

Island Restoration News: Gough and Henderson

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Working in partnership



One may start life in the sub-tropics, the other the sub-Antarctic, but balls of fluff (a.k.a. petrel and prion chicks) are in decline on both Henderson and Gough islands due to rodent predation.

Above: A petrel chick fighting the odds against Pacific Rat predation on Henderson Island (*S. Opperl*)

Below: Prion Cave early March 2024, chock-a-block with mature MacGillivray's Prion chicks (*L. Dorman, video still*)



Welcome: The Gough Island Review

Another year, and another breeding season for Gough's MacGillivray's Prions: although we do not have a definitive figure this year (see p7), all indications are that breeding success was high, and indeed rebounded back from the still respectable 62.9% of 2022 (but that was a dip from 2021 straight after the eradication attempt) towards the 80% mark. Long may this last.

Much of our recent focus has, however, been on commissioning a series of independent reviews as to likely causes of the eradication failure and digesting wide-ranging, fair but often tough comments and recommendations.

To date, the RSPB has conducted or commissioned three programme reviews:

1. An Internal Review of the Gough Island Restoration Programme was conducted in June 2022 that covered all aspects of the programme planning, preparation and delivery, drawing upon the experiences of the programme team.

2. An Independent Review to focus specifically on the eradication operation was initiated in October 2022 and conducted by a panel of six people with varied and comprehensive experience in ecology, ecotoxicology, island restoration and rodent eradication. The 104-page final report was completed in June 2023.

3. The findings of the Independent Review were sent for discussion in July 2023 to the New Zealand Department of Conservation's Island Eradication Advisory Group (IEAG): the IEAG Review, completed in August 2023.

We are incredibly grateful to the Independent Review panel for their dedication to leaving no stone unturned, the IEAG for their continued support and counsel, and to everybody, especially our partners and funders, who continue to stick with us on the long journey to restore one of the world's greatest seabird colonies. While the initial reviews have been completed, the process is ongoing with a nascent research plan in the making (see p5) to test how eradication methodology can be improved to give a future attempt to eradicate mice (and there must and will be one!) an even better chance of success. It was never expected that any of the reviews would provide the "smoking gun" for this but that a range of possible causes would be identified that could then be examined further. The Independent Review states explicitly: "... we make a number of recommendations... we believe will both improve the likelihood of successfully eradicating mice from Gough Island in the future, and assist the broader

conservation community in other, future island eradications that are being considered."

At times this process has been uncomfortable, but we believe it has and continues to be incredibly important. The external reviews are available for those who want to delve into the details of the recommendations, but there is also a Summary of the reviews that may be more accessible to many. However, while there is no way that Island Restoration News can do justice to the detail of these reviews, the following hopefully gives some flavour of the thrust of the thinking.

The Independent Review panel ranked likely contributing factors to the eradication failure by probability, presenting justifications and interpretation for and against their findings.

The two 'high probability' factors cited were:

1. *The bait application rate*: given the high competition for bait due to the large size of House Mice on Gough and their high population density, and the competition from non-target bait consumers such as birds and invertebrates, not enough bait was available to all mice for long enough. [There was subsequent discussion as to the importance of the first bait application linked to this factor.]

2. *Bait competition*: there are three elements to this:

(i) Non-target bird uptake, likely to be high in localized areas due to high density of moorhens, removed bait faster than mice had access;

(ii) Unexpectedly high invertebrate consumption - documented consumption particularly by slugs was widespread; and

(iii) Invertebrates consumed bait, competitively excluded and/or possibly reduced palatability of bait through secretions.

Two further factors were cited in the 'moderate to high probability' bracket:

3. *Gaps in aerial baiting*: weather conditions resulted in temporal bait gaps during the first bait application; the effectiveness of the 'back baiting' undertaken (to account for mice moving into treated areas after bait had been consumed) is unknown, pilots returning with empty buckets ('false sowing') may have left potential mouse territory un-baited, while high winds may also have created undetected gaps.

continued...

The Gough Island Review continued...

4. Alternative food sources: The panel believes that the resultant higher per capita availability of alternative natural foods by the time the second (and subsequent) bait application commenced meant that bait acceptance by mice surviving the first bait application may have declined – i.e., even when bait was encountered, some mice chose to eat other food instead.

This last factor links to two perhaps interconnected hypotheses that:

- (i) some Gough mice were more habituated on protein sources i.e., seabirds; and that
- (ii) this compounded the potential lower-than-required first application bait rate (i.e., that second bait application in these circumstances is less effective).

These findings were reviewed by the IEAG. As with the findings of the Independent Review, the IEAG found no definitive answer to why the

Gough project failed but nor did IEAG unanimously agree with the Independent Review, discounting the third factor/hypothesis above that spatial gaps in bait distribution alone led to failure.

All the reviews have proposed many recommendations that need to be discussed, appraised and investigated in order of priority. To take all forward, or discount some, and particularly the wide-ranging recommendations of the Independent Review, the IEAG “recommend RSPB develop a high-level project plan which provides a process (including key decision and review steps) agreed on by RSPB and partners. Within the project plan people and resources should be identified to develop a research plan, a communications plan, a new feasibility study and ultimately a new operational plan”. This is the intention of the RSPB.

The reviews have been shared widely, and we are actively supporting the thinking around other eradication project planning, notably for Marion Island (South Africa) and New island (Falkland Islands).

Indeed, as planning for a Pitcairn-Henderson eradication attempt advances, we are mounting an expedition to the islands in June/July of this year (p9-12). Along with completing some work on the population of Henderson Rails, and continuing to engage with the Pitcairn community, we will be carrying out bait choice trials on each island. These will offer the Pacific Rats a choice between the normal bait, a protein-infused bait and a bait that is coconut-flavoured to see whether there is any marked preference displayed. Results should be available towards the end of this year, and will be made available to all who are interested.

Andrew Callender
Gough Island Restoration
Programme Executive




From the lab to the field—next steps on Gough

With the project reviews and some initial lab results now in hand, we have a clear idea of what our next Overwintering Team need to focus on. The G70 team will shift away from seabird monitoring to find out more about the mouse population that is rebuilding on the island.

Are Gough's mice more tolerant of the rodent bait than elsewhere—perhaps because of their large size? Are those rebuilding Gough's population more tolerant still? Did mice survive across multiple locations of the island, or was there an isolated pocket? Did some mice actively avoid eating bait, thereby causing the eradication attempt to be unsuccessful? Did they prefer to eat seabirds and ignore the bait? Do they breed for more of the year than previously thought? Did slugs eat so much bait there wasn't enough for the mice? Did slug secretions put mice off eating bait? The review process has thrown up a multitude of questions. We may not get the answers immediately—or indeed ever— but our G70 team will certainly add more pieces to the jigsaw.

Mice

Since the eradication operation, more than 250 mice have been sampled from the southern half of Gough Island (the slightly less inaccessible half!) and been sent away to laboratories for investigation. Subsets of these mice have undergone genetic analyses and been tested for exposure to the rodenticide.

Genetics

The genetic analyses indicate that *the mice we sampled* from Gough Island originated from an extremely small founder population—in other words, from the information we have it seems we were very close to achieving eradication. Multi-point failure, at least across the southern half of the island, currently looks less likely than first thought. There are many important caveats, of course, which mean we need to interpret findings with care for

the moment; we have never obtained any mouse samples from the northern half of the island, for example.

Obtaining northern mouse samples is now a must. There is a reason we've never managed to collect samples so far away from Base and it will be a tall ask for next year's team. But it is now clear that we really do need them. Samples from the north will help us understand the population dynamics of Gough's mice more fully and shed further light on the likely extent of survival following the 2021 baiting operation. To have been tantalisingly close to achieving eradication, whilst immaterial on one level (mice are still there and remain a threat), would have a bearing on preparations for a second attempt. It would provide confidence in our approach, whereas widespread survival calls more urgently for a return to the drawing board. That's not to say we won't be considering carefully the theories put forward by the review team. We have already been in discussion with experts on ideas such as protein fixation (first, how can we effectively test for this?) and we intend to continue these conversations going forward.

Bait residues

We ran tests on 20 mouse samples for exposure to the toxin brodifacoum. Of the larger mice (presumed at the time of selection to be survivors) all individuals contained toxin residues—two individuals at surprisingly high levels. It is possible that these two mice had consumed a lethal dose of bait and would have later succumbed to the effects of the toxicant. As brodifacoum has a delayed onset of symptoms—something

which is critical for achieving eradication—this is a distinct possibility. But alternatively, these two individuals may have been living proof of a level of tolerance within the population—something we will also look to establish with the field team next year. If the initial eradication attempt has now selected for a more tolerant population, this could require more potent bait to be used in any future operation.

Invertebrates

To our surprise, many of the soft-bodied invertebrates, that we sampled after the baiting operation, namely earthworms, slugs and snails, also contained measurable amounts of the toxicant, albeit trace amounts in many cases. In contrast, millipedes and woodlice did not—yet we know millipedes (at least) poured over the bait in 2021. Rodent bait is not believed to harm the invertebrates themselves, but in most studies invertebrates have been shown to excrete the toxin quite rapidly. Whilst this appears to have happened with some species, on the face of it the soft-bodied species appear to be different. This may have important ramifications for the planning of eradication attempts both on Gough and elsewhere and there is more to be done to understand if there are mechanisms that may be causing repeat exposure (the island's waterlogged soils?) or allowing retention of the toxicant for longer than anticipated. Much of the necessary work on invertebrates can be done from the relative comfort of laboratories, but we will also try to discern whether mollusc secretions impact on the attractiveness of bait to the mice on Gough.

Next year's Overwintering Team will need to spend more time in the rugged northern half of Gough Island to expand our understanding of the island's mouse population (*H. Greetham*)



This season on Gough

It is hard not to conclude that this must have been a frustrating season on Gough for our Overwintering Team—poor weather kept them Base-bound for significant chunks of time and thwarted efforts to complete monitoring of key species at key times. Despite these setbacks, every moment they spent in the field added more colour to the picture we are building of Gough in the early aftermath of the mouse eradication attempt.

Seabirds

Breeding success for some of our monitored species dipped slightly in the second season after the baiting operation. We feared that the dip was due to mice, and expected this to signal the beginning of a downward trend. However, Gough continues to surprise us! To date, mouse predation still appears to be limited, with evidence from just a single MacGillivray's Prion chick (reported in IRN13) and a couple of Tristan Albatross chicks. This situation may change, of course, with winter around the corner, but for some species this means yet another great year for fledging young.

MacGillivray's Prions were a matter of days away from fledging when our team had to abandon further monitoring, so we cannot obtain final breeding success figures for this latest season. However, most failures related to mouse predation appear to happen in the first few weeks of incubation and chick rearing. As such, we are reasonably confident that breeding success would have been measured back up at 82% this year, matching that of the first season after baiting, and reversing the dip to 62.9% that was recorded last year. All in all, we consider this to amount to three excellent breeding seasons for the Critically Endangered species.

The **Tristan Albatross** results cannot be directly compared to previous years either as weather precluded the end of season repeat counts at some colonies. But, from the data we do have, breeding success appears strong despite the handful of mouse-inflicted injuries documented. Across the nine sites monitored in both years, breeding success was 74.9% last year compared with 84.8% the year before. Island-wide breeding success the year before was 75.5%. Compared to the 30.2% average from the 20 years before the mouse eradication attempt, these figures indicate that the 2021 operation continues to offer much-needed respite to albatrosses.



Land birds

In the last edition of IRN we spoke of our need to get a better understanding of how the **Gough Moorhen** population was faring after the eradication attempt.

A more intensive camera trapping network was installed by the Overwintering Team and their efforts duly paid off when a family of four (two adults, two chicks) was captured wandering into the field of view (see above). The ringed adult at the front of the picture was nicknamed Mellow Yellow by the team as it had been very relaxed whilst being ringed a few weeks earlier. Next year's field team will pick up this monitoring and will hopefully find Mellow Yellow has another successful year!

In the meantime, **Gough Bunting** appears to be continuing to do well. And they even seem to be more abundant in the fern bush habitat (their presumed preference) since the eradication attempt. It will be interesting to see if, over time, they are forced once more to retreat to the uplands where mice are expected to be less abundant.

Invertebrates

Whilst trekking out to check on albatrosses, Lucy and Hannah discovered the **moth** *Eudocima apta* (described from South America) on the Tafelkop Path. Its bright orange underwings with striking black dots were in stark contrast to the normal greens and browns of Gough's vegetation.

Interestingly, the species was found during the 1955-6 Scientific Survey, but we are not aware of further records from the island.

We have long been concerned about the possibility of local lepidoptera extinction on Gough due to mouse predation, and were looking forward to seeing more of the flightless moths *Dimorphinoctua goughensis* and *Peridroma goughi* after the eradication. Perhaps the team's exciting find signals respite from mouse predation across Gough's understudied invertebrate assemblage, too?

Above: Field cameras pick up a pair of Gough Moorhens and their chicks

Left: A Gough Bunting looks out across a glorious day on Gough Island (*H. Greetham*)



Pitcairn ponders a rodent-free future

There are benefits to tackling the rats on Pitcairn Island at the same time as an eradication attempt is mounted on Henderson—these include a better quality of life for Pitkerners, reducing the likelihood of rats being accidentally reintroduced to Henderson in future, and significant cost savings over mounting separate operations. But there are, understandably, many questions Pitkerners want answered before making a decision on the future of their islands.

RSPB secured Darwin funding to explore the wishes of the Pitcairn Island community with regards to eradication programmes on both Henderson and Pitcairn islands. Without the explicit approval of Pitcairn Island, neither eradication operation will proceed—but with community backing, the Pitcairn Islands could become the first rodent-free UK Overseas Territory.

In January 2023 RSPB began community consultation in earnest, with a bespoke visit to Pitcairn to gather questions, fears and ideas from those living on the island about what eradication would mean both for the island as a whole as well as for individual households.

Rodent eradications are increasingly being attempted on inhabited islands, but to succeed they require everyone to be on board because everyone will need to make adjustments, be it in the way their household waste is managed, how their pets are looked after whilst bait is being laid, or how they store their food.

Along with many 'standard' questions, typical of any community facing the prospects of such a profound conservation intervention, there were also some unquestionably Pitcairn concerns, such as whether the island's oldest inhabitant, Mrs T, a Galápagos Giant Tortoise taken to the island almost 90 years ago, would be at risk

and how she would be kept safe. (We have a plan!)

In October 2023, armed with answers, ideas and some questions of his own, eradication expert Pete McClelland together with a small RSPB team returned to the community to continue these discussions. At this stage we are content that nothing insurmountable has been identified by either the local experts nor the eradication experts! There are many more discussions still to be had but by early next year we hope the community will be in a position to decide whether or not they wish us to proceed with planning for a joint Pitcairn-Henderson rat eradication.



A tale of two reptiles—Below left: Special measures will be required to keep Pitcairn's famous resident reptile safe. Meanwhile (below) island eradications are known to benefit not only the terrestrial ecosystem but the surrounding seas too, which, for the Pitcairn Islands, includes Endangered Green Turtles.

Above: Masked Boobies on the shores of Henderson Island—the species should also benefit from rat eradication (All images: *D. KinchinSmith*)



Pitcairn and Henderson Island fact-finding expedition

Later this year a team will set sail for the Pitcairn Islands to try to fill gaps in our knowledge that will aid with Pacific Rat eradication planning and ultimately community decisions to press ahead or stop. There are significant knowledge gaps on both islands, even though Pitcairn is inhabited whilst most of uninhabited Henderson Island is completely inaccessible.

Knowledge gaps such as: precisely which species of crabs are present, and where, and in what numbers? Crabs are attracted to rodent bait and their consumption of it can cause all sorts of difficulties for eradication planners—not because they are affected by it themselves, but because they can eat it so quickly that it can be hard to ensure there’s enough left for rodents come dusk when they start to look for food.

Although many tropical islands have been cleared of rats despite the presence of crabs, and whilst crabs were not thought to have caused problems to the Henderson operation last time around, it has been 15 years since the last eradication attempt was planned and much can change

over that timeframe. We want to be confident that the crabs remain largely around the beach areas of the island and that there aren't too many more of them compared to last time. Any significant changes will mean we have to carefully revisit baiting plans to take account of the changed situation on the ground.

We also want to see if the rats have a particular preference for one type of bait over another. We need to identify an incredibly attractive bait that all rats will eat, even if other natural foods are available on the island. We hope to test four non-toxic bait types on the island and, using cameras, establish which is most attractive to Henderson’s rats as

preference can change from one island to the next.

The team is also setting out to learn more about the Henderson Rail population—we know it recovered well from the eradication attempt in 2011 but have little idea of whether the population is currently stable, nor how big it is. We need more information to help us plan the care of a safeguard population during any future eradication operation.

All this sounds relatively straightforward but on Henderson it is not likely to be. First, the team will actually have to land themselves and all their gear there—this will be no small feat and we will be depending entirely on the skills of

Pitkerners who know the reefs surrounding the island, and how and when they can be crossed with least trouble. Once ashore the team will face impenetrable vegetation with razor sharp coral underfoot and no natural supply of freshwater. The team will have about 8 weeks to learn as much as possible before leaving the island. They will leave behind a temporary weather station; given the high likelihood that a drought breaking contributed to the 2011 eradication failure, it is vital we gain a better understanding of typical weather patterns and explore the potential to predict accurately the island’s weather.

Meanwhile, another expert team will be based on Pitcairn Island where they will undertake similar bait preference trials. Other trials designed to feed in to operational planning, including setting the rate for baiting, were undertaken in 2023 but following some unusual results (extremely



variable rates of non-toxic bait consumption) this work will need to continue during the 2024 expedition.

All findings will be fed back to the Pitcairn community to help them make an informed decision on further eradication work.

Above: Murphy’s petrel—only around 1 in 6 chicks survive to fledge on Henderson as rats eat many chicks. Their numbers have doubled on neighbouring Oeno following rat eradication (S. Opperl)

Below: Henderson petrel flying above Henderson’s largely impenetrable vegetation (S. Opperl)



Ferretting out the last of Rathlin Island's ferrets

The quest to remove feral Ferrets and Brown Rats from Northern Ireland's only inhabited islands is well underway. Anna Feeney shares the latest from the island as Team Ferret starts to transition into Team Rat, taking their hard-earned experience with them into one of the largest ground-based rodent eradications ever attempted.

The LIFE Raft project, led by the RSPB in partnership with the Rathlin Community, aims to protect Northern Ireland's most important seabird colony on Rathlin Island from invasive non-native species.

Brown Rats and Ferrets have been preying on seabirds for decades, causing them to retreat further and further down the cliffs to find somewhere safe to nest. Internationally important numbers of Guillemots are in danger, as are hundreds of Atlantic Puffins and other seabirds. Last year only one in three of Rathlin's Atlantic Puffin chicks survived long enough to leave the nest.

Rats and ferrets also cause problems for the 160 people living on Rathlin. Ferrets make it almost impossible to keep poultry, while rats nibble through wires, are a pest to

farmers, and are a potential spreader of disease.

In October 2023, after years of planning, the operational phase began with the opening of over 500 ferret traps. There was one trap every 500m spread the whole way across the island—across farms, down cliffs, and over bogs.

Opening them was of course a tremendous physical feat for the fieldworkers, but it was also a culmination of many months (and even years, in some cases) of work from those focusing on community engagement and socioeconomic benefits, eradication science, installing kilometres of traverse lines into cliff climbs, and the logistical feat of getting dozens of people and tonnes of equipment to and from Rathlin.

As of spring 2024, the project is cautiously optimistic that there are, at most, a very small number of ferrets left. Intensive monitoring is underway, using everything from detection dogs to trail cameras, and even thermal drones.

In autumn 2024 the project will begin the rat eradication phase. It won't be possible to determine whether the rat phase has been successful until the end of 2026 at the earliest, but it is possible that in just a few short years Rathlin Island will be a safe haven for seabirds. If successful, this will be the first ever island-wide feral ferret eradication in the world.

For updates, please visit Rathlin360.com



NORTHERN IRELAND



Opposite: Atlantic Puffins are now listed by the IUCN as Vulnerable to extinction. The eradications on Rathlin Island should allow the birds to return to their old colonies (*Andy Hay rspb-images.com*)



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Contact

If you would like further information about the Gough and Henderson Island Restoration Programmes, please contact

Sophie Thomas RSPB, Seabird Island Restoration Project Manager

Email: goughisland@rspb.org.uk

Tel: + 44 (0) 7540 121465

www.goughisland.com

@goughisland

www.rspb.org.uk

Cover image: Gough Island supports 80% of the world's breeding Southern Elephant Seals (*M. Risi*)



The RSPB is a member of BirdLife International, a partnership of conservation organisations working to give nature a home around the world.