BANDED DOTTEREL

The Empty Nest Syndrome

A study of the dotterels of South Bay, KAIKOURA

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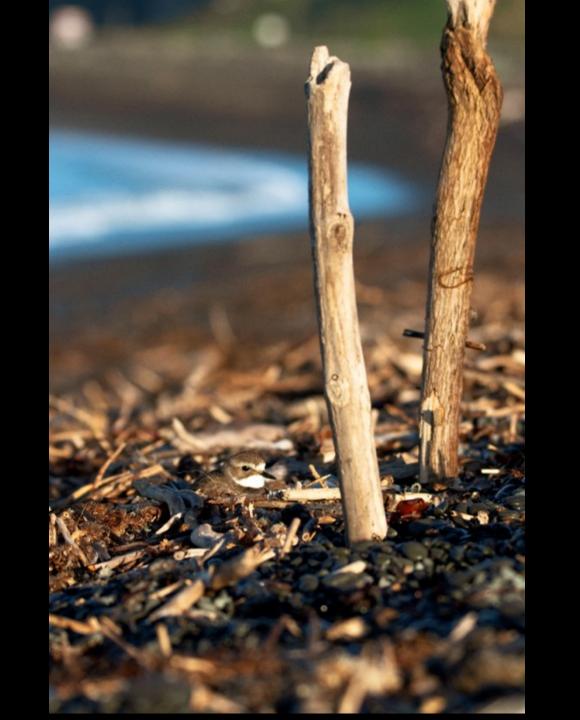




























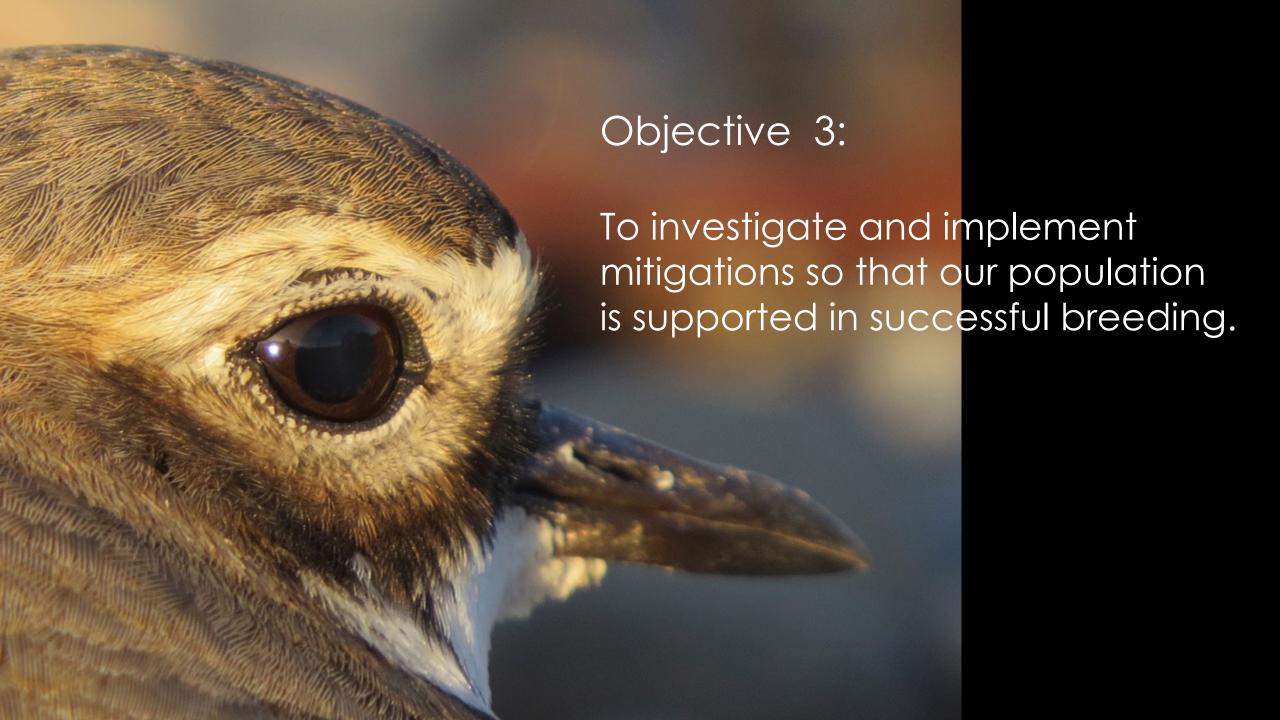


Breeding Season

	2015-2016	2016-2017	2017-2018	2018-2019
No. nests followed	20	23	33	50
Nests that hatched	20%	41%	56%	36%
Reproductive Effort	2%	14%	11%	14%





























This project arose from a chance encounter with a nesting dotterel on the South Bay beach in September of 2013. *What grabbed my attention was the extraordinary effort that the species put into reproducing. This nest failed and the three other nests I found also failed.

Recognising that this might represent a more general failure to breed for the dotterels of South Bay, I took my concerns to our local branch of Forest and Bird. As a branch we committed to adding a dotterel project to the initiatives we already support. It was decided that I would lead the research and be supported in experimental design and banding by well-known birder Lindsay Rowe, who at that time was also a branch member.

Our objectives were threefold – to measure breeding productivity on the beach, to identify the factors which led to nest failure, and to investigate and implement mitigations so that our population was supported in successful breeding.

Our observations began in August of 2015 and we are about to go into our 5th season.

Banded dotterels potentially have a certain inbuilt resilience which enables them to nest in quite a range of habitats*. Early on in my study I became aware that the problems of low reproduction were also playing out in the braided rivers. *Having a very accessible local site has its share of problems, but provides a unique opportunity to study in detail what is a stronghold for banded dotterel. It is the intention that this study will provide data and information which can used to support banded dotterel reproduction on braided rivers also.

Like our braided rivers would have been in historic times, the coastal gravel beaches * which stretch from much of north Canterbury to Cape Campbell provide an abundance of open nesting habitat. Areas of high nutrition – river mouths and reefs are amongst preferred sites. We have only sparse information on dotterels nesting on this coastline – either the numbers of pair who nest here or their ability to succeed.

Not all of you will be familiar with banded dotterel so I will outline a few of their main points. Like all braided river birds they nest on the ground. * However unlike terns and gulls they are territorial rather than colonial nesters. The dotterel strategy is each pair for itself and it is the individual nest that requires protection during incubation. *Chicks are precocial — or very advanced, and are self-feeding, so once hatching is complete the dotterel family leave the nest. Parents remain close and attentive and provide warmth to their chicks when they need it and peep out instructions to stand perfectly still if a threat is detected. The family may forage over a wide area.

*Dotterels are the master of camouflage, a great success story when the only threats consisted of sharp-eyed avian predators. *Eggs, nests, chicks and sitting birds recede into the environment, while hidden in plain sight. *This adaptation allows people to stumble on their nests, not recognise them or merely dismiss them as inconsequential. However why dotterels currently have such extreme vulnerability is that visual tricking provides no protection from an introduced mammal who hunts using their sense of smell *

*South Bay is a small village on the Southern edge of the Kaikoura Peninsula. Its beach is an exceedingly dynamic system bearing the brunt of intermittent Southerly storms which can be vicious depositing and scouring gravels on a whim. Nests wash away from time to time, however these storms bring in rich nutrients and ample seaweed which build a rich ecosystem as they decay and create rich insect life for dotterels to feed on. The beach can be accessed at any point.

- *My initial study concentrated on the beach directly opposite the racecourse which I had been told was the full nesting area.
- *However, over time it became clear that nests extended the beach length and also along the southern coast towards the Kowhai River and my study grew. I currently monitor all nests we can find on about 2 kms of beach —which over the past 2 seasons has supported 19 and 25 pairs. Competition for the area seems intense. When an adult is killed from a nest, quickly there is often another male fighting for a territory to set up house. *

So what has this research shown us?

Objective 1: Measuring the breeding productivity. *

The number of nests we followed each year increased. This reflected both an increase in area studied, but also in our ability to observe, which we think markedly improved with the familiarity of our subject. 2% seems on the low side for productivity in 2015-16 and most likely reflects us being inexperienced.

Productivity has been calculated through reproductive effort: the number of fledglings from the site, divided by the total number of eggs and expressed as a percentage. The strategy which enables a pair to renest several times during a season points to a natural vulnerability perhaps to flooding, to avian predation, or maybe a high mortality of dotterel juveniles. We do not know what reproductive rate would be required for the population to remain stable.

However our best estimates of around 14% at our site may be less than half of what is required to support a stable population. This is deeply worrying.

*Objective 2: Identifying the factors which lead to nest failure.

When a nest has been washed away, or failed through human disturbance, the evidence is most usually clear. Adding nest cameras to our research over last two seasons showed us the major cause of egg loss and abandonment - a mixture of hedgehogs and cats.

Hedgehogs are fully egg focused. They are drawn to the nest, and begin to eat. The adult dotterels work hard with a broken wing display at the nest edge which the hedgehog completely ignores. A hedgehog usually empties the nest.

What we found with the cats is a very different story. Cats visit a row of nests throughout the night, and their timing is never predictable. Some are egg eaters. However for most the egg is not the object. They appear to be checking the maturity of the eggs, and the nest is most at risk as eggs are hatching. Cats seem to have an instinct that if they wait the meal will be better. Cams have also shown cats attempting to catch adult birds. Though we have never caught the moment of death, we have clips of cats carrying adult birds away and also found adult bands in a nest. When rain saturates the pea gravel, cat tracks are clearly seen. Cats are our dominant predator and we are not yet winning the battle. *

One interesting observation is that embryos can be remarkably resilient to cooling. Adult birds will flee after the cat visit, often not returning until daylight. Last season two pair nested on a steep gravel bank. When a cat visited to check the eggs, it managed to

flick them from both nests and roll them down the hill. At dawn when the adults returned, because the eggs were scattered, each bird could only incubate one egg. I returned all eggs which were stone cold. These nests each hatched 2 chicks.

Human disturbance through unintentional trampling, beach bonfires, and vehicle damage plays a part in nest failure. However predators are three times more likely to destroy a nest. *

Objective 3: To investigate and implement mitigations so that our population is supported in successful breeding

Our first move was to set up live capture traps for hedgehogs and these have been successful. We continue to catch hedgehogs but not at high numbers. DOC has also provided trapping support in strategic areas.

Our hatch rates had become so low for the 17/18 season that we began the development of an exclosure nesting cage to keep our predators on the outside. The nesting birds took to them with barely a hesitation. Our first designs were a bit rough but we continued to finetune the grid size till we were confident animals could not penetrate the cage, while the incubating bird could freely escape, but still access the nest at will. *Where we used the cages, footage showed cats (and a night-time roving dog) visiting and completely put off by the cages. All eggs remained intact, our 6 nests hatched, *and since it is the nesting phase that is most vulnerable, each of these nests was able to fledge at least one chick. We went into the following season confident that we had a powerful tool to turn around nest failure.

We began a randomised trial to get statistical data on the cages. About a month into the trial we noticed a sharp increase in abandoned nests with eggs intact, and then the disappearance of a few well known birds. We became quickly aware that the loss of birds was associated in some way with the use of the nesting cages, and we immediately withdrew them. Because cams have never shown the moment of cat strike it's still difficult to work out exactly how this was achieved. It may have been a single jump across the cage to trap the adult as it exited. Several questions remain to be answered. Although events happened by night, in 3 out of the 4 incidences, it was the adult F who was killed. Rather than the male who would usually be incubating the nest. A single cat (one of the three we were continually seeing) had broken the code.

Nest exclosures are a tool used in huge numbers in the conservation of Piping and Snowy plovers in North America, birds very similar in size and habits to our own banded dotterel. It has been noted however that large cages are more successful than those of the size we tried, but can be associated with nest abandonment. Random adult predation is thought to still increase from their use, and there is always the potential for a single predator to learn to anticipate the departing adult and massacre a number of nests as we have seen. In our population, dotterels are as individual as people...some calm, some flighty, some open, and some very secretive. Nesting cages could potentially support pairs who have an early escape pattern when disturbed. Cats however hunt by stealth so there is still a lot of homework to do. One thing we hope to use this year is heat sensing technology, which we hope will make nest finding easier. Freed up time can be used to study patterns of disturbance. Cameras are not always a good choice for our site as they risk being stolen.

To sustain a loss of adult birds through the use of nesting cages, their use overall would need to increase the reproductive productivity by

several times. We need a huge increase in fledglings to sustain a loss of an adult bird. We lost at least 5 adults last year, 4 involving cages and one at a hatching nest. 1/5 of our pairs lost a mate. This led to nesting chaos as longterm nesting partnerships were broken. New partnerships formed and but many did not continue beyond one nest attempt. One male struggled to find a new mate though he continued to control his patch of beach. One female who lost her mate, nested with 3 more males before seeming to create a stable and workable partnership. She made a staggering 6 nests laying 17 eggs in total, hatched 3 chicks at the season's end but was unable to fledge them.

You'll be thinking have we tried to trap our cats. The answer is yes. Many different traps and baits have been trialled without success. We have been able to circulate our results to the community and research options for cat containment. Our Council has been supportive to a point, circulating brochures on responsible pet management, but until overnight cat containment becomes mandatory, and our community is a long way from this, we are unable to take out the cats at the risk of killing an owner's pet. Cat predation is also an issue for our white-fronted terns, red billed gulls, oyster catchers, Hutton's shearwaters and little blue penguins.

People's impact on nesting failure is not insignificant as people assume recreational priority on the beach. Around 14 percent of nests are damaged, usually unwittingly by people's beach activity. Many local people have asked us to mark our nests more clearly and we have trialled staking the corners with red-tips sticks. * We added nest information to the nests at the peak of the season. Marking a nest potentially makes it visible to predator birds. So far we have not distinguished this as a problem. We will follow this further next season.

With our cats still not dealt with, the season had more difficulties to come. Despite their advisors being made aware of the NZ Coastal Policy Statement which states that "adverse effects on threatened indigenous taxa must be avoided", *Council committed to setting up a freedom camping area immediately adjacent to nesting territory of around 6 dotterel pairs. What had been a largely out of the way beach area was quickly advertised on Campermate, a freedom camping app, and it proved impossible to control numbers at the site and much of their behaviour. *People tented directly besides the marked nest and by the foraging chicks. Vehicle numbers swelled to 120 rather than the 20 planned for. It was late in the season, but two stoic pairs were nesting. *Volunteers put extensive effort into protecting nests. Signs and advocacy did little to help as most people were confused and *unable to see the chicks, and there were a couple of cases of campers flying drones within the fenced off area. One of 5 chicks survived the onslaught, while another tragically died of avian pox.

*If there was a positive in this, and there was some, the opportunity for advocacy was extreme. Once the media became aware, the phone rang red hot, TV and newspaper arrived making the invisible banded dotterel a household name for a week. Priceless advocacy. Ironic that the TV presenter was herself unable to see the chicks. Fortunately the cameraman managed. The campsite is currently closed. Its future is unclear.

As pressure continues to mount on our populations of ground nesting birds we must continue to look for solutions. Despite the difficultly of acquiring data sets, robust data is needed for additional understanding of the situation and the issues. As we understand more, new solutions may present themselves. Data is essential to aid conservation and leverage against land-use change.

*It continues to be a privilege building up understanding and familiarity with the quirky banded dotterel. Though with our work we have not yet made a measureable difference to nesting outcomes, we continue to advocate strongly for dotterels within our community, to our Council through their planning process, and in our wider region. Advocacy is of course the first vital step in saving an otherwise invisible bird.