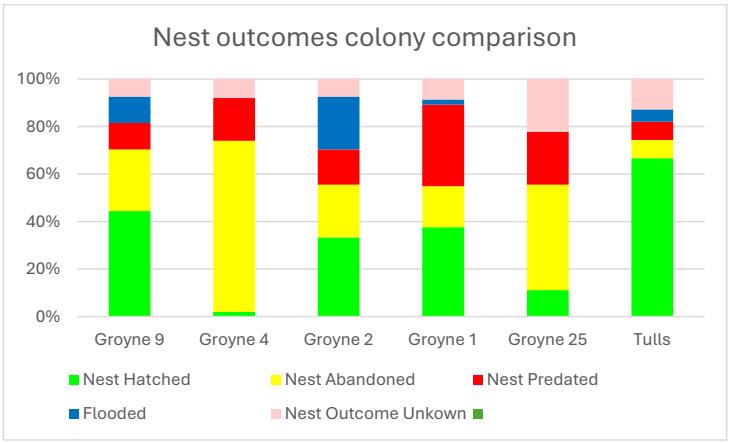

Figure 27: Scaled nest outcomes per colony

A re-visualisation of the outcome data above highlights the disproportionately high rate of chick loss across certain colonies, particularly at Tulls (Figure 27) 66.7% of nests here successfully hatched one or more chick, a solid hatch rate for a braided river species. This rate suggests that there were no major problems in the incubation stage. However, there is a steep decline here between hatching and fledgling. Of the 26 nests that hatched, only 8 survived to fledging, about 30%. This is where we see evidence of high chick mortality, particularly when comparing to last season where this was not as prevalent.

Depredation pressure on chicks remain high once chicks are mobile and begin to leave the relative parental protection seen at the nest. It is also difficult to determine exact cause of chick mortality, as large predators such as cats are able to swallow prey whole and are therefore unlikely to leave any physical evidence (Keedwell, Sanders, Alley, & Twentyman, 2002).

Five cats were captured in live capture traps at Tulls during the chick rearing period. While direct attribution of chick mortality to these individuals is not possible without more evidence, the markedly low fledging output is most likely reflective of the high localised predator abundance – in particular that of cats. Furthermore, Bell (2017) found that depredation of BFT continues until birds have moved on from the natal colony. Overall, therefore, it means fledging success could be even lower than what is reported here, as fledglings will continue to be predated on until they disperse.

5.1.4 Aggressive and Dominance Behaviours Within the Colony

Figure 28: Bullying behaviours exhibited

Multiple events were captured on trail camera footage (Figure 28) showing intraspecific aggression within the black fronted tern colonies this season. Kubelka (2020), noted that intraspecific depredation with shorebird species is not uncommon, and was seen with both Ruddy Turnstone and Snowy Sheathbills. Indeed, last season on the Waiau Toa, there was an increased rate of intraspecific egg depredation within the Black-fronted tern colonies (Connor-Maclean et al. 2024).

What we observed on the Ashley–Rakahuri was not intraspecific depredation, but behaviour more consistent with social aggression and bullying, largely by non-breeding individuals. As can be seen in figure 26, chicks were picked up and dropped, after which the attending parents returned and aggressively chased the intruders away. On another occasion, a chick was seen hiding under a rock while a non-breeding tarapirohe repeatedly pecked and harassed it. BFT defend their nest most actively at hatching, therefore aggressive behaviour peaks when chicks are around. While these interactions did not appear to have any measurable consequences this season, the behaviour provides an interesting insight into colony dynamics.

5.2 Predator trapping

5.2.1 Trapping impacts on colonies

The permanent trap lines running on the true north and south banks of the Ashley Rakahuri River were established in the early 2000s. Temporary trapping on the river is carried out each nesting season from August – February.

For the previous three seasons, the best nesting success has been in colonies outside of the permanent trap line extent or ‘treatment zone’. This could be from a myriad of reasons; the first is that, spaced at 100m, they are not at a high enough density to make a dent in predator abundance. The second is the potential that the traps and

subsequent bait are attracting mice and therefore attracting cats to the riverbanks. What is clear is that the presence of these permanent trap lines does not seem to have correlation with hatching success.

Temporary trapping out on the river has been successful at catching several target mammalian predators that are responsible for nest failures at BFT colonies. These traps are concentrated around the known colonies at a higher density.

Despite extensive trapping and other human interventions, raised islands with consistent, protective river flow remain the most important factor in keeping birds safe from predators. These islands naturally limit predator access in ways that management alone cannot fully replicate. However, flow in the Ashley is quite low and it is sometimes impossible to maintain flow around islands.

5.2.2 The discovery of a new predator

The little owl was a significant predator for the BFT this season. The first indication of the presence of little owls in a BFT colony was the discovery of a headless corpse on October 31 (Figure 29). A trail camera was placed at the corpse, and that night for around 5 hours from 11:26pm, an owl fed on the bird. Initially, it was thought to have been predated by a stoat or cat and only scavenged on by the little owl. On November 10 however, another headless BFT corpse was found at Groyne 4.

Figure 29: Black-fronted tern corpse

On 12 November 2025, a series of trail camera photos showed a little owl depredating an adult BFT on the nest at 03:17am (Figure 30). The owl was recorded intermittently on Trail camera 7 until 03:50am.

A further trail camera was located on a nest 15m east, where at 03:54am, the little owl was photographed. The owl is subsequently seen taking an egg from the nest at 04:01am (Figure 31).

Figure 30: Little owl depredation of adult black-fronted tern

Figure 31: Little owl depredation of black-fronted tern egg

The biggest impact of this predator, however, was not the nests it predated, but the mass scale abandonment of the colony that followed its nocturnal visits. Groyne 4 had 50 BFT nests of which only 1 successfully hatched one or more chick -although none fledged. Thirty-six of the 50 nests were abandoned over the course of 2 nights. While we

cannot definitively prove that all this abandonment was linked to the little owl, there was no evidence through either trail camera or trap catch, of any other predators.

There is some evidence, or a hint of such, that this mightn't be the first year a BFT colony has been wiped out by a little owl on the Ashley Rakahuri River.

In 2020, about 3.3km upstream from Groyne 4, a 21-nest colony was destroyed with some eggs abandoned, some nests robbed of eggs. At about the time of abandonment a headless BFT adult was found in the colony area. Along with cats and stoats, little owls are known for their opportunistic feeding habits, known to often only consume the head of prey due to its nutritional value (nzbirdsonline, 2026). While we cannot definitively attribute this abandonment and depredation to a little owl without DNA or trail camera evidence, it is nonetheless reminiscent of the experience at Groyne 4 in 2025.

Very little research has been done on what is the only purposely introduced bird of prey to New Zealand. Older studies state that little owls are not considered a significant threat as a predator to any native bird species (nzbirdsonline, 2026). Our findings highlight the importance of further research to understand the behaviour of the little owl.

6 Recommendations

6.1 Tarapirohe/black-fronted tern monitoring

- Increase river walk-through surveys early in the breeding season to ensure that colonies are found in good time. This will allow grid searching to be done early in the incubation stage which is safer for the birds.
- Attempt to predict where colony locations may be to allow traps to be installed earlier - in advance of birds nesting
- Use trail cameras more widely to detect predators – both at the colony location and potential access routes.
- Grid search all colonies after nesting has finished to find predated birds, dead chicks and other things of interest.
- Attempt to better monitor other species nesting in the BFT colonies such as poaka and pohowera.
- Continue to investigate using the 'hedgehog consent' to make improve flow around islands that have good nesting characteristics. This could have been done this season at Groyne 1 - early in the incubation phase.
- Utilise thermoscope technology to locate both birds and predators.

- Overall, ARRG's monitoring program is robust and more than adequate for elucidating the problems and reporting on key issues. We are not researchers, so although we acknowledge higher detail monitoring could be done, future effort needs to continue being directed into the predator control program.
- Further research into the tarapirohe dietary intake through the breeding season. Further knowledge of this could help in determining if food availability influences where the birds choose to nest.
- Very importantly, we need to band multiple black-fronted terns to further understand them. Are the same birds nesting on the river each year, are they renesting as we assume? This has been a priority for several years, but we have been unable to proceed with it.
- Next season a PhD student from Canterbury University will be commencing a thesis on the Ashley – Rakahuri. The topic has yet to be decided, but given the problems BFT are facing, they will constitute at least part of the study. ARRG will be closely involved in this work.

6.2 Trapping & Predator suppression

- A more targeted approach to predator control with greater use of live-capture traps and more strategic placement of temporary traps within established predator thoroughfares if they can be identified.
- Increase trap density around colonies, as colonies with higher trap-to-nest ratios this season achieved higher hatch rates. The aim is to increase the likelihood of predators encountering traps before reaching nesting colonies.
- Utilise DNA testing of BFT corpses to identify predators
- Undertake necessary adjustments to the Run-through traps to ensure they are reliably and humanely killing hedgehogs.
- Continue to experiment with different trap types and bait.
- Utilise the rat detection dog at ARRGs disposal before and during the season
- Investigate using a cat dog contractor to maximise cat trapping efficiency
- Look into cat deterrence methods – as being trialled by Manaaki Whenua Landcare Research.
- Continue to maintain the permanent trap lines on the banks of the river - but don't expand on them. Reinfestation and recruitment rates in an environment like this make reducing the predator populations extremely difficult. Instead focus on protective trapping around colonies.
- Have a better distinction for trap locations e.g. edge, berm, island, peninsula to allow for easier analysis of trapping data.
- Foster more volunteer opportunities for people to come help place and remove nesting season traps.

Acknowledgments

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- Wrybill Birding Tours, NZ

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