



Final report: Waiau Toa/Clarence River mouth black-billed gull outcome monitoring 2016-2020



Final Report: Waiiau Toa/Clarence River mouth black-billed gull outcome monitoring 2016-2020

Mike Bell

Wildlife Management International Ltd

PO Box 607

Blenheim 7240

New Zealand

www.wmil.co.nz

This report was prepared by Wildlife Management International Limited for the Department of Conservation and Environment Canterbury.

April 2020

Citation:

This report should be cited as:

Bell, M.D. 2020. Final Report: Waiiau Toa/Clarence River mouth black-billed gull outcome monitoring 2016-2020. Unpublished Wildlife Management International Technical Report to the Department of Conservation and Environment Canterbury.

All photographs in this Report are copyright © WMIL unless otherwise credited, in which case the person or organization credited is the copyright holder.

1. INTRODUCTION

The black-billed gull (*Larus bulleri*) is an endemic species to New Zealand, which is largely restricted to breeding on the braided rivers of the eastern and southern South Island. It is listed as 'Nationally Critical' by the New Zealand Threat Classification System due to drastic and rapid declines in population numbers (Robertson *et al.* 2017).

A small colony of black-billed gulls has been breeding at the Waiau Toa/Clarence River mouth and has been the focus of research and conservation management since 2012.

Breeding success at the Waiau Toa/Clarence River mouth colony has been extremely low, with the primary cause being due to depredation by Southern black-backed gull (SBBG). A large colony of which occurred just upstream of the river mouth. The SBBG appear to be targeting black-billed gull chicks and have been causing the complete failure of the colony.

Environment Canterbury and the Kaikoura Water Zone Committee has funded monitoring and conservation management action at the Wairau Toa/Clarence River to improve the breeding success of the black-billed gull since 2016.

This report presents the results of black-billed gull monitoring (as well as other gull and tern species) and SBBG control and monitoring undertaken at the Waiau Toa/Clarence River mouth during the 2016/17, 2017/18, 2018/19 and 2019/20 breeding seasons to summarise the overall results of this project.

2. METHODS

2.1 Black-billed gull monitoring

2.1.1 Colony monitoring using remote sensing cameras

Counts of birds and other observations were undertaken with a spotting scope or binoculars from the true left bank of the Waiau Toa/Clarence River at various times throughout the preceding winter and spring, to determine if and when breeding of gulls and terns occurred as each breeding season developed.

Following the onset of black-billed gull breeding, to monitor nesting success, four remote sensing cameras were set up at the colony.

For day-time monitoring, two remote sensing cameras were set up on a separate tall wooden pole facing into the colony at an appropriate distance to capture all nests within each photo. A buffer zone was also left around the colony to increase the probability of capturing footage of the cause of disturbance events. Multiple cameras were used to ensure that at least one camera was working at all times, even in the event of one camera malfunctioning, and to allow for different angles of the colony. The cameras were set to record one picture every minute from dawn to dusk (0600-2100). A north-facing solar panel attached to the camera ensured that the batteries remained charged at all times.

For night-time monitoring, two remote sensing cameras were set up on short wooden poles facing into the colony. These were placed as close as possible to the edge of the colony while still capturing as many nests as possible without causing disruption. The cameras had to be set in close proximity to the nests to ensure they were within reach of the cameras infrared flash. The cameras followed the

same set-up and checking procedures as the day-time cameras but were running from dusk to dawn (2100-0600).

2.1.1 Determining productivity

Productivity (chicks fledged per nest) is commonly used as a measure of breeding success. This is determined by carrying out a nest count during late-incubation or early-chick hatching. As this is when the greatest number of birds will be occupying nests, either incubating or brooding small chicks. Counts must be carried out before chicks are 3-5 days old and have started to leave nests and form crèches. Counts at colonies are made by laying ropes through the colony to divide it into sections. An observer then walks through each section counting all nests between the two ropes. Using two skilled observers a count of a colony up to 500 nests can be counted in 5-10 minutes, thereby minimizing disturbance.

All chicks were banded before just prior to fledging by herding all chicks into a pen approximately 5 meters in diameter made out of chicken wire. Chicks were removed from the pen individually and banded with both a metal band and a coloured alpha numeric band. Once banding was complete, each chick was placed into a second pen, until all chicks were banded, and the pen opened to release all the chicks together.

Several thorough systematic sweeps of the colony and surrounding area were carried out immediately after fledging when the colony was abandoned to check for any dead banded chicks. These were subtracted from the number of chicks banded to determine the number of chicks that fledged from the colony. Annual productivity was calculated by dividing the number of chicks fledged from of the number of nests counted earlier in the season.

2.2 SBBG control and monitoring

2.2.1 2017/18 control operation

From early October 2017 the SBBG colony was visited to identify and map all nests. As eggs were laid early in the season (October 2017 until the first week of November 2017) they were injected with formalin to prevent embryo development. This ensured that early nests did not hatch, and all adult birds remained associated with their nest.

When most birds were incubating, pre-feeding using non-toxic baits commenced. At each nest 9-10 baits were scattered around the rim of the nest. Pre-feeding was carried out for 4 days, to ensure that SBBG had become keyed into baits, and readily ate baits when they were laid out.

Immediately following the four days of pre-feeding, toxic baits containing 10% alpha-chloralose were fed out in the same fashion as during pre-feeding. As alpha-chloralose is relatively fast acting, poisoned birds were collected two hours after laying baits. Dead SBBG were disposed of at the Blenheim Landfill following their biological waste disposal protocols.

2.2.2 SBBG monitoring

During counts of birds undertaken at the Waiiau Toa/Clarence River, counts of SBBG were also taken. These occurred at all visits, both during the breeding and non-breeding season, in order to determine the trends in gull numbers at the river mouth.

Numbers of breeding pairs of SBBG we determined each year by undertaking a count of apparently occupied nests each season. Each season 1-4 observers searched the entire breeding colony area in a systematic fashion to avoid missing nests. Each nest encountered was marked with temporary paint (dazzle) and recorded on a handheld GPS. This ensured that nests were not double counted and provided a spatial extend of the breeding colony.

3. RESULTS

3.1 Pre 2016 black-billed gull productivity

Productivity at the black-billed gull colony at the Waiau Toa/Clarence River mouth has been carried out since 2012. Initially productivity was high (1.02 chicks/pair) but was then repeatedly low since (Table 1), including one season when no chicks were fledged at all.

Table 1. Number of nests, chicks fledged and productivity at the Waiau Toa/Clarence River mouth black-billed gull colony.

Season	Number of nests	Chicks fledged	Productivity
2012/13	254	258	1.02 (chicks/pair)
2013/14	250	60	0.24 (chicks/pair)
2014/15	188	0	0 (chicks/pair)
2015/16	137	21	0.15 (chicks/pair)

During the 2014/15 and 2015/16 breeding seasons the Environment Canterbury Kaikoura Water Zone Committee funded monitoring into the cause of black-billed gull breeding failure at the Waiau Toa/Clarence River mouth colony. Video evidence from this monitoring concluded that SBBG caused complete breeding failure in 2014/15 and almost complete failure in 2015/16 (Mischler and Bell 2016).

SBBG appeared to target the colony following chick hatching. During early incubation no gull predation was recorded, and as chicks started to hatch gull predation increased rapidly. This suggests that SBBG are selectively only predated black-billed gull chicks, and not eggs.

Following this monitoring, the Environment Canterbury Kaikoura Water Zone Committee funded management actions for the following season. This included undertaking a toxin operation to remove the SBBG colony up stream of the Waiau Toa/Clarence River mouth.

3.2 Black-billed gull monitoring

2016/17 breeding season

Black-billed gulls returned to the Waiau Toa/Clarence River mouth in late October and began courting. Mating was observed on 4 November, and the first eggs laid on 10 November. Although no accurate count was undertaken at this time, an estimated 150 pairs appeared to be establishing on the shingle spit.

On 16 November the magnitude 6.8 Kaikoura earthquake caused a landslide to dam the Waiau Toa/Clarence River. The following day the dam burst, and the resulting flood is likely to have caused the black-billed gull colony to be washed out.

Due to extensive damage to State Highway One north of the Waiau Toa/Clarence River the road was closed just south of Ward until mid-December. As such it was not possible to visit the Waiau Toa/Clarence River mouth, and all monitoring and SBBG control work was terminated for the season.

In mid-December when the road to the Waiau Toa/Clarence River re-opened a black-billed gull colony was found at Kekerengu River mouth. There was no evidence of breeding at the Waiau Toa/Clarence River mouth, and sightings of banded birds suggest that the many of the Waiau Toa/Clarence River

mouth birds were breeding at the Kekerengu colony. With the State Highway closed, Kekerengu Store was closed, and the beach and river mouth would have been deserted. It is likely that with no disturbance here, following the earthquake and the resulting flooding at the Waiau Toa/Clarence River mouth, the colony re-located to Kekerengu.

Being late in the season an accurate nest count was not possible, but by counting used nests and from the number of birds present the colony was estimated at 150 pairs. A colony of approximately 350 pairs of white-fronted tern also nested at the site. Black-billed gull productivity was high, with the colony fledging 165 chicks (estimated productivity of 1.1 chicks/pair).

2017/18 breeding season

Small groups of black-billed gulls were recorded at the river mouth from mid-October, but there was little sign of breeding behaviour. Initially this appeared to indicate a late breeding season – the Waiau Toa/Clarence River mouth black-billed gulls generally did not start laying until into November. However, as the season progressed the number of black-billed gulls declined. By mid-November, only first year black-billed gulls were being recorded and no breeding took place at the Waiau Toa/Clarence River mouth.

No colony was formed at Kekerengu, or at other river mouths to the north. With State Highway One remaining closed south of the Waiau Toa/Clarence River, no check could be made to the south. However, when the road did re-open in Mid-December at check of all river mouths to the south failed to locate any evidence of black-billed gull colonies.

2018/19 breeding season

black-billed gulls were recorded at the Waiau Toa/Clarence River mouth from mid-August to early November in groups of 5 to 178 birds. By 17 November a large mixed colony of black-billed gulls (156 nests), red-billed gulls (73 nests) and white-fronted terns (350 nests) had established. Birds were either in early incubation or nest building and part way through laying. At this time five remote sensing cameras were set up to monitor the colony.

An estimated total of 1,000 white-fronted terns were recorded at the Waiau Toa/Clarence River mouth in early November, with an estimated 350 nests recorded on November 17. Prior to this (from mid-August onwards) the number of white-fronted terns present varied from 7 to 350 birds.

Small numbers of red-billed gulls (group size varied from 3 to 94 birds) were present from mid-August onwards at the Waiau Toa/Clarence River mouth, and by November 17 a total of 73 nests were recorded at the mixed gull and tern colony.

A significant flooding event occurred on the Waiau Toa/Clarence River in late November which resulted in the gull and tern colony being destroyed along with the loss of the remote sensing cameras. River flow data shows that flooding peaked 28 November with mean daily flow of 36,709 l/s at Jollies Pass (Unpublished NIWA data, 2019) (please note there is now no river flow gauge in the lower river reaches).

In mid-December a small number of black-billed gulls (and a smaller number of SBBG, as well as red-billed gulls and white-fronted terns) were recorded at the Waiau Toa/Clarence River mouth however no further breeding attempts were made at this site.

Following the 28 November flooding event, a number of banded black-billed gulls that were present at the Waiau Toa/Clarence River mouth colony whilst breeding activity was occurring were re-sighted at colonies on either the Wairau River or Charwell River. The Wairau River re-sightings occurred as early as 14 December and the Charwell River re-sightings occurred as early as 22 December. These banded black-billed gulls were not re-sighted again at the Waiau Toa/Clarence River mouth colony

during December or January suggesting that birds shifted to other successful colonies further afield to re-nest.

2019/20 breeding season

black-billed gulls started to build up at the Waiau Toa/Clarence River mouth from late October. Few birds were present on October 17th, but numbers steadily increased and the first eggs were recorded on November 19th. Although egg laying was only just starting, a total of 120 apparently occupied nests was recorded.

A large white-fronted tern colony had formed by November 5, with approximately 600 pairs nesting. This increased to 800 pairs by November 19 when the black-billed gulls had started nesting alongside, and 50 pairs of red-billed gulls had started nest building also.

A flooding event combined with a high tide and strong storm surge occurred on the Waiau Toa/Clarence River on December 4 resulting in total loss of the black-billed gull colony, and 90% loss of the white-fronted tern colony. The remaining breeding terns were completely washed out in a flood event a week later along with the loss of the remote sensing cameras (the cameras and stands were later recovered).

Prior to this the cameras recorded no SBBG predation but did record predation by feral cats within the black-billed gull and white-fronted tern colony. Previous camera monitoring has shown that SBBG predation usually occurs during chick rearing; with the colony being washed out well before hatching.

black-billed gulls did not re-nest at the Waiau Toa/Clarence River mouth, with some of these birds re-sighted at colonies on either the Awatere, Wairau or Charwell River; again suggesting that birds abandoned the Waiau Toa/Clarence River mouth and shifted to other rivers following the flood event.

3.3 SBBG control

2016/17 SBBG control and monitoring

In late October and early November, a full count and mapping of the SBBG colony upstream of the river mouth was carried out. Eggs found were injected with formalin to prevent development, prior to a planned alpha-chloralose operation scheduled for late November.

Following the November 16 earthquake and the extensive damage to State Highway One north of the Waiau Toa/Clarence it was not possible to visit the Waiau Toa/Clarence River mouth until December. As such all SBBG monitoring and control work was terminated for the season.

2017/18 SBBG control and monitoring

Mapping, marking nests and egg pricking commence in mid-October, and continued weekly. Eggs in early nests are injected with formalin to prevent development to keep all birds incubating in preparation for the planned alpha-chloralose operation.

A total of 350 SBBG nests were identified and mapped to assist the control operation (Figure 1).

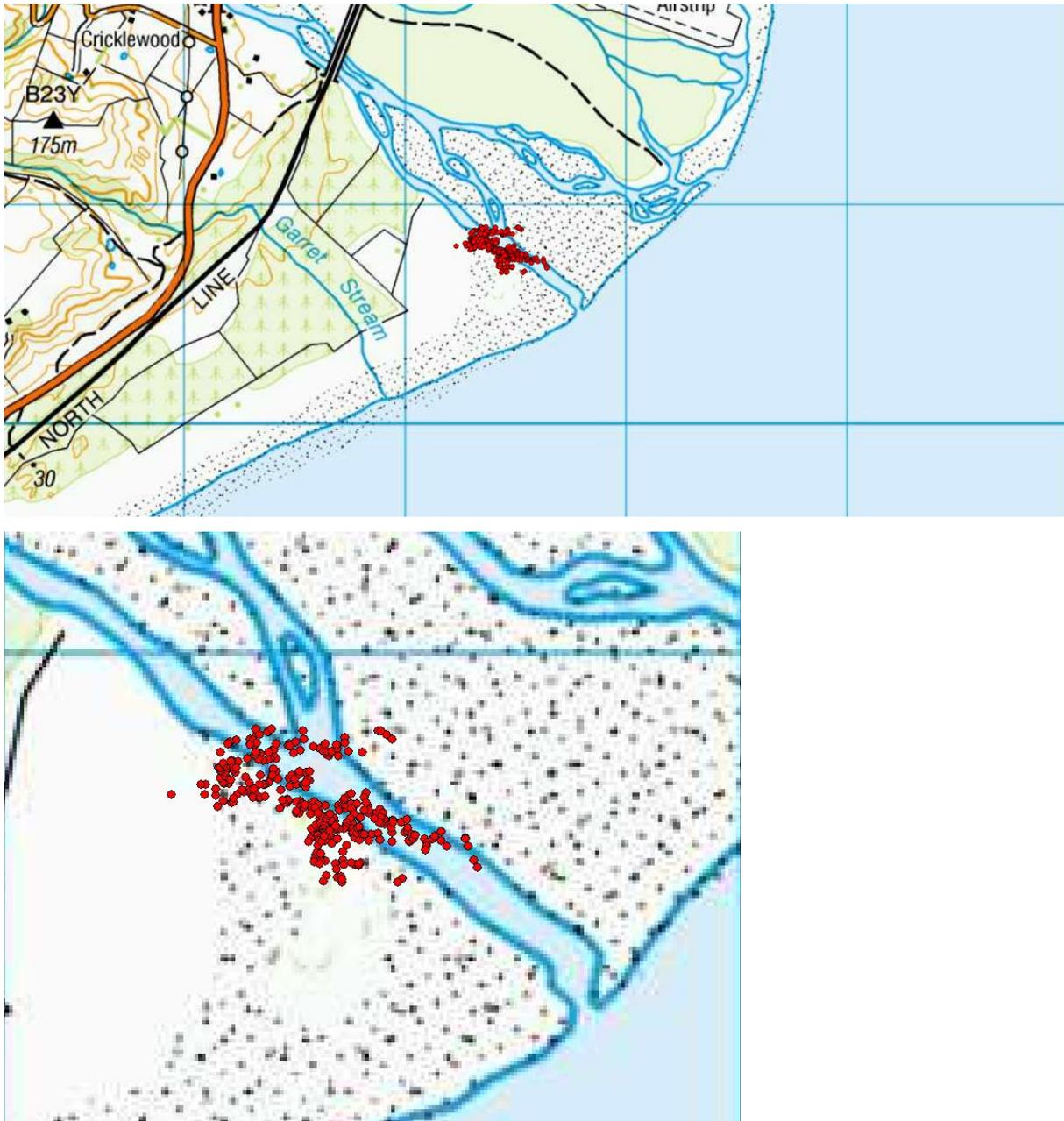
Pre-feeding using non-toxic baits started on 17 November and continued daily until 20 November. The SBBG readily keyed onto baits, and by day two were forming a feeding frenzy during feeding out.

The toxin operation was carried out on 21 November. Baiting occurred at the top end of the colony with a team of six spread out across the colony. The SBBG from the lower end of the colony immediately flew to the top end of the colony and formed a feeding frenzy. All baits were readily consumed.

A total of 450 SBBG were collected immediately following the operation, and a further 50 SBBG collected the following day. All poisoned SBBG were disposed of at the Blenheim Landfill in accordance with their disposal regulations.

Following the operation, a maximum count of 55 adult SBBG were recorded from within the colony area. All nests were destroyed, and no successful SBBG breeding occurred.

Figure 1. Distribution of SBBG nests at the Waiau Toa/Clarence River mouth.



2018/19 SBBG control and monitoring

Throughout winter regular visits to the Waiau Toa/Clarence River mouth were carried out to record birdlife present. During the SBBG non-breeding season (March-August) an average of 80 SBBG (range 30-200 individuals) were recorded at the Waiau Toa/Clarence River mouth (Figure 2). However, as the breeding season (September to December) progressed the number of SBBG being recorded declined;

with an average of 45 SBBG (range 5-300 individuals) recorded at the Waiiau Toa/Clarence River mouth (Figure 3).

No SBBG breeding activity was observed within the colony, or on the river below the State Highway One Bridge, and as such no follow up control operation was carried out.

2019/20 SBBG control and monitoring

Monitoring of the Waiiau Toa/Clarence River mouth throughout winter (March-August) recorded an average of 65 SBBG (range 15-325 individuals) during 2019 (Figure 2). During the breeding season (September-December) an average of 55 SBBG (range 25-150 individuals) were recorded (Figure 3).

As last season, no SBBG breeding activity was observed within the old colony area, or on the river below the State Highway One Bridge. Again, this meant that no follow up control operation was required.

Figure 2. Average number of SBBG recorded at the Waiiau Toa/Clarence River mouth throughout winter (March-August), 2012-2019.

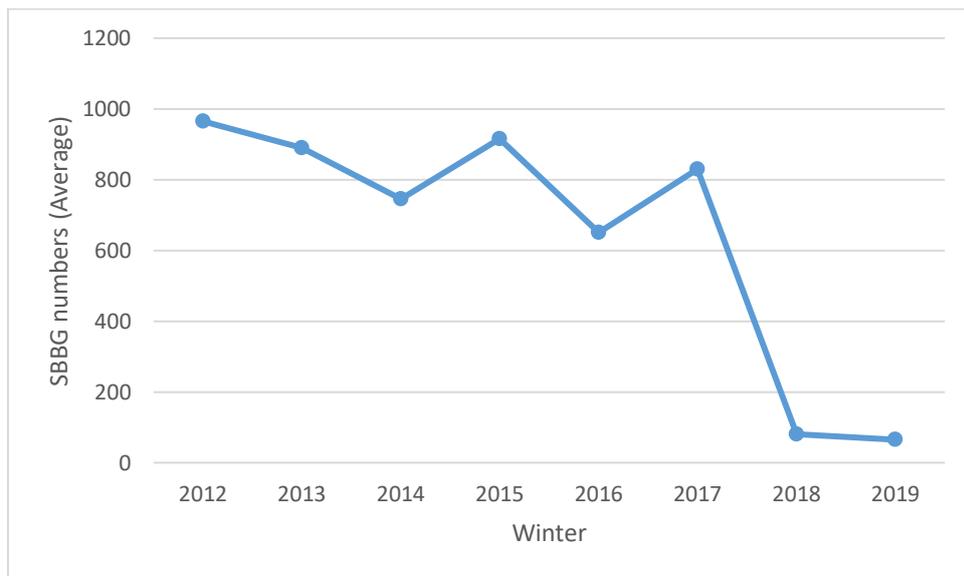
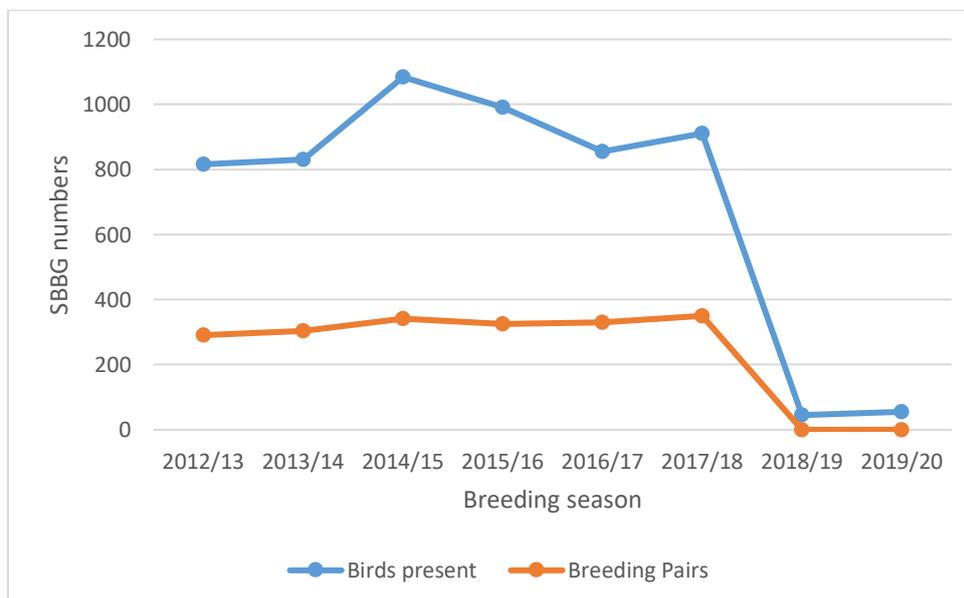


Figure 3. Average number of SBBG, and number of breeding pairs recorded at the Waiiau Toa/Clarence River mouth during each breeding season (September-December) 2012/13 - 2019/20.



4. DISCUSSION

Breeding of black-billed gulls at the Waiiau Toa/Clarence River mouth in the 2016/17 breeding season was influenced by the 2016 Kaikoura earthquake. The damming, and flooding of the river mouth caused the black-billed gulls to relocate to the Kekerengu River mouth, which due to the closure of State Highway One provided a breeding site with no disturbance. Interestingly, both the white-fronted terns and red-billed gulls also relocated here, and in the absence of SBBG all were productive. With the black-billed gulls having estimated productivity of 1.1 chicks/pair.

In the 2017/18 breeding season, it is possible that black-billed gulls didn't breed at the river mouth due to disturbance. With the re-build of State Highway One, the Waiiau Toa/Clarence River had a major rock crushing plant in close proximity to the river mouth. Associated with this was a large number of truck movements each day. The river mouth was noticeably noisier than previous seasons. Interestingly no white-fronted terns or red-billed gulls nested at the Waiiau Toa/Clarence River mouth, suggesting that disturbance caused all these species to choose not to breed at the site. No breeding occurred at Kekerengu, and it appears that none of these species nested from Kaikoura to the Waima/Ure River.

The reason black-billed gulls (as well as white-fronted tern and red-billed gull) did not return to the Waiiau Toa/Clarence River mouth is not certain. Gulls and terns often have irregular occupancy of breeding sites, and regularly desert a breeding site for a season (or more). The drivers of this behaviour are not known. Hence, the lack of birds breeding here during the 2017/18 season did not suggest the black-billed gulls had permanently abandoned the site, and continued conservation action was considered warranted.

In both 2018/19 and 2019/20 a large mixed colony of black-billed gulls, red-billed gulls and white-fronted terns again nested at the Waiiau Toa/Clarence River mouth. However significant flood events destroyed the colony in both seasons, and significantly changed the river mouth, altering the lagoon and single spit favoured by the gulls and terns. Evidence from re-sightings of banded birds indicates that failed breeders shifted to other black-billed gull colonies on rivers further afield (the Awatere, Wairau and Charwell Rivers).

The SBBG control operation during the 2017/18 season was highly successful – resulting in a 90-95% reduction in adult SBBG present at the breeding colony. The SBBG readily keyed into baits during pre-feeding, and during the toxin operation SBBG from the lower end of the colony flew to where we had started feeding out. This potentially meant there was greater competition for bait, and that not all birds in the top end of the colony had access to bait. In future operations when SBBG are so keyed into bait, feeding out from both ends of the colony at the same time may lessen the risk of this and ensure a better kill. This is likely to be especially important in operations at very large colonies.

As SBBG generally take four years to reach sexual maturity it was expected that follow up control would be required at the Wairau Toa/Clarence River colony. However, as SBBG have not bred at the Waiiau Toa/Clarence River mouth for two breeding seasons since the control operation and follow up control has not necessary.

The reason SBBG did not breed at the Waiiau Toa/Clarence River mouth could be due to the high level of reduction in SBBG numbers (as a result of the previous control operation) acting as a disincentive for any surviving SBBG to nest in the immediate area. This outcome is considered unusual as follow up control is usually required after initial control operations.

It is worth noting that although the SBBG control resulted in this species failing to nest in the immediate area black-billed gulls, red-billed gulls and white-fronted terns still nested in the same location. Until the flood events destroyed the colonies, no SBBG predation was observed, although breeding did not get through to the chick stage when SBBG are known to target black-billed gulls.

However, the almost complete removal of SBBG from the river mouth is likely to have reduced predation on black-billed gulls if they had survived longer.

Schlesselman *et al* (2018) found that modifying islands to improve breeding habitat removed mammalian predators, but breeding success of black-fronted tern was not improved due to predation by SBBG. Suggesting that removal of SBBG at the Waiau Toa/Clarence River mouth would have led to improved breeding success if the colonies had not been impacted by flooding.

Remote sensing camera monitoring picked up feral cat predation amongst the black-billed gull and white-fronted tern colony during the 2019/20 breeding season prior to the flood events which washed out the colony. This continues to highlight the impacts of introduced mammalian predators on braided river shorebirds, and that SBBG control alone might not be enough to improve breeding success of black-billed gull at the Waiau Toa/Clarence River mouth.

Recommendations

1. Conservation management actions should continue at the Waiau Toa/Clarence River mouth for the following 3 years to build on gains made and continue to improve the area for threatened shorebirds.
2. Follow up work should continue to ensure SBBG do not become re-established at the Waiau Toa/Clarence River mouth. Control could likely be undertaken without using toxin (i.e. shooting or trapping birds).
3. A mammalian predator trapping programme is established and operated at the Waiau Toa/Clarence River mouth to reduce the impacts of these species and provide further protection to threatened shorebirds.
4. Black-billed gull, red-billed gull and white-fronted tern breeding success should be monitored annually to measure improvements in breeding success resulting from this multi-species predator control regime.

5. ACKNOWLEDGMENTS

This project is funded by the Environment Canterbury Kaikoura Water Zone Committee and I thank Jessica Hill and Frances Schmechel for managing this so effectively. The contract for this work was carried out by the Department of Conservation, and I thank Richard Maloney for managing this. Thanks to the landowners and adjacent landowners for allowing the SBBG control operation to take place. Thanks also to NIWA for providing river flow data from the Waiau Toa/Clarence River flow gauges. Lastly, thank you to the following WMIL staff for assisting with this project, Biz Bell, Patrick Crowe, Dan Burgin, Paula Harborne, Hamish Tuanui-Chisholm, Toni Bell and Kailash Willis.

6. REFERENCES

- Mischler, C.P.; Bell, M.D. 2016. Waiau Toa/Clarence River black-billed gull Management. Unpublished technical report by Wildlife Management International Ltd to Environment Canterbury.
- Jones, A.B.; Smith, A.B. 2015. *How to trap a wild pig*. Working Title Publications. Smithville, New Zealand.
- Robertson, H.A.; Dowding, J.E.; Elliott, G.P.; Hitchmough, R.A.; Miskelly, C.M.; O'Donnell, C.F.J.; Powlesland, R.G.; Sagar, P.M.; Scofield, R.P.; Taylor, G.A. 2013. Conservation status of New Zealand birds, 2012. *New Zealand Threat Classification Series 4*. Department of Conservation, Wellington, 26pp.
- Schlesselman, A.V. O'Donnell, C.F.J.; Monks, J.M; Robertson, B.C. 2018. Clearing islands as refugia for black-fronted tern (*Chlidonias albostratus*) breeding colonies in braided rivers. *NZ Journal of Ecology* 42: 137-148.