Management and monitoring of shorebirds in the Ashley-Rakahuri River during the 2019/20 season

Weed invasion is arguably the No 1 threat to breeding habitat for braided riverbed birds.
A purpose-built tractor-mounted undercutter appears to create good weed-free gravel surfaces.

Ashley-Rakahuri Rivercare Group, Inc.

Management and monitoring of shorebirds in the Ashley-Rakahuri River during the 2019/20 season

A report by:
N. J. (Nick) Ledgard
G. R. (Grant) Davey

Prepared for:
Ashley-Rakahuri Rivercare Group, Inc.
(composition of Group given on last page – Appendix 3)

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Summary

The Ashley-Rakahuri Rivercare Group was formed in 1999. Its main goal is to protect key shorebird populations in the lower reaches of the Ashley-Rakahuri River, in the 21km stretch between the Okuku river junction and the upper estuary below the SH1 road bridge. This is the 15th annual report from the Group.

The Group's finances are in good shape. We are now mostly self-funded for our day-to-day existence, with finances coming from a trap making and selling project (197 traps made and 116 sold in 2019-20), donations and sponsorship via Karikaas Natural Dairy Products Ltd cheese sales. Grants for larger special projects (such as weed clearing) come from ECan and DOC.

Activities were focussed on management to assist the feeding and breeding of the threatened species in the river, particularly the wrybill (ngutupare), black-billed gull (tarapuka) and black-fronted tern (tarapirohe). To this end, the main actions undertaken involve habitat management (mainly weed control), monitoring bird populations and breeding success, predator control, restricting 4WD access to the river during the breeding season, and improving awareness by the public and river management decision-makers. ECan is currently overseeing and funding the writing of a long-term plan for the Ashley-Rakahuri river.

Habitat enhancement. The impact of weeds has changed considerably over recent years. Between 2014 and early 2017 there was a major decline in bird numbers caused by weed invasion and the loss of clear gravel areas (essential for bird breeding), before large floods over the 2017 winter increased clean shingle areas from around 30ha to over 250ha. However, these clear areas are now being reinvaded. Therefore past weed clearing efforts have been continued, with around 35 ha cleared by a locally developed tractor-mounted undercutter in August, 2020. The Group is concerned about management leading to an ever-widening berm zone, which limits 'room for the river to move' and leads to loss of the 'normal' braided riverbed habitat essential for the long-term survival of riverbed birds.

Bird surveys. Although the bird population trend up to 2014 was a positive rising one, it reversed (declined) in the following 2 years. However, the survey figures for November 2017 and 2018 indicated that this decline in bird populations had stopped. It is pleasing to report that the survey of 2019 recorded record numbers of most species. Wrybill numbers (27) were the highest ever, as were those for all the other core species. These numbers could have been boosted by birds displaced by large floods on the Waimakariri river. Every month a 2-km stretch of riverbed is surveyed between Groyne 1 and 2, with the aim of comparing bird numbers over a full year. Over summer, the average number of different core indigenous species is 4-5 times greater than in the winter, whilst the total bird numbers are over 6 times greater.

Monitoring of breeding birds. Up to 10 pairs of wrybill took up different territories at some stage during the 2019-20 season - a record number. Eight chicks were raised, for a minimum productivity of 0.80 chicks fledged per pair. Such productivity is close to the 14-year average of 0.79. For the first time since 2000, there were two black-billed gull colonies containing over 2000 nests. There was also a record number of breeding black-fronted terns (111 nests). Average productivity (number of chicks fledged) of the two gull colonies was 0.41. This is lower than the 10-year average of 0.55. Average productivity of the three black-fronted tern colonies (those with more than 20 nests) was only 0.06. This is well below the 16-year average of 0.32. Breeding productivity of other species was not recorded, but signs of success were noted at many sites. During the season, two small colonies of gulls (191 nests) and terns (14 nests) were visited in the upper Okuku (a tributary of the Ashley-Rakahuri), where fledging success appeared to be better than further down the river.

Predator control. Alongside the river. There was an average of 249 traps alongside the river (mainly DOC 200 and Timms), maintained by a team of 17 volunteer trappers. The number of trap-nights during the 2019-20 year was 90,517, with a catch rate/100 nights of 0.54. This cannot be compared to previous years, as up until now summer and winter trapping have been treated separately (average of 0.41 and 0.73 resp). A total of 489 predators were trapped. Rats were the most numerous (183), followed by hedgehogs (162), weasels (70), feral cats (42) and stoats 25. *Estuary*. 135 traps were serviced by 8 trappers along a shoreline of around 10.5km. Trap-nights totalled 49,654, with a catch rate of 0.54 (last season 0.63). A total of 270 predators were trapped. Ship rats were the most common caught predator (80), followed by Norway rats

(56), weasels (48), stoats (42), hedgehogs (17) and feral cats (16), unspecified rats (8) and ferrets (3). In addition to the traps, over 100 rat bait stations were deployed alongside the river and around the estuary. Rats are a relatively new concern (few caught until recently) and the aim is to reduce numbers before the breeding season starts. Other significant bird losses were caused by harrier hawks and bird strike involving powerlines. These will be monitored more closely in the 2020-21 season.

Meetings /members and awareness / education. The group has 35 members and 116 recipients of regular update emails. During the 2019/20 season, the Group held four meetings, with attendance numbering between 13-19. The Group also has an 8-person Management Committee which met on three occasions. Over the past year, many opportunities have been taken to ensure that the public were kept aware of the Group's activities. Four articles appeared in local papers. Powerpoint presentations were given to five schools, plus presentations were made to eight public groups and service clubs. Four interviews were given to the local radio 'Compass FM', in addition to one for Radio NZ. A regular email update was sent out during the breeding season. The Group's 20-minute documentary/ video 'Rakahuri Rescue' was shown a number of times and regularly viewed on our website. Karikaas Natural Dairy Products Ltd in Loburn continues to use our name, plus images of riverbed birds, on their premier cheese packages, in return for which we get a percentage of profits. During the year, group member and professional communicator/photographer, Steve Attwood, completed a Communications/Promotions strategy for the Group. The purpose of the strategy is to ensure that communications and promotions meet the purpose of the Group and its conservation objectives, and are consistent, planned, credible and accountable. The strategy also proposes that ARRG establish and publish to members an annual activities and communications / promotions calendar. Our website (www.ashleyrivercare.org.nz) was kept up to date by Sonny Whitelaw, while Steve Attwood ran our Facebook page (https://www.facebook.com/ashleyrivercare). Relative to the latter, Steve records that it is 'pleasing to see followers increasing year by year with very few drop-offs'. Both social media outlets are vital, as they serve as our 'shop window'. The Group remained closely associated with staff from DOC, the Waimakariri District Council and local Zone Committee, Environment Canterbury (ECan) and the Ashley-Rakahuri Regional Park - plus contributed actively to the running of BRaid Inc, a group which aims to improve the ecological welfare of all braided rivers in Canterbury.

Conclusion. Relative to the future success of rare and endangered shorebird species breeding in the Ashley-Rakahuri river, bird populations and breeding success increased significantly from 2000 – 2014. They then declined, due primarily to a major increase in weed-infested areas, but have now recovered to above previous levels. Over the past 3 years, much effort has gone into artificial weed removal and increasing predator trapping. The major challenges now involve maintaining adequate weed control, further improving predator control (particularly relative to climbing numbers of rats and weasels), addressing the problem of advancing berm zones which are reducing traditional braided river habitat, and maintaining the interest and involvement of the local community and major decision makers. The Group looks forward to a closer future liaison with ECan. David Owen, their Principal Biodiversity Advisor Braided Rivers is co-ordinating the writing of a new long-term management plan, aided by improved funding.

Recommendations for future management include:

1. Monitoring. Continue annual bird surveys and extend monitoring of breeding activities to include samples of nesting pairs of banded dotterels, S. Island pied oystercatchers and pied stilts – traditional focus has been on wrybill, black-billed gull and black-fronted tern. A measure of egg hatching is needed, plus more emphasis should be put on counting fledglings.
   To date: Surveys and monitoring being maintained adequately.

2. Improving habitat. Create and maintain improved habitat (e.g., extensive weed-free sites – preferably islands) for bird breeding and feeding - on an annual basis. Continue development of cost-effective and environmentally-friendly means of maintaining weed control, and promote removal of fairway islands with semi-permanent vegetation. Need for further discussions with ECan about the ever-widening berm zone which limits 'room for the river to move' and leads to loss of 'normal' braided riverbed.
   To date: Significant artificial weed removal since 2017 floods, with promising potential for greater clearance using tractor-mounted undercutter. Concern about ongoing increase in berm width.

3. Record keeping. Continue to improve record keeping and mapping (traps and bird nesting), and band more birds.
   To date: Record keeping and data presentation plus feedback to end-users is now excellent. Moves are underway for approval of new wrybill banding attempts.

4. Predator control. Continue efforts to extend predator control and the use of new strategies, particularly around breeding birds. This effort needs to refine dense trapping around colonies (particularly targeting rats), deployment of a second line of traps along the riverbank, and greater use of trail cameras, plus the possible use of scarecrows to deter hawk predation within colonies. Bird losses are also caused by powerline strikes – the numbers concerned need to be quantified by regular inspection.
   To date: Trapping has been adequate, and now includes rat bait stations and more intense trapping around colonies. Additional funding has been sought to complete the entire river margin (doubling current trap numbers) and reduce on-going losses of eggs, chicks and adult birds.

5. Advocacy. Adopt a recently completed PR strategy to continue advocacy initiatives both by members and other agencies such as DOC, making use of the website and Facebook, the Powerpoint presentation, the documentary/video 'Rakahuri Rescue' and printed material such as handout fliers, bookmarks. Particular attention should be paid to schools and field interpretation / awareness signs for the public. Make use of a calendar/diary to ensure timely promotions at appropriate times and better recording of activities.
   To date: Good advocacy to date, which should be improved by a new Promotions/Communications strategy. In addition, the estuary interpretation panel will be repeated up-river.

6. Funding. Maintain funding via Group initiatives (such as trap-making), and improved public awareness, plus enhanced agency linkages, especially with ECan.
   To date: Funding has been adequate over recent years. Our major fund raiser, trap-making and selling, not only adds to funds, but promotes effective predator control elsewhere. Larger projects have been supported by outside agencies, such as DOC, ECan and the Rata Foundation. However, new trapping, weed control and promotion intentions may stretch our resources.

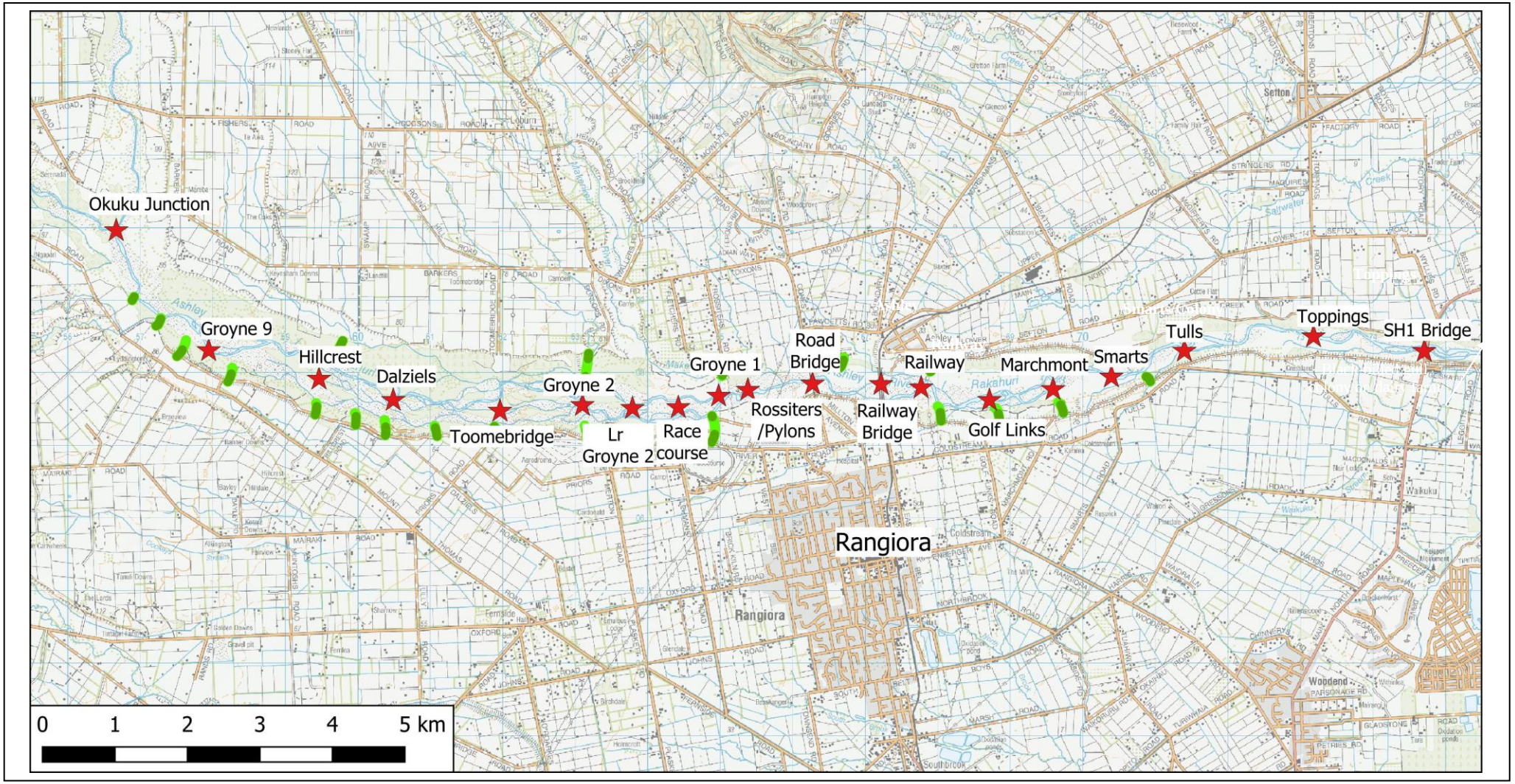
7. BRaid. Continue full support for BRaid Inc.
   To date: Good support of BRaid and its outreach programmes. The Group works closely with BRaid – both have the same chairman.

8. Maintain and improve collaboration. With ECan's Biodiversity Programme, the Waimakariri District Council and Zone Committee, the Canterbury Water Management Strategy's Regional Committee, Fish and Game, Forest and Bird and local iwi/runanga – plus with other influential local stakeholders, such as the Rangiora Airfield.
   To date: Good collaboration with all agencies, particularly with ECan. However, links with iwi/runanga, Fish & Game and Forest & Bird need improvement. Collaboration with the river engineer section of ECan could be significantly improved.

9. Gravel extraction. Maintain and improve collaboration with commercial gravel extractors. Monitor gravel extraction sites to help determine methods which are optimal for the environment.
   To date: Good collaboration with Taggart Earthmoving Ltd, but needs extending to other operators. Need to promote appropriate regulation enforcement by ECan, particularly of the smaller operators.

10. Local management. Support ECan's new braided river initiative and in particular its intentions for the Ashley-Rakahuri river - which involves the writing of a new management plan. Assist activities within the Ashley-Rakahuri Regional Park, and implementation of the Northern Pegasus Bay Bylaw 2016.
    To date: Good collaboration. The access way blocking during the breeding season is an example of this, but there are still on-going issues relative to motorised use of the riverbed and estuary.

Figure 1. Map of lower Ashley-Rakahuri river, showing main breeding areas



1. Introduction

The braided rivers of the South Island are a unique habitat of outstanding importance to endemic wildlife (Cromarty & Scott 1996, Dowding & Moore 2006). In particular, they provide breeding habitat for a range of threatened shorebird species, some of which depend largely or entirely on braided rivers for their survival. Braided rivers commonly have large areas of bare, mobile shingle, multiple channels, and variable flows (O'Donnell & Moore 1983). However their ecological values are increasingly threatened; most have been invaded by weeds and introduced mammalian predators, and are further degraded by a wide variety of human activities. This is well covered in DoC's publication 'Management and research priorities for conserving indigenous biodiversity on New Zealand's braided rivers' (O'Donnell *et al*, 2016).

The Ashley-Rakahuri is a medium-sized river located in North Canterbury. From the Ashley Gorge, the river flows east and enters the sea about 25 km north of Christchurch. Halfway to the coast it is joined by its major tributary, the Okuku river. In contrast to the larger snow-fed rivers, the Ashley-Rakahuri is fed by rainfall from the foothills and has relatively low flow rates. The estuary where the Ashley-Rakahuri drains into the Pacific Ocean has large areas of tidal mudflats, and is recognised as one of the best shorebird feeding sites on the South Island's eastern coastline.

Ashley-Rakahuri river / Saltwater creek estuary

The shorebird values of the Ashley-Rakahuri are well-recognised. The Ashley-Rakahuri River and estuary are included in a list of wetland sites which meet criteria prescribed to be of international importance by the International Union for the Conservation of Nature (IUCN) (Cromarty & Scott 1996). Following surveys of Canterbury rivers in the 1970s and early 1980s, the New Zealand Wildlife Service ranked their wildlife and conservation values; the Ashley-Rakahuri was one of five rivers given the highest possible ranking of 'Outstanding' (O'Donnell & Moore 1983). In 2009, declining bird numbers over the previous 25 years led to a reclassification of 'Regional' importance (Hughey *et al.* 2010).

The Ashley-Rakahuri Rivercare Group (ARRG) is a community group (see Appendix 3 for composition) formed in 1999 to assist with management of the lower reaches of the Ashley River. Its main aims are to protect shorebirds and their habitat in the riverbed, to monitor breeding success, and to promote these activities to the wider public, while at the same time recognising other sympathetic users. In 2005, the Group became an incorporated society. Between 2004 and 2012, the Group received considerable 'set-up' funding from the Pacific Development and Conservation Trust, the New Zealand National Parks and Development Foundation, the Habitat and Protection Fund of World Wildlife Fund and the Lotteries Environment and Heritage Committee. Currently, the Group supports itself by local fund raising, sponsorship from Karikaas Natural Dairy Products Ltd, and donations, with larger projects funded by grants from outside agencies, particularly Environment Canterbury (ECan). The activities undertaken since 2004 have been described in the Group's annual reports (Dowding & Ledgard 2005, 2006, 2007, 2008, 2009, 2010; Ledgard & Dowding 2011; Ledgard, Spurr and Crossland, 2012; Ledgard and Mugan, 2013; Ledgard & Dowding, 2014, Ledgard, 2015, 2016, 2017; Ledgard and Davey, 2018, 2019), which also record the results of bird monitoring, habitat enhancement, predator control, and advocacy, and make recommendations for future management. The present report documents the management activities and monitoring of birds that were undertaken during the 2019/20

season. An analysis of longer-term results from 2000-2015 is given in the 2013-14 report, with a scientific paper by Eric Spurr and Nick Ledgard published in *Notornis* 63(2), 2016.

In the past, the river has provided breeding habitat for significant numbers of black-fronted terns and many hundreds of pairs of black-billed gulls. In the 1990s and early 2000s, the number of gulls in particular declined substantially (Dowding & Ledgard 2005). The Ashley-Rakahuri used to be described as the most northerly river on which wrybills breed, following a southward contraction of the core range of the species over the past century (Riegen & Dowding 2003). However, a number of wrybill pairs have now been recorded breeding on the Waiau river, which is about 70 km north of the Ashley-Rakahuri. The Ashley birds remain the northern-most population which is known to have been stable for some time. These three key species have been the main focus of management activities of the Group; all are endemic, have declining national populations and are considered threatened.

Black-fronted tern (tarapiroe) in riverbed

The threat categories of all New Zealand birds were revised in 2012 and the results reported by Robertson *et al*. (2017). The most endangered species on the Ashley-Rakahuri River is the black-billed gull (tarapuka) which is now classified as Nationally Critical, and internationally as Endangered, making it the world's most threatened gull species (BirdLife International 2014). However, a more recent study suggests its current threat status may be too high (Mischler 2018). The next most threatened species is the black-fronted tern (tarapirohe), which is classified as Nationally Endangered, the second-highest ranking possible under the New Zealand scheme. The wrybill (ngutupare) has a declining range and is classified as Nationally Vulnerable, as is the banded dotterel (pohowera), which is considerably more common on the Ashley-Rakahuri River. Other shorebird species which breed on the river, such as the pied stilt (poaka) and the South Island pied oystercatcher (torea), are listed as At Risk.

Future riverbed and bird management is currently being reviewed, led by David Owen, ECan's recently appointed Principal Biodiversity Advisor Braided Rivers (see section 10).

2. Study area

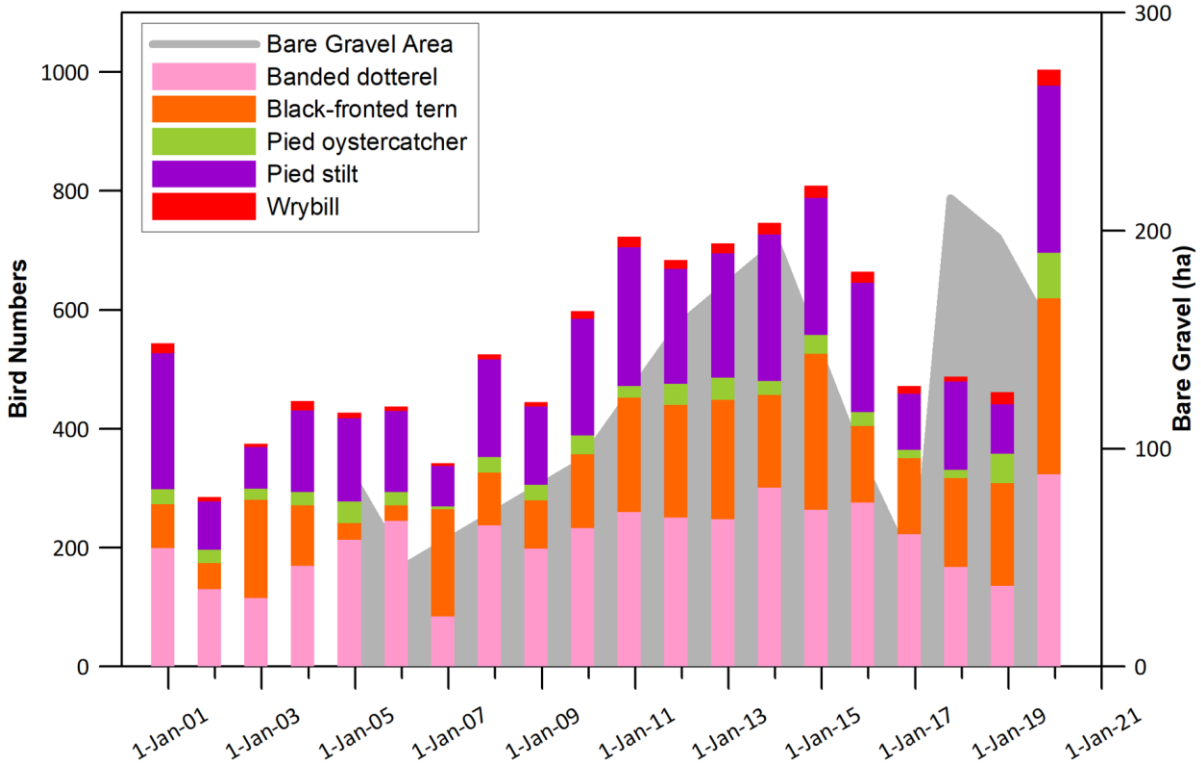
The study area has traditionally comprised the 19 km stretch of the lower Ashley-Rakahuri river, from the State Highway 1 road bridge up its confluence with the Okuku river. It was described in detail in the Group's first report (Dowding & Ledgard 2005) and an updated Google-based map of the area is presented in Figure 1 above. In 2018, the area was extended to 1.5km below the SH1 bridge, which marks the upper reaches of the tidal estuary.

3. Habitat management

Controlling weeds. Over the past 5 years, the negative impact of weed invasion on bird populations and breeding has become very obvious. Consequently, major efforts have gone towards weed clearance and control. Early reports describe a combination of physical hand-pulling and earth-moving machines which was used to remove weeds from specific sites in order to create potential bird breeding areas. However, experience has shown that these cleared areas can only be small and there is no guarantee that birds will use them. Hence, the reliance has been on natural floods to clear away large areas of weeds. However, after the May, 2014 flood ($480cm^3$) there was no major flood event until the winter of 2017, and hence the area of clear, weed-free shingle declined significantly, from nearly 200ha to around 30ha. Following that drop remarkably closely, came a decline in bird

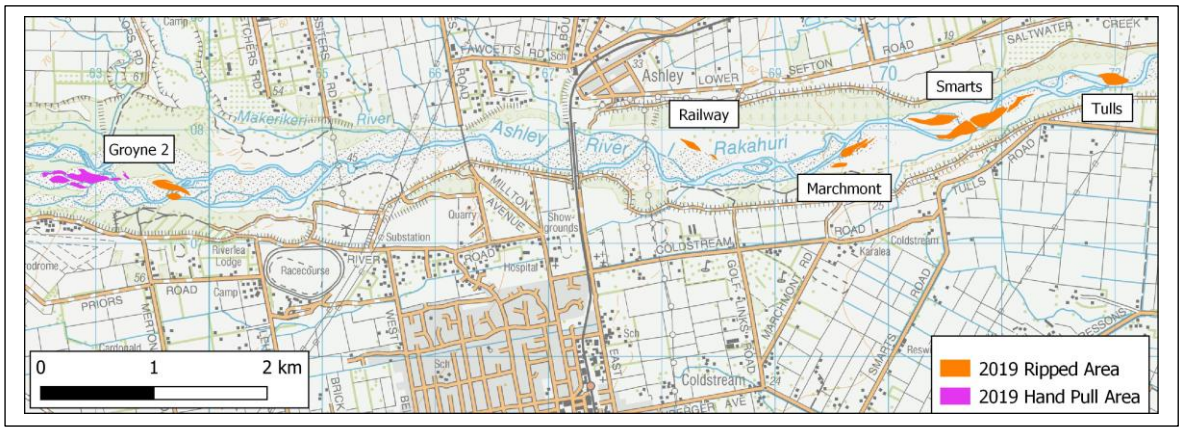
numbers, which only reversed in 2019 (see Survey section), 2 years after a major flood in July 2017 cleared over 200ha of encroaching weeds (Figure 2)

Figure 2. Changes since 2005 in bare gravel area relative to numbers of key bird species.



As major floods cannot be guaranteed, weed clearance using heavy earth-moving machines was initiated in the winter of 2016, with further removals to the present day (see 2018 'weed clearance' Internal report listed at end of References). In June / July, 2019, a new trial funded by DOC and ECan was initiated in the same area, this time using a ripper/undercutter unit towed by a dual-wheeled 200hp tractor. This was developed by local farm contractor, Nathan Stewart of Cresslands Contracting Ltd (Tulls Road, Rangiora). A total of around 15.5 ha were cleared of weeds after 20 hours of riverbed work - see Figure 3 and Internal report Ledgard and Davey, 2019). 4.6 ha were also hand pulled in the Groyne 2 area.

Figure 3. Areas cleared of weeds in July 2019.



With the support of ECan and DOC, this ripper/undercutter has been slightly modified and the clearance will be continued over the 2020 winter. It is planned to clear an area of 30ha, comprised of 10 different sites where bird breeding has been favoured in the past.
In 2019, in conjunction with the tractor-ripper weed clearing work, a student study was initiated. The student is University of Canterbury student, Sanaz Safavian, working on a 3-year PhD degree, under the supervision of UoC lecturers and DOC. In her trials at the Tulls and Smarts sites, she is comparing vegetation growth and successions between cleared sites and control plots left undisturbed.

Lachlan Shaw of Cressland Contracting Ltd alongside the ripper/undercutter his employer developed for clearing riverbed weeds.

Loss of braided fairway area. Over the past year, some time has been spent investigating historical changes in braided fairway area and the possible reasons behind them. Studies of 11 sets of aerial images going back to 1942 show that the open fairway has shrunk in width by around 50% - and is continuing to shrink to the present day. The main reason for this is the increasing width of the berm zone particularly along the north bank of the river. Figures 4 and 5 show the changes between 1942 and 2018 out from Groyne 9 , plus the vegetation types in the present-day enlarged berm area. Figure 6 graphs the shrinking width along all the river between the Okuku junction and the SH1 bridge. The end result is that the river is losing its 'ability to move' and act as a normal braided river, with the associated braids and shallow water which are such an important component of riverbed bird habitat. Of added concern is the reinforcing of this berm advance by the planting of rows of willows and poplars and plantations of pine trees, plus the lowering of riverbed surfaces by excessive removal of gravel for commercial reasons. In short, in terms of acting like a braided river, the Ashley-Rakahuri is slowly but surely being 'strangled'. Investigations elsewhere indicate that the same process has occurred in other smaller foothills-fed braided rivers, such as the Orari and Opihi.

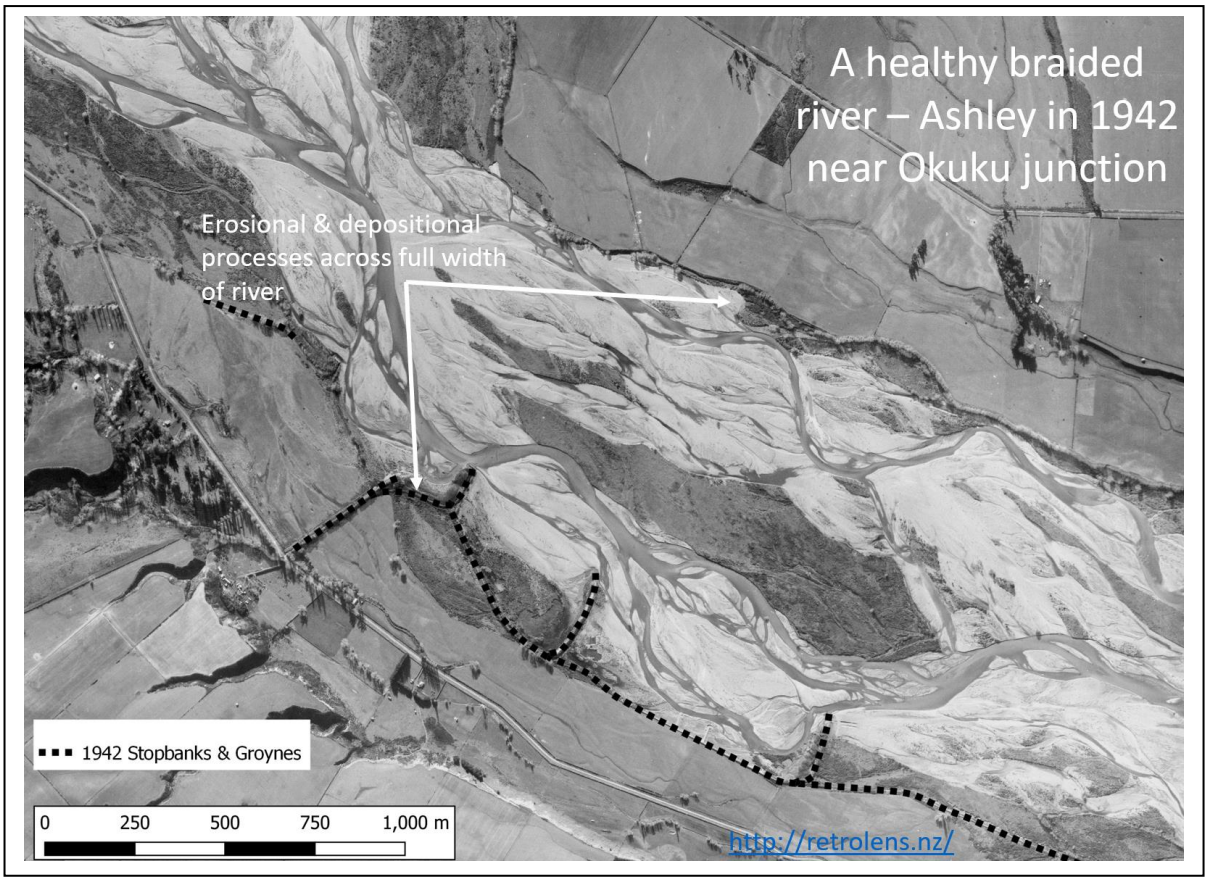


Figure 4. An aerial photo of the Ashley-Rakahuri river in 1942 – Groyne 9 area.

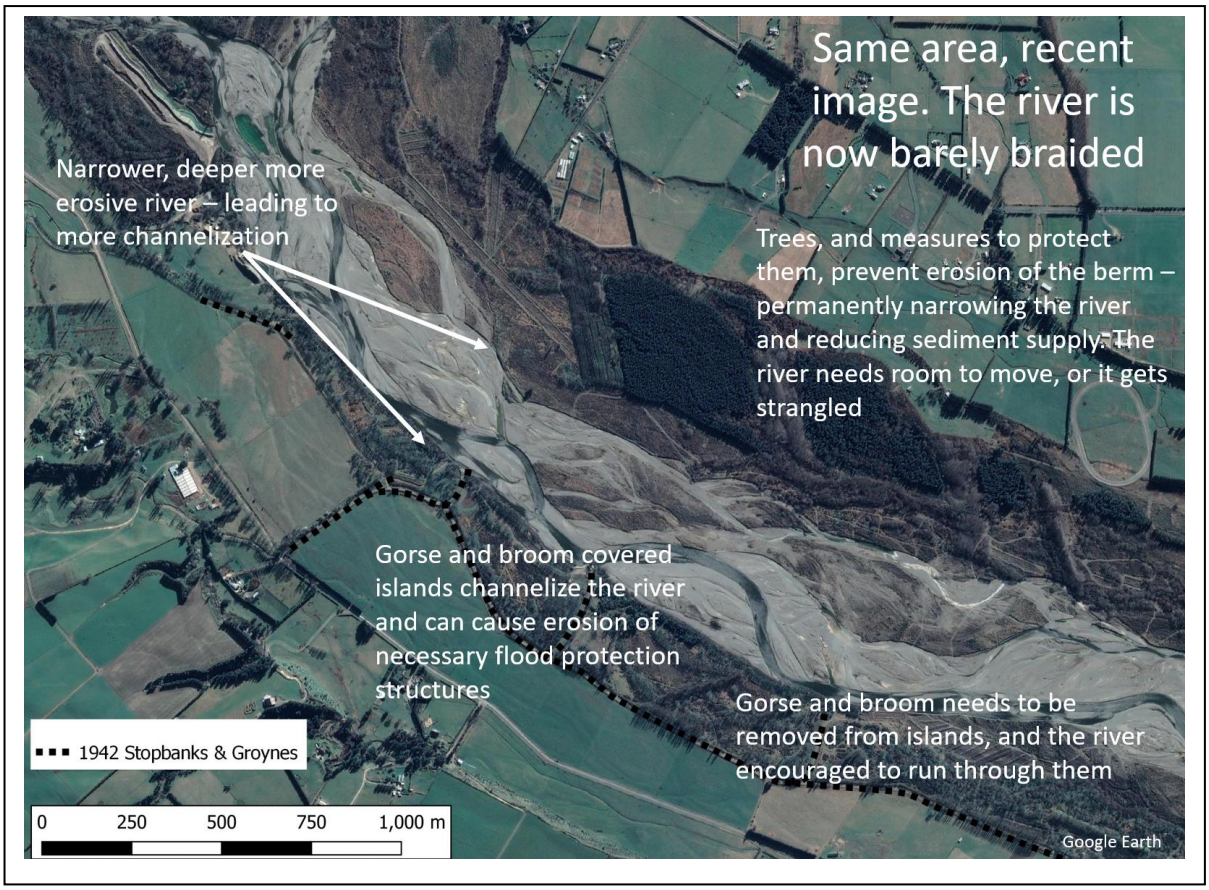


Figure 5. The same Groyne 9 area in 2019, showing wider berm with vegetation cover types.

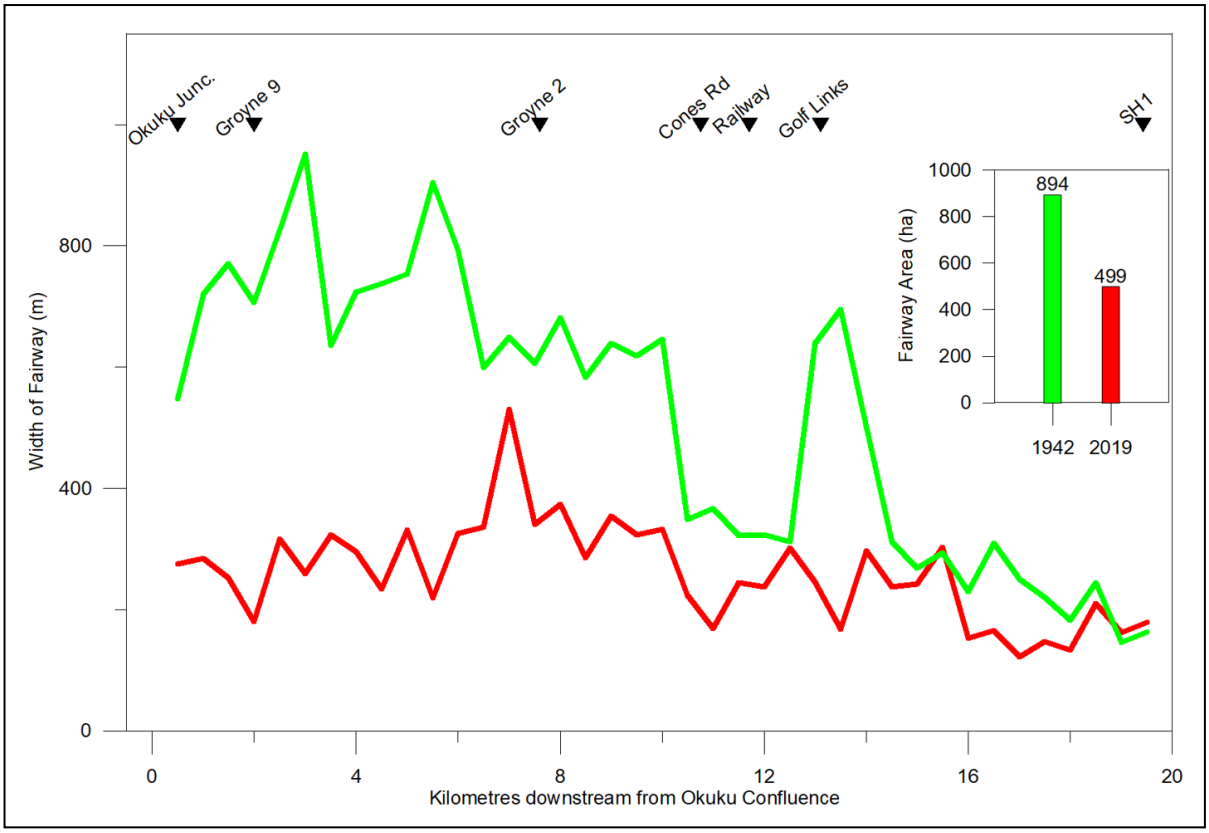


Figure 6. Loss of fairway width over the last 20 years – due to expanding berm width.

The major focus of braided river berm management has always been to protect stopbanks to ensure minimal risk of flooding onto adjacent productive farmland and areas of human habitation. However, it appears that little research has been carried out into what berm width and vegetation coverage is required to attain appropriate flood prevention. It could well be that this fundamental question has not even been asked, let alone answered.

Needless to say, the above findings relative to reducing fairway width gives good reason for concern about the future of the Ashley-Rakahuri river as a 'normal' braided river and a core breeding habitat for shorebirds. In the coming year, it is intended to raise this topic with ECan river engineers, in the hope that present-day berm management can be reviewed as to whether it is fit for purpose and as compatible as possible with the other main braided river management goal – to sustain the indigenous ecosystem and biodiversity values.

The bed of the Ashley River is wholly owned and managed by Environment Canterbury. Consequent to the above, discussions are underway with river engineers relative to how berm management for flood control could be leading to encroachment on, and general environmental degradation of, the braided river character of the central fairway. Published work on the Rangitikei River concluded that bank protection measures and gravel extraction led to the river changing from a braided nature to a single channel nature.
Discussion. The continuing and vigorous invasion of woody weeds within the study area remains as arguably the greatest challenge to successful bird breeding in the riverbed. Any increase in weeds is likely to lead to a decline in bird numbers (Figure 2), and that natural floods cannot be relied upon to remove sufficient weeds. For this reason, the Group has artificially cleared around 45ha of weeds since 2016. By and large, successful bird breeding has not resulted from this work due to the loss of cleared sites to floods, reinvasion by weeds and the fact that there is no guarantee that cleared sites will attract birds. But lessons have been learnt about what constitutes a 'favourable' breeding site, relative to location in the riverbed and the type of shingle surface created (see 2020 'Aspects' Internal report at the end of References). Islands with good surrounding flow of water are the best sites, and the preferred nesting substrate for the birds was weed-free poorly sorted coarse gravel. Terns and gulls built nests in close proximity to 8cm and 12-15cm pebbles respectively, plus sandy surfaces were avoided.
Using this knowledge and experience, the Group will continue weed removals on an annual basis (when necessary), utilising the experience gained using the tractor-mounted ripper / undercutter unit. The estimated cost is $250/ha. Cheaper clearance is possible using blades on such machines as bulldozers and graders, but the resulting shingle surfaces are often too compacted and smooth.

4. Predator control

4.1 Ashley River

At the end of the 1 August 2019 to 31 July 2020 period there were 228 traps in place. These consisted of 169 DOC 200 traps, 56 Timms traps and 3 Trapinators. Changes during the year included the loss of some 30 traps to fires (by the end of July these had been mainly replaced) and the addition of 55 traps (mainly purpose built run-throughs with DOC 150 mechanisms) which were in place around nesting colonies mainly from October to March. We also replaced a number of Timms traps with DOC 200 traps. Catch from Timms traps was much lower than that for the DOC traps and we received advice from DOC that such large numbers of these traps were unnecessary as they are mainly for feral cats, which have large ranges. Some rearrangement and infilling of traps was also done along lines – to come closer to the 100m trap spacing recommended by DOC.
During the year we had an average of 248 traps in place.

The photo below shows one of the run-through traps. These were made with a coreflute upper on a plank base. Such traps do not necessarily require bait – they generally rely on the instinct of predators to explore narrow spaces. However, they were baited with a sprinkle of cat biscuits and some peanut

butter – applied through the hole in the top. These traps were highly successful in catching Norway rats, hedgehogs and some stoats. However, they were not efficiently killing hedgehogs – which were pushed by the trap mechanism against the buckling coreflute. Peter Whitehead has designed a lightweight factory-made metal box to replace the coreflute - which should solve this problem.

Coreflute run-through DOC150 trap – specially made for temporary use around breeding birds

We now have 26km of the riverbank trapped with 17 lines being checked by the same number of trappers – although currently, there is a gap of about 3km on the southern bank just above the SH1 bridge. Traps have been checked 398 times - Figure 7. Checking rates have been quite good, although there was an obvious downturn during the lockdown period. We should be aiming to check traps twice monthly during the nesting season – approximately September to January. Not including temporary trap lines, our checking frequency should be around 34 per month.

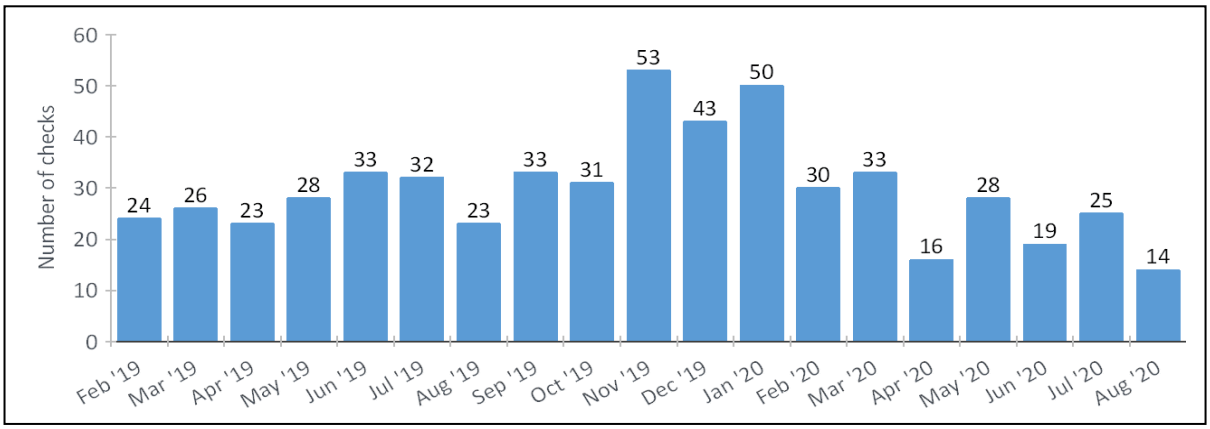


Figure 7. Trap checking frequency

Trapping supplies have been centralized in the DOC store shed for some time now. This is working well. DOC 200 traps are generally baited with eggs and salted meat, but individual trappers add their own favourite bait. Timms and Trapinator traps are generally baited with meat donated from the supermarket and salted by the group. Cheerios and rabbit are sometimes also used.
Discussions have been held with Environment Canterbury about them funding extension of the trapping network – and a consultant is preparing a report on the options. Possibilities include:

- Extending single line coverage each side of the river to cover all the banks between the Okuku confluence and the estuary.
- The above plus installing a second parallel line of traps.
- The above plus limited trapping along hedgerows etc. on private land outside the stopbanks.

If any of these options go ahead, the traps would be maintained professionally, as it would probably be beyond the capabilities of our group to do so.
Catch during the year consisted of -

Predator	**Number**
Feral cats	42
Hedgehogs	162
Weasels	70
Stoats	25
Ferrets	7
Undistinguished rats	29
Ship rats	77
Norway rats	77
Total	**489**

These data, along with that since 2004 is presented on Figure 8.

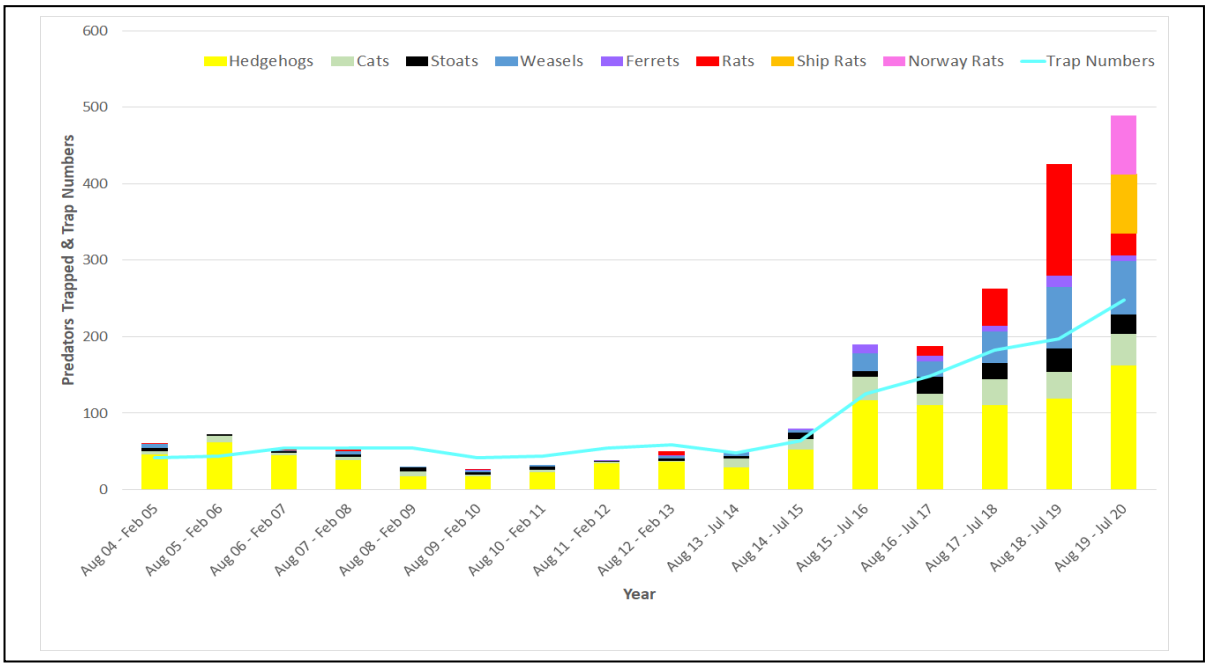


Figure 8. Trapping results since 2004

Locations where the predators were trapped are summarized on Figure 9 - see the legend in the previous figure. Lines 191 – 194 were around black-fronted tern and black-billed gull colonies. Trapping results for these were reported fully in an earlier internal report (Davey, 2019).

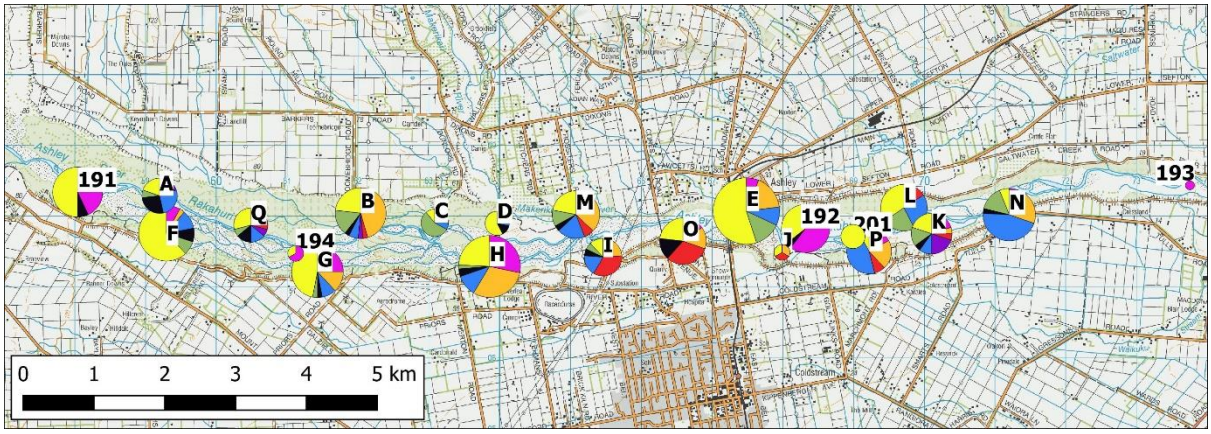


Figure 9. Predator catch per trap line

Comments on the predator species follow:

Feral cats

The 42 caught this year compared with 35 in the previous year. Twice as many were caught on the north bank compared with the south bank – despite roughly equal numbers of cat traps either side of the river. Some trail cameras have recently been deployed at traps, and it is apparent there are many cats around that are not being caught.

No cats were caught at the colonies, which included some Timms traps, so we had no evidence last nesting season of them being a threat to braided river birds. However, they would no doubt threaten bird species that live and nest along the berms.

Hedgehogs

Hedgehog numbers increased this year from 119 to 162. They also increased on a per trap night basis – which is against the trend since 2006. It is not known why per trap night numbers had been decreasing and it is worrying that they seem now to be on the increase.

Hedgehogs do not seem to have been a threat to the birds nesting on the river this year – as none were caught in traps immediately adjacent to the colonies while the river was flowing – almost all colony nests were on islands. They seem to be very averse to water. At Line 192, the Railway colony, hedgehogs were caught in the colony area as soon as the river went dry, but this was when the black-billed gull chicks were reaching fledgling stage.

They were caught in approximately equal numbers in all the environments we trap – under trees, in scrub, and on the riverbed.

Weasels

Weasel numbers decreased slightly this year – with a total of 70 compared with 80 the year before. None were caught out on the riverbed and traps in scrub and under trees were approximately equally successful in catching them.

Stoats

Stoat numbers also decreased slightly – with 25 versus 31 the year before. Several stoats were caught out on the riverbed close to colonies – and the remains of black-billed gull chicks were found close to what appears to have been a stoat den. This year the rabbit population on the berm seemed high, this perhaps meant fewer stoats on the nesting islands.

Ferrets

Ferret numbers also decreased – from 15 to 7. None were caught in the colony areas, and traps in scrub and under trees were approximately equally successful.

Unspecified Rats

We began distinguishing the rat species – Norway rat and Ship rat – at the start of the 2019-2020 year. However, 29 unspecified rats were still reported. It is important to tell the difference between these rats as it is the Norway rat which is clearly a major danger to birds on the river. Norway rats are typically larger, have a shorter stubbier tail and shorter ears than the Ship variety. However, it can be difficult to distinguish them if they are long dead. Traps under trees were more successful at catching these unspecified rats, so it seems likely that they were mainly Ship rats – see below.

After many years of virtual absence, rats (mainly Norway) are becoming the major cause of loss of eggs and young

Ship Rats

Seventy-seven of these were reported. None were caught out on the riverbed near the colonies and they were more than five times as likely to be caught in traps under trees than in scrub. From this evidence, Ship rats do not appear to be a danger to riverbed nesting birds, but are no doubt a threat to birds such as fantails and grey warblers that nest in the trees on the berm.

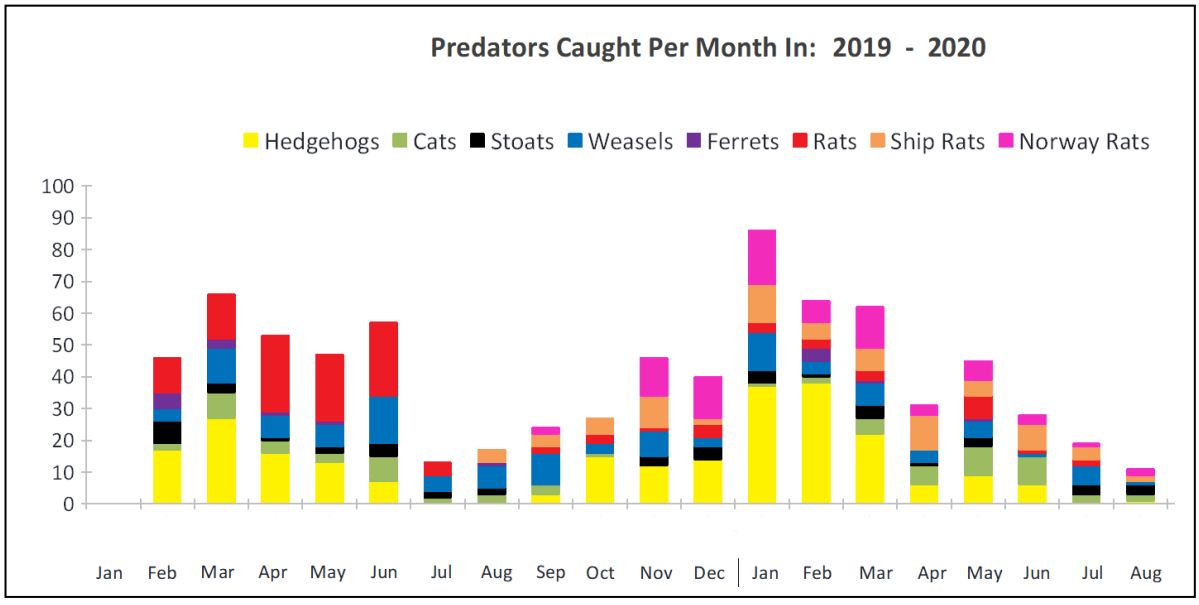
Norway Rats

Seventy-seven of these were also caught in 2019-2020. On a per trap night basis the most successful traps by far were those on the riverbed within or immediately adjacent to colonies. However, after the fledgling terns and gulls left the colonies, no more rats were caught there. The damage done to the colonies is laid out in an Internal report (Davey, 2020) – the remains of more than a hundred black-billed gull chicks were ascribed to rat predation at the Railway colony and they are the suspected culprit for wiping out the black-fronted tern colony at the same location. However, it has been suggested that harriers could have been involved in the tern predation.

Thirty-seven Norway rats were reported as being caught on the southern bank compared to only 5 on the northern bank – the remainder were from the middle of the riverbed. The reason for this is not known.

More than a hundred poison bait stations have been deployed along the river and at the estuary in an attempt to deal with the worsening rat problem. In total we caught 183 rats in

Figure 10. Trap catch per month, 2019-2020



2019-2020 vs 146 the year before. Rats were an absolute rarity in our traps until the 2016-2017 year (average of just one/year), but now are the most commonly caught predator. Despite the bait stations being put out prior to July 2020, rat numbers increased in this month over the corresponding month the year before – (7 vs 4 Figure 10). The bait (brodifacoum based) has generally been popular with rodents, but recently on some lines it hasn't been necessary to replenish it. Some of it has definitely been eaten by mice – with trail camera and dropping evidence – but hopefully some has been taken by rats. In the future, it is planned to minimize the use of brodificoum, due to its cumulative persistence.

Others

Possums and mice are reported by trappers - these numbers are collected but not reported on.

Trap catch. The overall catch per hundred trap night in 2019-2020 was 0.54 – this compares with 0.59 last year. This may not be a significant reduction, as in 2016 – 2017 this figure was 0.48. Figure 11 shows catch per hundred trap nights per predator species since trapping records began. This shows that whilst hedgehog results declined for most of the period, with a recent slight upturn, catch per trap night of the other predators has been quite stable. It is difficult to see how our trapping could have made such an impact on hedgehogs, perhaps disease is the reason for their decline.

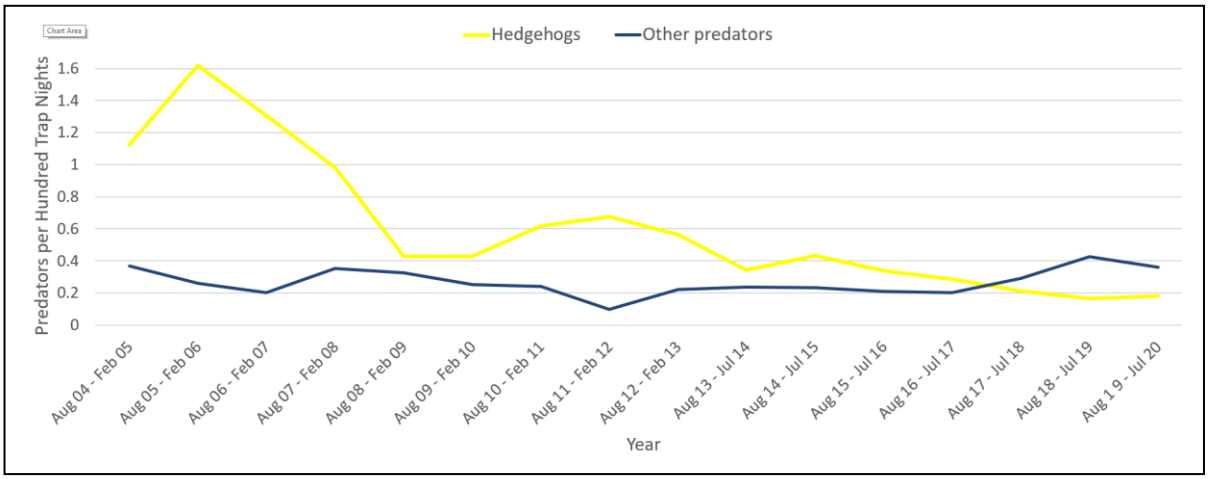


Figure 11. Trap catch per hundred trap nights, hedgehogs and other predators

Catch per hundred trap nights per trap type was DOC 200 – 0.56, Run through – 1.09, Timms – 0.38 and Trapinator – 0. There has to be a question as to whether our few Trapinators have been properly installed. The reason why the Run through traps have been so successful is probably entirely because they were sited where birds were nesting and predators were present in large numbers.

Conclusions

Norway rats were the most important land predator of chicks and probably eggs on the riverbed this year, and total rat numbers were greater than last year. Hopefully the poison bait will lead to a reduction next year. More traps and perhaps poison bait are required at the nesting colonies this year – although if at all possible, the poison type will be changed away from brodifacoum, due to its accumulative persistence. Nests of individual nesting birds will have to be monitored to make sure that rats are not a danger to them.

The increase in hedgehogs caught is a worry, but they do not seem to be a problem to birds that nest on islands.

4.2 Ashley Estuary

There have been no significant changes to the estuary trapping network during this year. A few traps have gone missing, but were generally replaced. Some traps were moved slightly. We currently have

135 traps consisting of 119 DOC 200, 15 Trapinator and 1 Timms. There is a possibility that the ECan funded assessment of our trapping network will recommend more traps.
Our trapping covers about 10.5km of river and estuary edge from the SH1 bridge and around most of the estuary. Trapping supplies are integrated with those of the river group.
Catch during the year consisted of -

Predator	**Number**
Feral cats	16
Hedgehogs	17
Weasels	48
Stoats	42
Ferrets	3
Undistinguished rats	8
Ship rats	80
Norway rats	56
Total	**270**

The lockdown probably had a small impact on catch – with fewer checks being done – Figure 12.

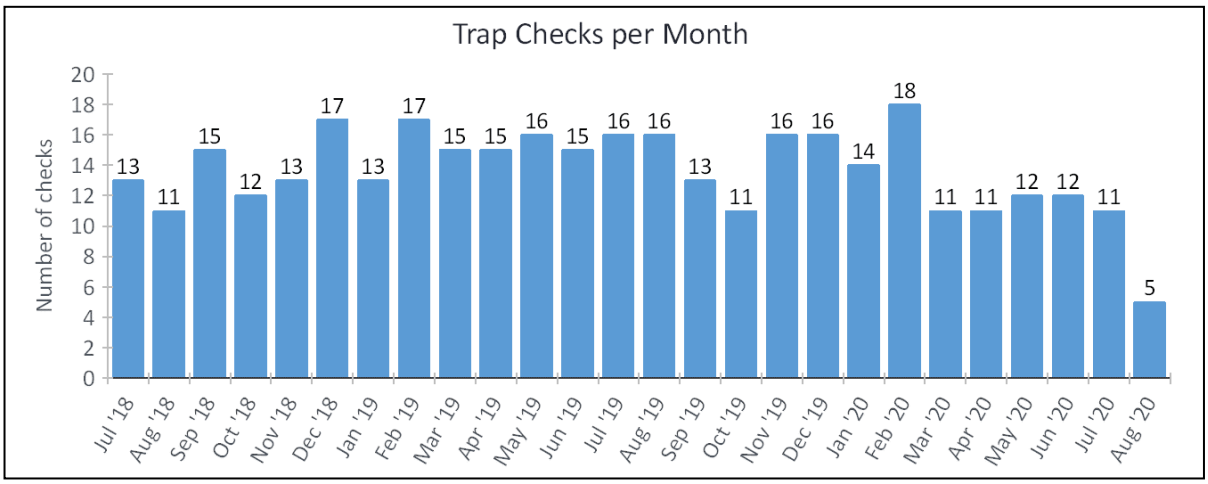


Figure 12. Trap checks per month

Catch for the past year, and for the corresponding period the year before (not including July – as the first traps were installed in late June 2018) are shown on Figure 13. We began distinguishing the rat species in August 2019. Total catch was lower this year than last year, despite more traps being out – Lines I and J were installed in late January 2019.

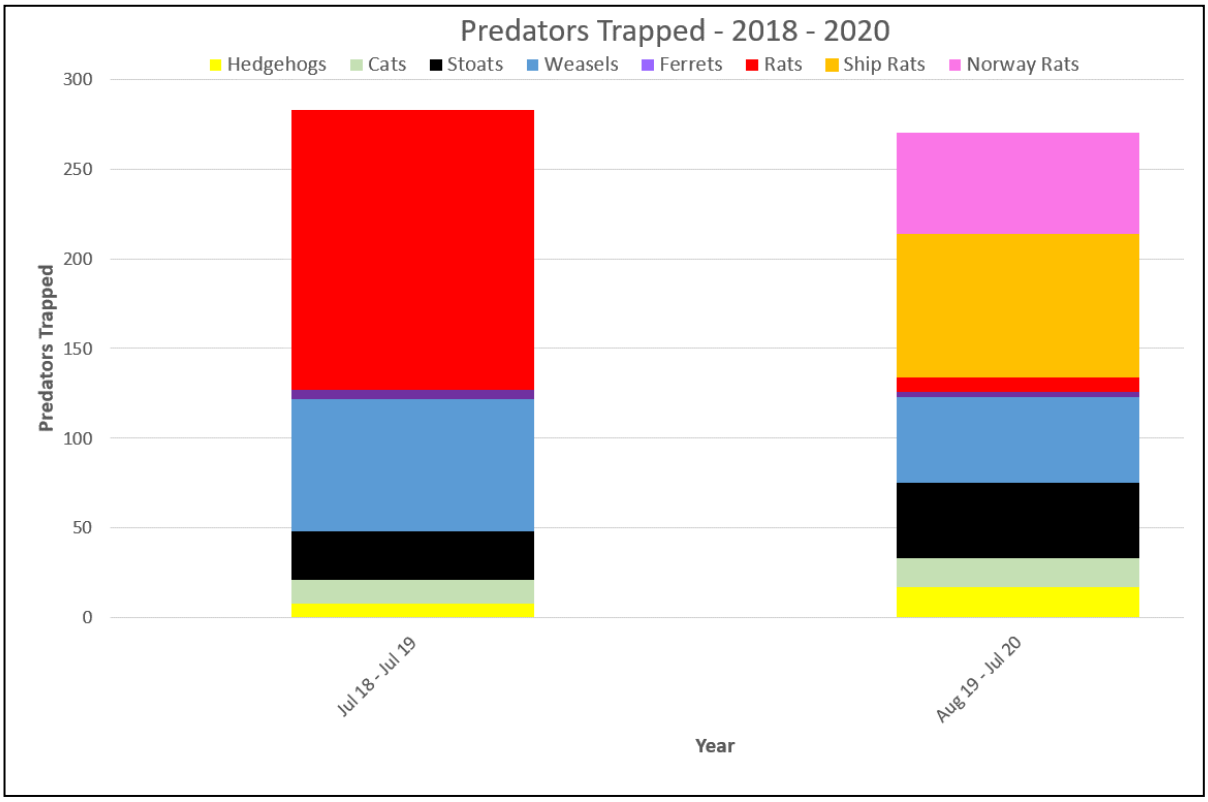


Figure 13. Annual predator catch, 2018 - 2020

Locations of the catch are summarized on Figure 14

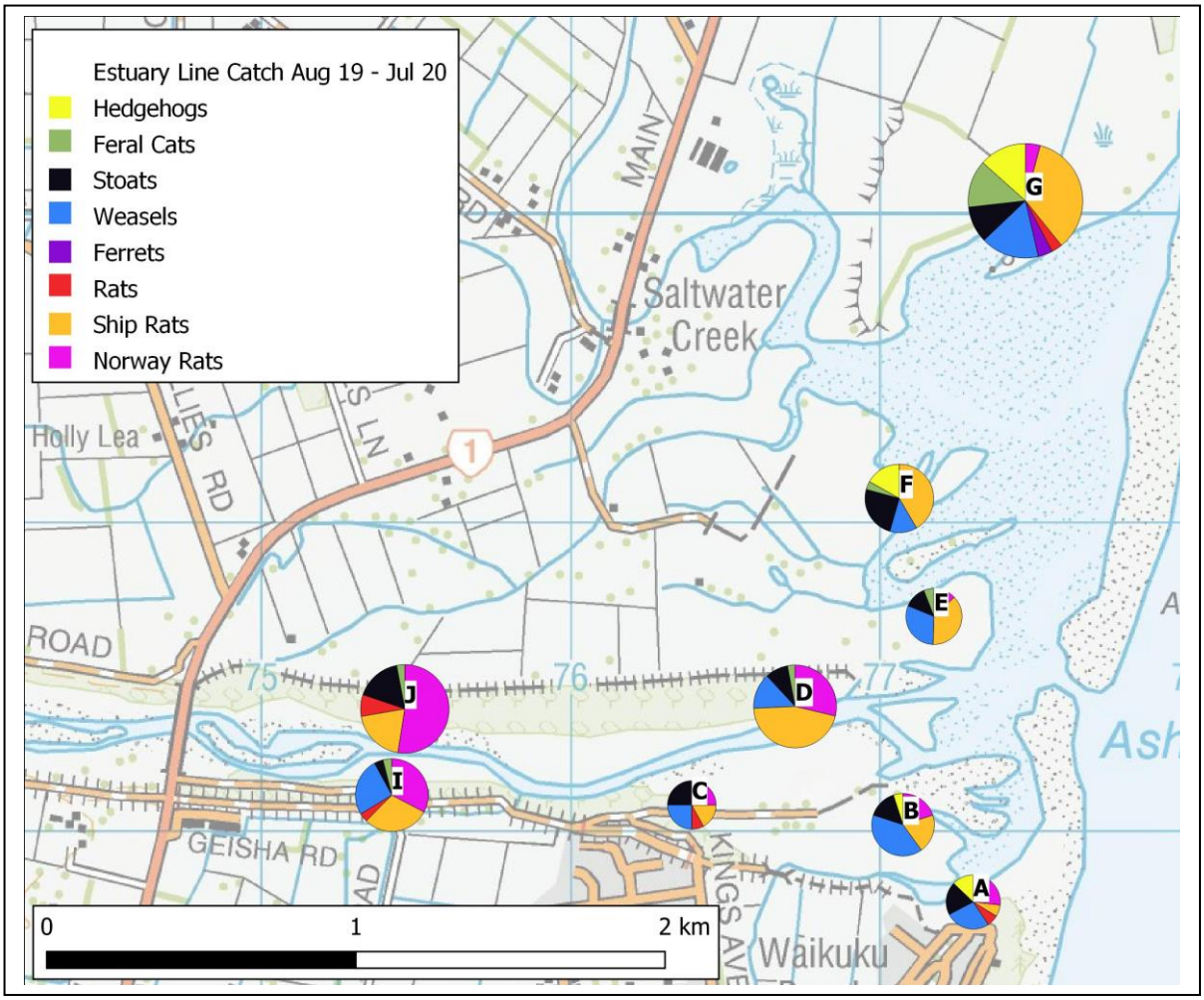


Figure 14. Trap catch per line, August 2019 – July 2020

Comments on the predator species:

Feral cats

Sixteen were caught this year versus 13 last year. By far the most cats were caught on Line G – 9 the next highest catch was on Line H. We do not have cat traps on Lines A and C due to proximity to houses.

Hedgehogs

In the second year of trapping, hedgehog numbers more than doubled from 8 to 17. In the first year numbers were inexplicably low, and they still make up only 6% of total catch when further up the river they are 33% of total catch. We understand that hedgehogs are also a major component of catch in the Tuhaitara park. Most hedgehogs were caught on Lines F and G.

Weasels

Weasel numbers were significantly down – from 74 to 48. They seem to be quite widespread through the area, with the strange exception of Line J.

Stoats

Stoat numbers were significantly higher – going from 27 in 2018 – 2019 to 42 in 2019 – 2020. At the estuary they make up a much greater proportion of catch than along the river – 16% vs 5%. These are potentially very dangerous to birds. Stoats were caught on all the lines.

Ferrets

Ferret numbers were higher, 5 vs 3 the year before. But they remain quite rare at the estuary and along the river.

Undistinguished Rats
Estuary trappers are doing a good job at reporting the rat species with only 8 individuals unspecified. Total rat catch last year was 156, this year it was 144 – despite more traps being in place this year. Hopefully this is a trend which will continue. Some of the estuary lines have poison bait stations to help deal with the rat problem.

Ship Rats
Ship rats (total of 80) were reported from all lines, with the greatest percentage of catch being from Line D.

Norway Rats
Fifty-six Norway rats were caught in total, with the lines downstream from the SH1 bridge having caught the most. Traps along the northern edge of the estuary caught very few – for reasons unknown.

Figure 15 shows monthly catch from the start of 2019 to 20 August 2020. Seasonality of catch seems a little different from further up the river.

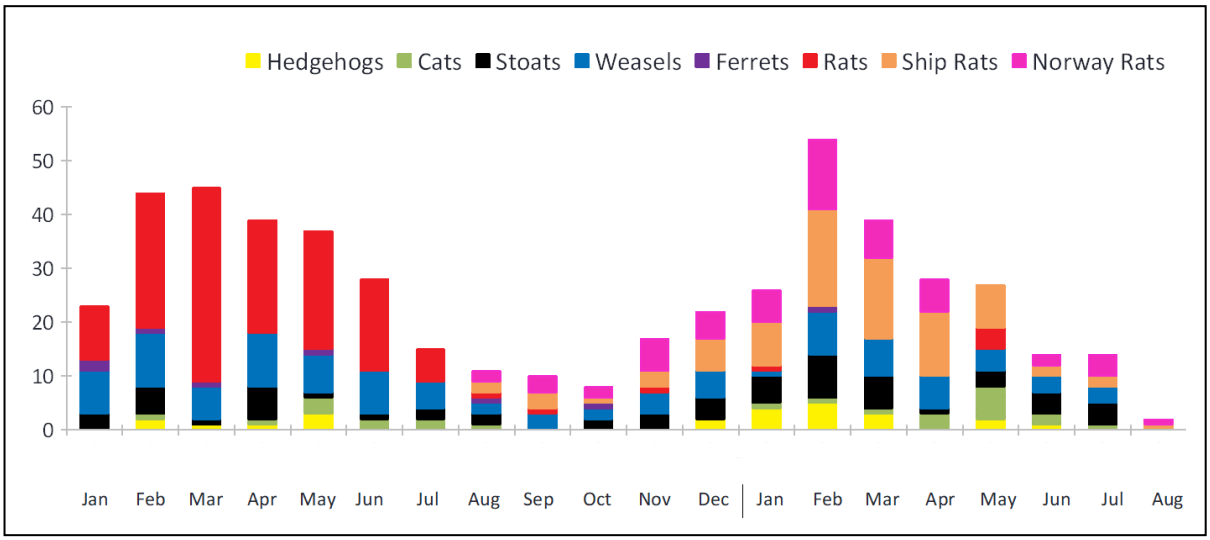


Figure 15. Trap catch per month, January 2019 – August 2020

Catch per hundred trap nights this year was 0.54 – identical with that of the river traps. Hopefully this is the start of a downward trend.

Catch per trap type was 0.6 for DOC 200, 0.55 for Timms (only 1 trap) and 0.11 for Trapinator. Perhaps the installation of the Trapinators should be checked. Some are perhaps too high up trees for anything other than cats to enter.

Conclusions

Total catch and catch per hundred trap nights declined this year at the estuary. Whether this is the start of a meaningful trend is to be established. As Norway rats were the most important land predator during the nesting season further up the river, the drop in total rats caught at the estuary is encouraging. What is not encouraging is the increase in stoats and hedgehogs this year.

5. Bird survey

Annual Survey

The first Ashley-Rakahuri Rivercare Group bird survey was in 2000, so that undertaken on November 16 was our 20th consecutive such event. It attracted the most volunteers ever (29), and it was pleasing to note that for a good number of them it was their first braided river bird survey. The weather was fine, if a little windy at times, and the river flows were average, making for some interesting but safe crossings. Volunteers were divided into four groups to cover the 21km of riverbed, starting at the Okuku junction and finishing at the SH1 bridge. Last year, for the first time, bird numbers were counted per kilometre, and this was repeated in 2019. This year, for the second time, the survey was extended below the SH1 bridge, as far as the upper tidal limit. There was no survey of the 22 km stretch between the Okuku river junction and the Ashley Gorge, which was last surveyed in 2011 (for the first time since 1981). Nor was there any survey of the Lees Valley section of the river (last undertaken by DOC in 2011).

Bird numbers in the annual survey were considerably boosted by the presence of two large black-billed gull colonies, totalling over 4000 birds.

Figures from the November 16 survey from the Okuku junction to the SH1 bridge, are given in Table 1, along with results of earlier counts.

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Ave 2000 - 2018
Black shag	18	3	nc	8	7	2	2	10	9	6	2	5	6	3	4	1	5	2	5	8	5
Little shag	3	6	nc	4	7	6	2	4	0	17	6	13	11	19	5	6	8	3	8	17	7
SI Pied oy'catcher	25	22	19	22	37	22	5	26	27	32	20	35	38	23	32	24	14	14	50	77	24
Variable oy'rcatcher	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pied stilt	229	82	70	138	140	137	68	164	131	196	233	194	209	247	230	217	95	148	83	281	163
Black stilt	0	0	0	0	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Banded dotterel	199	130	115	169	213	245	84	237	198	233	260	250	248	301	263	276	222	167	136	323	212
Wrybill	17	7	6	16	9	7	5	9	8	13	18	15	17	19	21	19	13	9	20	27	13
Spur-wing plover	18	nc	16	13	27	149	37	116	11	39	15	89	55	65	37	9	6	32	17	98	43
Black-back gull	26	nc	11	10	27	3	5	12	10	19	19	2	11	17	7	13	4	1	15	11	12
Black-billed gull	314	3	5	0	10	1	213	13	16	2	41	425	202	364	23	13	9	361	16	4097	112
Black-front tern	74	44	165	102	28	26	180	89	81	124	192	190	200	156	263	128	128	150	172	296	129
White-front tern	0	0	0	0	0	0	0	0	0	0	8	77	6	2	0	0	0	0	0	7	5
Caspian tern	0	0	0	4	0	0	1	0	0	0	0	0	0	1	0	0	0	5	0	1	1
Black-fronted dotterel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Totals	**923**	**297**	**407**	**486**	**509**	**599**	**603**	**681**	**492**	**682**	**814**	**1295**	**1003**	**1217**	**885**	**706**	**504**	**892**	**522**	**5244**	**711**
Totals (minus BBG)	**609**	**284**	**407**	**476**	**499**	**598**	**389**	**668**	**476**	**681**	**765**	**825**	**795**	**853**	**861**	**693**	**495**	**531**	**506**	**1147**	**601**

Table 1. Annual bird count results

The numbers of all species were records within the period since we started in 2000. The total number of birds of each species counted was 5,244 – the previous highest being 1295 in 2011. This number was considerably boosted by there being two large colonies of black-billed gulls – a total of 4,097. In the past, there has never been more than one such colony, and for over half of our surveys there have been no colonies present at all. In 2018 there was a colony, but at the time of the bird survey it was located downstream of the SH1 bridge. The changes in total bird numbers from 2004 – 2019 are shown in Figure 16.

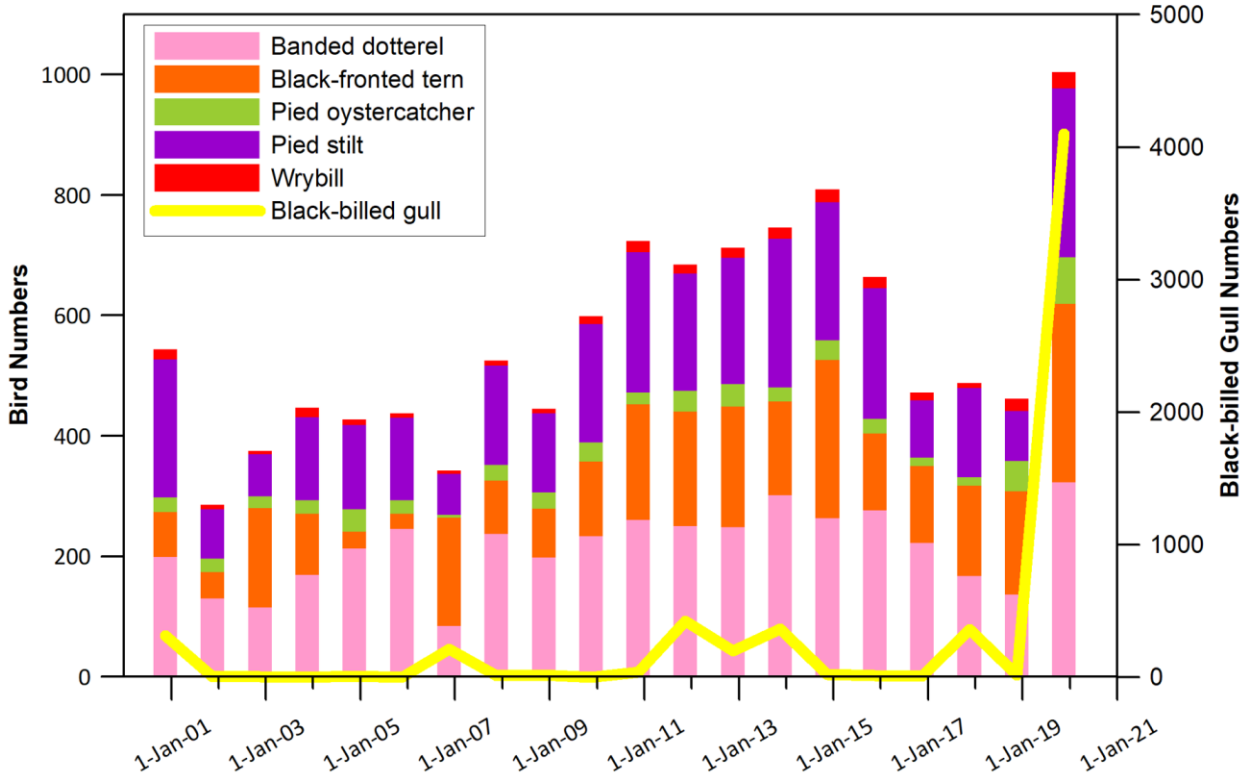


Figure 16. Changes in total numbers of birds, 2004 – 2019

All the major species were in higher numbers than recorded previously. Wrybills (27) were 33% higher than the previous best of 21 (2014) and well above the 20-year average of 14. Black-fronted terns (296) were 9% better than previously recorded, and over twice the annual average of 139. Pied stilts (281) were 59% higher than the long-term average of 165, and banded dotterels (323) were 66% higher. The only other commonly observed native species not in record numbers was the black-backed gull, where the 11 seen was the same as the long-term average.

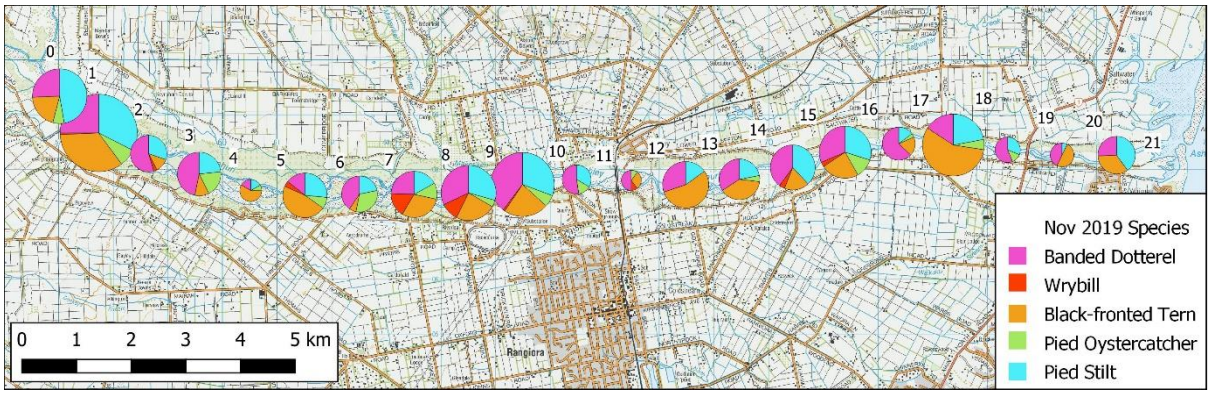


Figure 17. Bird distribution for the November 16, 2019 survey, including the extended area i.e.., from the Okuku junction down to the estuary.

Royal Spoonbills and a Little Egret. On January 31, three spoonbills were observed not far below the Okuku junction, plus another 6 near Groyne 1. A flock of over 20 (maximum 28) were resident at the Okuku junction for some weeks, and were still present in early March. A Little Egret was seen at Hillcrest on December 26. Spoonbills have not often been seen in the riverbed, and the Little Egret was a first – probably the same bird observed at the estuary during previous weeks.

Winter bird counts. Since 2014, birds have been counted every month between Groyne 1 and Groyne 2 – a distance of 2km. The timing within the month has varied due to river flows sometimes being too high for safe crossing. The main reason for this monthly survey has been to determine differences in species and total numbers between the summer breeding season and winter, when many species migrate to warmer environments. Results show a major difference between the number of core indigenous species and their total numbers during winter and summer. In the summer, the average number of core indigenous species is almost 5 times greater than in the winter, whilst the total bird numbers are over 6 times greater. In contrast, the numbers of other species (half of which are introduced) vary little between summer and winter.

Discussion.

Summer survey. The steep decline in bird numbers after 2014 was attributed to a significant loss of clean gravel due to weed invasion. This was followed by 3 years of lower but stable numbers, even though a major flood in July 2017 cleared weeds back to pre-2014 levels. Hence, it is most pleasing to see the record numbers of birds observed in the November, 2019 survey – most species in higher numbers than observed since annual surveys were initiated in 2000. The reason for the high numbers is most likely to be due to the riverbed being relatively free of weeds. In addition, regular floods in the Waimakariri river may have forced some species to relocate (almost certainly the case for the black-billed gulls). It is also reasonable to assume that the Group can claim credit for its many years of management, primarily aimed at controlling predators, reducing human disturbance and removing weeds.

Figure 17 above shows the distribution along the river of the main braided river birds that we aim to protect. This year birds were quite evenly distributed along the river with notably low abundances adjacent to State Highway 1, between and close to the Cones Road bridge and the railway bridge, and downstream from Hillcrest. Greatest abundances were at Toppings, Groyne 1 and between 1 and 2km downstream from the Okuku junction. Most of the wrybills were seen between Groynes 1 and 2 – this is the area where braiding of the river is best preserved.

Winter numbers. Like most shorebird species, the sites where they breed – in this case braided riverbeds - are vacated for the non-breeding winter months. On the Ashley-Rakahuri, only a few black-fronted terns remain. Half of the species which are observed during winter are relatively recent Australian immigrants – spur-winged plover, white-faced heron and welcome swallow. These, and the 'other' species which do not vary so much between summer and winter, are those which do not have braided riverbeds as a preferred breeding habitat. Amongst these, spur-winged plovers are usually the most numerous.

Numbers of royal spoonbills were a new addition to the riverbed bird scene in the 2019-20 season.

New species. Three new or rarely seen species were observed during the season. A total of four black-fronted dotterel were counted (the most ever) – three below the SH1 bridge, one immediately above it. This species have long been present in the Waipara river just to the north of the Ashley-Rakahuri river. Royal spoonbills are often present in the Ashley-Saltwater creek estuary, and occasionally further up the river, but never in such numbers as seen near the Okuku river junction (up to 28) during this season. The Little Egret is a new species, and most likely the same bird observed at the estuary.

31 January Survey

A less formal survey was conducted, with only 2 participants, on January 31 2020. The main aim of this was to count fledgling BFT. By this time, sections of the river between Cones Road and Tulls had gone dry. Figures 18 and 19 depict results of this survey. Points of note are:

- Large numbers of birds were present in the few kilometres upstream from where the river was dry.
- Very few birds were present along the dry sections of the river.
- The great majority of BFT were above Cones Road.
- Twenty-three juvenile BFT were counted.

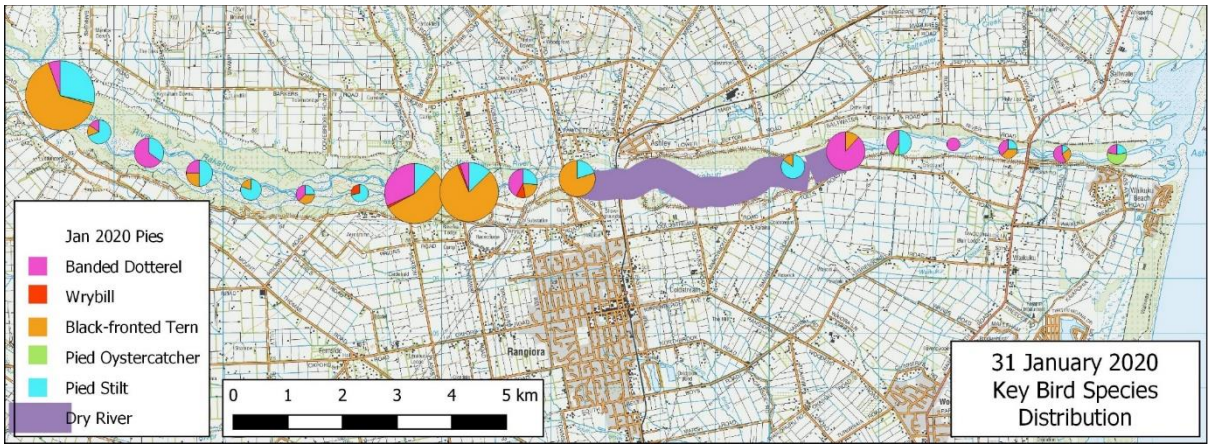


Figure 18. Numbers of core bird species from informal survey in January, 2020

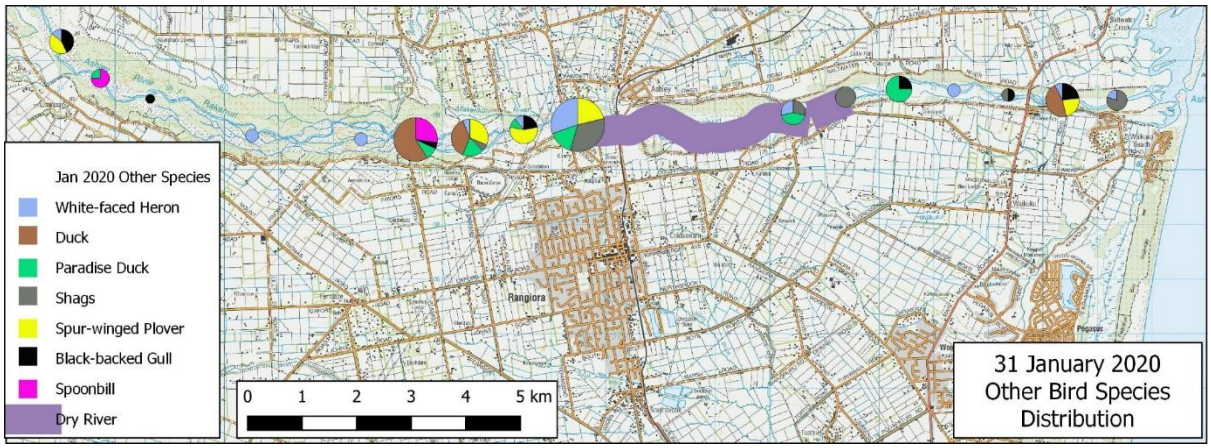


Figure 19. Numbers of other species from informal survey in January, 2020

6. Monitoring of breeding birds

Monitoring of wrybills, black-billed gulls, and black-fronted terns during the breeding season was carried out as described in previous reports (e.g., Dowding & Ledgard 2005, 2006, 2007), and began this season in August. Location names of shorebird territories are shown in Figure 1. Riverbed visits were undertaken at least weekly until early February. Breeding success (productivity) for each of these species was recorded as the average number of chicks fledged per pair.

There were no major floods during the breeding season (see Appendix 3 for river flow data), although a minor one (60 cumecs) did curtail an early BBG nesting attempt in September, resulting in their move to a better site, where they bred successfully.

Wrybills

Banded birds are identified by their colour-band combinations, bands are recorded left leg first and top to bottom (possible colours are: O=orange, R=red, B=blue, Y=yellow, G=green and W=white). M=metal, UB=unbanded. However, no new birds have been banded over the past 6 seasons.

<u>Breeding pairs</u>

Up to ten pairs of wrybills took up territories in the 2019-20 season (Figure 20). This is above the eight pairs that were present in the 2016, 2017 and 2018 seasons, and equal to the ten present for the two seasons prior to that.

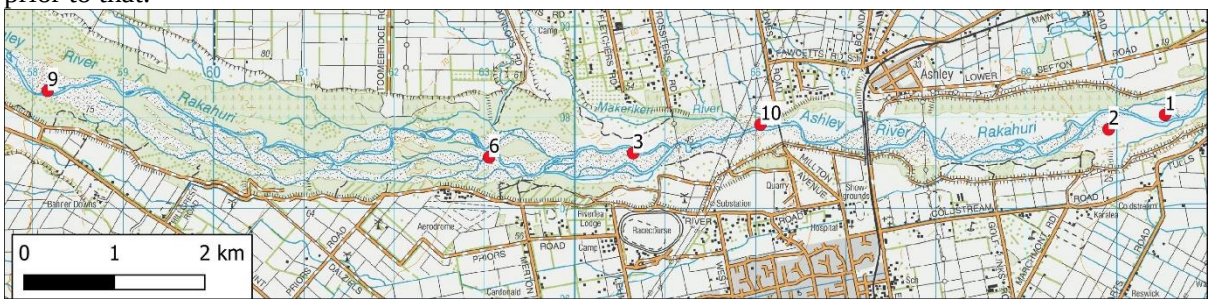


Figure 20. Locations of breeding wrybill pairs during the 2019-2020 season

1. Male: UB Female: UB (1570534E, 5208034N)
This pair were first observed at the lower Smarts site on September 11 with a nest found on October 3. Eggs were hatched by October 16. Two adults and a fledged chick were seen on November 12.
Result: One chick fledged
2. Male: UB Female: UB (1569909E, 5207874)
A UB pair were first seen at the upper Smarts site on September 12, with a 2-egg nest located on the south bank on September 16. Eggs had hatched by 10 October. On November 11, an adult was present with a single almost fledged chick. This chick was later seen flying, and was present with at least one adult until mid-January.
Result: One chick fledged.
3. Male: CP0864 Female: UB (1564645E, 5207612N)
A UB pair was first seen at the Groyne 1 site on October 5, and a 2-egg nest was found on November 4. However, 2 days later this was empty, with no sign of adults or chicks. It is suspected that this nesting attempt failed. However, new eggs must have been laid soon after (nest not found), as in mid-January 2 adults were seen with 2 recently fledged chicks. In early February a male bird, presumably of this pair, was seen to have a metal band with CP0864.

Result: Two chicks fledged.
4. Male: UB Female: UB
A UB pair were first seen in the Racecourse area (half-way between Groyne 1 and 2 in mid-October. No nest was found but an adult and a chick were observed in early November before an adult with two well-grown juveniles was seen on November 16.
Result: Two chicks fledged.
5. Male: UB Female UB
This UB pair was first seen off Groyne 2 on August 13. By mid-October they appeared to be breeding, but no nest was found, and no chicks were ever seen.
Result: No chicks fledged.
6. Male: BW-BW Female: UB (1563050, 5207566)
Three adults were seen just above Groyne 2 on August 11 – the first of the season. On August 13, BW-BW and a UB mate were present, with their 2-egg nest located on September 19. One egg did not hatch, but BW-BW was seen with a flying juvenile in mid-November. On December 24, BW-BW was seen with the white band on his left leg missing, so became BW-B.
Result: One chick fledged.

7. Male: UB Female: UB

A UB pair was first seen at the Toomebridge site on November 1, with a single bird seen intermittently thereafter. No nest was found but an adult and flying juvenile was seen on January 11.

Result: One chick fledged

8. Male: UB Female: UB

A UB pair was first seen at Hillcrest on October 4 - just above the road entrance on the S bank, where a pair unsuccessfully nested the previous season. They were seen again a few days later, but not thereafter, so it is suspected that they never bred at this site.

Result: No chicks fledged

9. Male: UB Female: (1558164E, 5208300)
A 2-egg nest was found by the BFT colony at Groyne 9 on November 6. The eggs were in the process of hatching on 16 November and the nest was empty by the 19th. These birds were observed regularly thereafter and were seen acting chick-like in early December. However, no chicks were ever seen. Both birds had metal bands, information from Miranda is that one was CP 0727, banded Miranda on 02.03.14 as adult or CP 1727 banded Miranda 21.06.14 aged as adult and the other CP1694 banded Miranda 19.02.19 as adult.

Iranian PhD student, Sanaz Safavian, viewing a wrybill on its nest. Sanaz is studying weed successions on the riverbed.

Result: No chicks fledged

10. An empty nest was found 200m upstream from the Cones Road bridge on 1 February 2000. No wrybills had been seen in this vicinity. (1566055E, 5207927N)

Overall result: Up to 10 pairs took up different territories at some stage of the season, raising 8 chicks, for a minimum productivity of 0.80 chicks fledged per pair. Such productivity is close to the 14-year average of 0.79, and improves on the previous year's figure of 0.75.

In addition to the above breeding results, a single male bird was first observed at the eastern end of the Railway site (on October 22) and was present for much of the season.

Black-fronted terns and black-billed gulls

The story of these two species is described in detail in Internal report 'Black-fronted tern and black-billed gull colonies – 2019-2020 season' (Davey, 2020). Copied below is the summary of this report:
Two black-billed gull (BBG) and four black-fronted tern (BFT) colonies were monitored over the 2019-2020 season. Another five BFT colonies were located but not monitored closely. Colony locations and general outcomes are outlined in the following table (Table 2):

Species	Location/name	No birds (max)	No nests (max)	No. fledged	Productivity (min)	Comment
BBG	Railway	4363	1547	700	.45	Fledglings scattered and hard to count accurately
	Toppings	1280	485	140	.32	
BFT	Railway	c. 100	48	0	0	Possibility that 1 or 2 chicks fledged
	Toppings	20	4	0	0	Monitoring infrequent
	Groyne 9	70	20	2	.10	
	Groyne 4	40	25	4	.16	
	Cones road	8	2			No proper monitoring – success unlikely
	Smarts	20	7			No proper monitoring – success unlikely
	Tulls	4	2	2	1.0	No proper monitoring – success unlikely
	Upper Toppings	30				No proper monitoring – success unlikely
	Estuary	12	3			No proper monitoring – success unlikely

Table 2. Black-billed gull and black-fronted tern colonies found during the 2019-20 season

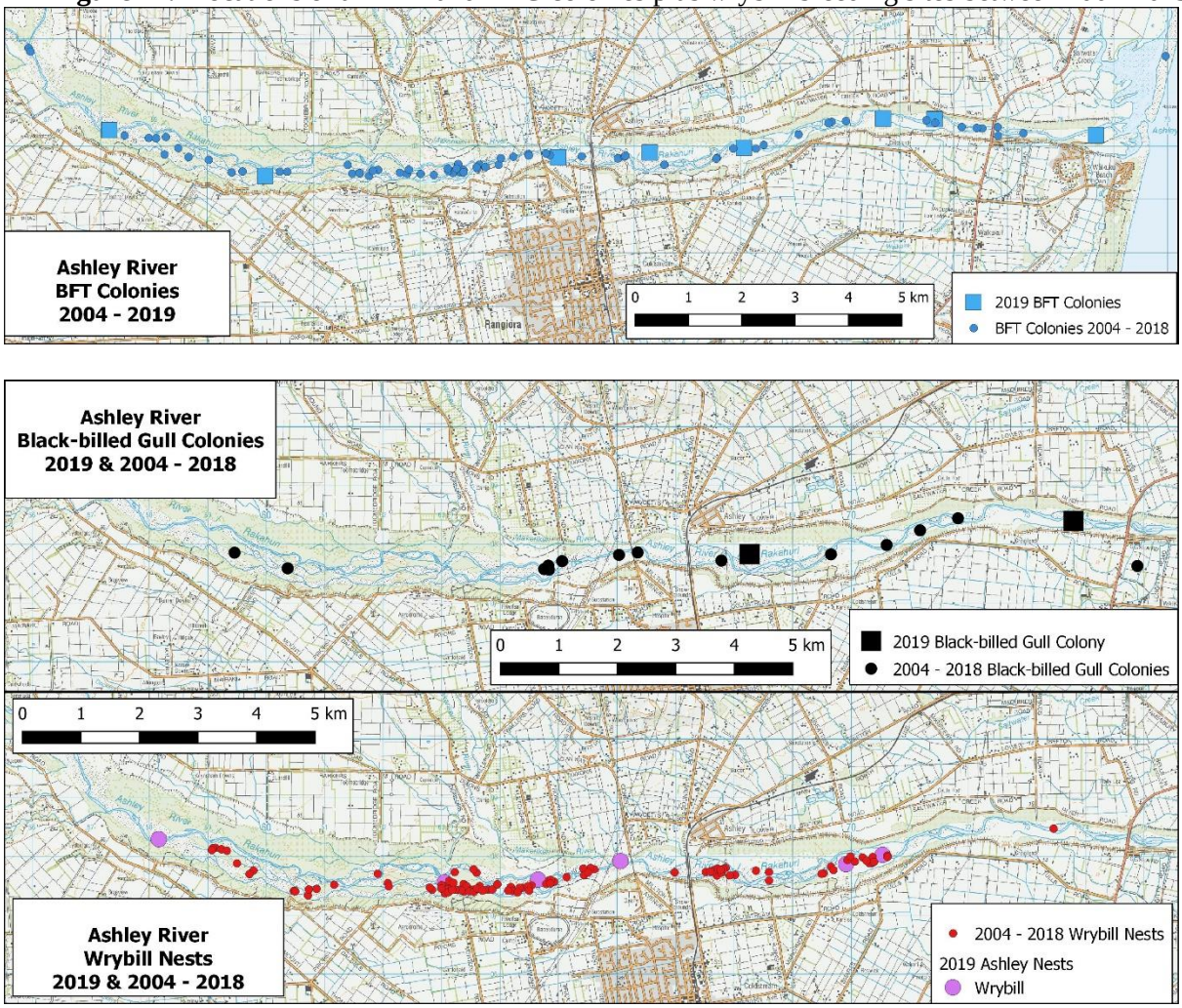
The main points arising from observations during the season are:

Breeding

- Record number of breeding BBG (2032 nests) – first time since 2000 that 2 colonies located on the river.
- Record number of breeding BFT (111 nests).

- It is likely that frequent flooding of the Waimakariri river (13km to the south) contributed to the increase in BBG numbers, and possibly the same with BFT.
- Despite clearance of weeds from almost 20ha (machine and hand pulling) prior to the season, only one such site (Railway) hosted a gull or tern colony (see section 3 for more weed comment).
- Average productivity (number of chicks fledged) of the two BBG colonies was 0.41. This is lower than the 10-year average of 0.57 (only including years when colonies present), and considerably lower than that for the previous season (0.64 – 0.71).
- Average productivity (number of chicks fledged) of the three BFT colonies which had more than 20 nests was only 0.06. This is well below the 16-year average of 0.32, and that for the previous season (0.29).
- It appears that predation could have been a major cause of low productivity.

Figure 21. Locations of all BFT and BBG colonies plus wrybill breeding sites between 2004-2019



Predation

- In addition to the normal all-year-round berm trapping, a total of 55 additional traps were located close to the two BBG colonies and four main BFT colonies during the season.

- Norway rats appeared to be the most important land-based predator. At the Railway site, >100 BBG chicks were killed and over 20 BFT nests robbed of eggs (and probably chicks). However, we have no definitive proof of predation of BFT by rats – harriers could also have been involved. Norway rats were also the dominant trap-catch within the Groyne 9 BFT colony.
- Nine hedgehogs were trapped in a weed-infested area alongside the Groyne 9 colony, but were not caught where there was a water barrier.
- Predation did not appear to be a major issue at the Toppings and Groyne 4 colonies.

A young black-billed gull fledgling alongside a sibling killed by rats.

- Harrier hawks accounted for the loss of 116 BBG chicks at the Railway colony.
- 20 BBG were found dead under powerlines, which they presumably had hit during flight.
- The remains of 91 BBG chicks, which most likely died from natural causes, were found within the Railway colony.

White-fronted terns

Normally a few are seen on the river, with the occasional pair nesting alongside black-billed gulls and black-fronted terns. However, none were seen on the river this season.

Pied oystercatchers

During the season, breeding pairs were noted to be present at a minimum of seven locations. Although record numbers were seen during the annual survey on November 16, breeding pairs appeared to be down on previous seasons, but some chicks were observed to reach fledging age. No formal count of pairs or chicks has been attempted since 2008.

Banded dotterels

Banded dotterels nested throughout the study area. Record numbers were seen on the November 16 survey, but breeding attempts appeared normal. The species is usually the first to display breeding behaviour (July), but the first nest was only found on August 27 at Tulls. No attempt was made to record productivity, but chicks were observed at a range of sites. The usual flocks of adults and juveniles were seen towards the end of the season – 18 at Smarts on Jan 17, 15 at Groyne 9 on Jan 30 and 10 at Groyne 2 on Feb 21.

Pied stilts

The occasional bird was seen during the 2019 winter, but by the end of August, pairs of this species were present at most sites. On the November 16 survey, record numbers (281) were seen, well over the long-term average of 165. This high number appeared to manifest itself in more breeding pairs. At least 5 pairs were present at Smarts on September 10, 4 pairs at Dalziels (Groyne 4) on November 6, plus 3 pairs at Toppings on November 22. The best breeding appeared to be at these sites, but pairs were well scattered right throughout the study area. Towards the end of the season, large flocks of mixed age birds were seen at Smarts (21 on December 31, and a record 58 on January 17), and Groyne 1 (19 on January 1). In summary, the season appears to have been good for stilts.

Pied stilt

Black stilt

No black stilts or obvious hybrids were seen on the riverbed this season However, as in the previous year, a black male bird (banded but colours unclear) most likely bred with a pied mate in a swamp just inland

from the sand-dune forests, about 1km south of the end of Ferry Road – which is a side-road at the eastern end of the Woodend Beach road. One or two black stilts (and hybrids) were present at the estuary for much of the year.

Black-backed gull

Numbers remain low. Since 2000, only one pair has been observed breeding on the river (2013), with no chicks fledged. There are colonies of reasonable size at the river-mouth estuary and at the river's head in Lees valley.

Caspian tern

Lone Caspian terns were seen on the river during the season, but there was no sign of breeding.

Spur-winged plover

A few pairs of this species breed on the river, but their nests and chicks are rarely observed. Flocks of dozens are not uncommon at any time of the year. On November 14, 27 were seen at Rossiters/Pylon, 30 at Groyne 1 on January 1 and 45 at Railway on May 10.

Black-fronted dotterel

This species has been seen more often over recent years – usually in the lower parts of the study area, particularly below SH1. Birds were seen in this area on November 17, and most likely bred – as they did last year.

Conclusions

- Although a record number of wrybills were seen on the annual survey on November 16, the number of breeding pairs remains similar to previous years – 8-10 pairs since 2014. There are plenty of potential breeding sites on the river, and the population is growing, so the reason for the lower than expected increase in numbers of breeding pairs is unknown.

- Numbers of breeding BBG and BFT were at record levels, but productivity was below average for BBG and very poor for BFT, mainly due to predation. To the authors, it is a mystery how black-fronted tern numbers appear to remain relatively stable in the Ashley-Rakahuri river, and even increased significantly in 2019, when breeding success is so low.

- Rats and harrier hawks were the main predation threat at the largest colonies (Railway site), but over all sites, weed invasion is considered to remain as the biggest long-term challenge.

- In the future, the Group should:

    - Maintain weed control at the most attractive breeding sites, making use of gravel extraction operations where possible.

    - Record egg hatch success of BBG and BFT, and Improve techniques for counting chicks.

    - Find and monitor some BD nests – as this species may be an important indicator of ecosystem health. Weed infestation in the Opihi River has led to the almost complete absence of BD whereas other species are not so badly affected.

On-going weed control in preferred nesting areas is essential – probably using the tractor-mounted undercutter

    - Initiate predator control earlier at potential colony sites – particularly targeting rats.

    - Install more trail cameras at colonies, and improve design of run-through traps.

    - Experiment with harrier hawk deterrents – e.g., strategic use of scarecrows.

    - Regularly patrol under powerlines to record bird losses to aerial hits.

7. Members and meetings, advocacy and public liaison

Members and meetings. The group email list contains 115 people, who in the past have served as its membership. However, the Charities Commission now requires us to have 'registered members'. Forty members have requested to be placed on the formal membership list, and only they can vote at meetings. No subscription is charged. During the 2019/20 season, the Group held general meetings in the Department of Conservation's offices on River Road, Rangiora, on July 11, August 29 (included the AGM), November 14 and February 20. Attendees numbered between 13-19. The Group also has a Management Committee which has the capacity to make decisions and approve funding for small tasks requiring immediate attention – for final approval at the next General meeting. It has seven members and met on September 5, November 12 and June 17.

Advocacy and public liaison. This is a primary focus and undertaken in the form of media articles, displays, videos, talks to schools, service clubs, land administration agencies and the public (usually accompanied by the Group's PowerPoint presentation), a web page and Facebook site, sales of a children's book and bookmarks, plus advertising. During the breeding season, riverbed visits were organised for the public (October 8, 10 and November 27) and customised Corflute signs are placed in managed riverbed areas to ensure people are aware of the location of breeding birds.

During the year, group member and professional communicator/photographer, Steve Attwood, completed a Communications/Promotions strategy for the Group. The purpose of the strategy is to ensure that communications and promotions meet the purpose of the Group and its conservation objectives, and are consistent, planned, credible and accountable. The strategy also proposes that ARRG establish and publish to members an annual activities and communications / promotions calendar, which would be more effective for achieving and monitoring objectives than if carried out in an ad-hoc or opportunistic manner. This strategy is in the process of being considered by the Management Committee for approval at a general meeting.

During 2019-20, many opportunities were taken to ensure that the public were kept aware of the Group's activities in the riverbed. These are listed in Appendix 1. Three articles appeared in local papers, and there were three interviews by the local CompassFM radio. The Group's video and/or Powerpoint presentation were given to seven community / interest groups and five schools; most of the latter as part of a 'Down the Back Paddock' series organised by Kerry Miles of the Waimakariri District Council Community Team. Further contact with the general public was attained by three twilight walks in October/November, a display at the Ohoka market (October 25, November 15, December 13 & 27), and a sausage sizzle outside The Warehouse (November 23). A regular email update was sent to all Group members during the breeding season.

The public were invited to see breeding birds during twilight walks in October / November.

The Group's only sponsor, Karikaas Natural Dairy Products Ltd in Loburn continues to use our name (together with that of BRaid Inc), plus images of riverbed birds, to promote their premier cheeses. ARRG receives a percentage of the profit made from the sale of these cheeses.

The Ashley-Rakahuri Regional Park staff have continued to develop walking and trail bike tracks and grass recreational areas in the berm alongside the river. This discourages people from recreating in the riverbed itself, as does the 4WD track (on the northern bank) along with open 'dirt-bike' areas. As in previous years, a digger was hired in August to close off tracks running through the berm into the river, with appropriate signage alongside. Over 50 such blockages are now in place during the breeding season and there is little

doubt that this reduces vehicle use of the riverbed. Most blockages were removed in early February, so that public use can resume during the remaining summer weeks and over winter.

During 2018-19, the Group remained closely associated with staff from DOC, the Waimakariri District Council and Zone Committee, ECan, the Tuhaitara Coastal Park and the Ashley-Rakahuri Regional Park. ARRG also contributes actively in the running of BRaid Inc, a group which aims to improve the ecological welfare of all braided rivers in Canterbury.

The Group's website (www.arrg.org.nz) is now maintained by Sonny Whitelaw, who also manages BRaid Inc and maintains their website. Our Facebook page (https://www.facebook.com/ashleyrivercare) continues to be maintained by Steve Attwood.

Discussion.

The Group's advocacy efforts over the past years continue to improve local awareness of the problems faced by riverbed birds, and of the Group's activities to protect them.

The long-term future of braided river birds will rest in the hands of today's children. Therefore, it is pleasing to report that the Group remains part of the Waimakariri District Council-assisted programme 'Down the Back Paddock', which aims to address all primary schools in N. Canterbury over a 4-year period. At primary school visits, every child is given an 'Endangered Birds' bookmark featuring one of the seven indigenous species which are the focus of our riverbed management. There were five primary school visits over the past year.

Our revamped website is now right up to speed and readily answers the questions of most visitors. In 2019 the site had 3,478 views and 1200 visitors. The site appears to be attracting greater attention in 2020, as so far this year (as of mid-June) views have reached 2,393 and visitors 1084. The most popular item viewed concerns traps and predator control Between August 1, 2019 and 22 June, 2020 our Facebook page accumulated 770 followers and we made 60 posts (up from last year's 58, with some of the year still to go). Total views for this period were 55,049 which will be down on last year's full year stats of 92,927, but still a very good number. It is pleasing to see followers increasing year by year with very few drop-offs. The most popular post (6295 views) was in mid-August 2019 reminding everyone that the birding season on the river was about to start and warning about vehicles, disturbance etc. A 'boosted' post about our traps for sale was also very popular with nearly 4000 views. The average number of views per post was 917.

The Group often has vigorous discussions around the use of funds for promotion purposes. Hence, the preparation of a draft Promotion and Communication Plan, by group member and communications expert, Steve Attwood, is a major step forward. It sets criteria for assessing the cost / benefit of all our promotion efforts, and will be completed and tabled for Group approval during the coming year.

8. Berm walkway, bike track, 4WD track and riverbed access

The Ashley-Rakahuri Regional Park staff continue to develop tracks and recreational areas in the berm alongside the river. This discourages people from recreating in the riverbed itself.

Walkway and bike track. The track is sited along the south bank, and is now complete from Groyne 1 down to the estuary. It is much appreciated by the public and gets frequent use by both locals and visitors from further afield.

4WD track. This is located in the north bank berm, extending from the end of Rossiters road up to the Okuku junction (a distance of approximately 8km). It is used reasonably frequently, but the most favoured area for 4WD vehicles is the north bank stretch of berm extending from the SH1 bridge up

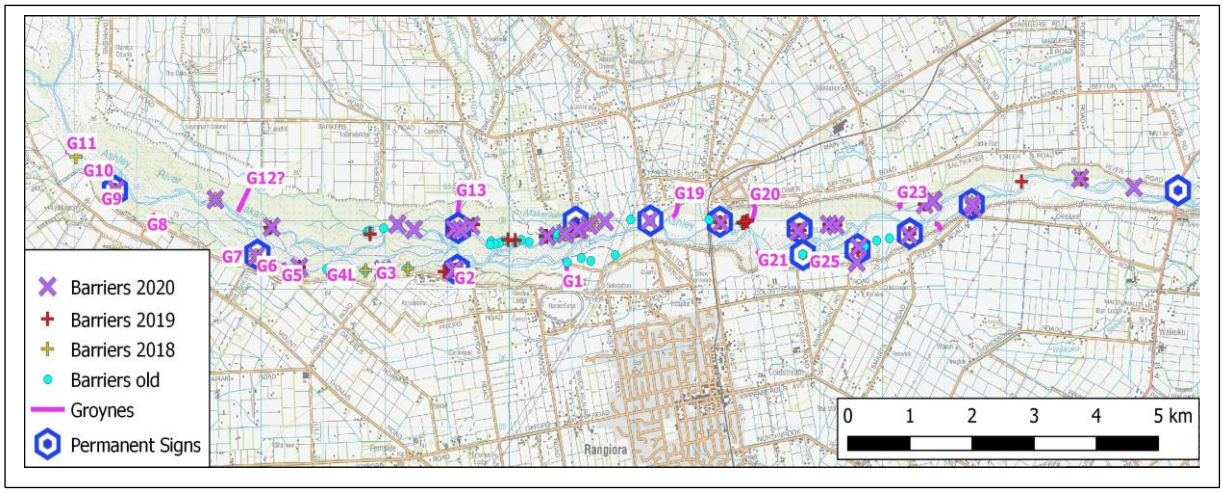
Concrete blocks being installed to prevent vehicle access between September and February.

to the railway bridge (7km). In this area there are some very testing 'mud-holes'. The purpose of these tracks is to encourage 4WDers to stay in the berm area and out of the actual riverbed.

Access to riverbed. Gates have been installed on the southern stopbank either side of where riverbed access tracks cross. This has prevented the stopbank from being used as a general vehicle track. In September 2019, a digger was used to close all 4WD access ways into the open riverbed (except the major ones). Figure 22 shows the location of these blocked access ways. Signs notifying closures and restricted vehicle access were erected at the major entrances in September and removed in February at the end of the bird breeding season – as agreed with the Combined 4WD Club. Concrete blocks ($1m^3$) are the favoured means for preventing access, as they are very visible, reasonably cheap, and are not difficult either to install or to remove at the season's end.

Fire. On February 3, a fire burnt two areas of vegetation in the berm – the largest of which was over 50ha. The Group has asked to be involved in discussions about vegetation restoration, and has submitted a proposal for trial / demonstration plots to explore how best to return a native cover to the burnt sites.

Figure 22. Access barriers as at September 2019 – with planned 2020 locations and permanent signs.



Discussion.

Tracks. All the purposely created tracks (for walking, biking and 4WDs) in the berm area are getting increasing attention. There is little doubt that they attract use that could otherwise take place in the riverbed. Those with many years of familiarity with the river report far fewer sightings of people and vehicles than there used to be – especially during the breeding season.

Vehicle access. Braided riverbeds are not only attractive to birds, but they also encourage greater use by off-road vehicles (trail bikes, ATVs and 4WDs). There is good circumstantial evidence that efforts over the last few years by the Group and Regional Park staff to block off all but the major access tracks in the spring, is being largely accepted and has reduced vehicle access during the bird breeding season. Such work will continue, even though there will always be a small percentage of drivers who do not read signs or care for restrictions, and will therefore find ways to negotiate barriers and drive on the riverbed. Vehicle pressure is greatest to the east where there is ready access just above SH1. ECan park rangers are doing a good job in apprehending and warning drivers of vehicles that encroach on the riverbed during nesting season, but their enforcement powers are limited.

9. Income and Expenditure

Income. Over the last year the Group's income has come from a mix of sources. Most was obtained from trap making and selling. For every trap made and sold ($70), a percentage is retained for the Group. Donations were the second largest fund generator ($2,030), followed by sales of the Group's children's book ('Ria the reckless wrybill') and wrybill banner pens ($1,187 between them). During the year, Karikaas Dairy Products Ltd in Loburn continued to sponsor the Group and BRaid, using our names, plus images of riverbed birds, to promote their premier cheeses. In return, the Group receives a percentage of profits from sales.

During the year, frequent discussions were had with David Owen, ECan's Principal Biodiversity Advisor Braided Rivers. He is charged with writing long-term plans for braided rivers, and the Ashley-Rakahuri has been chosen as 'first off the block'. ECan will fund a predator control plan to be written by Mike Bell of Wildland Management International. In the meantime, almost $10,000 has been assigned to the Group for purchase of a drone, trail cameras, hand-held radios, a personal locator beacon and a tablet for data recording in the field. ECan also covered the cost of weed clearing approximately 15ha of riverbed in the winter of 2019, and has agreed to financing the clearing of another 30ha over the 2020 winter (see section 3)

Phantom 4 Pro V 2 drone purchased with ECan funding

Expenditure. Most expenses have been associated with buying materials for trap making and predator control, plus maintaining the website and preparing promotion material. Over the past year, expenditure has exceeded income by $6,317, and the draft budget for 2020-21 forecasts a deficit of over $11,000.

Discussion.

The Group is most grateful for the support of ECan relative to its long-term planning and finances. ECan officer, David Owen, is committed to addressing long-term planning and its implementation in as sustainable a way as possible. Although there is much 'water yet to go under the bridge', establishing this relationship has arguably been the highlight of our year.

As stated above, the Group is well supported by its own fund-raising (mainly from trap-making), sponsorship (from the likes of Karikaas Dairy Products Ltd) and donations. However, expenditure is exceeding income by some thousands of dollars, and in the coming year this loss will have to be covered from our unallocated funds in the bank – currently standing at almost $20,000. Before the end of the year, the Group will address how income can be improved.

10. Future management

Of particular note over the past year, has been the assistance of David Owen, ECan's recently appointed Principal Biodiversity Advisor Braided Rivers. David's main focus is on writing management plans for braided rivers, and he has chosen the Ashley-Rakahuri river to be the first. This has led to frequent discussion, plus the advance of funds to purchase some operational items – tools for better monitoring in the field (GPS, trail cameras, a drone and tablets), plus safety equipment, such as hand-held radios and a PLB. The first draft of a plan is due in the near future.

11 Conclusions

The shorebird species in the Ashley-Rakahuri river face four main threats – the invasion of weeds (mainly grasses, yellow lupins, broom / gorse and willows), reduced survival and productivity due to introduced predators, disturbance by human activity, and contraction of the fairway area. The Group's attention continues to be focussed on reducing impacts from these – with particular focus on assisting the wrybill, black-fronted tern and black-billed gull.

The success of management in reducing the above threats is assessed by an annual summer survey of bird populations, plus monitoring of breeding success in order to determine productivity (number of chicks fledged per nesting pair of adults). Spurr and Ledgard (2016) presented evidence that management by the Group since 2000 has led to improved bird populations on the Ashley-Rakahuri river. However, that rising bird population trend up to 2014 reversed (declined) in the following 2 years, before stabilising and rising to above former levels in 2019. Wrybill numbers in the last survey (27) were the highest ever, as were those for all the other core species.

Over the past season, closer monitoring of weed invasion and predation in and around colonies of terns and gulls led to major progress in understanding how to manage these threats, plus the types of ground surface most favoured for bird nesting. Results from these studies are well covered in two internal reports.

Banded dotterel on nest

The Group continues to maintain a high profile relative to public awareness and education, assisted by agencies such as DOC and ECan, particularly staff from DOC's Rangiora Field Base and ECan's Ashley-Rakahuri Regional Park. During 2019-20, the Group created many opportunities to improve awareness. Most involved media articles, presentations to schools and local groups, and displays at public events.

During all its initial years, the Group relied on outside agencies (e.g. Lotteries, WWF) for funds, requiring considerable time and effort in writing applications and supplying reports. Hence, it is pleasing to record that for the last 5 years, the Group has been able to increase self-sufficiency by its own fund-raising projects, plus donations, with on-going commercial sponsorship from a local firm, Karikaas Natural Dairy Products Ltd. The generosity of such a sponsor and the public in general is due to our improved public profile. Specific outside support is sought for major projects, such as the pre-season weed control over 33 ha by a tractor-mounted undercutter.

The Group looks forward to a closer future liaison with ECan. David Owen, their Principal Biodiversity Advisor Braided Rivers is co-ordinating the writing of a new long-term management plan, aided by associated funding. In addition, discussions with ECan are underway about the management of berm areas, aimed at maximising the width of the central fairway in order to allow the river 'room to move' and thereby retain the special braided river habitat characteristics required by the birds.

Looking into the near future, the major challenges involve maintaining control of weeds and improving bird nesting and feeding habitat, continuing/improving the control of predators, plus banding more adult birds (particularly wrybills). To these challenges and opportunities must be added the ever-present challenge of maintaining public interest, and the involvement of the local community in bird management on the Ashley-Rakahuri River. This not only enhances fund raising opportunities, but also helps to reduce human disturbance in the riverbed during the breeding season.

12 Recommendations

1. Monitoring. Continue annual bird surveys and extend monitoring of breeding activities to include samples of nesting pairs of banded dotterels, S. Island pied oystercatchers and pied stilts – traditional focus has been on wrybill, black-billed gull and black-fronted tern. A measure of egg hatching is needed, plus more emphasis should be put on counting fledglings.

Justification
Collection of information through surveys and monitoring is vital, as it indicates if the Group is attaining its goal of improved bird numbers, as well as providing vital data for future management and decision-making. Almost two decades of past experience should enable the group to extend breeding monitoring beyond the core species of wrybill, terns and gulls. The numbers of fledglings are the true measure of success, but egg hatching percentage is a good interim measure – not undertaken to date.
To date: Surveys and monitoring being maintained adequately.

2. Improving habitat. Create and maintain improved habitat (e.g., extensive weed-free sites – preferably islands) for bird breeding and feeding - on an annual basis. Continue development of cost-effective and environmentally-friendly means of maintaining weed control, and promote removal of fairway islands with semi-permanent vegetation. Need for further discussions with ECan about the ever-widening berm zone which limits 'room for the river to move' and leads to loss of 'normal' braided riverbed

   Justification
   Recent experience has shown that weed invasion and loss of bare shingle areas can lead to declining bird numbers. Natural floods have helped reverse this situation, so challenge is to maintain weed-free status into the future. The issue of widening berm zones, reinforced by tree planting, is leading to permanent loss of 'normal' braided river habitat – this has not been adequately recognised to date.
   To date: Significant artificial weed removal since 2017 floods, with promising potential for greater clearance using tractor-mounted undercutter. Ongoing loss of fairway and increase in berm width.

3. Record keeping. Continue to improve record keeping and mapping (traps and bird nesting), and band more birds.

   Justification
   Good records and mapping are essential for effective monitoring and accountability over the long-term. Banding provides information on adult survival and pairing, plus movements of individual birds.
   To date: Record keeping and data presentation plus feedback to end-users is now excellent. Moves are underway for approval of new wrybill banding attempts.

4. Predator control. Continue efforts to extend predator control and the use of new strategies, particularly around breeding birds. This effort needs to refine dense trapping around colonies (particularly targeting rats), deployment of a second line of traps along the riverbank, and greater use of trail cameras, plus the possible use of scarecrows to deter hawk predation within colonies. Bird losses are also caused by powerline strikes – the numbers concerned need to be quantified by regular inspection.

   Justification
   Predator control occupies more of the Group's time than any other single activity. Improved finances will allow for increased trapping effort, plus refinement of new strategies to reduce adverse impact of predators and losses of adult birds to powerline strikes.
   To date: Trapping has been adequate, and now includes rat bait stations and more intense trapping around colonies. Additional funding has been sought to complete the entire river margin (doubling current trap numbers) and reduce on-going losses of eggs, chicks and adult birds.

5. Advocacy. Adopt a recently completed PR strategy to continue advocacy initiatives both by members and other agencies such as DOC, making use of the website and Facebook, the Powerpoint presentation, the documentary/video 'Rakahuri Rescue' and printed material such as handout fliers, bookmarks. Particular attention should be paid to schools and field interpretation / awareness signs for the public. Make use of a calendar/diary to ensure timely promotions at appropriate times and better recording of activities.

   Justification
   Although awareness has improved significantly since the Group was formed in 1999, it can only be maintained and improved by continued effort, involving implementation of the new strategy, and utilisation of a calendar/diary, social media, and appropriate modern outreach technologies. Children are excellent advocates for influencing adults, and future management will be in their hands.

To date: Good advocacy to date, which should be improved by a new Promotions/Communications strategy. In addition, the estuary interpretation panel will be repeated up-river.

6. Funding. Maintain funding via Group initiatives (such as trap-making), and improved public awareness, plus enhanced agency linkages, especially with ECan.

   Justification
   The Group now has a sufficiently high profile to seek more local donations and sponsorship - such as that from Karikaas Cheeses. The completion of a new long-term plan, funded by ECan, should help to ensure continuity of long-term funding.
   To date: Funding has been adequate over recent years. Our major fund raiser, trap-making and selling, not only adds to funds, but promotes effective predator control elsewhere. Larger projects have been supported by outside agencies, such as DOC, ECan and the Rata Foundation. However, new trapping, weed control and promotion intentions may stretch our resources.

7. BRaid. Continue full support for BRaid Inc.

   Justification
   BRaid Inc aims to improve environmental awareness and management on all South Island braided rivers. It has become a recognised 'umbrella' group for maintaining braided river ecosystems. BRaid has a part-time Manager, and regularly organises advocacy workshops and training courses.
   To date: Good support of BRaid and its outreach programmes. The Group works closely with BRaid – both have the same chairman.

8. Maintain and improve collaboration. With ECan's Biodiversity Programme, the Waimakariri District Council and Zone Committee, the Canterbury Water Management Strategy's Regional Committee, Fish and Game, Forest and Bird and local iwi/runanga – plus with other influential local stakeholders, such as the Rangiora Airfield.

   Justification
   Decisions on the future improvement and maintenance of braided river ecosystems rest with these agencies and committees. They also dispense considerable funds for river management. ECan is making major commitments to braided river management, including the writing of a long-term plan for the Ashley-Rakahuri river.
   To date: Good collaboration with all agencies, particularly with ECan. However, links with iwi/runanga, Fish & Game and Forest & Bird need improvement. Collaboration with the river engineer section of ECan could be significantly improved.

9. Gravel extraction. Maintain and improve collaboration with commercial gravel extractors. Monitor gravel extraction sites to help determine methods which are optimal for the environment.

   Justification
   Gravel (shingle) extractors are the major commercial users of the Ashley-Rakahuri river and have opportunities to create weed-free sites and islands surrounded by water that encourage successful bird breeding. However excess gravel extraction has been shown around the world to contribute to channelization, narrowing and destruction of the braided nature of rivers. ECan needs to determine whether the current gravel take is sustainable.
   To date: Good collaboration with the likes of Taggart Earthmoving Ltd, but needs extending to other operators. Need to promote appropriate regulation enforcement by ECan, particularly of the smaller operators.

10. Local management. Support ECan's new braided river initiative and in particular its intentions for the Ashley-Rakahuri river - which involves the writing of a new management plan. Assist activities within the Ashley-Rakahuri Regional Park, and implementation of the Northern Pegasus Bay Bylaw 2016. .

    Justification
    ECan's plan for the river (currently being completed) will determine future management direction. Of particular importance is the matter of how flood protection operations influence the maintenance of braided river environmental values. The Pegasus Bay Bylaw is integral to the future protection of the birdlife in the Ashley-Saltwater creek estuary.

To date: Good collaboration. The access way blocking during the breeding season is an example of this, but there are still on-going issues relative to motorised use of the riverbed and estuary.

13. Acknowledgements

We are particularly grateful for major past financial support from national agencies such as:

- World Wildlife's Habitat and Protection Fund
- Pacific Development and Conservation Trust
- New Zealand National Parks and Development Foundation
- Lottery Environment and Heritage Committee of the New Zealand Lottery Grants Board

Acknowledgment for significant more recent funding is owed to the Department of Conservation, ECan and its Waimakariri Zone Committee's Immediate Steps fund, the Waimakariri District Council, the Rata Foundation, Sargood Bequest, the Rangiora Lions Club, plus our first 'sponsor', Karikaas Dairy Products Ltd.

The Australasian Wildlife Management Society donated $1000 as part of its Practical Management Award for 2018.

The Group is most grateful for a number of smaller donations received from a range of sources.

Agencies who have offered special operational assistance are the Dept of Conservation and ECan (most recently with initial weed removal trials and operational use of a tractor-mounted undercutter/ripper) and the Ashley-Rakahuri Regional Park and its staff, whose aspirations for the birds on the river mirror those of the Group. The Group also thanks its members and their friends and families for help with bird monitoring, participation in the spring survey, advocacy, and attendance at meetings. Particular acknowledgement must go to the small band of trap-makers, and the trappers who weekly maintain many traps over the full year.

The activities recorded in this report would not have been possible without the above support.

All figures / maps in this report were created by Group member, Grant Davey. Images are courtesy of Grant Davey, Steve Attwood and Nick Ledgard.

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Appendix 1. Promotional activities, July 1, 2019 – June 30, 2020

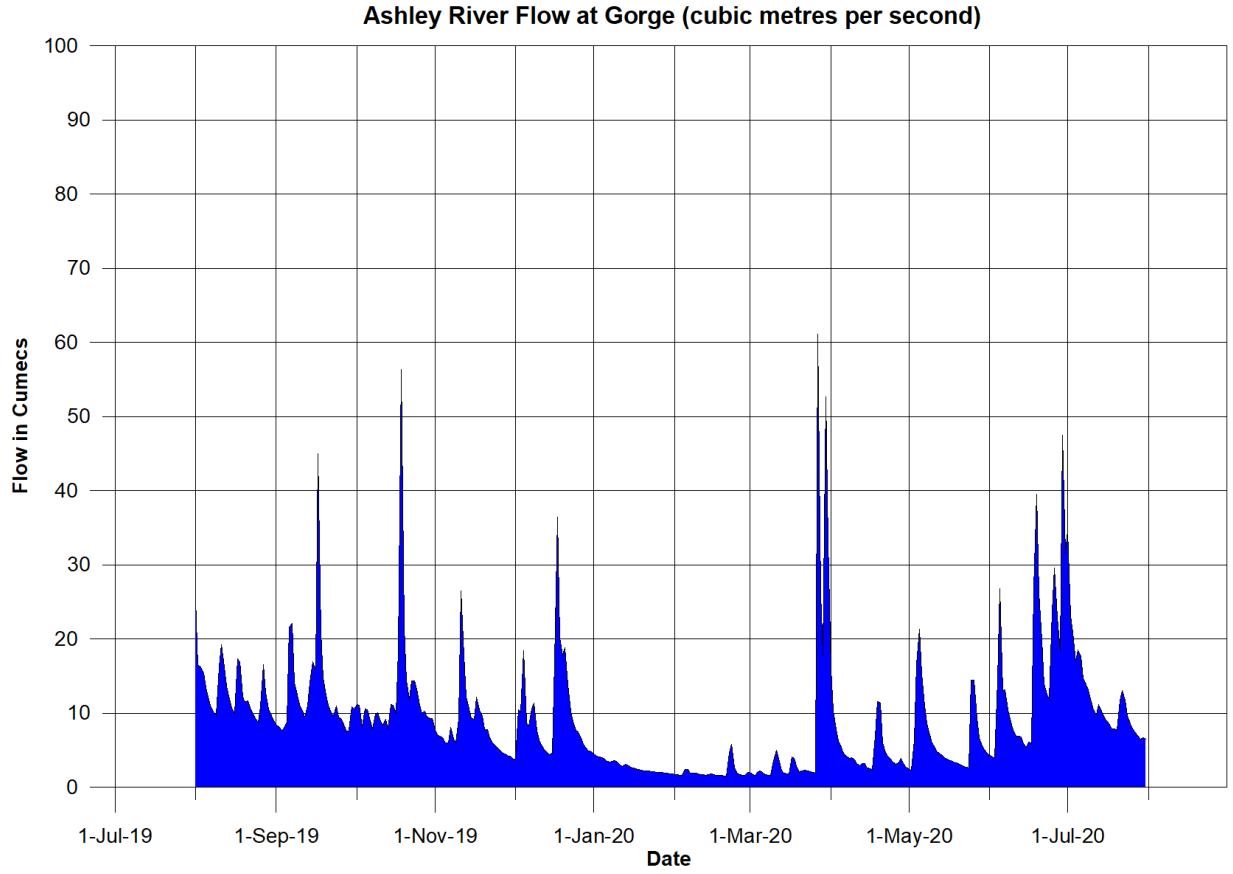
Promotion / Activity	Date	Comment
Meetings / survey		
AGM	Aug 29	DOC offices, Rangiora, 14 present
Meetings – General	July 11, Aug 29, Nov 14, Feb 20	DOC offices, Rangiora: 13-19 present
Meetings - Management Committee	Sept 5, Nov 12, Jun 17	7-8 present
Promotions sub-committee	Nov 27	Met with Steve Attwood to discuss Promotions and Communication plan
Annual bird survey	Nov 16	25 participants
Presentation/Representation		
Trapping workshop	July 6	DOC, Hanmer
Compass FM Rangiora	July 11	Local radio interview
Rangiora Tramping club	July 23	Ppt presentation
Indigenous Biodiversity meeting	Aug14	WDC Council rooms
Oxford Lions, Oxford	Aug 22	Ppt presentation
Talk to Group trappers	Aug 23	Richard Maloney, DOC
Birds NZ, Christchurch	Aug 26	Ppt presentation
Ch/Ch Over-40s tramping club	Sept 3	Ppt presentation
Fernside School	Sept 2&5	Down Back Paddock series
Rangiora Borough School	Sept 9	Down Back Paddock series
DOC gathering, Ch/Ch	Sept 17	Conservation week, Antarctic Centre
Twilight walks	Oct 8 & 10, Nov 27	Conservation Week riverbed visits
Compass FM, Rangiora	Oct 24	Local radio interview
Kaiapoi Library talk	Oct 24	ARRG video shown
ECan meeting, Ch/Ch	Oct 25	David Owen, ECan Braided River advisor
S Is Forest and Bird dinner, Ch/Ch	Nov 2	ARRG video shown
Compass FM Rangiora	Nov 4	Local radio interview
Kids Press interview	Nov 6	Hine Waaka, Kids Press representative
Display presence	Nov 10	Tuhaitara Open day
St Patrick's school, Kaiapoi	Nov 11	Down Back Paddock series
RNZ interview	Dec 4	Lynn Freeman, Ch/Ch (aired on Jan 12)
Roads Scholar Tour	Nov 2, Feb 15, Mar 7	14 retired Americans shown estuary and river
Waimak Friendship Society	Jan 23	ARRG video shown
Compass FM,Rangiora	Feb 28	Local radio interview
New Life school, Rangiora	Mar 4 & 10	Down Back Paddock series
ECan meeting, Ch/Ch	Mar 19	Discussing long-term plan preparation
Summerfield school, Ch/Ch	Mar 20	Ppt presented
Riverbed meeting	May 21	With David Owen, ECan
Media Articles		
NC News	Oct 31	Gulls opt for a better river spot after flood
Kaiapoi Advocate	Nov 11	Riverbed birds seek votes
NC News	Feb 20	Charred riverbed could aid bird life

Other		
Weed clearing - volunteer	July 7, 13, 14 & Aug11	Volunteer weed pulling at Groyne 2
Weed clearing - contractor	July – mid-August	15 ha by tractor-mounted ripper/undercutter
Trap making	Oct 23, 25, Nov 1, Feb 19, Mar 19	Coreflute run-through 150s and DOC200s
Ohoka Market	Oct 25, Nov 15, Dec 13 & 27	Display table
Sausage sizzle	Nov 23	The Warehouse
Trappers BBQ	Dec 6	DOC offices, Rangiora
Berm fire	Feb / March	50ha burnt, trial planting proposed

Appendix 2. River flow (cumecs)

Taken at the Ashley Gorge from July, 2019 to July, 2020 (data requested from Environment Canterbury). The 2019/2020 bird breeding season lasted from August 1, 2019 to February 1, 2020.

Note that this year there were no significant flood events. The highest flow in 2019/2020 was just over 60 cumecs with a maximum in the breeding season being about 55 cumecs – not enough to be a serious threat to nests. In the previous year there had been a flood of 342 cumecs (July 2019).



Appendix 3. ARRG office bearers and management structure

Chair: Nick Ledgard (nick.ledgard@xtra.co.nz)

Secretary: Joan Miles (k.jmiles@icloud.com)

Treasurer: Sue Mardon (suemardon02@gmail.com)

Trapping organiser: Peter Whitehead (peter@sabretech.co.nz)

Management Committee. In September, 2017, the Constitution was amended to allow the creation of a Management Committee with the capacity to make decisions and approve funding for small tasks requiring immediate attention – for final approval at the next General meeting. There are seven members on this Committee – office bearers plus Bev Alexander, Chris Martin, Grant Davey, Peter Whitehead and Bruce Newland.

The Group has 40 signed-up members, plus 115 interested people on our email list.

The Group has a website (www.ashleyrivercare.org.nz) maintained by BRaid manager, Sonny Whitelaw, while our Facebook page (https://www.facebook.com/ashleyrivercare) is maintained by member, Steve Attwood.