
*Management and monitoring of shorebirds in the
Ashley-Rakahuri River during the 2020/21 season*



A volunteer student study indicates that most predators visiting traps are not caught (see P18)



Ashley-Rakahuri Rivercare Group, Inc.

Management and monitoring of shorebirds in the Ashley-Rakahuri River during the 2020/21 season

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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 16th 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 (177 traps sold in 2020-21), 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 indigenous species in the river, particularly the wrybill (ngutupare), black-billed gull (tarapuka) and black-fronted tern (tarapirohe). More recently, greater focus is being given the banded dotterel (turiwhatu). To this end, the main actions undertaken involve habitat management (mainly weed control), monitoring bird populations and breeding success, predator control, improving awareness by the public and river management decision-makers, and restricting 4WD access to the river during the breeding season.

ECan is currently overseeing and funding the writing of a long-term plan for the Ashley-Rakahuri river. This should become the guiding document for future management.

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. These areas were rapidly being reinvaded, before record floods in May/June 2021 removed virtually all weeds from the riverbed. The focus now is to develop cost-effective and environmentally-friendly means for maintaining weed control, and to retain island status and good surrounding flows during the season. The Group is concerned about management aimed at flood prevention leading to an ever-widening berm zone, which limits the river's 'room to move' and leads to loss of the 'normal' braided riverbed habitat essential for the long-term survival of riverbed birds. Discussions with ECan on this matter are on-going.

Bird surveys. Although the bird population trend up to 2014 was a positive rising one, it reversed (declined) in the following 2 years. Despite a rise in bird numbers in 2019, populations have yet to recover to former levels. The 376 key birds counted in the annual 2020 survey on November, 21, was the third equal worst year on record (with 2002) – with the worst year being 2001 (285 birds). The exception was black-billed gulls, where a single good-sized colony of 2000 birds, meant that the count was the second best ever. More regular surveys between the Cones Road bridge and the estuary, and further up-river between Groynes 1 and 2, follow population and species changes during the year – with significantly lower numbers present over winter.

Monitoring of breeding birds. Up to 7 pairs of wrybill took up different territories at some stage during the 2020-21 season – just less than the recent years longer-term average of 8 pairs. Seven chicks were raised, for a minimum productivity of 0.86 chicks fledged per pair – slightly above the 15-year average of 0.80. A good-sized black-billed gull colony (1278 nests) fledged around the same number of chicks, to give a productivity of 1.0, which would be the best outcome ever on the riverbed. Despite black-fronted terns attempting to nest in at least 4 sites, the only success was at Smarts island, where 15 nests fledged 9 chicks. This above-average productivity of 0.6 is overshadowed by the very low numbers nesting. Breeding productivity of other species was not recorded, but signs of success were noted at many sites.

Predator control. Alongside the river. There was an average of 236 traps alongside 21km of riverbed (mainly DOC 200 and Timms), maintained by a team of 18 volunteer trappers. The catch rate/100 nights was 0.51 (0.54 previous year). A total of 442 predators were trapped (489 previous year). Hedgehogs were the most numerous (190), followed by feral cats (45), weasels (35), and stoats (25).

Estuary. 129 traps were serviced by 8 trappers along a shoreline of around 10.5km. Trap-catch rate was 0.43 (last season 0.54). A total of 202 predators were trapped (270 last year). Rats were the most

common caught predator (101), followed by weasels (37), stoats (36), hedgehogs (22) and feral cats (6). Over the last 2 years, the composition of predators caught alongside the river has been very different to that caught at the estuary. Compared to the river, the estuary had a higher percentage of rats (53% estuary; 35% river), stoats (16%; 6%) and weasels (18%; 11%), but a lower percentage of hedgehogs (9%; 38%) and feral cats (5%; 10%). The reason for the declining predator catch over time at the estuary, while that along the river remains the same, may be a greater density of traps at the estuary than along the river. Bird losses, (BFT and BBG chicks and adults) to predation appeared to be significantly less than in the previous season.

Meetings/members and awareness/education. The group email list contains 138 people. General meetings were held on October 8 (included the AGM), December 3, March 18 and June 17. Attendees numbered 13-26. In addition to the normal committee hierarchy of chair, secretary, treasurer and, in our case, a management committee, it was agreed in June to create three management teams - operations (river work, bird counts, habitat maintenance, monitoring and trapping), communication (stakeholders, media, promotions) and administration (membership, treasurer/accounts). It was felt that such a structure will lead to less work required by any one individual. During 2020-21, thirty-nine promotion opportunities were taken to ensure that the public were kept aware of the Group's activities. They included riverbed visits for the Rangiora Mayor, Dan Gordon, and the Waimakariri Zone Committee, displays at three public venues, four articles in local papers, and interviews by TVNZ, TV3, Stuff and the local CompassFM radio. Presentations were given to seven community / interest groups and three schools – as well as Environment Canterbury councillors and senior river managers. An email update of Group activities was sent to all members in September and January.

Discussions with ECan. A number of meetings addressed the loss of braided river fairway area, and the impact of gravel extraction operations. In brief, it was felt that the past ECan management focus on flood control, plus certain extractor activities, had been at the expense of environmental values, and contributed to the loss of the braided river habitat favoured by birds. We were encouraged by ECan's acceptance of our views and the need for change in the future.

In addition to the river management discussions with ECan, the Group remained closely associated with staff from DOC, the Waimakariri District Council and Zone Committee, 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. Members contributed two Powerpoint addresses to the BRaid seminar held on July 8, 2020 (98 attendees), plus two others at the BRaid seminar held this year on July 14 (181 attendees).

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. Over the past 3 years the number of website views has risen from 2479 in 2019 to 4621 in 2020, and after 6 months of 2021 is already at 3822 from 1600 visits. Between August 1, 2020 and 21 June, 2021 our Facebook page accumulated 942 followers, up from 770 the previous year. We made 45 posts (60 the previous year) but achieved a substantial increase in views, 65,667, compared with 55,049 the previous year.

The Ashley-Rakahuri Regional Park staff continue to develop walkway and bike tracks and recreational areas in the berm alongside the river. In addition, there is a short but very testing 'mud-hole' stretch, plus an 8km 4WD track along the north bank berm. These discourage people from recreating in the riverbed itself. During the breeding season, vehicle access-ways into the riverbed are blocked in order to minimise bird disturbance.

Conclusion. Relative to the future success of rare and endangered shorebird species breeding in the Ashley-Rakahuri river, populations and breeding success increased significantly from 2000 – 2014. They then declined, due primarily to a major increase in weed-infested areas, and have yet to recover to previous levels. The record floods of May/June 2021 have cleared the riverbed of most weeds. The major challenges now involve maintaining good weed control, further improving predator control, 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, which will guide future management in the Ashley-Rakahuri river.

Recommendations for future management are detailed in Section 12, and include:

1. *Future planning.* Contribute to and approve ECan's long-term management plan, and initiate implementation.
To date: Approval of the plan has been held up while outside authorisation is being obtained, but this issue should be resolved in the near future.
2. *Improving habitat.* Create and maintain improved habitat (e.g., extensive weed-free sites – preferably islands) for bird breeding and feeding. Maintain island status and good surrounding flows during the season if appropriate. Continue development of cost-effective and environmentally-friendly means of maintaining weed control. Promote operational management changes by ECan to avoid / reverse widening berm which limits 'room for the river to move' and leads to loss of 'normal' braided riverbed. ECan is in the process of improving habitat in the upper Ashley-Rakahuri and lower Okuku rivers. ARRG supports increasing feeding and nesting opportunities along these reaches.
To date: Significant artificial weed removal since 2017 floods, with promising potential for greater clearance using tractor-mounted undercutter. However, recent floods have negated the current need for this. Increases in berm width, which have contributed to loss of fairway habitat, were reversed by flooding, but braiding of the river appears to have actually declined. Suitable bird habitat in the upper Ashley-Rakahuri and lower Okuku rivers was lost to weeds many years ago.
3. *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. Enable this by making more use of technology, such as drones, thermo-scope, trail cameras, and radio tagging of birds. A measure of egg hatching is needed, plus more emphasis should be put on counting fledglings. Surveys and monitoring will be needed in the upper Ashley-Rakahuri and lower Okuku rivers – currently being cleared of weeds.
To date: Surveys and monitoring has been undertaken for almost 20 years below the Okuku river junction. Monitoring above this point has been minimal.
4. *Record keeping.* Continue own record keeping and mapping (traps and bird nesting), and contribute to improvement of regional/national record keeping. Try to band more birds.
To date: The Group's record keeping and data presentation plus feedback to end-users is now excellent. Unavailability of approved personnel has prevented continuation of past banding efforts.
5. *Predator control.* This occupies more of the Group's time than any other activity, and must be maintained. ECan is funding a review of the current trapping regime and methods, which should endorse an extension of predator control and the appropriate use of new strategies - being aware that most trapping is on public land. Particular emphasis is required around breeding birds.
To date: Trapping has been adequate, although results indicate that predator numbers may not have been reduced significantly. Additional funding has been sought to complete and widen trapping of the entire river margin (doubling current trap numbers).
6. *Advocacy.* Continue to implement recently completed PR strategy involving 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 and a children's book. Particular attention should be paid to schools and more field interpretation / awareness signs in public places. Make use of the 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 PR strategy. In addition, the estuary interpretation panel will be repeated up-river.
7. *Funding.* Maintain funding via Group initiatives (such as trap-making), and improved public awareness, plus enhanced agency linkages, especially with ECan, DOC and Waimakariri District Council.

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.

8. *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 had the same chairman.

9. *Maintain and improve collaboration.* Particularly via better and regular communication with ECan's new Rivers group and its on-the-river engineers and operations staff. Also with DOC, 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.

To date: Reasonable collaboration with all agencies, particularly with ECan planners – but not good with river operational staff. Links with iwi/runanga, Fish & Game and Forest & Bird also need improvement.

10. *Gravel extraction.* Maintain and improve collaboration with commercial gravel extractors. Monitor gravel extraction sites to help determine methods which are optimal for the environment and appropriate H&S standards.

To date: Good collaboration with Taggart Earthmoving Ltd, but needs extending to other operators. There is concern that consent criteria, operational safety (particularly involving truck movements), and enforcement need improvement.

11. *Berm biodiversity.* Inventory the environmental / biodiversity values of the berm.

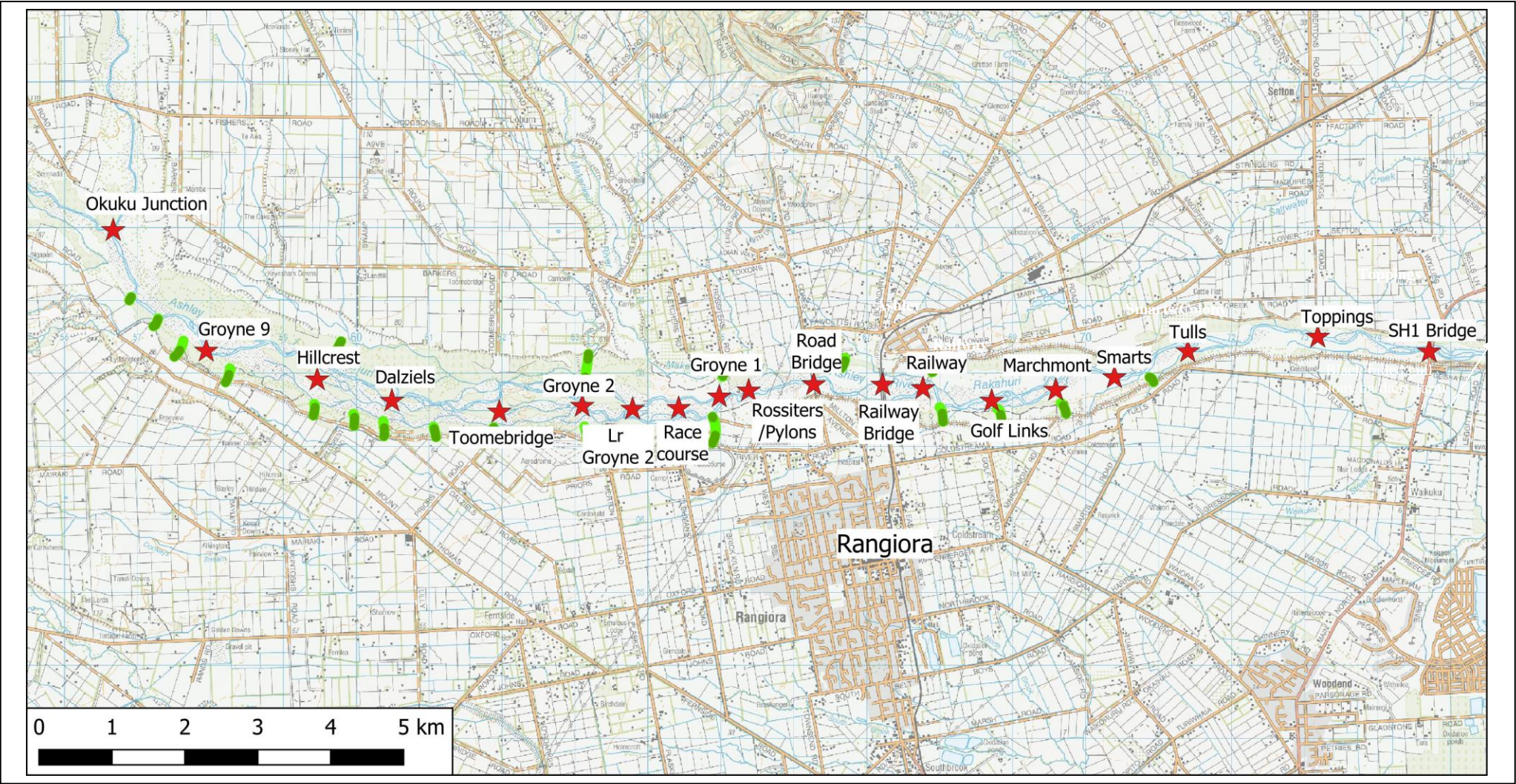
Justification. The berm zone between the stopbanks and the fairway occupies a major part of the Ashley-Rakahuri braidplain. Its biodiversity values may be considerable, and it could be a major part of any vegetation corridor running from the coast to the mountains.

To date. Little attention has been paid to the berm's environmental/biodiversity values

12. *Local management.* Support ECan's new braided river initiative and in particular its intentions for the Ashley-Rakahuri river - which involves the completion and implementation of a new management plan. Assist activities within the Ashley-Rakahuri Regional Park.

To date: Good collaboration with local staff. 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, tree planting on the berm and fairway management. Collaboration with higher level operation managers can be improved (see 2 and 9 above).

Figure 1. Map of lower Ashley-Rakahuri river, showing main bird sites



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.

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).



Ashley-Rakahuri / Saltwater creek estuary (2018). The record May 30 / 31, 2021, flood opened two new exits through the coastal sand-dune.

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). Together with the estuary, it is recognised as the most readily accessible site on the east coast for seeing a wide range of shorebirds.

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, 2020), 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 2020/21 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.

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 (turiwhatu), which is 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. As recent work shows the banded dotterel to be more at risk than previously thought, the group intends to monitor this species more closely.



Black-billed gulls and chick

Future riverbed and bird management is currently being reviewed, led by David Owen, ECan's Principal Biodiversity Advisor Braided Rivers.

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 annual bird count was extended to 1.5km below the SH1 bridge, which marks the upper reaches of the tidal estuary. Hence, the total area surveyed now covers 21 km of riverbed, but for consistency reasons, this report mainly covers the previous 19km stretch. In addition to trapping the riverbed margin, predator control was extended to cover around the estuary margin 3 years ago.

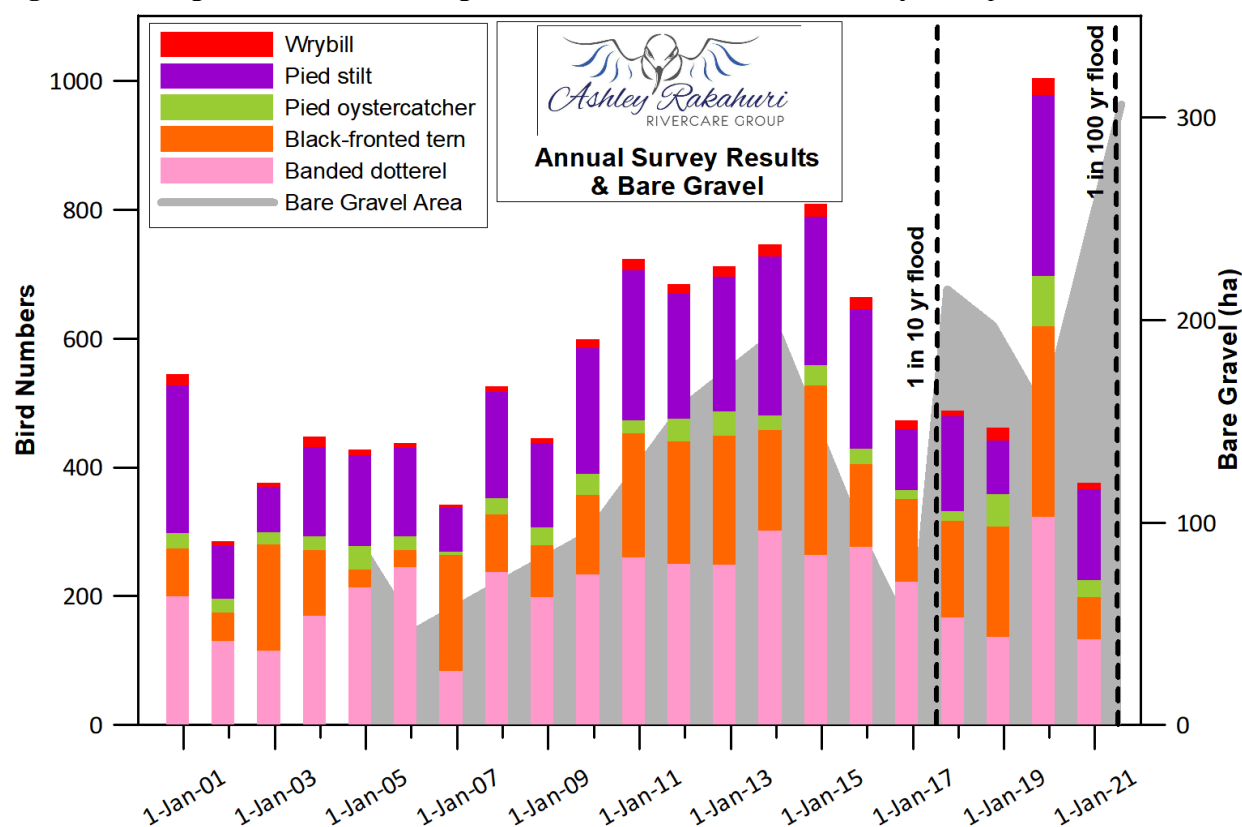
3. Habitat management

Arresting the loss of the braided river habitat needed for good bird breeding and feeding is arguably the greatest challenge facing the Group. This loss can be mainly attributed to two factors. One is the on-going invasion of vigorous exotic weeds. The other is the increasing width of the vegetated berm zone which has caused the fairway area to decrease significantly – 'dynamism' is a characteristic of braided rivers, and they will die if not given 'room to move'. The impact of commercial gravel extraction has also contributed to loss of braided river bird habitat. Over time the river has become less braided.

Weed invasion

Over the past 6 years, the negative impact of weed invasion on bird populations and breeding has become very obvious. Historically, it has been large floods which have kept fairways open, but these cannot be relied upon to do this. Weed invasion in the absence of floods happens very quickly. This was well illustrated in the period between May, 2014 and July, 2017, during which there was no major flood event. Figure 2 shows how the area of clear, weed-free shingle declined significantly over these years, from nearly 200ha to around 30ha. A decline in bird numbers mirrored that drop remarkably closely.

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



Even though a major flood in July, 2017 (Appendix 2) cleared over 200ha of encroaching weeds (Figure 2), bird numbers since have yet to return to 2014 levels. The high numbers of 2020 appears to have been an anomaly caused by birds arriving from a flooded Waimakariri river, as numbers in the subsequent year (2021) were back to low levels (see Figure 18).

Consequently, major efforts have gone towards weed clearance and control. Early Group 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. In 2019, a local farm contractor, Nathan Stewart of Cresslands Contracting Ltd (Tulls Road, Rangiora) was approached to develop and test a tractor-mounted tool for weed control use in the riverbed. In July, 2020, a Mark 1V version of this tool, featuring undercutter blades, was used to clear 8 sites covering a total of 34ha in mid July (see Ledgard and Davey, August, 2020, section 14 – References/Internal reports). However, experience has shown that these cleared areas can only be small and there is no guarantee that birds will use them. Most of the 15.5ha cleared in 2019 and 34ha cleared in 2020 did not appear to attract increased numbers of breeding birds – with two exceptions. These were the Railway island in 2019 (see 2019-20 annual report and Internal reports listed in the Section 14 - References) and the Smarts island in 2020 (Internal report in Section 14). During the late winter of 2021 it was intended to machine-clear weeds from 60-70ha of riverbed, but a major flood event at the end of May negated the need for this.

Major flood of May 29-31, 2021. This was a record rainfall event, with around 350mm of rain falling in Lees Valley. Flood waters at the gorge almost reached a one in one hundred year event – as calculated by

one methodology from records dating back almost 50 years. This flood was followed by a rainfall of slightly less volume in mid-June. The resulting floods were records (see Appendix 2) and not only cleared almost the entire fairway of weeds, (see photos below) but also widened its width (area yet to be determined).



Above. Photo before May flood and 24 hours later. Taken looking down from Cones Road bridge

Below. Photo before and after May 29-31 flood. Taken looking up from Cones Road bridge



Past work on the Ashley-Rakahuri and other rivers have shown how best breeding results can be obtained on weed-free islands with good surrounding water flows (O'Donnell et al, 2016). The record May/June floods have significantly changed the state of the riverbed and its flow channels, so there is now a good opportunity to improve habitat by redirecting flows to enhance islands. Depending on bird occupancy, this may well have to be maintained during the breeding season. Although it has not been attempted in the past, it is intended to carry out such work during this coming season. Environment Canterbury are progressing a consent (the “hedgheg consent”) which will allow this.

The record floods have also left a ‘clean slate’ relative to weed presence in the riverbed, and it has yet to be seen how the birds react once they start to arrive in numbers for the 2021-22 season. The floods also present unique opportunities for maintaining weed control into the future. The option of using light chemical brews to spray small weeds over large areas could well be much more cost-effective than traditional methods using machines.

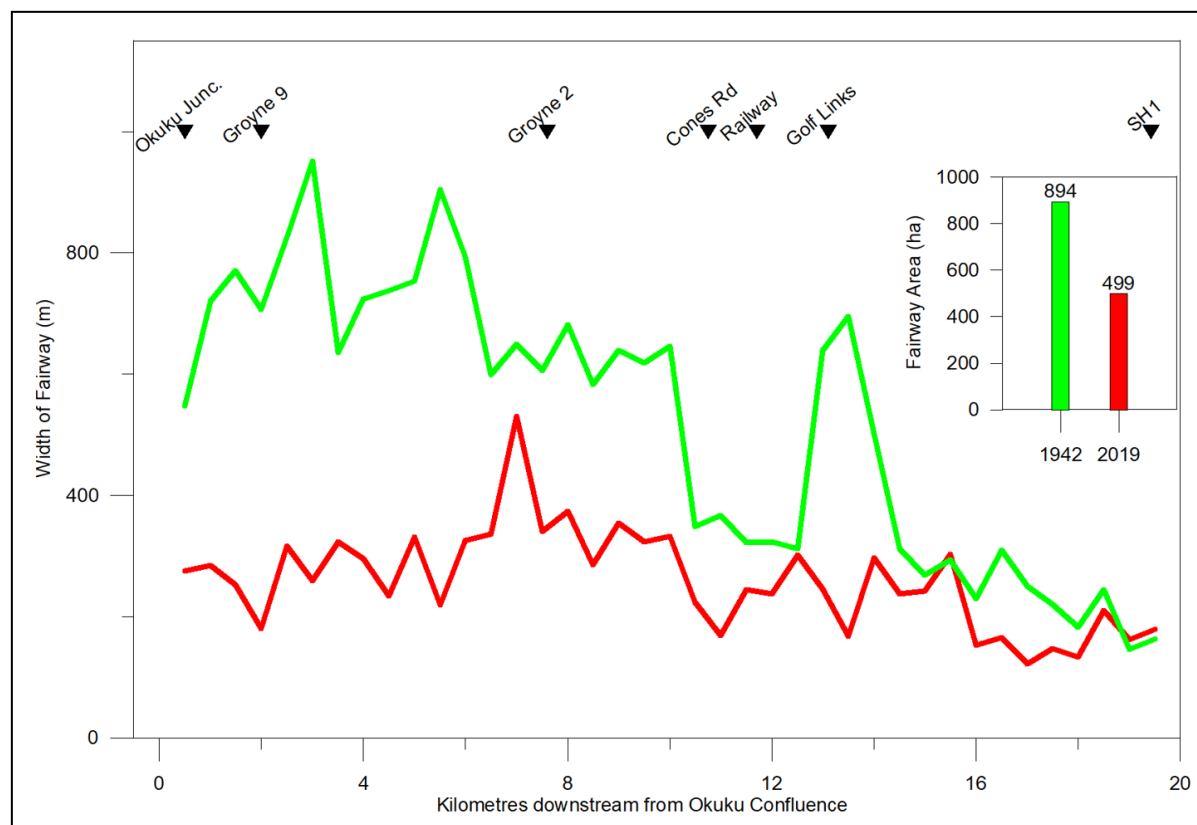
It is unknown how these major floods, which were followed by a period of regular high flows, affected the food chain. It may be that the aquatic and land insects and small fish, which are important bird food sources, take longer than usual to recover to normal levels. Particularly as they have been hit by two closely spaced flood events which turned over the gravel in the entire fairway.

Loss of braided fairway area

In last year’s annual report, it was written that studies of 11 sets of aerial images going back to 1942 show that the open fairway has shrunk in width by around 50% (Figure 3) - and continued to shrink until the recent floods. The main reason for this is the increasing width of the berm zone particularly along the north bank of the river. 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 been worse in other smaller foothills-fed braided rivers, such as the Orari and Opihi, which now have poor bird numbers.

Figure 3. Loss of fairway width over the last 20 years – due to expanding berm width.



The increase in berm width and narrowing of the fairway has been the consequence of management’s major focus on protecting stopbanks to ensure minimal risk of flooding onto adjacent productive farmland and areas of human habitation. The impact of such management on environmental values has not received the attention it not only deserves but is required legally.

Over the past year, there have been many discussions with ECan about the above issue, including presentations to appropriate bodies and gatherings – such as to the ECan council and Waimakariri Zone committee, and the public at the BRaid seminar on July 14, 2021. The reception has been encouraging, but substantive changes have yet to happen.

A fundamental question relative to berm width and flood protection is – how much berm is needed to protect stopbanks and prevent flooding? An indicative answer was given by the recent flood of May 30-31. This was a record in terms of flow volume, but did not breach stopbanks anywhere despite the width of berm protecting them varying from 50m to many 100s of meters in width. This is an issue which has attracted national attention, and will be addressed in a Rivers Group conference in Lower Hutt in November 2021.

Gravel extraction.

There is plenty of evidence that gravel extraction can assist bird breeding by removing weeds as part of the operation. In addition, birds can tolerate (be encouraged by?) by extraction operations carried out in a considerate way (see Ledgard and Davey, 2018 Internal report – referenced in section 14). However, gravel extraction can also have a negative impact by removing excessive amounts of shingle and creating straight channels with steep banks and minimal braids. This can be exacerbated by lack of appropriate criteria in consent approvals, coupled with poor enforcement of consent conditions, which do require

returning the site to its former state once operations cease. This appears to have been the case on the Ashley-Rakahuri river. Internationally, braided rivers are losing their natural character, and almost everywhere excessive gravel extraction is implicated. An abundant sediment supply is a necessary condition for the creation and maintenance of the braided character of a river. Over the past year, we have pointed out the above deficiencies to ECan, and moves are afoot to address them.

Mudfish in the berm

During early 2021, a volunteer, Quill Yates, monitored four berm sites for the presence of kowaro, Canterbury mudfish (Figure 4).

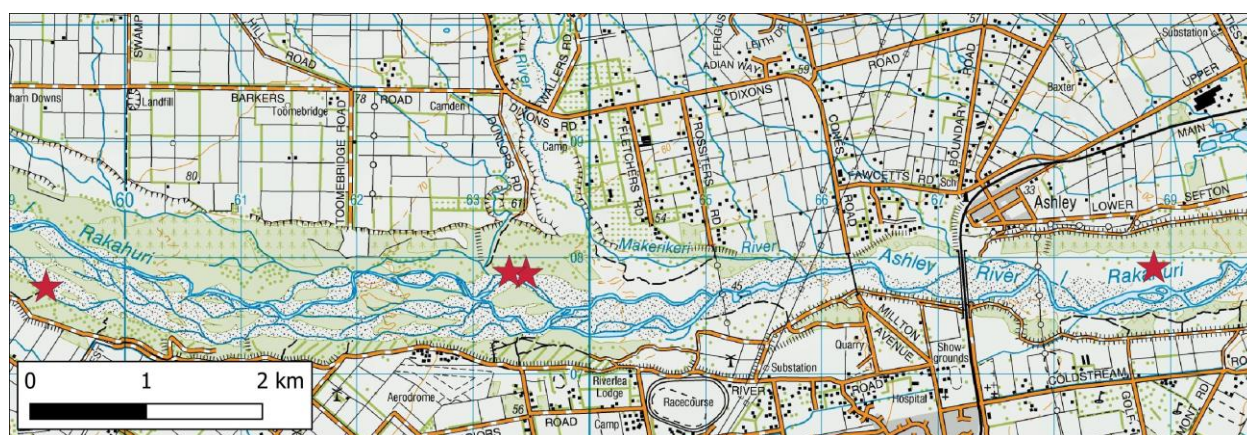


Figure 4. Mudfish trap locations

Four of the sites were permanent spring-fed small bodies of water, which had been cut off from the main fairway flow in recent years, with one including a rain fed pond. Following advice from Jenny Bond of the Working Waters Trust and from the Tuhaitara Trust, five specially-designed mudfish traps were installed in the late afternoon and recovered the following morning. No mudfish were trapped – the only catch was a single adult inanga. Further monitoring of similar sites was planned, but was not carried out due to the major impact of the floods in May-June, 2021 – which swept through most of the berm zone.

Environment Canterbury staff have been monitoring several sites on the berm for lizards. This will add to the knowledge of the river's indigenous biodiversity.

Discussion

Weed invasion. 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. We have observed how any increase in weeds is likely to lead to a decline in bird numbers, and that 'normal' floods cannot be relied upon to remove sufficient weeds. For this reason, the Group has artificially cleared around 45ha of weeds since 2016, and planned to do another 65ha this winter. However, the record May/June floods negated the need for any artificial weed clearance, and presented unique opportunities for maintaining a weed-free status into the future. The inevitable reinvasion of weeds will be monitored, and control options will be explored once the 2021-22 breeding season is finished. During the season, we will attempt to maintain the best island conditions by managing surrounding water flows as required.

Loss of fairway width / widening of berm zone. Concern about the negative impact of these on bird habitat has been expressed to ECan. It is expected that future management will adjust accordingly.

Gravel extraction. Similarly, there have been discussions with ECan as to how commercial gravel extraction criteria could be amended, not only to minimise adverse impacts, but also to enhance bird breeding / feeding habitat. The Group has offered to maintain a watching brief on gravel extraction and to keep ECan informed about any such operations observed on the river. In addition, we have brought attention to the fact that there are some basic Health and Safety aspects which need improvement – particularly involving truck movements.

Biodiversity. There is need for a wider inventory of all biodiversity values (particularly indigenous) within the berm and fairway of the river. Bird values in the open riverbed are well recorded and monitored, but this is not the case in the berm. Neither is it the case for plants and invertebrates. A recent report by Wildlands Consultants (see Section 14 References / Internal reports) describing such values in the stretch of river between the Gorge mouth and the Okuku river junction needs repeating in the river stretch from the Okuku down to the estuary.

4. Predator control

Over the 2020-2021 year, there were no major changes in our trapping network covering the riverbank and estuary, and only small changes in trappers. However, the major floods of May – June 2021 washed away more than 100 traps from the river and estuary areas. At the time of writing these are being gradually replaced – usually further from the river where they will be less vulnerable to floods.

Over the year there have been on average 236 traps along the river and 129 at the estuary. These numbers were arrived at by first calculating trap nights (using a programme written to use the dates traps were installed and moved/lost - as recorded in the database), then dividing this by 365. Thus this accounts for losses in the flood and for temporary traps placed around colonies and nests in the nesting season. Traps in place as of 13 August 2021 were –

Type	River	Estuary
DOC 200	138	88
Timms	42	1
Trapinator	2	13
	182	102

The traps have been monitored by 26 volunteer trappers.

More information about predation and traps around nests and colonies is included in Grant Davey's Internal report cited under References (Section 14).

4.1 Ashley river

The table below shows catch in the period 1 August to 31 July over the last two years.

Predator	2019 - 2020	2020 - 2021
Feral Cats	42	45
Ferrets	7	3
Hedgehogs	162	190
Norway Rats	77	49
Rats	29	13
Ship Rats	77	82
Stoats	25	25
Weasels	70	35
Total	489	442

Of particular note are larger numbers of hedgehogs in 2020 – 2021 and fewer weasels, Norway rats and unclassified rats in this time. In 2019 – 2020 there were 102 mice reported with 81 in 2020 – 2021. There were 367 line checks made in 2020 – 2021 compared with 384 the year before – but some of the colony trap checking results were not recorded when nothing was caught.

Figure 5 shows predators trapped, trap numbers and catch per hundred trap nights since our records began in 2004. The decrease in the latter two parameters in the past year was mainly due to traps lost in the May – June floods.

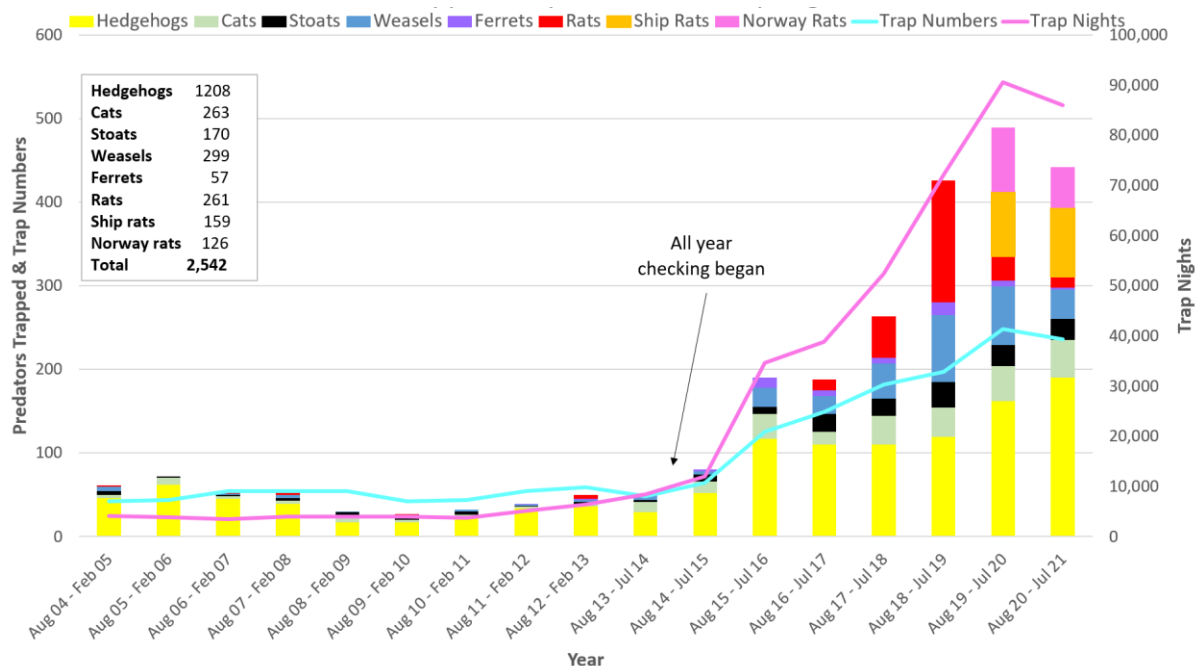


Figure 5. Trapping results - 2004 – 2021

Catch per hundred trap nights in 2020 – 2021 was 0.51, this compares with 0.54 for the previous year. These figures are virtually the same as the 5-year (2014-2019) average of 0.54.

Figure 6 shows catch per hundred trap nights since 2004 – for hedgehogs and the sum of other predators. Hedgehog catch declined markedly in the first few years, but is now on the increase. It is considered that these changes are unlikely to be due to our trapping programme. Catch per hundred trap nights for the sum of other species has remained essentially static.

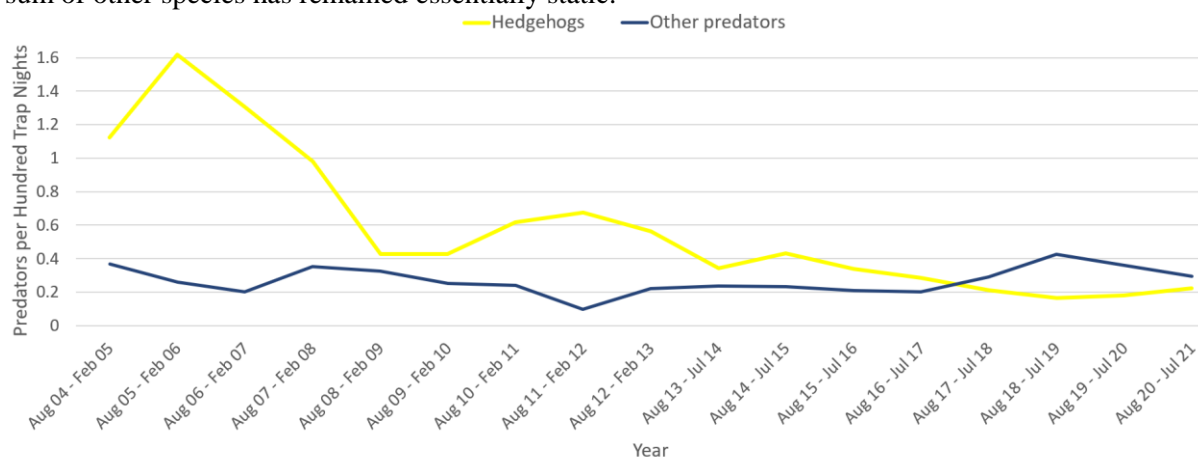


Figure 6. Catch per hundred trap nights, hedgehogs and other predators

Figure 7 breaks down the catch per hundred trap nights for predators other than hedgehogs. Total rat catch per hundred trap nights has declined slightly after a very steep increase from 2016. Weasel catch per hundred trap nights has also decreased in the last two years. The variation in catch probably represents cycles in the predator populations rather than any decline due to trapping success.

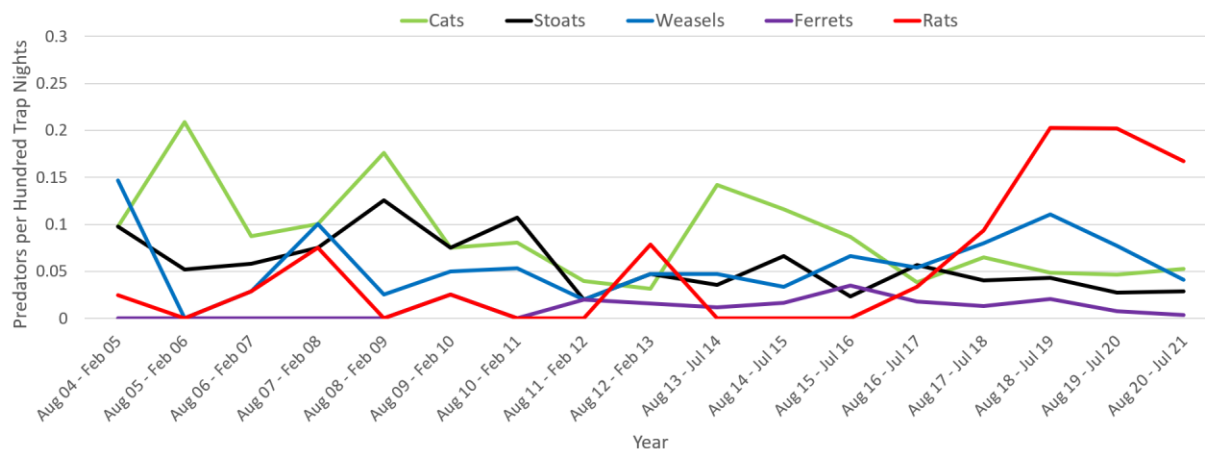


Figure 7. Catch per hundred trap nights, predators excluding hedgehogs

Figure 8 shows catch per hundred trap nights per line – numeric labelled lines are temporary ones around colony and nest sites. The most productive permanent lines were E and O. Line O has traps at 200m spacings rather than our now standard 100m. This was done as these traps are immediately north of Rangiora where people are most abundant. Initially, we didn’t know if traps would be disturbed and if predators would be present, but it now seems that more traps could be placed here.

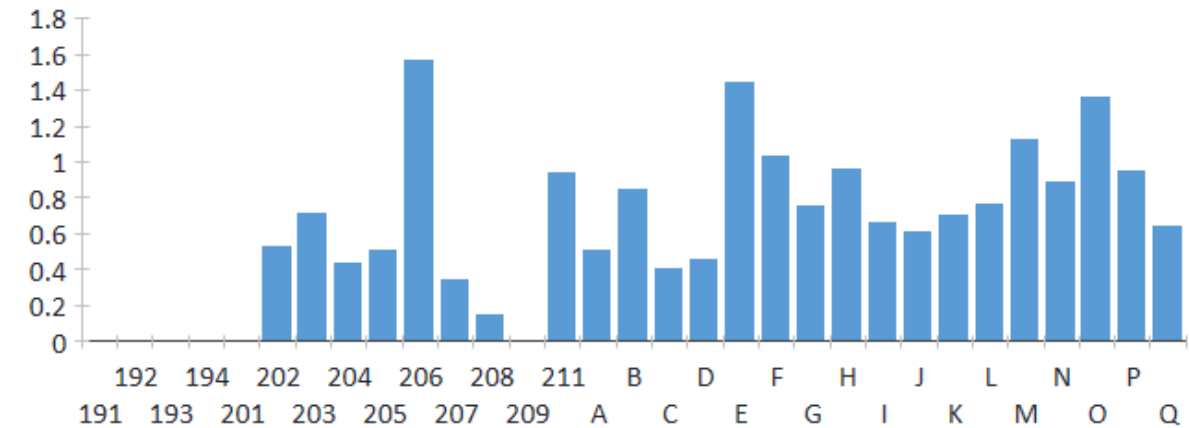


Figure 8. Catch per hundred trap nights per line, 2020 – 2021

Figure 9 shows catch per hundred trap nights per trap type over the last year. The high number for conventional rat traps is because of the success of a small number of these on colony trap lines that were installed for just a short time. In the previous year, catch per hundred trap nights was much greater for DOC200 traps than it was for Timms. With the fewer Timms we now have out, catch was almost identical for these trap types.

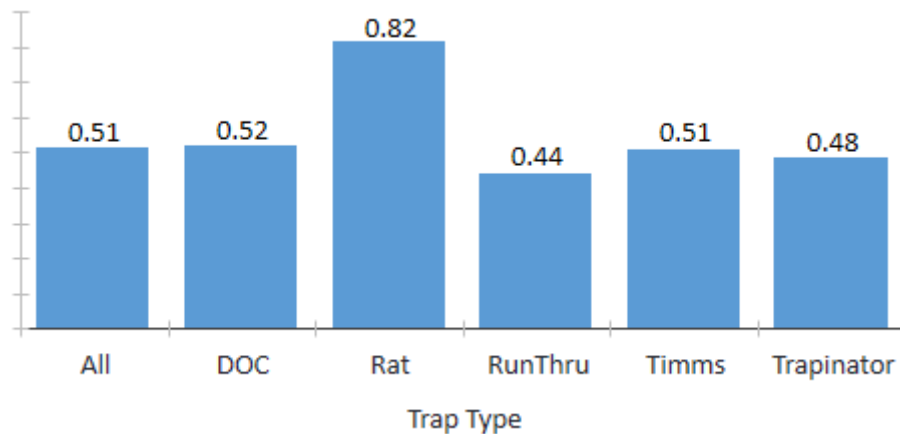


Figure 9. Catch per hundred trap nights per trap type, 2020 – 2021

Figure 10 shows catch per month per hundred trap nights since February 2019. The distinctive pattern of low catch in the winter has continued.

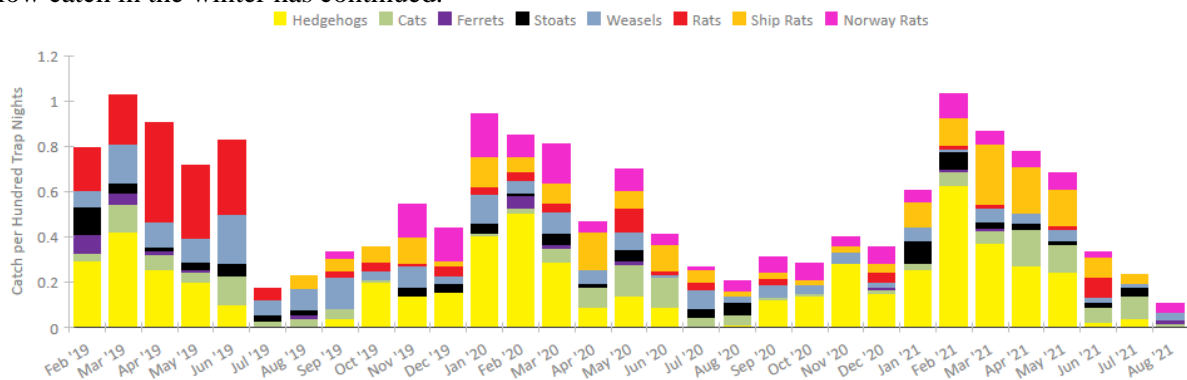


Figure 10. Monthly catch per hundred trap nights 2019 – 2021

Figure 11 graphically depicts catch on each permanent trap line. Line E has more traps than any other line.

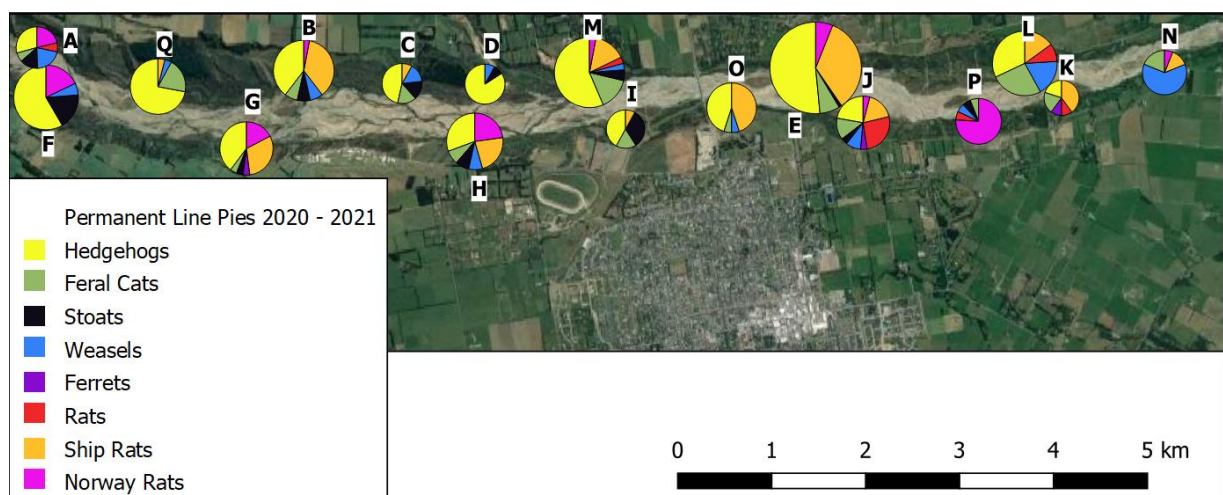


Figure 11. Catch per line, 2020 – 2021

4.2 Ashley-Saltwater creek estuary

Tabulated below is catch for the last two years:

Predator	2019 - 2020	2020 - 2021
Feral Cats	16	6
Ferrets	3	0
Hedgehogs	17	22
Norway Rats		
Rats	56	35
Rats	8	7
Ship Rats	80	59
Stoats	42	36
Weasels	48	37
Total	270	202

In addition, 49 mice were caught in 2020 – 2021 compared to 35 the year before.

The first traps were installed in late June 2018. Figure 12 shows predators trapped, trap numbers and catch per hundred trap nights since August 2018. Note that in 2020 and 2021, most rats were identified as species - either ship or Norway, while there was no such distinction in 2019. There is an obvious decrease in the last year, which can only partly be attributed to traps lost in the flood. In the three years there were 175, 161 and 133 line checks made – this will have had some influence on the catch.

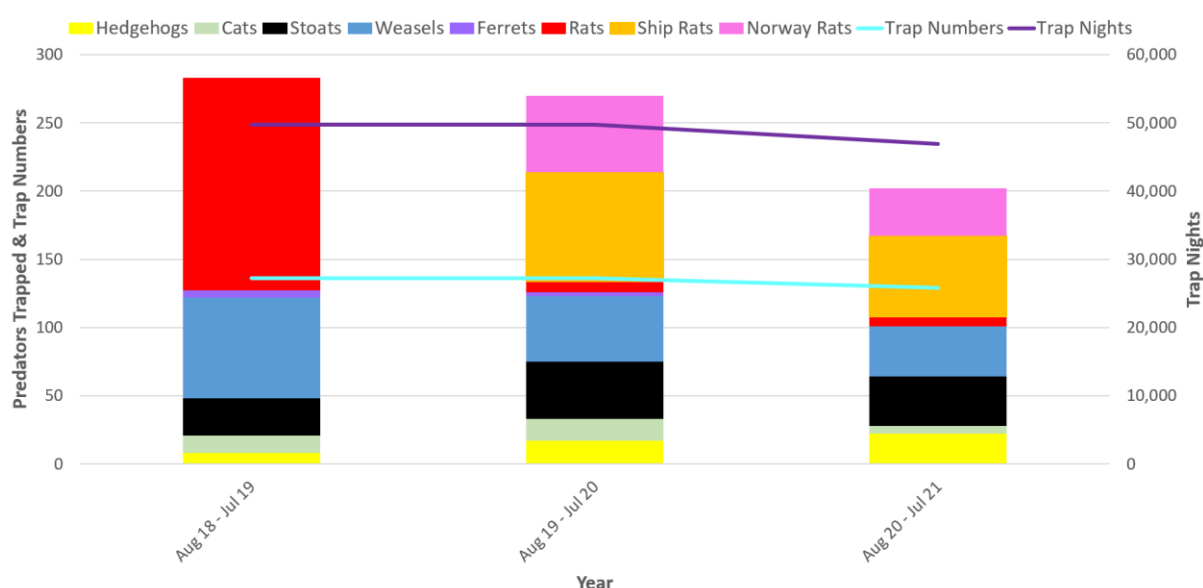


Figure 12. Estuary trapping results, 2018 – 2021

Catch per hundred trap nights in 2020 – 2021 was 0.43 compared with 0.54 the previous year and 0.63 in the first year. This is perhaps significant, and could be partially attributed to trapping done in the adjacent Tuhaitara Coastal Park to the south.

Figure 13 shows catch per hundred trap nights per species – with rats combined. The biggest decreases have been in rat and weasel catch, with hedgehog catch per hundred trap nights increasing slightly.

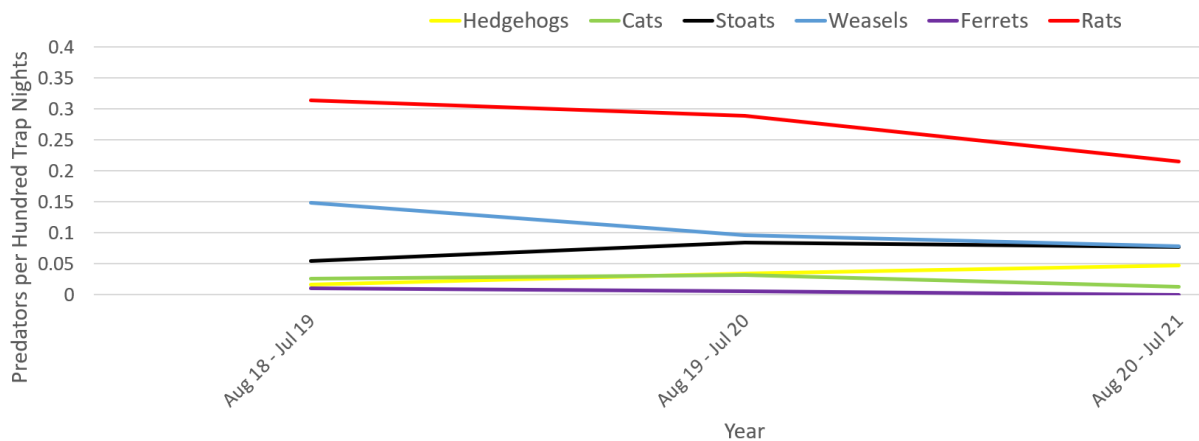


Figure 13. Catch per hundred trap nights per predator species, 2018 – 2021

Figure 14 shows catch per hundred trap nights per trap type. DOC200 traps have by far the highest success rate.

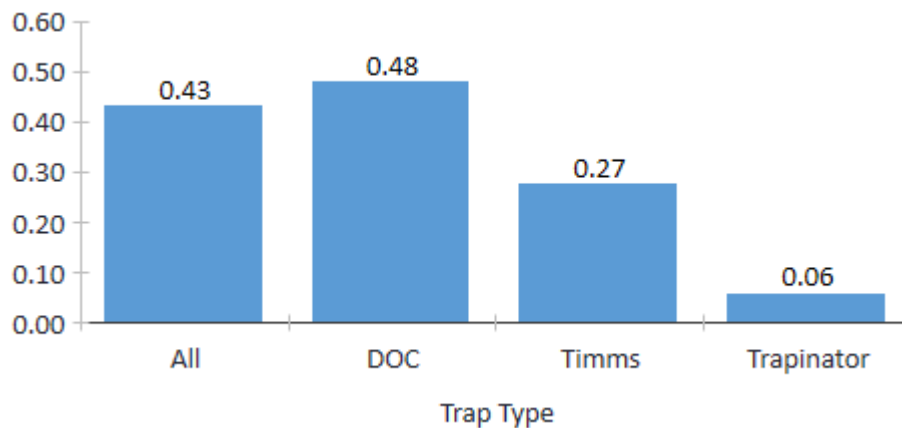


Figure 14. Catch per hundred trap nights per trap type, 2020 - 2021

As with the river traps, there is an obvious seasonality to catch numbers (Figure 15):

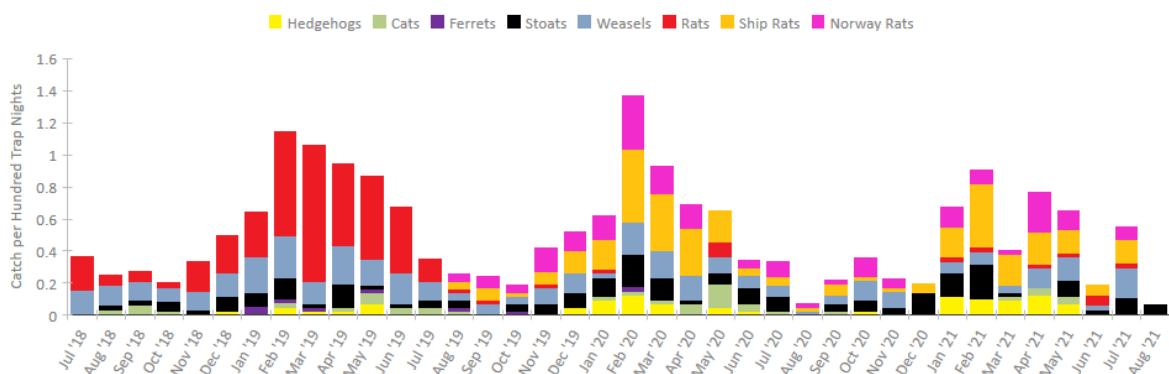


Figure 15. Catch per hundred trap nights per line, 2020 – 2021

Figure 16 shows catch per line. Probably the most notable feature of this is the high numbers and percentage of Norway rats on Line J.

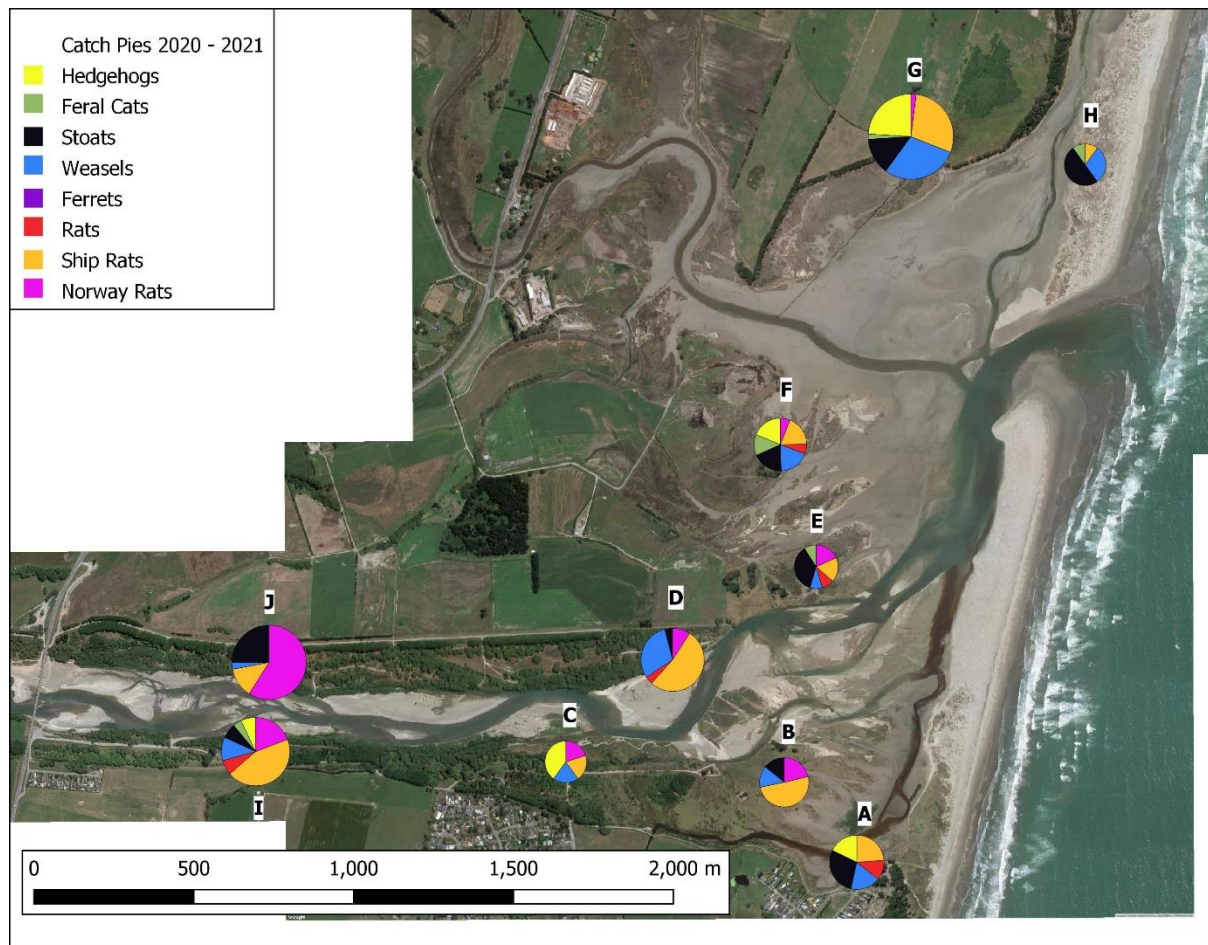


Figure 16. Catch per line, 2020 – 2021

River .v. estuary predator numbers

Over the last 2 years, the composition of predators caught alongside the river was very different to that caught at the estuary. Compared to the river, the estuary had a higher percentage of rats (53% estuary; 35% river), stoats (16%; 6%) and weasels (18%; 11%), but a lower percentage of hedgehogs (9%; 38%) and feral cats (5%; 10%). The reasons for this are unknown.

A reason why catch rate is declining at the estuary but remaining the same along the river could be that there is a much greater density of traps at the estuary per unit area of prime predator habitat (vegetated berm etc) than along the river. At the estuary there is approximately 1 trap per hectare of vegetated berm, along the river it is about 0.4.

Study of trap visits relative to trap catches

During the autumn of 2021 Quill Yates investigated predator visits and catches over a 2-month period. Trail cameras were set up at three sites where three trap types were placed alongside each other (see cover photo). The trap types were DOC200, Timms and run-through tunnels. Almost 20,000 images were analysed. The main finding was that only 8.3% of predator visits resulted in successful catches. The percentage caught per visit for feral cats, rats and hedgehogs were 2%, 22% and 22%. No mustelids (ferrets, stoats and weasels) were caught, but there were too few visits for any analyses to be done. A detailed report is being written, which will contain recommendations as to how the number of trap-catches might be improved.

Discussion

Along the river the evidence that ARRG trapping is having an influence on predator numbers is not strong. The high catch rate over the early period (2004-08) were due to high numbers of hedgehogs, which crashed subsequently (for unknown reasons). Hence, changes in catch of each species over time

are probably natural population features due to factors such as food sources. If our aim is a predator-free river, much more trapping is required, including extending out into farmland peripheral to the river.

Trapping targeted around colonies and nests should be stepped up, even though in the 2020 – 2021 nesting season fewer predators were caught in such traps than the previous season. There was also less evidence of predation at colonies.

At the estuary, catch has been declining since 2018. However, with only three years of records, it is not clear that this is due to ARRG trapping. Greater trap density than along the river may be a cause.

Recommendations

- Maintain existing traps and extend to a double line alongside the river. This has already been discussed relative to an intended review of trap locations to be undertaken by a consultant.
- Increase trapping around colonies and nests.
- Review trapping practice relative to results from the Yates study of predator visits and the low associated trap catches.

5. Bird survey

An internal report by Grant Davey on the 2020 annual survey (November 21) is referenced in Section 14 (References/Internal reports). This contains more detail than the summarised version given below.

Annual Survey

ARRG has an unbroken 21-year history of annual bird counts – running 19km from the Okuku junction to State Highway 1. For the last 3 years we have also included the 2km section from SH1 to the top of the estuary and have counted the birds in 1km stretches of the river. This counting method has now been standardized across Canterbury. The graphs (other than that for the black-billed gulls) and numbers in this report show data that excludes the lowermost 2km of the river.

On November 21, 2020 we had 22 active participants in 4 groups on the usual river reaches – starting at 9am. In the afternoon two surveyors did the 2km down to the estuary. There was a weak to moderate northwesterly wind, with cool conditions and a river flow of about 8 cumecs at the Ashley gorge.

For the past 3 years we have counted black-billed gulls in colonies using drone photographs – in 2020 this was done the day before the survey. The result is considerably more accurate numbers, and almost inevitably higher ones than would have resulted from a land count.



Using a drone to count
BBG numbers in a colony

Overall Numbers and Bird Locations

The six key braided river bird species that we are most concerned about are wrybill, banded dotterel (BD), black-fronted tern (BFT), southern pied oystercatcher (SIPO), pied stilt (PS) and black-billed gull (BBG). Numbers since 2000 of the former five species are plotted in Figure 17, with BBG in Figure 18 – as the BBG numbers tend to overwhelm those of the other species when plotted on a single graph. Note that there was a BBG colony in a dairy paddock near the river in 2016 (not included in Figure 18).

Figure 17. Annual bird count results for key braided river species, 2000-2020

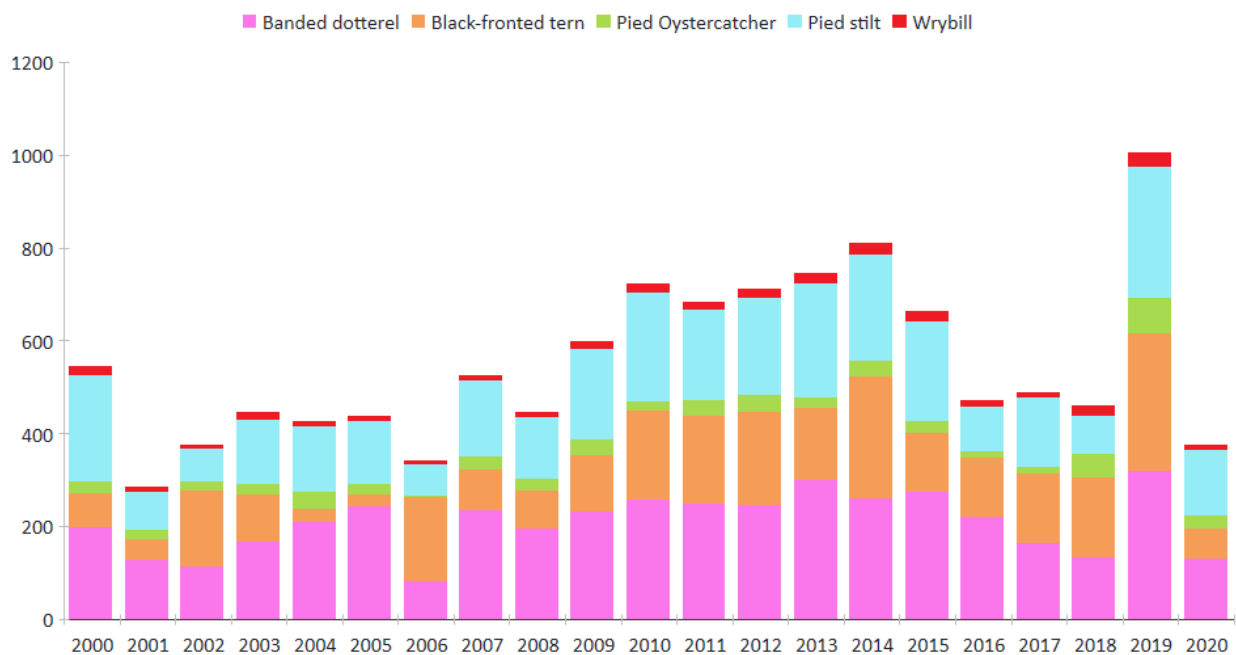


Figure 18. Annual bird counts for BBG, 2000 – 2020

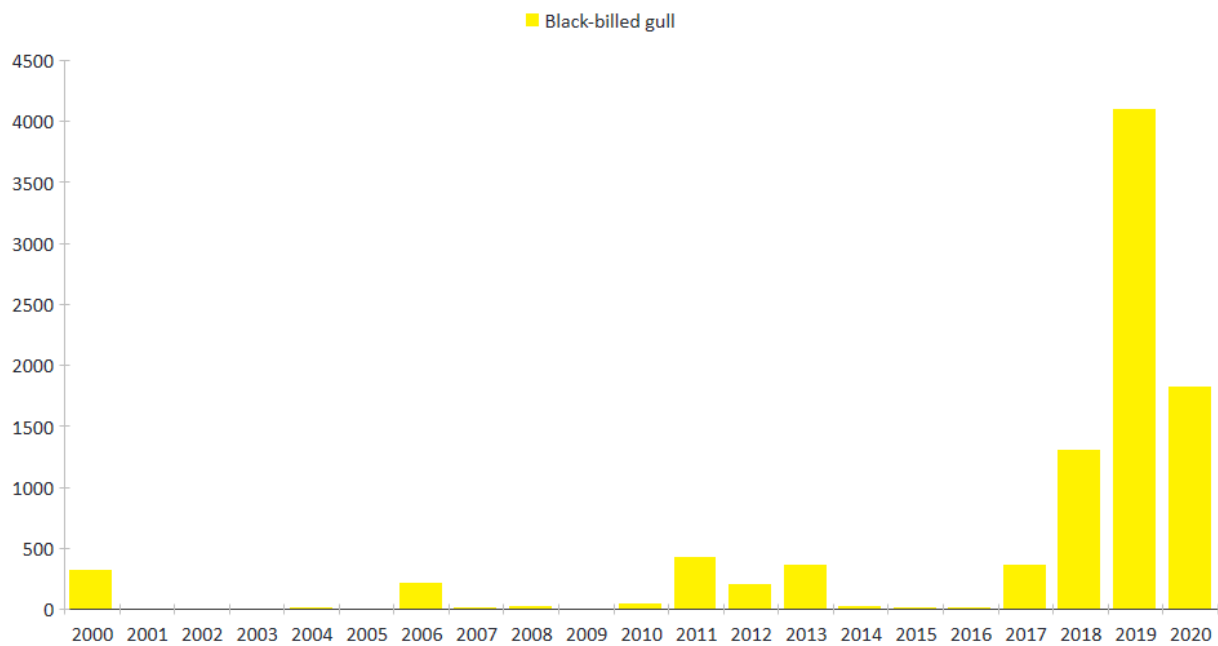


Table 1 (below) shows annual data from 2000 to 2020; Table 2 shows the 2020 data by kilometre, and Table 3 gives the 2020 data from the SH1 bridge down to the estuary.

Table 1. Annual bird counts (Okuku junction to SH1)

Year	BD	BFT	SIPO	PS	Wrybill	BBG	SBBG	BF Dott	Black shag	Little shag	Black stilt	SW plover	Casp Tern	WF tern	Duck	P. Duck	C Goose	WF Heron	Harrier
2000	199	74	25	229	17	314	26		18	3	0	18	0	0					
2001	130	44	22	82	7	3	0		3	6	0	0	0	0					
2002	115	165	19	70	6	5	11		0	0	0	16	0	0					
2003	169	102	22	138	16	0	10		8	4	0	13	4	0					
2004	213	28	37	140	9	10	27		7	7	2	27	0	0					
2005	245	26	22	137	7	1	3		2	6	1	149	0	0					
2006	84	180	5	68	5	213	5		2	2	1	37	1	0					
2007	237	89	26	164	9	13	12		10	4	1	116	0	0					
2008	198	81	27	131	8	16	10		9	0	1	11	0	0					
2009	233	124	32	196	13	2	19		6	17	1	39	0	0					
2010	260	192	20	233	18	41	19		2	6	0	15	0	8					
2011	250	190	35	194	15	425	2		5	13	0	89	0	77					
2012	248	200	38	209	17	202	11		6	11	0	55	0	6					
2013	301	156	23	247	19	364	17		3	19	0	65	1	2					
2014	263	263	32	230	21	23	7		4	5	0	37	0	0					
2015	276	128	24	217	19	13	13		1	6	0	9	0	0					
2016	222	128	14	95	13	9	4		5	8	0	6	0	0					
2017	167	150	14	148	9	361	1		2	3	0	32	5	0					
2018	136	172	50	83	20	16	15		5	8	0	17	0	0	17	52	0	5	2
2019	323	296	77	281	27	4097	11	1	8	17	0	98	1	4	31	54	5	8	6
2020	133	65	27	141	10	1826	14	7	4	10	0	21	0	0	29	34	0	5	24

Table 2. 2020 bird counts by kilometer - Okuku Junction to SH1

Kilometre	BD		BFT	SIPO	PS	Wrybill	BBG	SBBG	BF Dott	Duck	Black Shag	Little Shag	SW Plover	P Duck	WF Heron	Harrier
1	8		11	5	12	0	0	0	0	0	0	1	0	0	1	1
2	13		3	0	0	0	0	0	0	0	0	1	0	0	0	1
3	23		7	0	0	0	0	0	0	8	0	0	0	0	1	2
4	22		1	2	4	1	0	0	0	0	0	0	5	1	1	2
5	9		0	0	6	0	0	1	0	0	0	0	0	2	0	0
6	8		3	2	8	0	0	0	0	4	1	0	5	3	1	1
7	2		9	2	4	4	1	0	0	10	0	0	0	0	0	0
8	8		9	5	20	4	0	0	0	0	0	1	0	2	0	5
9	3		0	0	9	0	0	0	0	0	0	0	0	0	0	4
10	8		2	0	18	0	0	0	0	2	1	1	4	5	0	1
11	15		7	3	4	0	0	0	0	0	0	0	2	0	0	0
12	1		0	0	6	0	0	0	0	3	0	1	4	6	0	2
13	2		0	2	2	0	0	1	0	0	0	0	0	4	0	2
14	1		0	0	7	0	0	3	4	0	0	3	0	8	0	1
15	7		7	0	23	1	1800	1	0	0	1	0	1	0	0	1
16	1		1	3	2	0	25	5	2	0	1	0	0	1	0	0
17	1		1	3	16	0	0	0	1	0	0	0	0	0	0	0
18	1		1	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0		2	0	0	0	0	3	0	2	0	2	0	2	1	1
Total	133		65	27	141	10	1826	14	7	29	4	10	21	34	5	24

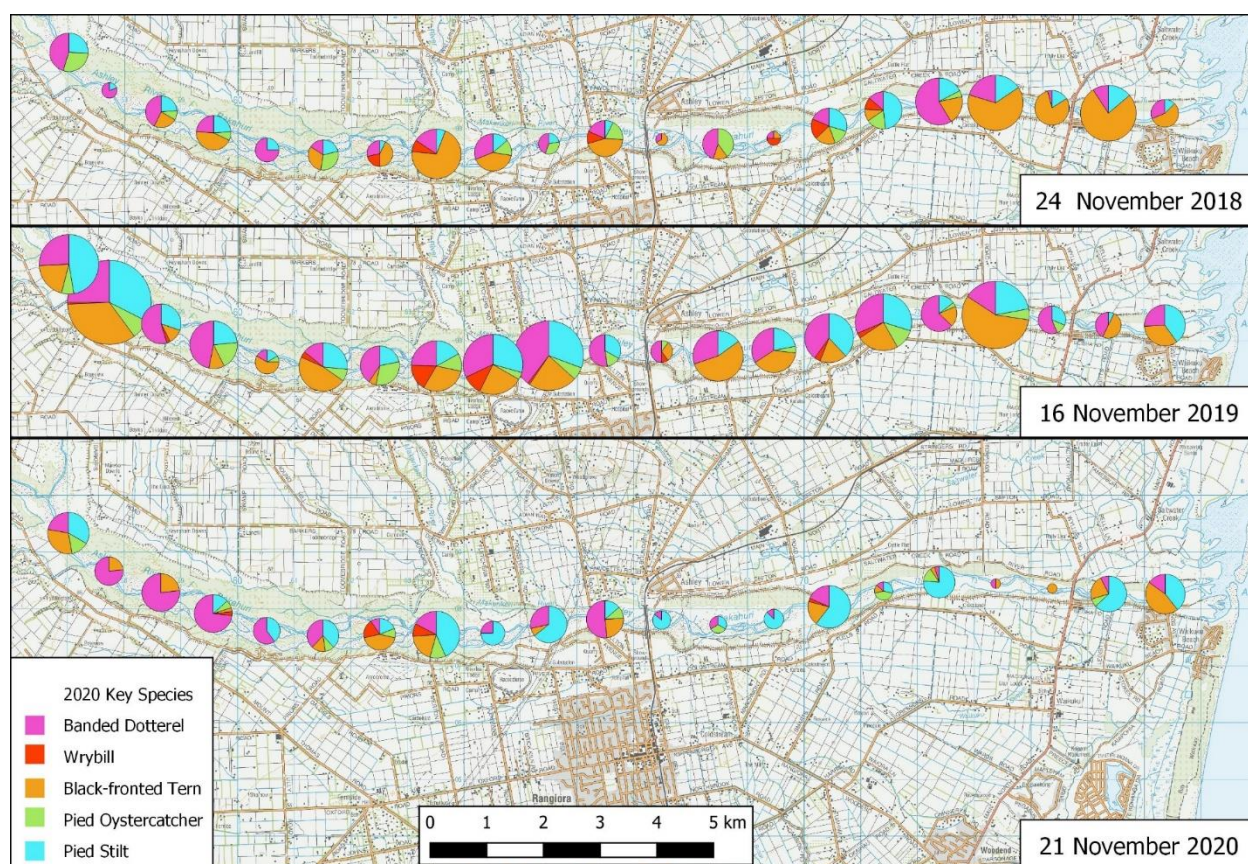
Table 3. 2020 bird counts SH1 to Estuary

Kilometre	BD	BFT	SIPO	PS	Wrybill	BBG	SBBG	BF Dott	Duck	Black Shag	Little Shag	SW Plover	P Duck	WF Heron	WF Tern	C. Tern
20	2	6	2	17	0	2	0	0	1	0	4	1	0	1	1	0
21	5	15	0	13	0	5	0	1	21	0	5	0	0	2	0	1
Total	7	21	2	30	0	7	0	1	22	0	9	1	0	3	1	1

Some observations from the 2020 survey are:

1. The total of wrybill, BD, BFT, PS and SIPO was 376 compared with 1004 in 2019 and 461 in 2018. Last year (2019) was however an exceptional year and most likely an anomaly - with bird numbers almost certainly strongly influenced by floods in the Waimakariri river, which caused the Ashley-Rakahuri to become a refuge site.
2. 2020 was the third equal worst year on record (with 2002) for these species – with the worst year being 2001 (285 birds). This result no doubt partly reflects the regrowth of weeds since the July 2017 1-in-10-year flood. In July-August this year ARRAG (with ECan funding) cleared weeds from 40 ha of islands. This should have given enough space for colony (BFT and BBG) and territorial nesters. Perhaps the overall weedy nature of the river was a deterrent to the birds, and no doubt there are other local and external factors at play.
3. Black-billed gulls do not appear to have been affected by any adverse conditions – note that Figure 18 shows the 2018 colony that was just below the SH1 bridge at the time of the survey. This got washed out and the birds moved several kilometres upstream soon after the survey.
4. Figure 19 shows the kilometre by kilometre locations of the key species in the years 2018, 2019 and 2020.

Figure 19. Numbers of key species by km in the years 2018-2020.



Of note in 2020 are –

- Quite large numbers of birds, especially PS and BFT, eastward of SH1. This is a single channel reach with little bare gravel and trees close to the river – in reaches with similar conditions elsewhere along the river there are few braided river birds. Presumably the higher bird numbers here are due to increased food supply in the estuary and tidal part of the river.
- Relatively high percentages of PS in the mid-section between SH1 and the railway bridge. This includes a stretch of recent gravel extraction where Taggart Earthmoving cleared a large area of weeds. This was also where the BBG colony was located.

- Large bird numbers near the Cones Road bridge – this was a favoured area for BD nesting, with a small BFT colony also present. There was been less human disturbance than usual here, in a stretch with quite a large area of bare gravel.
- Best bird numbers, with the greatest species variation, were off Groyne 2 (near the airport). This was the best-preserved section of braiding along the river and has been the favoured wrybill nesting section for some time.

In addition to the annual survey, a weekly survey was undertaken between the Cones Road bridge and the estuary. Data and discussion on these results will be given in a later report. The major finding of this work is the preference of the wading river birds for the braided sections of the river; with the single channel areas, especially those closest to the fairway margin, being more frequented by non-wading species such as the ducks, herons and shags. Results for a 3km section of river are shown in Figure 20.

Combined results from 20 weekly bird surveys – Rangiora to SH1 (July 20 – Feb 21):

- Braided river birds are 5 to 6 times more likely to be in multi-braid sections of river for nesting and feeding
- Islands with bare gravel are necessary for nesting
- Braided river birds avoid tree-clad margins
- Other water birds - ducks, paradise ducks, shags and herons prefer vegetated margins

Bird Observations

- ▲ Wrybill
- ▲ Black-fronted Tern
- ▲ Black-billed Gull
- ▲ Banded Dotterel
- ▲ Pied Stilt
- ▲ Pied Oystercatcher
- ◆ Water Birds

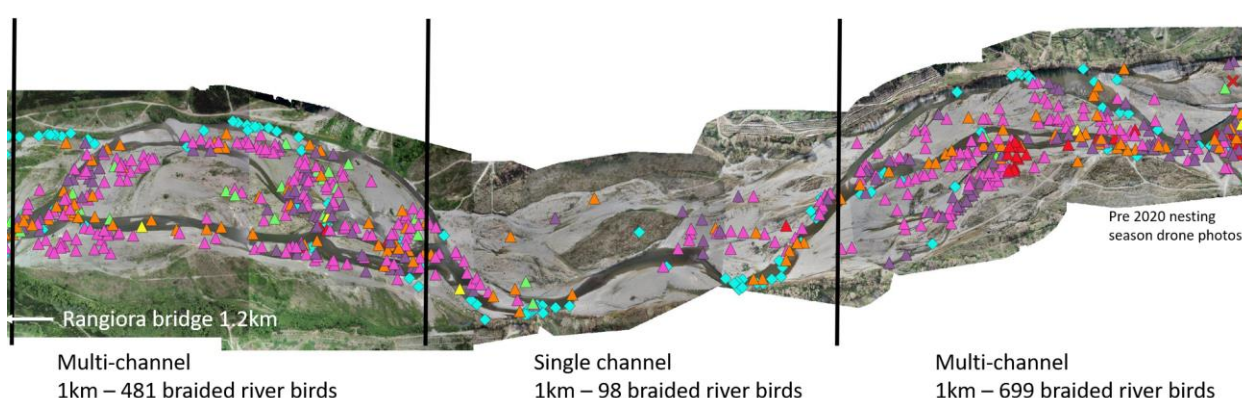


Figure 20. Bird observations in the Railway to Marchmont areas

Separately, since 2013, a monthly survey has been conducted between Groynes 1 and 2. The 2014-17 results are given in the 2017-18 annual report (Ledgard and Davey, 2018). These show that in the summer, the average number of core species seen (5.6) is close to 5 times greater than those seen in winter (1.2). As expected, the total number of key indigenous birds seen in summer is over 4 times greater, whereas the number of other species (half of which are exotic) varies little between summer and winter. More recent results have yet to be analysed, but are expected to show a similar picture.

Comments on individual species seen in 2020 survey

Wrybill

Ten wrybill were counted this year, which is considerably fewer than the 27 last year and less than the average since 2000 of 13. Of particular note is that despite 7 pairs having territories, many of these were not seen on survey day. For example, 2 pairs were nesting east of the Cones Road bridge (at Marchmont and Smarts- see Figure 1) this year, but only one bird was seen during the survey. None were found in the vicinity of Groyne 1 where a pair were successfully raising a chick just before the survey. Most of the wrybill were seen in kilometres 6 to 8 (Groyne 2 area).

Last season, 9 pairs of wrybills were seen on territories, this year there had been 7 pairs seen prior to the survey. Many of the 27 wrybill observed in the 2019 survey are likely to have been displaced by floods from the Waimakariri, and did not nest on the Ashley.

Banded Dotterel

The 133 BD counted this year was well down on the 323 last year and the long-term average of 209. However, the northwest wind may have caused BD to be under-counted. Several times birds were seen up close, keeping low and not making noise when they would normally be expected to fly when approached. With this behaviour, and sometimes quite widely spaced surveyors, some birds would have been missed. Several BD chicks were seen in the survey, but perhaps not as many as should be expected. Early in the season, a number of BD nests were found and monitored, but most of these were not successful. BD were most common between the Okuku junction and the railway bridge, particularly so just below the junction and between the Cones road and rail bridges.

Black-fronted Tern

The 65 counted this year was the fourth lowest on record - 2005 (26), 2004 (28) and 2001 (44). BFT numbers were the most reduced of the key species compared to 2019 when 296 were counted. Numbers seemed to increase slightly eastward of the Cones Road bridge in the few days after the survey – with some new nests located.

This 2019-20 season was a very poor breeding season for BFT (see Section 6). At the time of the survey nesting seemed to be taking place in only 4 locations, but a good colony off Groyne 9 (with around 20 nests) had been abandoned before the survey day. These birds had time to reneest in this area, but did not do so.

Black-billed Gull

On 18 November, 1820 birds were counted from drone photos at or near the colony on Smarts island – with just a few elsewhere along the river (mainly near the estuary). This is the second highest number on record – after 2019 when there were 4097. Just prior to the survey there had been 2846 at the Smarts site, but numbers followed what now seems to be an established pattern – maximum numbers occurring around a week after inception of the colony, after which many birds leave the area.

Until relatively recently on the Ashley-Rakahuri we have had a BBG colony about every second year, but since 2016 a reasonable local colony has been an annual feature. Note that Figure 18 does not show the 2016 colony which was in a dairy farm paddock just southeast of the SH1 bridge.

Pied Stilt

This was the most abundant species on the river this year – although the total number at 141 was still less than the long-term average of 163. This was the 10th poorest year on record for PS. Stilt numbers increased significantly in the lower half of the river after August, and in the November 21 survey they were seen to be most abundant near the estuary, and at Smarts, Tulls and near Groyne 2. None at all were seen in kilometres 1 to 3 downstream from the Okuku junction. Their behaviour in most places showed that they were nesting.

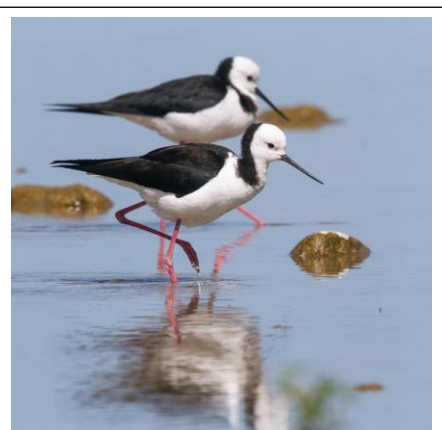
Pied Oystercatcher

Twenty-seven SIPO were counted this year, down significantly from the 77 seen in 2019, but essentially the same as the long-term average of 28. SIPO and PS are the least threatened of the braided river birds and nest in several other environments.

They were seen sporadically along the river. As with BD, they are early nesters and most of them probably had fledged chicks at the time of the survey. Two dead adult SIPO were located off Groyne 9 - they had perhaps been shot.

Black-backed Gull

Fourteen SBBG were counted, this compares with the long-term survey average of 11. All but one of these were seen between kilometres 12 and 19. These birds are a major predator of braided river bird eggs and chicks on other rivers such as the Waimakariri and Waiau – where they nest in large colonies. They also nest at the Ashley estuary, but for reasons unknown, they are quite rare further up the river. In the last 15 years only one SBBG nest has been found in the Ashley-Rakahuri riverbed.



Pair of pied stilts

Black-fronted Dotterel

Seven were seen between kilometres 13 and 17 (Marchmont to Toppings). Black-fronted dotterels (BFD) have been increasing in abundance in the last few years (although only 1 counted in 2019) and have been seen further upstream as time goes by. They are usually found in sandy or muddy backwaters which are not classic braided river habitats. For years they have been well known in the Waipara river (13km to the north of the Ashley-Rakahuri) and are quite common in the Opihi river (S. Canterbury). These rivers are degraded and channelized braided rivers and increasing BFD numbers in the Ashley may not be a good sign.

Spur-winged Plover

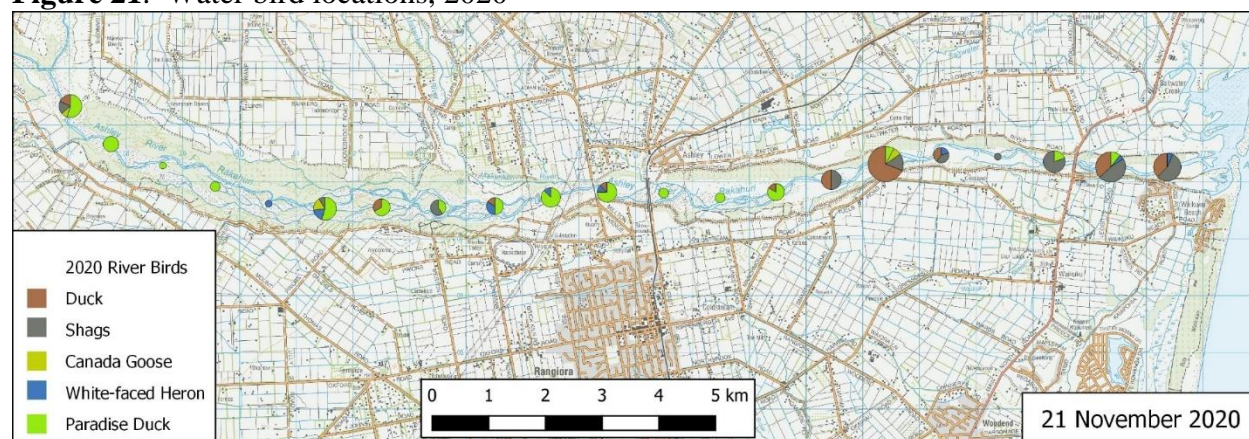
Twenty-one were counted in 2020, this compares to a long-term average of 41. This species is highly erratic in distribution, sometimes occurring in large flocks, sometimes as only a few individuals. The maximum seen in a survey since 2000 was 149.

Water Birds

Ducks, shags, Canada Geese, white-faced herons and paradise ducks are found along the river but are not specifically braided river birds. They actually prefer deeper water channels that run along the edges of the fairway close to trees – and thus are probably an indication of the degradation of a braided river. In the Opihi, an extremely channelized and degraded river, the average ratio of braided river birds (wrybill, BD, BFT, PS and SIPO) to these river birds in the 4 years of surveys was 1.2. In the Ashley for the past 3 years this ratio has been 4.4, 6.5 and 3.4 respectively. The total of these birds counted this year was 111.

Figure 21 below shows the distribution of these birds, with pie charts scaled the same as in the previous maps. Shags (predominantly little shags) and ducks were most abundant near the estuary and in the single channel river for a few kilometres upstream of it. Further upstream, paradise ducks predominated. Early in 2020 when the river was drying up, shags, herons and even royal spoonbills were quite abundant further up the Ashley-Rakahuri where they were fishing in drying sections of the river.

Figure 21. Water bird locations, 2020



Other birds

Twenty-four harriers were counted this year, but it appears that some double counting has occurred as more than one person in each group was counting them – despite instructions for one person per group to do this. Numbers from previous years are unreliable as these birds are generally seen only in the distance. Harriers are a major predator of braided river bird chicks on this river, and perhaps also of eggs. One was captured by a trail camera raiding a BD nest this year.

One Caspian tern was seen east of SH1. A few more are often seen earlier in the season. No unusual birds, which have occasionally been seen in the past, such as white-winged black tern, were observed.

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 2 for river flow data)

Wrybills

There used to be up to 14 banded birds present on the river. However, no new birds have been banded over the past 6 seasons, and the last one, BW-BW, was seen briefly only once in 2020-21. UB stands for unbanded bird.

Breeding pairs

Up to seven pairs of wrybills took up territories in the 2020-21 season (Figure 22). This is below the nine pairs recorded in the 2019-20 season, and the eight pairs that were present in the previous three seasons. On July 22, two flocks of wrybill, numbering 15-20 birds in each, were seen flying close together up-river off Groyne 1. These are likely to have been en-route to rivers further south. A flock of similar size was observed feeding at Toomebridge on August 7, 2018.

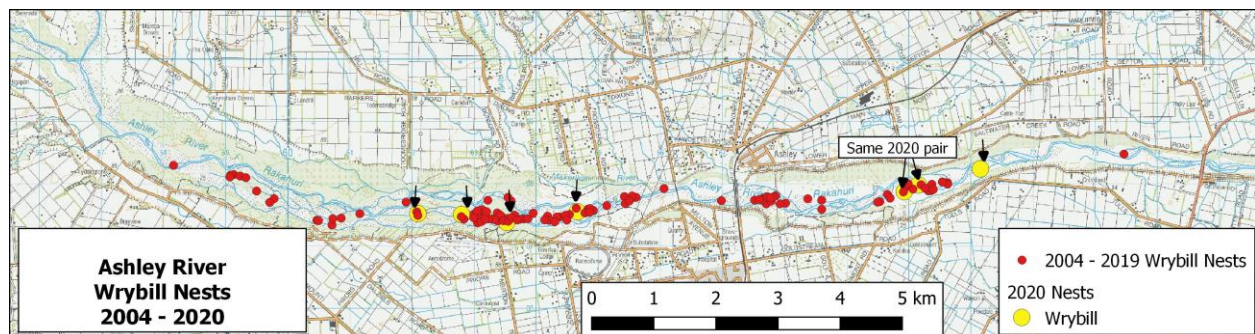


Figure 22. Map of wrybill nesting sites since 2004, including 2020-21 (arrowed)

1. Male: UB Female:

A lone adult was first observed at the Smarts site on September 3. A 2-egg nest was found in the middle of the eastern island on September 30, with a single chick seen on October 19 and 2 chicks on October 29 and November 4. However, it appeared that only one survived to the flying stage.

Result: One chick fledged

2. Male: UB Female: UB

A UB pair were first seen at the lower Marchmont site on August 28, with a 2-egg nest located on the south bank on September 8. However, these had disappeared on September 11. A second nest was found 250m away on September 30. This must have hatched by October 15 (eggs gone). An adult was present with a single almost fledged chick on November 4. It is presumed that this was the chick later seen flying in the Marchmont area in mid-December.

Result: One chick fledged.

3. Male: UB Female: UB

A lone adult was first observed at the Groyne 1 site on September 21, with a pair seen and a 2-egg nest found on the south bank on September 29. The eggs hatched in late October, and adult birds with one well feathered chick were observed on November 16.

Result: One chick fledged.

4. Male: UB Female UB

This UB pair was first seen off Groyne 2 on August 10. A 2-egg nest was found on the south bank on September 3. Despite its proximity to a popular public access point, the eggs hatched in early October, and a single small chick was seen soon after. On November 5, it appeared ready to fly, and was seen flying on December 16.

Result: One chick fledged.

5. Male: UB Female: UB

Two adults were seen just above Groyne 2 in early October, and a 2-egg nest found on October 20. Adult activity on November 16 indicated that the eggs had hatched, and a flying juvenile was seen during December.

Result: One chick fledged.

6. Male: UB Female: UB

On October 23 a new UB pair was seen just downriver off Groyne 2 – their territory was right alongside pair 4 (see above). These birds were not seen to start breeding until December 3, but a small flood soon after destroyed the nest.

Result: No chicks fledged

7. Male: UB Female: UB

A UB pair was first seen at the Toomebridge site on November 5, together with a well feathered chick, which is presumed to have reached the flying stage soon after.

Result: One chick fledged

In past years, wrybills have nested further upriver at Hillcrest, Swamp road and just below Groyne 9. None were seen at these sites during the 2020-21 season.

Overall result: Seven pairs took up different territories at some stage of the season, raising 6 chicks, for a minimum productivity of 0.86 chicks fledged per pair. Such productivity is close to that obtained last season (0.88) from 9 pairs, and is above the 15-year average of 0.80.

In addition to the above breeding results, the banded male adult, BB (formerly BW-BW), was seen just once off Groyne 2 on November 16. He was banded in 2010, and bred annually at this Groyne 2 site from 2014 – 2019. A pair of UB wrybills were observed at the Railway Island site on August 19, and the occasional adult was seen thereafter, but no breeding was noted.

Black-fronted terns and black-billed gulls

The story of these two species is described in detail in Grant Davey's 2021 report on the monitoring of BFT and BBG colonies, with additional coverage of banded dotterel, pied stilt and S. Island pied oystercatcher (see Internal Reports in Reference section 14). A summary of this report is given below.

Black-fronted tern colony – Groyne 9

This site was located 400m east (downstream) of Groyne 9. Part of this area had been the site of a large BFT colony in the previous season - within the larger area outlined in red in Figure 23. As weed growth had been considerable, it was cleared with the tractor-mounted undercutter in July 2020 before the nesting season started. In addition, a lower-lying island to the north was also cleared.



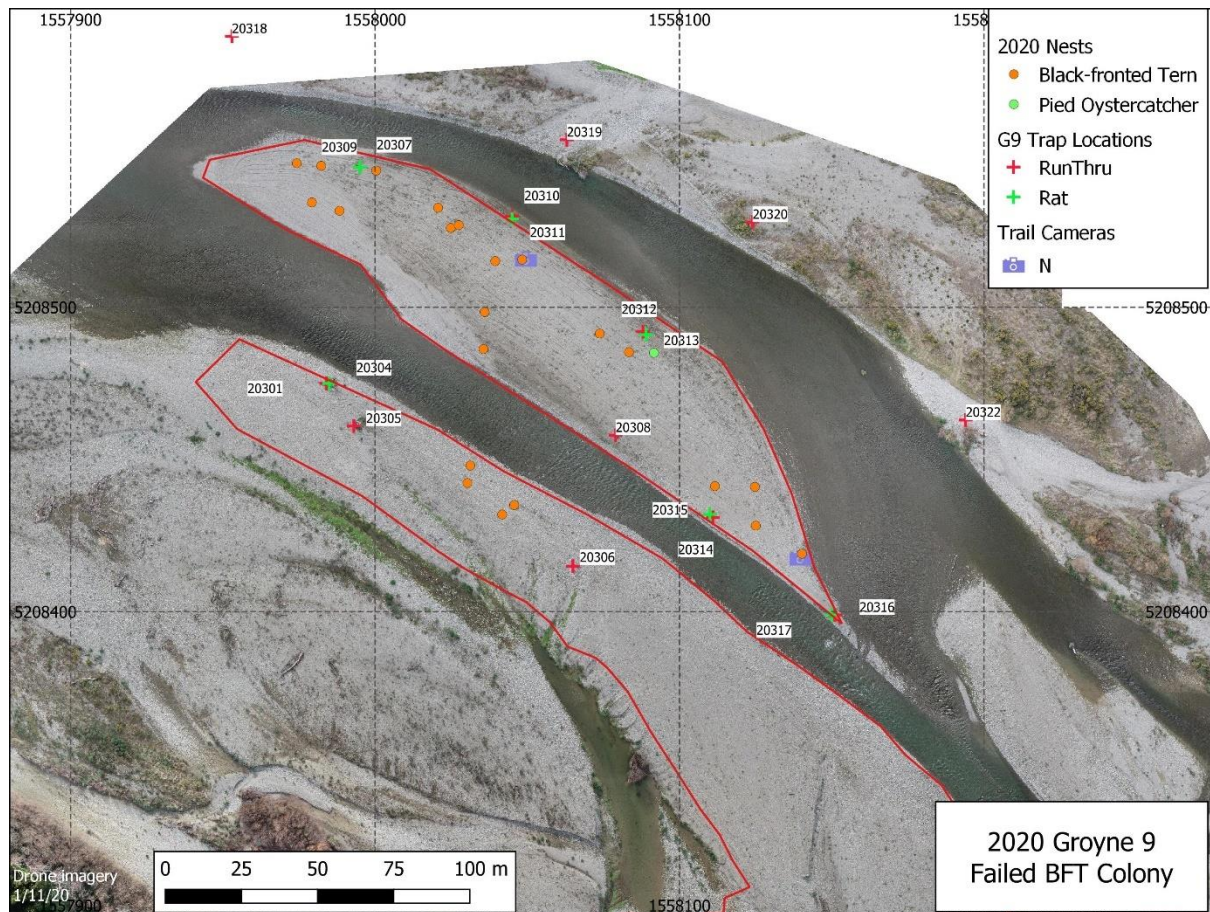


Figure 23. Groyne 9 BFT colony

Prior to beginning nesting, BFT were common in this area. The first nest was found on the low-lying island on 20 October and on 25 October 55 BFT were counted. Subsequently (until 6 November) a further 21 nests were located, making this the biggest BFT colony on the river in 2020 – 2021. However, all of the nests were abandoned before any eggs were hatched. Some of the abandoned nests still had eggs. A possible explanation for some of the abandonment was human disturbance. Vehicles and motorbikes were photographed on several occasions. The photo below shows a trail camera image of a BFT on a nest observing a motorbike passing about 20m away. Other trail cameras did not record any evidence of predators. Twenty-one traps were placed around the colony. A total of 3 hedgehogs and 3 Norway rats were caught, but none of these were on the island which had most of the nests.

In summary, this BFT colony was a failure in terms of any successful breeding outcome.



BFT on nest observing passing motorbike

Black-fronted tern colony – Cones road bridge

This area was immediately downstream (within 75m) from the Cones Road bridge. From 20 August terns were often seen in the area. The first four nests were found on 26 October. From the number of birds seen nearby, there could have been as many as 5 other nests present. These nests were tended up to 2 December but were soon after abandoned. The cause is unknown, but is suspected to be human disturbance, as the area is close to well-used riverbed access points. A small number of terns have commonly nested in this general area, but no successful breeding has ever been recorded. Four DOC 200 traps were placed to the north of the colony on 29 and 30 November. Nothing was caught in these traps and they were removed on 18 December.

Black-fronted tern colony - estuary

On several occasions, a number of BFT were seen just above where the river enters the estuary. The few BFT pairs which are suspected to have nested are unlikely to have been successful due to heavy traffic in the area during and after the whitebait season.

Smarts Island – the most favoured breeding site in 2020-21

This area is located north of where Smarts Road intersects Tulls Road, some 3.5km downstream from the railway bridge. A large island has existed here since the July 2017 1-in-10-year flood. This island was host to a black-billed gull colony in 2018, a wrybill pair plus SIPO and BD pairs in 2019 and in the last season a wrybill and SIPO pair, a BFT and BBG colony and several BD and PS pairs. The island had been partially cleared of weeds in July 2018 by bulldozer ripper and again in July 2019 with a tractor mounted ripper. During March – July 2020, an area of approximately 9ha was the subject of major gravel extraction by Taggart Earthmoving. It was the largest weed-free area on the river during the 2020-21 breeding season, and proved to be excellent bird nesting habitat (Figure 24). The island disappeared during the record floods of May/June 2021.

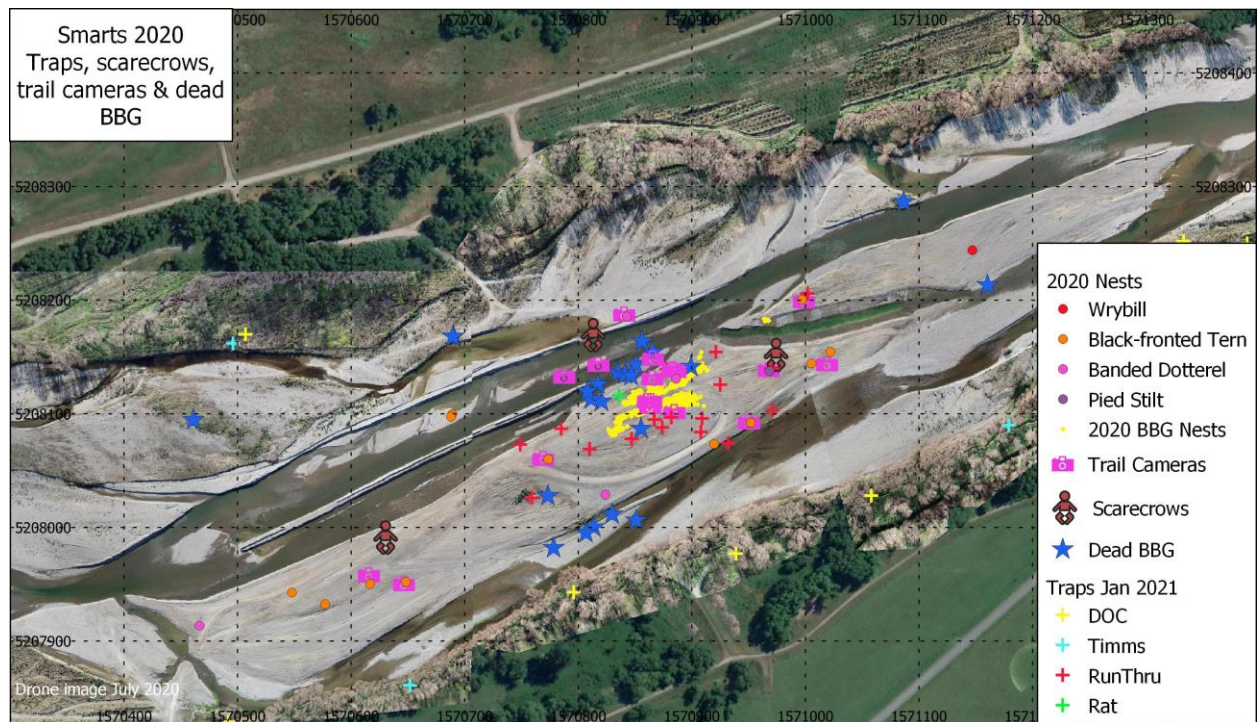


Figure 24. Smarts islands in July 2020

The drone photos in Figure 24 were taken on 21 July 2020, soon after excavation had finished – when weed presence was minor. However, during the nesting season there was considerable weed regrowth. Prior to December 2020, another gravel extractor dug a deep narrow 150m long trench at the western end of the Smarts site (obvious in Figure 24). Unfortunately, it was left in this state and a BFT chick was seen trapped in the bottom of it. This was an example of how not to leave a site after gravel extraction. The assistance of Matt Kim in monitoring the colonies in the Smarts area is acknowledged. At the time he had a university holiday intern position with ECan. He proved to be a very interested and capable assistant.

Black-billed Gull Colony - Smarts island

On 27 October 2020, 300 BBG were sighted in the area, and by 31 October, 1673 BBG had been counted, along with some nests, from drone images. These gulls displaced a few BFT which had been nesting at the same site. Counting was continued from drone photographs approximately weekly until adults could not be distinguished from juveniles. Numbers of adult BBG showed what is becoming a very familiar pattern during the breeding season – increasing over the first 2 weeks of the colony, followed by a sharp then gradual drop off as time goes by (Figure 25).

It appears that a large number of non-breeding birds visit the colony sites in the early days, as well as perhaps some that decide to breed elsewhere. At Smarts this year the maximum number of gulls counted was 2,846 – 16 days after the colony was first found. After 45 days, there were fewer adult birds on site than there had been nests.

As indicated above, the first nests were seen on 30 October. On 26 November, a drone count revealed 1,278 nests - this is likely to be accurate within a few percent. Nests were mainly within an area of approximately 100 by 30m and were either side of a gravel extraction haul road on which there were no nests, due to the heavily compacted surface (see Davey 2020 – Section 14 References/Internal reports). Greatest nest density within the colony was up to 7 per square metre.

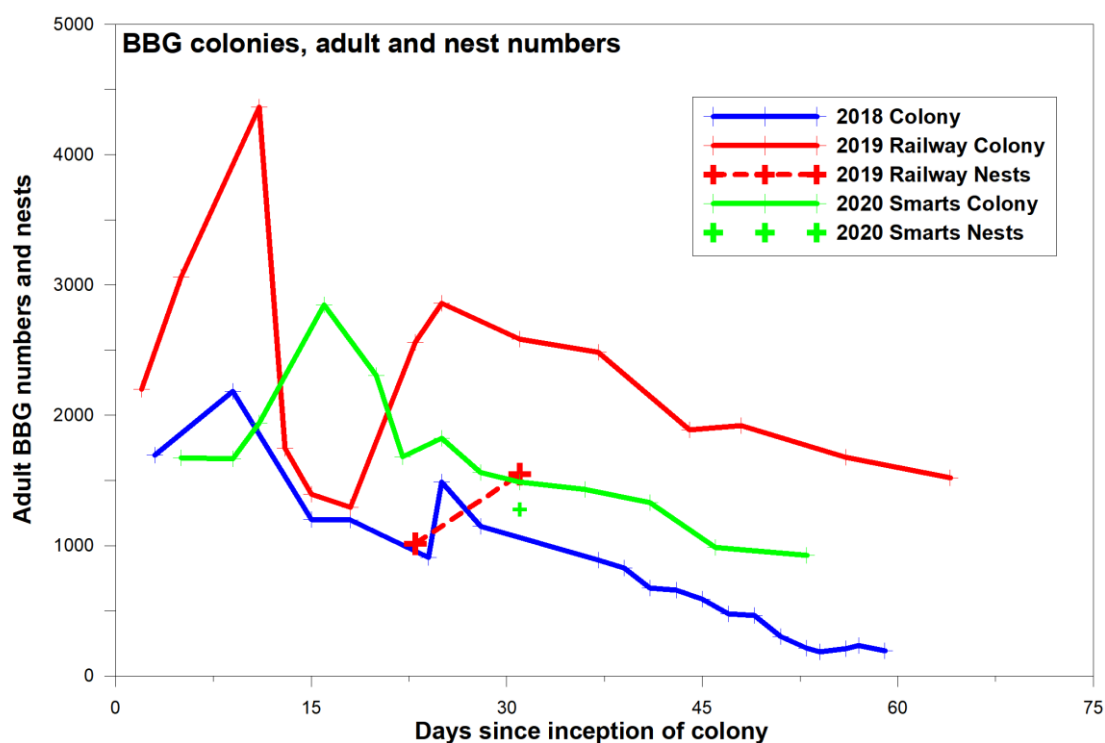


Figure 25. Adult BBG numbers at 2018, 2019 and 2020 colonies

First chicks were seen on 30 November, with the great majority of eggs having hatched by 12 December. By 18 December it appeared that only around a dozen nests were occupied, and on 9 January it was observed that many fledglings had left the colony. On 1 February there were still 3 adults, 2 fledglings and 2 juveniles on site.

This was a highly successful colony. An estimate of 1,276 fledglings or near fledglings was made on January 5 – essentially one per nest. On this day a total of 2,036 birds were counted from drone photographs, with adults and fledglings indistinguishable. There were two creches present, with 136 fledglings at the smaller one. At this stage it was common to see adults feeding two fledglings and a trail camera several times captured photographs of an adult apparently feeding three chicks – see photo.



BBG feeding 3 fledglings

On 5 February an attempt was made to count dead chicks in the colony area. Only about a dozen were seen – these all appeared to have been natural deaths, there was no sign of predation. In the previous

season, natural deaths at the Railway colony were very much greater, plus there were many losses to predation by rats and harrier hawks (see 2019-20 annual report).

Although, it is not easy to accurately count fledgling gulls, it appears that there were around 1300 present over a month after most eggs had hatched. This number is very close to the number of nests counted. Hence, the productivity of the colony at Smarts island was around 1.0. This would make it the most successful colony seen on the riverbed over the last 20 years. The next most successful was in 2008 (0.75) and 2018 (0.68). In 2016, a local colony had a productivity of 1.4, but this was not on the riverbed – it was on adjacent farmland, where circumstances were much more favourable than in the riverbed (virtually no predation or disturbance, and a good adjacent food supply).

Ground Predation

A total of nineteen traps were placed on the Smarts islands to protect BFT as well as BBG (Figure 24). The majority were DOC150 run-through traps. Catch from these traps was very low – only 2 Norway rats and 1 mouse were caught. A single dead BBG chick showed signs of being eaten by rats, but there were no signs of kill by any other land predator. This was different to the previous year, when Norway rats killed >100 chicks at Railway Island, and stoats also killed a few.

Trail Cameras

Up to 4 trail cameras were placed in twenty different locations on the island. No evidence of ground predators was seen, but the cameras did capture human disturbance – consisting of 4wds and motorbikes. On one occasion motorbikes appear to have killed close to 10 fledgling BBG. These incidents were reported and received considerable coverage in the media, plus were the focus of a DOC investigation. They have been presented in a separate report (see Davey 2021, section 14 References/Internal reports).

Harrier Predation

The entire Smarts area was inspected for indications of predation by harrier hawks for several hundred metres upstream and downstream of the colony. The remains of only 10 young gulls were found. However, after the experience last season of harriers being a major problem at the Railway BBG colony (>100 kills – see 2019-20 annual report), it was decided to trial some scarecrows. Three elaborate scarecrows (see photo) were installed in mid-December. Matt Kim of ECan spent time at the site over 10 days (several hours per visit) with a main aim of assessing the efficacy of the scarecrows. His conclusions are detailed in Davey 2021 (Section 14, References/Internal reports). They were that the scarecrows did initially deter hawk presence, but that this did not last for more than a few days. However, he felt that scarecrows would have a more worthwhile deterrent effect if they were moved around weekly with regular changes in appearance – although hawks would almost ‘definitely catch on at some point’. One gull chick was seen to be taken by a harrier.



Scarecrow adjacent to BBG colony at Smarts – to deter harrier hawk predation

Influence of other nesting birds. The relatively few losses to hawks in 2020-2021 cannot be attributed just to scarecrows. The presence of a large number of PS and BFT in the area seems to have been important. They were commonly seen attacking and successfully driving off harriers which were several hundred metres from the BBG colony – see two photos. BBG were rarely seen to do this – they usually only chased harriers when they were very close to the nests. Perhaps tellingly, at the Railway site in the 2019-2020 season there were no PS or BFT in residence by the time BBG were fledging. It is likely that harriers also preyed on young BFT at Smarts island, but no evidence of this was found.

On one occasion a SBBG was captured by trail camera flying low over the colony – otherwise they were only rarely seen in the area.



BFT attacking harrier - Smarts



Stilts attacking harrier - Smarts

Black-fronted Tern Colony - Smarts Island

Approximately 71 BFT were noted on the ground at Smarts island on 4 September, with 65 on 11 September, 54 on 14 September and approximately 60 on 22 September. The first indications of nesting were seen on 21 September – but nests were soon abandoned, probably due to the BBG colony being formed in that location.

In early November, 12 BFT nests that were located on the island (Figure 24), but no effort was made to systematically search for nests (as had been done on a grid basis at the Railway site in 2019). There is no

doubt that there were more BFT nests than were counted - hence for nest productivity purposes, it is assumed that there were 15 nests in total.

Nesting appeared to be far from simultaneous, as nests were found between 4 November 2020 and 9 January 2021, with the first newly hatched chick noted on 23 November. Other than where the first nests were made and displaced by BBG, eggs were hatched at most nests, with only one noted as abandoned. Adults were observed mainly feeding their chicks with smelt. However on several occasions worms were offered (see photo).



Trail camera image of BFT chick being fed a worm - Smarts

As always, estimating fledgling BFT production accurately was extremely difficult. The maximum number of fledglings seen in one visit to the colony in late January was 9. This gives an extremely approximate productivity of approximately 0.6 fledglings per nest. As 133 BFT were counted on the annual survey of 21 November, and no nesting success was noted elsewhere on the river, a productivity of 9 chicks from this number of adults is disturbingly low.

Fledglings seem very vulnerable to predation from the air during the day – they are often alone or in very small groups and they call loudly for food – see photo. However, no evidence was seen of harriers predated BFT chicks in the area.

Trail cameras were set up on a number of nests. Only one mouse was captured in a photo – visiting an occupied nest. This doesn't seem to have disturbed the bird. On at least two occasions BFT were disturbed from nests during the night by hares. They returned in approximately an hour. The photo shows a BFT returning to its nest at 12.32 am after being disturbed at 11.41. This is interesting, as night-time disturbance is often stated as being the reason why BFT abandon nests. Other bird species often went close to nests – especially BD, SPW and PS. This did not seem to disturb sitting BFT.



BFT chick calling for food - Smarts



BFT returning to nest after being disturbed by hare - Smarts

Banded Dotterel

An effort was made to find as many BD nests as possible between Cones Road and SH1. Nests proved either easy to find or required an impractical amount of time to do so. They were easier to find from a vehicle, and this was done from haul tracks at the Smarts island, but was not an option elsewhere. Of the 10 nests found (between 29 July and 7 December) and subsequently monitored, it appears only 2 may have produced chicks. However, it is possible that some chicks may have hatched and moved away between monitoring visits – which were approximately weekly.

Based on observations of BD, there were several other locations where nests were made. These included:

- Immediately downstream of Cones Road bridge where there could have been as many as 6 nests. These birds were very cagey. On 3 occasions a chick was seen.
- In the area of the nest found by Andrew Crossland – southwest of the Railway island.
- In three locations on the Railway island.
- On an island in the north part of the Marchmont area – possibly 3 nests indicated.
- On the western part of the eastern Smarts island.
- On the western end of an island just up from Toppings Road.

The impression gained, from far too little data, was that success was variable at best, with early nesters being particularly unsuccessful. This could be due to them being more prone to predation – being the earliest of the braided river birds to nest. One nest was definitely robbed by a harrier – see photo.



BD eggs being raided by harrier - Smarts

A frequently seen BD pair nested in a very vulnerable place on the north bank at Smarts – close to where a hide had been set up to monitor the BBG and BFT colonies. On two occasions a dog (being walked by its owner) almost stepped on the nest (see photo). The sitting BD was also disturbed on multiple occasions by hares. The photo shows a BD seemingly attacking a hare at night. The nest was also filmed by a TVNZ crew, who placed a GoPro camera very close to it. The indications at this site (and elsewhere) are that it is not easy to permanently disturb a BD from its nest. Several days after hatching (first chick seen in a trail camera image on 29 December) three chicks were observed here, but they soon moved off site or were taken by predators.



Dog running over BD nest - Smarts



BD attacking hare near it's nest - Smarts

It is clear that measuring fledgling success of BD on the Ashley-Rakahuri river will be extremely difficult, but attempts to do so will be carried out during the 2021-22 season. It is hoped that use of a thermo-scope will help with nest detection.

Pied Stilts

During and soon after the nesting season large numbers of stilts were often seen on the Smarts islands. For example - approximately 50 on 30 October, 54 on 12 December and about 90 on 27 January. This was the major breeding site in the lower half of the river, with resident birds often showing “broken wing” behaviour. Despite this, only 1 nest was found (see Figure 24 and photo) and few chicks were seen until February.



Pair of PS at nest on Smarts island

Other nesting locations were seen along the river. It is hoped that the thermo-scope will enable more nests to be located next season.

Pied Oystercatchers

There were only 27 SIPO counted in the 2020 annual survey. Nesting occurred at a number of sites and a few nests were found. Chicks were also observed, but no attempt was made to determine fledging success and productivity.

Conclusions

- The breeding success of a range of species was greatest at the Smarts island site, which, with some modification, could be seen as a model of what is needed in the future. Such weed-free, island sites have proven equally successful in other S. Island braided rivers. In the coming season, after the large May/June floods, there should be many similar sites available on the Ashley-Rakahuri river.
- As in past years, the breeding success of BFT was disappointing – with most nesting attempts failing. To the authors, it is a mystery how black-fronted tern numbers appear to remain relatively stable in the Ashley-Rakahuri river, when breeding success is so low.
- Predation of eggs and chicks was less of an issue during the past season than it has been previously – particularly at Smarts island. This could possibly be due to better management practices, which will be continued into the future.
- In the future, the Group should:
 - Maintain weed-free islands chosen by birds for nesting. This may well need management of surrounding channels during the season to ensure that good flows are maintained.
 - Maintain more intensive predator control around breeding birds.
 - Record egg hatching success of key species, and improve techniques for counting chicks.
 - Find and monitor some BD nests – as this species may be an important indicator of ecosystem health. The thermo-scope should greatly assist in locating nests.
 - Continue deployment of trail cameras at nests/colonies, plus strategic use of scarecrows.
 - Continue checking under powerlines to record bird losses to aerial hits.

7. Group structure, members / meetings, advocacy and ECan discussions

Group structure. In addition to the normal committee hierarchy of chair, secretary, treasurer and, in our case, a management committee, it was agreed in June to create three management teams. These are:

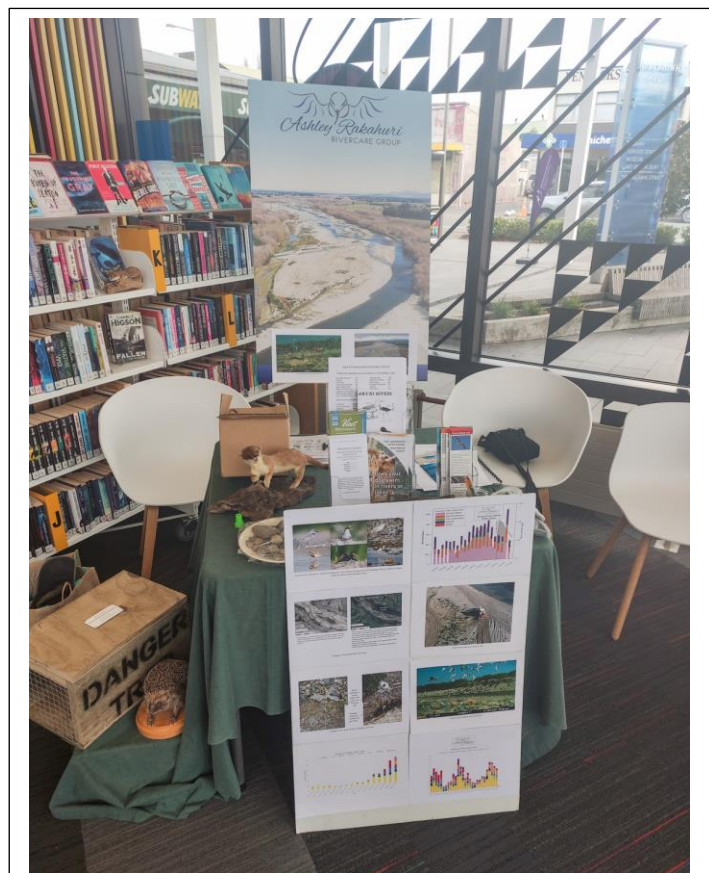
1. Operations – river work, bird counts, habitat maintenance, monitoring and trapping
2. Communication – stakeholders, media, promotions
3. Administration – membership, treasurer/accounts

It was felt that such a structure will lead to less work required by any one individual. The teams will be confirmed at the 2021 AGM on October 7, together with the member(s) to lead each of them.

Members and meetings. The group email list contains 138 people, who in the past have served as its membership. It has been agreed that there is no need for the Group to have subscription-paying members. During the 2020/21 season, the Group held general meetings in the Department of Conservation's offices on River Road, Rangiora, on October 8 (included the AGM), December 3, March 18 and June 17. Attendees numbered between 13-26. 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 comprises of office-bearers plus up to 5 others, and met on September 3, December 1, January 28, March 11 and June 10.

Advocacy and public liaison. This is a primary focus and was addressed in detail by Steve Attwood's Communications / Promotions strategy written in 2019 and finally approved (after much discussion) at a general meeting in October 2020. An important outcome of the Strategy is the creation of a calendar/diary which records promotion/communication activities. This keeps members up to date with both intended and completed activities.

Promotions are 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 are organised when possible. Customised Corflute signs are placed in managed riverbed areas to ensure people are aware of the location of breeding birds.



Promotional booth at Kaiapoi library

During 2020-21, thirty-nine opportunities were taken to ensure that the public were kept aware of the Group's activities. These are listed in Appendix 1. They included riverbed visits for the Rangiora Mayor, Dan Gordon, and the Waimakariri Zone Committee, but it was not possible to organise one for the general public. Four articles appeared in local papers, and there were interviews by TVNZ, TV3, Stuff and the local CompassFM radio. The Group's video and/or Powerpoint presentation were given to seven community / interest groups and three 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 via invited displays at three public venues and a fund-raising sausage sizzle outside The Warehouse. An email update of Group activities was sent to all members in September and January.

Interpretation sign. For many years we have discussed more interpretation signs to inform the public about the riverbed's environmental values, particularly relative to birdlife. An excellent panel is now alongside the estuary at Waikuku, and a similar one is nearing completion for erection in the picnic area by the Cones Road bridge.

Bird disturbance and floods. Bird disturbances by 4WDs and trail bikes at two colony sites in December and early January, plus the record flood of May 30-31 created unique opportunities for media coverage. These were well utilised and focused on bird and trap losses, plus the almost complete clearance of weeds from the riverbed fairway (see sections above).

Riverbed management discussions with ECan. In the 2019-20 annual report, a section addressed loss of braided river fairway area, and the impact of gravel extraction operations. In brief, it was felt that the past management focus on flood control had been at the expense of environmental values, and contributed to the loss of the braided river habitat favoured by birds. During 2020-21 this topic was furthered at a number of meetings, discussions and riverbed visits with ECan staff and engineers, with ARRG represented by Grant Davey. We were encouraged by their acceptance of our views and the need for change in the future. More detail is contained in the Habitat section above.

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 and 'mud-hole' sites (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 2020-21, in addition to the river management discussions with ECan (see above), the Group remained closely associated with staff from DOC, the Waimakariri District Council and Zone Committee, 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. Members contributed two Powerpoint addresses to the BRaid seminar held on July 8, 2020 (98 attendees), plus two others at the BRaid seminar held this year on July 14 (181 attendees).

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 new 'three-team' structure promotes greater activity in the advocacy field, which helps to implement the recommendations of the Communications/Promotions strategy. Even though this structure is new we are already seeing the positive benefits in terms of media coverage, and this should become even greater in 2021-22. Good use is being made of the calendar/diary to record activities – both intended and completed.

A major step forward during the past year has been the close discussion we have had with ECan about riverbed management and gravel extraction implications. It is agreed that past management aimed almost solely at flood protection has led to reduced braided river habitat which is attractive for bird breeding and feeding. There needs to be greater consideration of the conservation outcomes resulting from riverbed operations. There was also agreement for a review of the amount of gravel extraction being undertaken and that contractor consents need to include additional criteria and better enforcement. But most important of all, and incorporating all of the above, there needs to be more regular meeting and better communication between all the stakeholders which work in, and make use of, the Ashley-Rakahuri river.



Poplars planted for flood protection on the berm

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 three primary school visits over the past year – fewer than normal due to Covid. Our website is kept up to speed by Sonny Whitelaw and readily answers the questions of most visitors. Over the past 3 years the number of views has risen from 2479 in 2019 to 4621 in 2020, and after 6 months of 2021 is already at 3822 from 1600 visits. The most popular items viewed concern traps and predator control. Between August 1, 2020 and 21 June, 2021 our Facebook page accumulated 942 followers, up from 770 the previous year. We made 45 posts (60 the previous year) but achieved a substantial increase in views, 65,667 compared with 55,049 the previous year. The most popular post, with a massive 14,700 views, was about our missing traps caused by the May/June Canterbury floods. Other posts concerning our campaign for support to find the missing traps and fund the costs of new ones also attracted views ranging from 8000 to 12,000 viewers. Outside our flood recovery posts, the next most popular were about creating weed-free islands and the black-billed gull colony last breeding season, both of which attracted more than 5000 views each. We also used social media to appeal for funds, through *Givealittle*, for replacing the traps lost in the flood. As at 7 August 2021, the total donated was \$3,045 from 57 generous donors in 7 weeks. The campaign concludes in September with a few donations still trickling in at time of writing.

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 runs 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. The record flood of May 30-31 followed by another large flow in mid-June covered much of these tracks, which are currently being repaired.

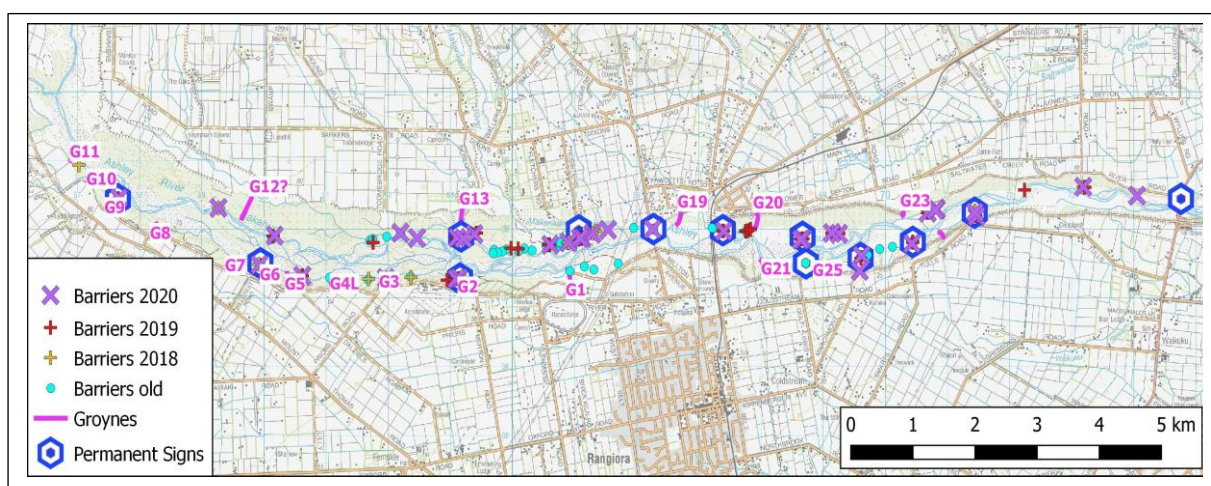
4WD track. This is located in the north bank berm, extending from the end of Rossiters road up to the Okuku junction (a distance of approximately 8km). It is used reasonably frequently, but the most favoured area for 4WD vehicles is the north bank stretch of berm extending from the SH1 bridge up to the 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 August 2020, a digger was used to close all 4WD access ways into the open riverbed. Figure 26 shows the location of these blocked access ways during the 2020-21 season. Signs notifying closures and restricted vehicle access were erected at the major entrances in September and removed in early February at the end of the bird breeding season – as agreed with the Combined 4WD Club. Concrete blocks (1m³) 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.



Blocking vehicle access-ways during the breeding season

Figure 26. Access barriers during the 2020-21 season, plus permanent signs.



Discussion.

Tracks. All the purposely created tracks (for walking, biking and 4WDs) in the berm area, plus the ‘mud-holes’ just above SH1, 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 riverbed 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 is reinforced by appropriate signs and media advocacy. Both 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 riverbed 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 (\$13,544). For every trap made and sold (\$70), a percentage is retained for the Group. Donations were the second largest fund generator (\$2,640), followed by fund-raising events (\$845) where items such as the Group's children's book (‘Ria the reckless wrybill’) and wrybill banner pens were

sold. In addition, ECan gave us \$1,075 for weed clearing, and 56 people have committed \$3,020 via Givealittle to replace traps lost in the large May/June floods. 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.

Expenditure. Most expenses have been associated with buying materials for trap making and predator control, plus maintaining the website and preparing promotion material. Expenditure has exceeded income by \$2,544, which is similar to the previous year. As at June 30, 2021, the figure for unallocated funds stood at \$8,755.

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.

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 over \$2000 per annum, and in the coming year this loss will have to be covered from our unallocated funds – currently standing at \$9,000.

Complete financial details can be obtained by contacting the Group's treasurer, Sue Mardon (sueardon02@gmail.com).

10. Future management

As outlined above, the Group has internally created 3 teams to manage operational activities in the field, communications and promotion, and administration - each with its own leader. It was felt that this would lead to better sharing of the workload, and greater ability to organise specific activities. Relative to external input, the Group is working more closely with ECan, with the particular assistance of David Owen, their 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 - access to the first draft of a plan is due in the near future. Combined with implementing this plan, is a resolve for much better communication between all parties working in and using the Ashley-Rakahuri river, particularly with ECan's river engineering and biosecurity staff.

Management of braided rivers is coming under increased scrutiny worldwide, and in New Zealand particularly with the activities of the Rivers Group. This is a technical interest group for people who are passionate about the successful management of river systems across New Zealand. A prime concern of the group is making room for rivers – this is the title of a forthcoming conference and has been the subject of media articles. ARRG needs to be fully conversant with the highly relevant findings of this group.

11 Conclusions

The shorebird species in the Ashley-Rakahuri river face four main threats. These are loss of habitat due to the invasion of weeds (mainly grasses, yellow lupins, broom / gorse and willows) and loss of braided fairway area, reduced survival and productivity due to introduced predators, and disturbance by human activity. 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 – plus more recently, the banded dotterel.

The internal restructuring of the Group into three 'teams' (operational, promotion/communication and administration) should enable more attention to be placed on these areas.

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 had led to improved bird populations on the Ashley-Rakahuri river. However, that rising bird population trend up to 2014 has since reversed, most likely due to loss of open, weed-free braided river habitat. The high numbers found in the 2019 survey was almost certainly due to an influx of birds from the

Waimakariri river, which was experiencing a period of major flooding. The survey of November, 2020, saw numbers return to the much lower levels of 2016 to 2018. It is sincerely hoped that the 2021 survey will see an improvement in bird populations – at least back to the 2014 peak.

The major challenge of habitat loss was reduced by two major weed-clearing floods in May/June, 2021. In addition, discussions with ECan relative to past management encouraging a widening berm zone and a reduction in fairway width, should see more focus on environmental outcomes. It is also planned for more appropriate management of water flows in order to maintain the weed-free islands favoured for successful bird breeding. The reinvasion of weeds over the 2021-22 season will be closely monitored, and more cost-effective means of weed control will be explored in order to take advantage of the current weed-free status of the riverbed.



River after May/June flood. Only some areas of mature gorse and broom remained

After almost a year of preparation, a long-term management plan for the Ashley-Rakahuri river is about to be released. This hopefully will become the guiding document for future management – but will require thorough review by ARRG before implementation. In addition, a review of predator control procedures is to be written. This, together with trapping improvements made over the last season and the results of a recent study of trap-catch effectiveness, should enable better control of predators and reduced losses of eggs, chicks and adults. The Group is most grateful to ECan, particularly its Principal Advisor for Braided Rivers, David Owen, for funding and facilitating the writing of these plans.

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 2020-21, the Group created many opportunities to improve awareness, and these should be enhanced by the recently created communications/promotions team. Most involve 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 from the likes of ECan is sought for major projects.

Looking into the near future, the major challenges involve maintaining good bird nesting and feeding habitat and continuing/improving the control of predators. To these must be added improved communication with ECan river engineers, plus the ever-present challenge of promoting public interest, and the involvement of the local community in bird management on the Ashley-Rakahuri River. Apart from being vital for overall long-term success, local involvement enhances fund raising opportunities, and helps to reduce human disturbance in the riverbed during the breeding season.

12 Recommendations

1. *Future planning.* Contribute to and approve ECan's long-term management plan, and initiate implementation.

Justification. ECan has been working on a long-term plan for the Ashley-Rakahuri river for over a year. The plan should guide our actions for many years to come, and the Group is keen to give it approval and begin its implementation.

To date: Approval of the plan has been held up while outside authorisation is being obtained, but this issue should be resolved in the near future.

2. *Improving habitat.* Create and maintain improved habitat (e.g., extensive weed-free sites – preferably islands) for bird breeding and feeding. Maintain island status and good surrounding flows during the season if appropriate. Continue development of cost-effective and environmentally-friendly means of maintaining weed control, taking advantage of current post-flood weed-free status, plus promote removal of fairway islands with semi-permanent vegetation. Promote operational management changes by ECan to avoid / reverse widening berm zone which limits 'room for the river to move' and leads to loss of 'normal' braided riverbed habitat. ECan is in the process of improving habitat in the upper Ashley-Rakahuri and lower Okuku rivers. This should increase feeding and nesting opportunities along these reaches.

Justification. There is plenty of evidence to show that weed invasion and loss of bare shingle areas can lead to declining bird numbers. Recent record floods have created a 'clean-slate' weed situation, so the challenge is to maintain weed-free status into the future. Past ECan management has focused on flood protection. One result has been widening berm zones, which particularly if reinforced by tree planting, is leading to permanent loss of 'normal' braided river habitat. This has not been adequately recognised until recently. Efforts to improve habitat in the upper Ashley-Rakahuri and lower Okuku rivers could enable the return of birds to these stretches.

To date: Significant artificial weed removal since 2017 floods, with promising potential for greater clearance using tractor-mounted undercutter. However, recent floods have negated the current need for this. Increases in berm width have contributed to loss of fairway habitat. Suitable bird habitat in the upper Ashley-Rakahuri and lower Okuku rivers was lost to weeds many years ago.

3. *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. Enable this by making more use of technology, such as drones, thermo-scope, trail cameras, and banding / radio tagging of birds. A measure of egg hatching is needed, plus more emphasis should be put on counting fledglings. Surveys and monitoring will be needed in the upper Ashley-Rakahuri and lower Okuku rivers – currently being cleared of weeds.

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. The latest technology should enable the group to improve monitoring of breeding outcomes and bird movements. 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 has been undertaken for almost 20 years from below the Okuku river junction. Monitoring above this point, in the upper Ashley-Rakahuri and lower Okuku rivers, has been minimal in the past.

4. *Record keeping.* Continue own record keeping and mapping (traps and bird nesting), and contribute to improvement of regional/national record keeping. Try to band more birds.

Justification. Good records and mapping are essential for effective monitoring and accountability over the long-term. Regional and institutional bird data storage protocols need improvement.

Banding provides information on adult survival and pairing, plus movements of individual birds.

To date: The Group's record keeping and data presentation, plus feedback to end-users is now excellent. Unavailability of approved personnel has prevented continuation of past banding efforts (25 wrybill).

5. *Predator control.* This occupies more of the Group's time than any other activity, and must be maintained. ECan is funding a review of the current trapping regime and methods, which should endorse an extension of predator control and the appropriate use of new strategies - being aware that most trapping is on public land. Particular emphasis is required around breeding birds.

Improve awareness of 'other' losses – such as those caused by power-line strikes.

Justification. Recent analysis of trap-catch data, coupled with a local study of trap effectiveness and changing predator trap-catch composition (e.g., large increase in % of rats) raises questions about current strategies. A review is needed to ensure efforts are as cost/time effective as possible and suitable to local circumstances (e.g., use of poison baits in public areas). Adult birds are known to be killed by powerline strikes, but the numbers lost are unknown.

To date: Trapping has been adequate, although results indicate that predator numbers may not have been reduced significantly. Additional funding has been sought to complete and widen trapping of the entire river margin (doubling current trap numbers).

6. *Advocacy.* Continue to implement recently completed PR strategy involving 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 and a children's book. Particular attention should be paid to schools and more field interpretation / awareness signs in public places. Make use of the 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, plus future management will be in their hands.

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

7. *Funding.* Maintain funding via Group initiatives (such as trap-making), and improved public awareness, plus enhanced agency linkages, especially with ECan, DOC and Waimakariri District Council.

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 funding into the future. However, new trapping, weed control maintenance and promotion intentions may stretch our resources.

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.

8. *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 organises advocacy workshops and training courses to which the Group contributes.

To date: Good support of BRaid and its outreach programmes. The Group works closely with BRaid – both have had the same chairman.

9. *Maintain and improve collaboration.* Particularly via better communication with ECan's new Rivers group and its on-the-river engineers and operations staff. Also with DOC, 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. In some situations, become more publicly critical of poor management.

Justification. Decisions on, and fund allocation for, the future improvement and maintenance of braided river ecosystems rest with these agencies and committees. Past communication between ECan's operational team (such as their engineers) and with the Group must be improved. ECan is

making major commitments to braided river management, including the writing of a long-term plan for the Ashley-Rakahuri river.

To date: Reasonable collaboration with all agencies, particularly with ECan planners – but not so good with river operational staff. Links with iwi/runanga, Fish & Game and Forest & Bird also need improvement.

10. *Gravel extraction.* Maintain and improve collaboration with commercial gravel extractors. Monitor gravel extraction sites to help determine methods which are optimal for the environment and maintain appropriate H&S standards.

Justification. Gravel (shingle) extractors are the major commercial users of the Ashley-Rakahuri riverbed 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, that consents ensure maintenance of environmental values, and that consent criteria are enforced..

To date: Good collaboration with the likes of Taggart Earthmoving Ltd, but needs extending to other operators. There is concern that consent criteria, operational safety (particularly involving truck movements), and enforcement need improvement.

11. *Berm biodiversity.* Inventory the environmental / biodiversity values of the berm.

Justification. The berm zone between the stopbanks and the fairway occupies a major part of the Ashley-Rakahuri braidplain. Its biodiversity values may be considerable, and it could be a major part of any vegetation corridor running from the coast to the mountains.

To date. Little attention has been paid to the berm's environmental/biodiversity values.

12. *Local management.* Support ECan's new braided river initiative and in particular its intentions for the Ashley-Rakahuri river - which involves the completion and implementation 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 and gravel extraction 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 – a vital component of the river's ecosystem..

To date: Good collaboration with local staff. 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. Collaboration with higher level operation managers can be improved (see 2 and 9 above).

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

The agency which offers the Group most support is ECan. David Owen, its Principal Advisor Braided Rivers is committed to producing a long-term plan for the Ashley-Rakahuri river, plus a review of its predator trapping operations. Such planning is essential for long-term success, and the Group looks forward to contributing to these plans and initiating them in the coming year.

Over the past year, significant assistance on the riverbed has been given by two younger volunteers, Matt Kim and Quill Yates.

The Group works closely with 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 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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- Grant Davey, 2019. An evaluation of the Ashley Rakahuri Rivercare Group (ARRG) predator trapping data from 2004 to July 2019. 11pp
- Grant Davey, 2019. ARRG Ashley river and estuary trapping update. December, 2019. 6pp`
- Grant Davey, 2020. Black-fronted tern and black-billed gull colonies, 2019-2020 season. 39pp
- Grant Davey, 2020. Aspects of Ashley river weed problem. 40pp

Grant Davey, 2020. Notes on braided river birds in the Lees Valley – Okuku and Ashley-Rakahuri rivers - 2019 breeding season. 5pp

Grant Davey, 2020. 2020 Ashley-Rakahuri annual bird survey. 13pp

Grant Davey, 2021. 2020-21 nesting season. 20pp

Grant Davey, 2021. Ashley River Smarts Island Black-billed gull disturbance incidents. 14pp.

Grant Davey, 2021. Annual trapping report: 2020-2021. 12 pp

Nick Ledgard, 2018. Ripping to control weeds on the Ashley-Rakahuri river – a pilot trial. 5pp

Nick Ledgard and Grant Davey, 2018. Shingle extraction and bird breeding on the Ashley-Rakahuri river Case study – Taggart Earthmoving Ltd operation at end of Swamp Road. 6pp

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Nick Ledgard and Grant Davey, 2019. Trial of tractor-mounted ripper to clear weeds in the Ashley-Rakahuri river. Report to Dept of Conservation, September, 2019. 4pp

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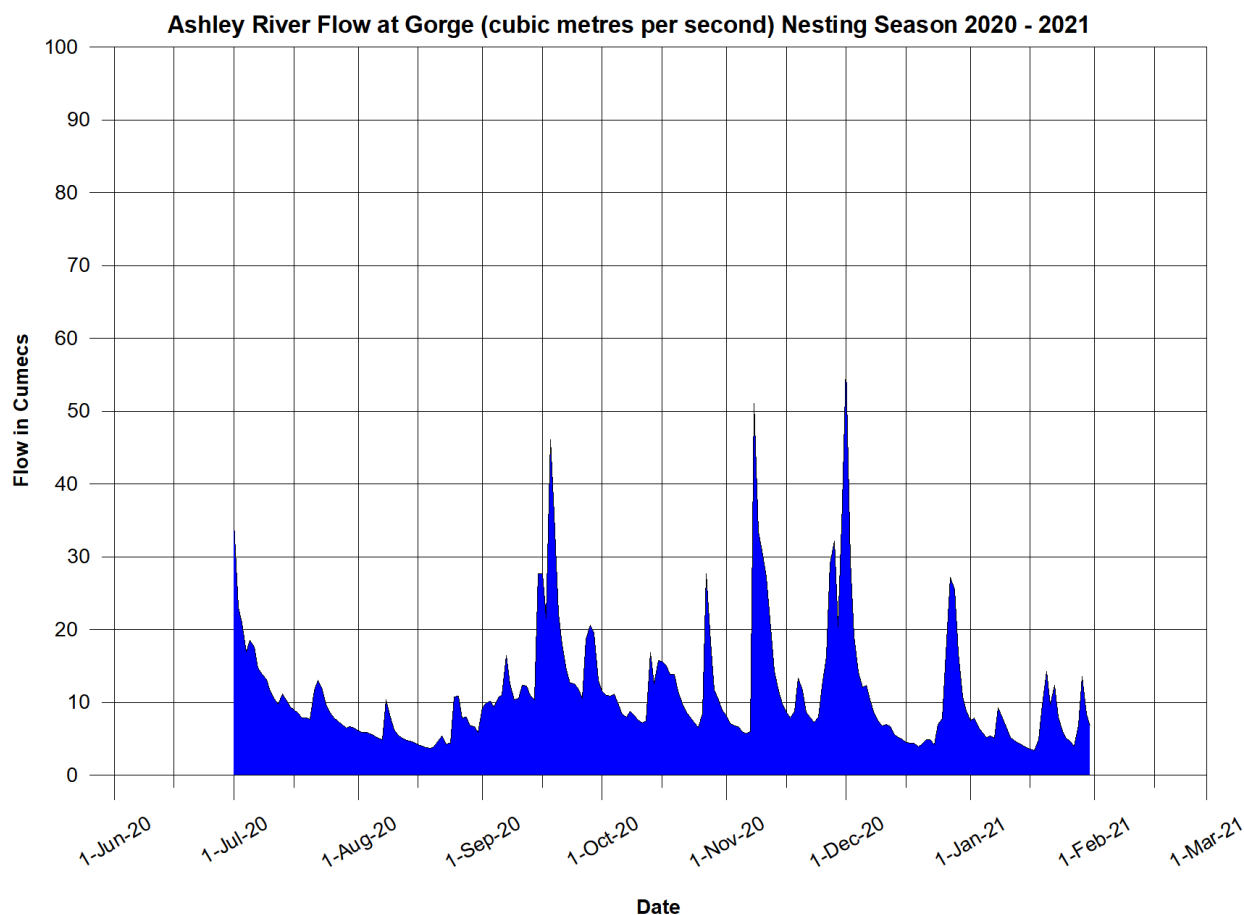
Appendix 1. Promotional activities, July 1, 2020 – June 30, 2021

Promotion / Activity	Date	Comment
Meetings / surveys		
AGM	Oct 8	DOC offices, Rangiora, 17 present
Meetings – General	Oct 8, Dec 3, Mar 18, Jun 17	DOC offices, Rangiora: 13-26 present
Meetings - Management Committee	Sept 3, Dec 1, Jan 28, Mar 11, June 10	6-8 present
Annual bird survey	Nov 21	22 participants
Okuku survey/visits	Dec 9/ Jan 14	2 participants
Groyne 1 to Groyne 2 surveys	Monthly	1 participant
Cones Rd bridge to estuary	Fortnightly	1 participant
Presentation/Representation		
BRaid 2020 seminar	July 8	2 Ppt presentations by ARRG members
Rangiora Borough School	July 28	Down Back Paddock series
Peninsula Tramping club	Sept 8	Ppt presentation
CompassFM	Oct 16	Local radio interview
River visit	Oct 17	School child donor and father
Scouts at Blue Skies, Kaiapoi	Oct 22	Ppt presentation
Waikuku estuary visit	Oct 30	EnviroSchools
Zone Committee	Jan 6	Ppt presentation and riverbed visit
Bird disturbance interviews	Jan 19	TVNZ, TV3, Newshub and Stuff
DOC and Rivercare Grp, Te Anau	Jan 21	Ppt presentation
Rangiora Tramping club	Feb 23	Ppt presentation
ECan council	Feb 25	Ppt presentation
Rangiora Soroptemists	Mar 15	Ppt presentation
St Josephs School, Rangiora	Mar 18	Down Back Paddock series
CompassFM	June 3	Local radio interview
Ashley School	June 4	Ppt presentation
Media Articles		
NC News	Sept 10	Machine proves to be a ripper
NC News	Dec 23	Linda comes to rescue of gulls
NC News	Jan 21	Rare BBGs killed by dirt bike riders
NC News	June 24	Endangered birds benefit from floods
Updates to members		
	Sept 18	Sent out to email list
	Jan 13	Sent out to email list
Other		
Riverbed meeting	July 9	ECan and Taggarts
ECan meeting with engineers	Sept 21	Discussion on riverbed management
Tuhaitara Open Fay	Jan 31	Display
ECan meeting with engineers	Feb 1	Discussion on riverbed management
Field visit with Rangiora mayor	Feb 4	Mayor Dan on riverbed
Potential sanctuary visit	Feb 7	Colin Wightman property by estuary
Sausage sizzle	Feb 20	Outside Warehouse
Sefton School field trip	Feb 23	Visit to estuary
Display	April 17	Back to Basics display in Baptist Hall
Riverbed visit	April 19	With 2 ECan engineers
ECan Long Term Plan	Apr 27	Verbal submission to ECan council
ECan Volunteer video	May 18	Interview and riverbed visit
Riverbed visit	May 19	Ashley School class
ECan meeting	May 28	With Ops director and Engineer manager
Kaiapoi cubs and keas	June 1 & 2	Talk re riverbed birds
DOC meeting	June 16	Discussion on river bird data storage
RNZ interviews	June 23	Damage from May 30/31 flood
Volunteer Expo displays	June 22, 25, 26	Kaiapoi, Pegasus and Rangiora
Volunteer video shown	June 29	ECan

Appendix 2. River flow

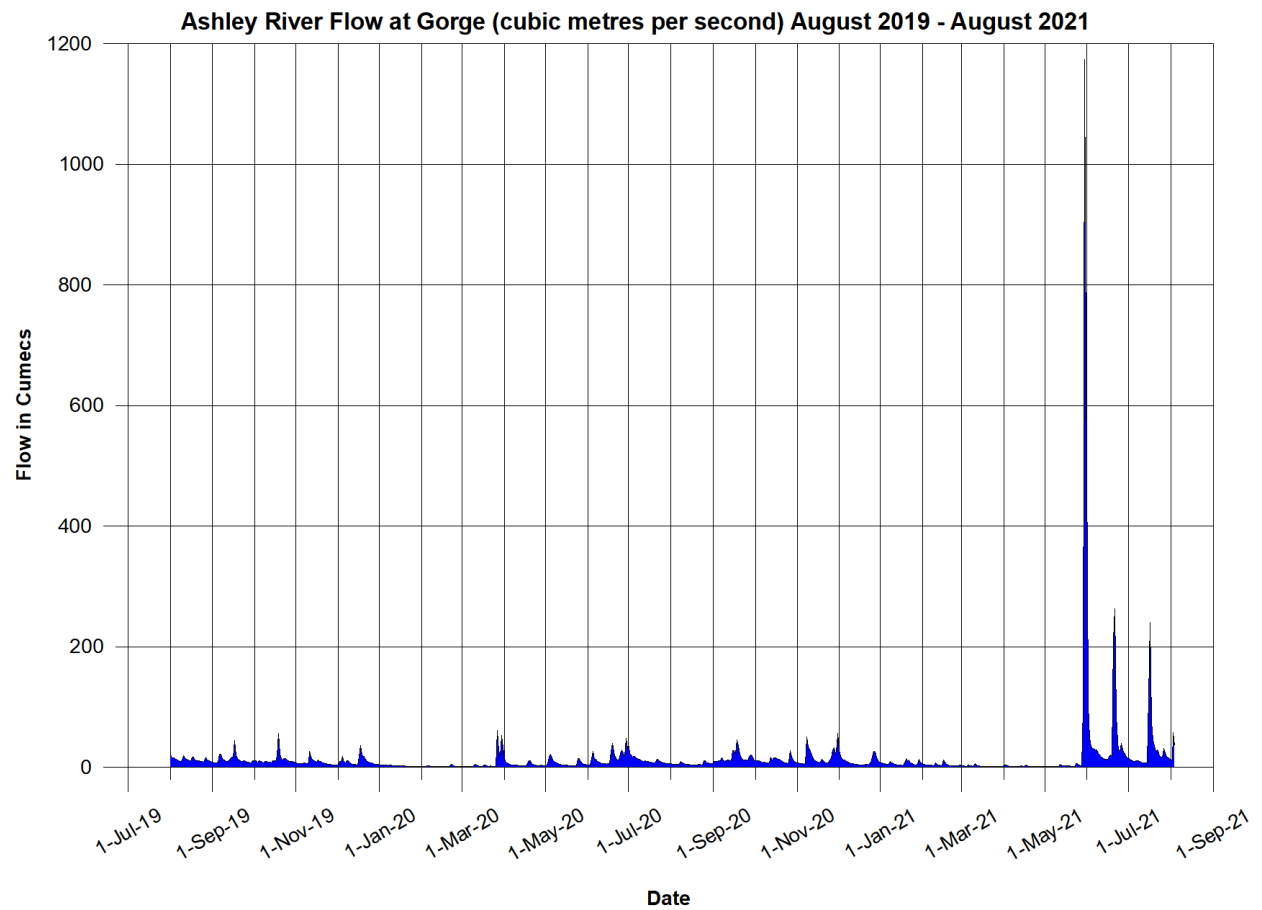
The following graphs are from data supplied by ECan from the Ashley Gorge recorder.

This year there were no significant flood events in the nesting season - the highest flow being 56 cumecs which was almost identical with that from last year. This flow does not constitute a serious threat to nests.



Flow at gorge during 2020/2021 nesting season

Peak flow during the year (partly interpolated as the recorder was out for some time), was 1173 cumecs on 30 May. The one in one hundred year flood event has been calculated as 1172 (AECOM, 2019). Other flood events included 263 cumecs on 21 June, and 240 cumecs on 17 July. There was an unusually long period of very low flow of less than 5 cumecs from 17 February to 28 May. During this time the riverbed was dry from just below Cones Road to Tulls.



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.

New management teams. In June, 2021, the Group proposed three internal teams to manage operational activities in the field, communications and promotion, and administration - each with its own leader. It was felt that this would lead to better sharing of the workload, and greater ability to organise specific activities

The Group has 138 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.