

HIHI CONSERVATION 2017



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WE CAN SAVE THE HIHI WITH YOUR HELP!

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if you are interested in sponsoring hihi recovery.

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REPORT PUBLISHED BY



Department of Conservation
Te Papa Atawhai

ZSL
LET'S WORK
FOR WILDLIFE

WHO WE ARE

Hihi have been actively managed since 1980 with a strong focus on protecting the existing populations and using reintroduction to increase the species range and global population size. In the early years of this recovery project the majority of work was undertaken by the New Zealand Wildlife Service and then Department of Conservation (DOC). More recently conservation has been increasingly undertaken by non-government organisations including community run conservation groups and research institutions in collaboration with DOC. Representatives from across these organisations collectively make up the current Hihi Recovery Group (HRG).

The HRG works towards an agreed set of objectives and provides advice to requests for information, management guidance and recommendations. Its membership includes all site biodiversity managers so that management guidance can be shared and directly implemented in a way that is tailored for site-specific needs and with a national recovery focus at its basis. Right from the earliest translocations of hihi, there has been an involvement of research. This partnership has developed so that most forms of management are underpinned by research, and changes to management practice are monitored to determine how the change affects the population.

OBJECTIVE	MEASURE	UNITS OF MEASURE
Increase number of hihi	Populations Population size	Number Number
Increase the degree to which the ecological setting of hihi is natural	Sugar water (min) Nest boxes (min) Percentage of rare alleles maintained (max) Presence of non-native disease causing agents (min) Presence of non-native predators (min)	Litres / bird / year Number / bird / year Percentage of alleles Number Number
Reduce cost	Value of management effort	Dollars / year
Increase public appreciation	Visitors to hihi sites Hihi volunteers News / magazine articles Scientific publications	People / year People / year Number & readership Number

THANKS FOR OUR NATIONAL SPONSORSHIP FROM



THE HIHI

He manu ririki te Hīhī e noho kau ana i ngā ngahere o Niu Tīreni. I tēnei wā tonu, ka whakarōputia te manu Hīhī he manu mate haere ki tō te rautaki 'Threat of Extinction' o Te Papa Atawhai.

I mua i te taenga mai o tauwi mā, ka rere whānuitia te Hīhī ki Te Ika a Māui whānui me ōna moutere. Heoi, i te paunga o te rautau tekau mā iwa, ka noho motuhake aua manu rā ki Te Hauturu o Toi. Nō te taenga mai o ngā kararehe tauhou, o te mate manu, me te muru kohanga, ka mate haere te Hīhī.

Mai rā anō ko te Hīhī he manu kaikai miere (te whānau manu o Meliphagidae), he whanaunga pātata ki te komako me te tui. Ahakoa tonu, he tūhuratanga anō tā te aronui 'Phylogenetic', he manu motuhake te Hīhī, ā, he tātai anō tōna ki tōna ake whānau, arā ko te 'Notiomystidae'.

He rerekētanga motuhake tōna, arā, ka mahi ai te Hīhī kanohi ki te kanohi. He rerehua te tame o tēnei tū manu, he pango, he kowhai tea, he mā ōna tae. Kāore i te pērā te uha o tēnei manu, ka mau i a ia te kākāhu parauri, me ōna neko mā kei ōna parirau.

I te tau 1980, ka timata te mahi atawhai mō te Hīhī, nā wai nā wai, atu i Hauturu, e rima ngā wāhi whakamarumaruru anō hei kāinga mō te Hīhī. Nā te mahi atawhai, ka nui haere te maha o ngā Hīhī, ahakoa tonu, he manu mate ā-moa tonu. Ko ngā kararehe kaikai manu, ko te mate manu, ko te korenga o te ira whakaurutau, me te rāweke kāinga ngā āhuatanga e whakararu ana i te orangatonutanga o te Hīhī.



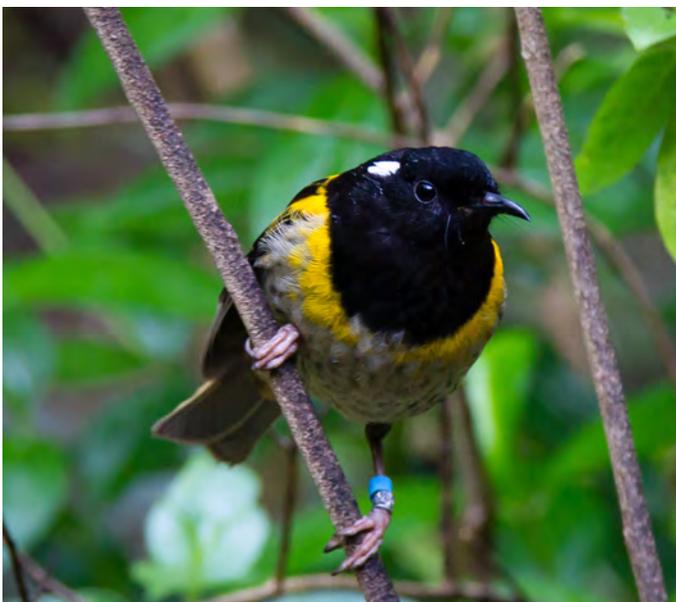
The hibi are a small (30 – 40g) forest dwelling passerine endemic to New Zealand. At present the species is classified as nationally vulnerable under the Department of Conservation's 'Threat of Extinction' system.

Pre-European times the species was distributed throughout the North Island and its offshore islands. However, by the end of the 19th century the only population that remained was that on Hauturu-o-Toi. The disappearance of the hibi was most likely due to introduced predators, habitat loss and disease.

The hibi was long considered to be a honeyeater (family Meliphagidae) closely related to bellbirds and tui. Phylogenetic analysis, however, has revealed that it is taxonomically distinct from this lineage and has been subsequently placed as the sole member of its own family, the Notiomystidae.

The species is also behaviourally unique, being the only known bird to copulate face to face. The males are one of New Zealand's most strikingly coloured birds with black, bright yellow and white plumage. Females are a less conspicuous brown colour but also with bold white wing bars.

Management of the species began in 1980 and there are now five reintroduced populations spread across northern New Zealand in addition to its remnant population on Hauturu. Under intensive management the hibi has been steadily increasing in numbers but is still at risk of extinction. Introduced predators, disease, the loss of genetic diversity and environmental disturbances continue to pose a risk to the long-term viability of the species.



CURRENT POPULATIONS

Since 1980 translocation has been used to establish and maintain populations. The Hauturu population was used at first to harvest individuals, but after a population on Tiritiri Matangi Island was established this became the source for many translocations. Currently six wild populations exist throughout New Zealand. Hihi populations are actively managed. Management actions include non-native predator

control, supplementary feeding, provision of nest boxes, management of parasites, and monitoring population demography. The success of the conservation strategies employed by the recovery group can best be seen by the steady increase in both the total population size over the past 10 years and the growing number of hihi populations (Figure 1).

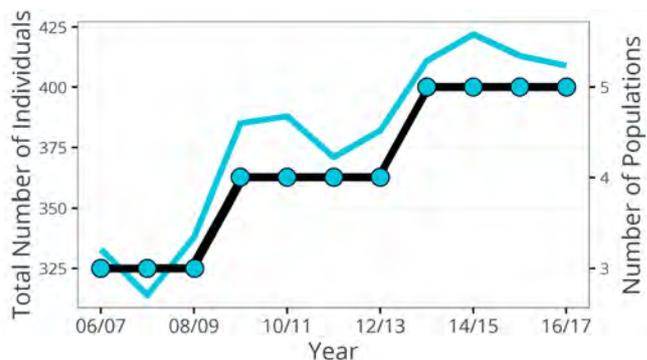
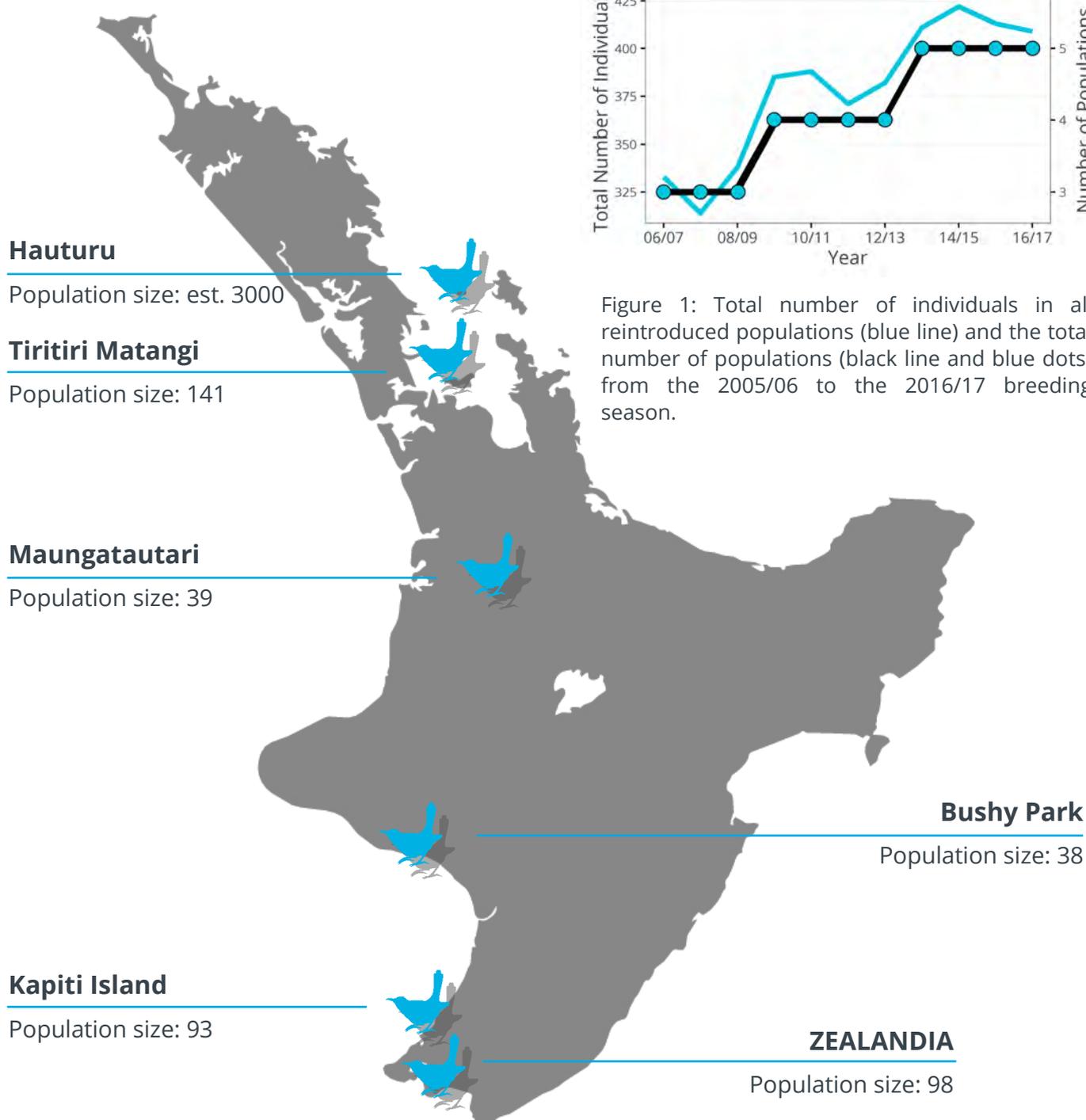


Figure 1: Total number of individuals in all reintroduced populations (blue line) and the total number of populations (black line and blue dots) from the 2005/06 to the 2016/17 breeding season.

TIRITIRI MATANGI



NEWS

The Tiritiri Matangi Island hihi population is open for business once again. Through careful management and a decision not to translocate hihi from Tiritiri Matangi in April 2016 we have grown the population by an additional 10 breeding females. This, combined with a good 2016/2017 breeding season, means that the recovery team has given a green light to use the population as a source for translocation.

At the time of writing this annual review all planning and permitting is in place to take hihi from Tiritiri Matangi to Rotokare Scenic Reserve, in the Taranaki region of New Zealand. We are optimistic that this translocation will be successful and we will share regular updates with you during and following the move.

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BACKGROUND

Tiritiri Matangi Island is a wildlife sanctuary and one of New Zealand's most exciting conservation projects. The island was stripped of nearly all its native bush following human occupation. Thanks to restoration efforts, approximately 60% of the island is now covered in native bush. All mammalian predators have been eradicated and the island is now home to native birds, reptiles and invertebrates.

Tiritiri Matangi is frequently used as the source for hihi translocated to other sites and continues to be the focus of many research projects that contribute to our knowledge on the species. Of the 38,000 plus people who visit the island every year over 6,500 are school students. Our Growing Minds programme funds 1200 students from low decile schools who wouldn't otherwise have the opportunity to visit the island. The project is managed by the Department of Conservation in partnership with the Supporters of Tiritiri Matangi Incorporated.



PERFORMANCE



141 adults in the population



151 fledglings produced



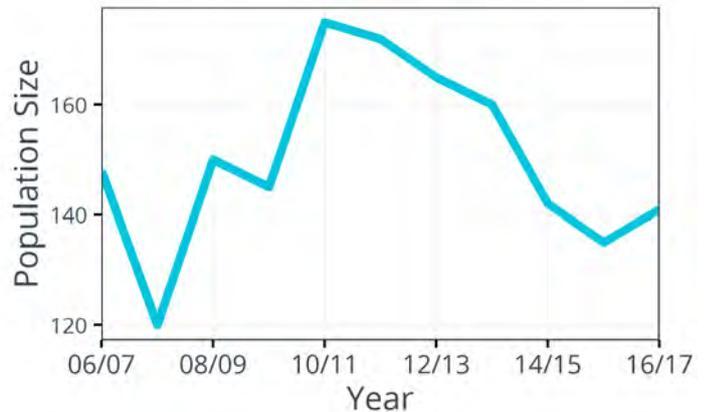
8623 litres of sugar water provided



98% of females using nest boxes



38665 visitors to the site



Following another year without harvesting we have seen an increase in the breeding population, including 10 additional breeding females. These birds are enjoyed by a growing number of visitors. Over 38,000 this year including a highly successful focus on school groups (over 6500 students). The New Zealand school curriculum is delivered using hihi as a focal example.

KEY FACTS

Island size : **2.2 km²**

Restoration started: **1984**

Mammalian predator free since: **1993**

Hihi reintroduced: **1995 (then 1996 and 2010)**

Community group: **Supporters of Tiritiri Matangi**

Site page: **www.tiritirimatangi.org.nz**



ZEALANDIA

BACKGROUND

Located just 10 minutes from downtown Wellington, ZEALANDIA is the world's first fully-fenced urban eco-sanctuary, with an extraordinary 500 year vision to restore a Wellington valley's forest and freshwater ecosystems as closely as possible to their pre-human state.

The eco-sanctuary is a groundbreaking conservation project that has reintroduced 18 species of native wildlife back into the area, 6 of which were previously absent from mainland New Zealand for over 100 years.

The 225 ha sanctuary valley is fully enclosed by an 8.6 km fence that excludes 14 types of mammalian pest, and has seen huge success over the past 20 years thanks to dozens of community groups, hundreds of volunteers, thousands of members and millions of donations and funding.



NEWS

This year saw a small decrease in hihi numbers with three fewer individuals recorded than for the previous year. Whilst the number of males increased slightly, female numbers were down resulting in a corresponding reduction in the number of nests completed, eggs laid and fledglings produced. Despite these reduced numbers and some early nest failures due to unseasonal weather events, the percentage of successful nests was significantly higher than recent seasons.

Throughout the year the use of supplementary feeders by hihi was significantly lower than in previous years, but due to a prolonged flowering and fruiting season hihi were regularly observed throughout the valley feeding on natural foods. Natural nests have once again been a feature, with unbanded juveniles appearing at the feeders. To date, however, the location of the first natural nest has remained elusive. This increased use of natural food sources and nest sites is a small yet encouraging step towards the goal of a self-sustaining natural population.



PERFORMANCE



98 adults in the population



87 fledglings produced



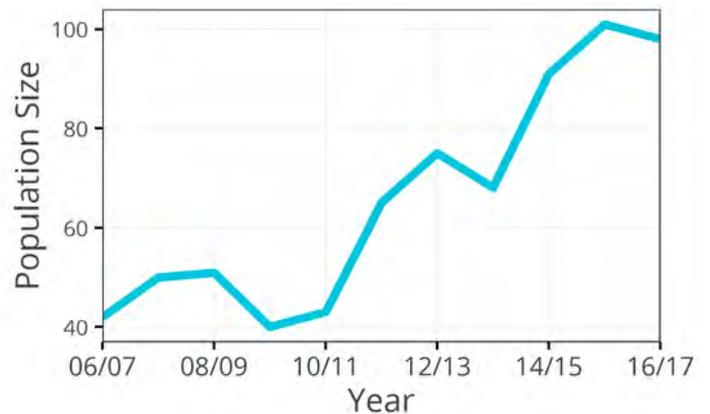
1000 litres of sugar water consumed



7% of females using natural nests



126,000 visitors to the site



The ZEALANDIA population decreased slightly from the previous year's high. Despite this dip and a lower number of females breeding, nesting success rates showed an improvement over recent seasons. More females used natural nesting sites and the number of fledglings from these sites continued to increase.

KEY FACTS

Total area : **2.25 km²**

Restoration started: **1995**

Length of fence: **8.6 km**

Hihi reintroduced: **2005**

Site page:

www.visitzealandia.com



KAPITI ISLAND



BACKGROUND

Kapiti Island is one of New Zealand's oldest protected areas, with most of its landmass being gazetted as a Nature Reserve in 1897. It is located 5.5 km off the west coast of the lower North Island, is 1965 ha in size and 521 m at its highest point.

The island was largely cleared for farming in the 1800s but has been naturally regenerating since. Possums and rats were eradicated by 1997 leaving the island free of introduced mammalian pests. Following a stoat incursion in 2010 the island was once again declared 'introduced predator free' in January 2013.

Hihi were first transferred to Kapiti in 1983 and favour the area of the island within two major catchments that descend from the summit, as these areas have the highest plant diversity, rainfall, and many of the island's larger trees and old growth forest which offer nesting cavities.

NEWS

This season was an interesting one on Kapiti as the island experienced the wettest spring in the last five years, and also endured very unsettled weather through summer. Female numbers at feeding stations reduced dramatically part way through the pre-breeding census in October, suggesting that breeding may have begun earlier than in previous seasons. Breeding success seemed to be steady, but catching and banding of birds proved challenging so a large banding effort at the beginning of the 2017/2018 season will be required to determine the number of fledglings produced.

In November 2016 a group of local iwi rangatahi/ youth and some young birders from BirdsNZ visited the island for a conservation skills weekend. They undertook many tasks, including five minute bird counts, how to read band combinations and were also shown hihi banding in action. It was fantastic to have an injection of youth to the island and to be reminded of how lucky we are to work in such special places. No doubt some budding young conservationists left the island at the end of the weekend!



PERFORMANCE



93 adults in the population



Number of fledglings unknown



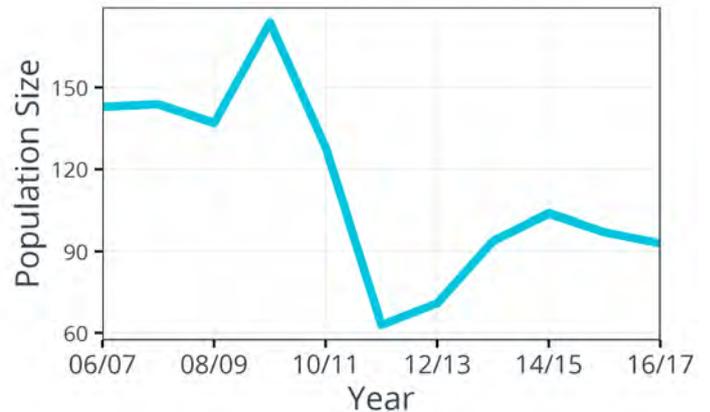
3484 litres of sugar water provided



0% of females using nest boxes



7500 visitors to the site



The hibi population on Kapiti has risen and fallen over the years as management structures have changed. Currently the population is holding steady slowly following an increase in supplementary feeding amounts and changes to feeding station locations in 2013.

KEY FACTS

Total area : **19.65 km²**

Restoration started: **1897**

Mammalian predator free since: **1997**

Hihi reintroduced: **1983 (then 1985, 1990, 1991, 1992, 2002 and 2010)**

Site page: www.doc.govt.nz/parks-and-recreation/places-to-go/wellington-kapiti/places/kapiti-island-nature-reserve/nature-and-conservation

BUSHY PARK

BACKGROUND

Bushy Park is a 98 ha conservation area situated 24 km northwest of Whanganui on the North Island's south coast. It comprises 87 ha of mature lowland temperate forest, with tawa, pukatea northern rātā, rimu and rewarewa predominant and 11 ha of gardens and pasture around a historic Edwardian-era homestead.

It was bequeathed to the Royal Forest and Bird Protection Society in 1962 by the late G.F. Moore, a prominent Whanganui farmer. Stewardship of the area was then ceded in 1995 to the Bushy Park Trust. Protected from major disturbance for over 100 years, the forest is a prime example of an intact forest ecosystem.

Predator control was achieved in 2005 following construction of a predator-exclusion fence around the forest. This has allowed successful re-introductions of North Island robin, tīeke and hihi.



NEWS

Compared with 2015/16, when 48 chicks fledged, breeding during 2016/17 was more constrained. We had 16 confirmed nesting attempts, nine of which were successful. Overall, 31-33 chicks fledged, the range reflecting uncertainty in the number coming from undiscovered natural nests; 26 chicks fledged from nest boxes. One 4 year old bird, the last female remaining from the original release, successfully bred three times in 2016/17, rearing 10 chicks and bringing to 33 the total number fledged in 11 nesting attempts. She has been paired with the same male throughout. With 82% of the adult population originating from just three females, the risk of inbreeding is increasing, as shown by one female that paired with a previous season's offspring.

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PERFORMANCE



38 adults in the population



33 fledglings produced



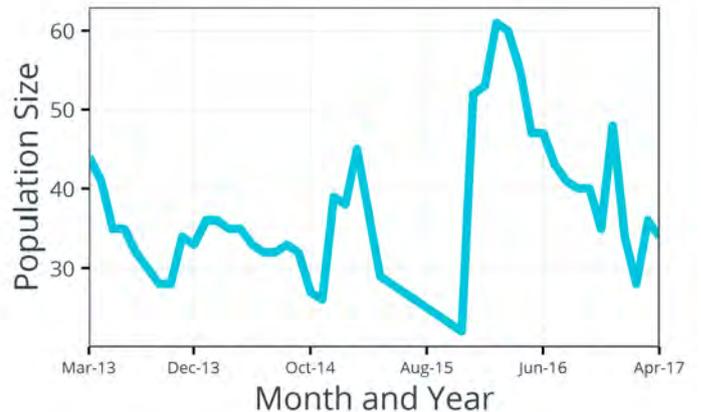
306 litres of sugar water provided



72% of nests in nest boxes



2500 visitors to the site



Although hiihi numbers at Bushy Park show little overall change, the number of females present at the start of each breeding season has increased steadily, from 7 in 2013/14 to 16 in 2016/17. Productivity in 2016/17 was less than in 2015/16, probably reflecting the wet and windy weather experienced throughout much of the breeding season.

KEY FACTS

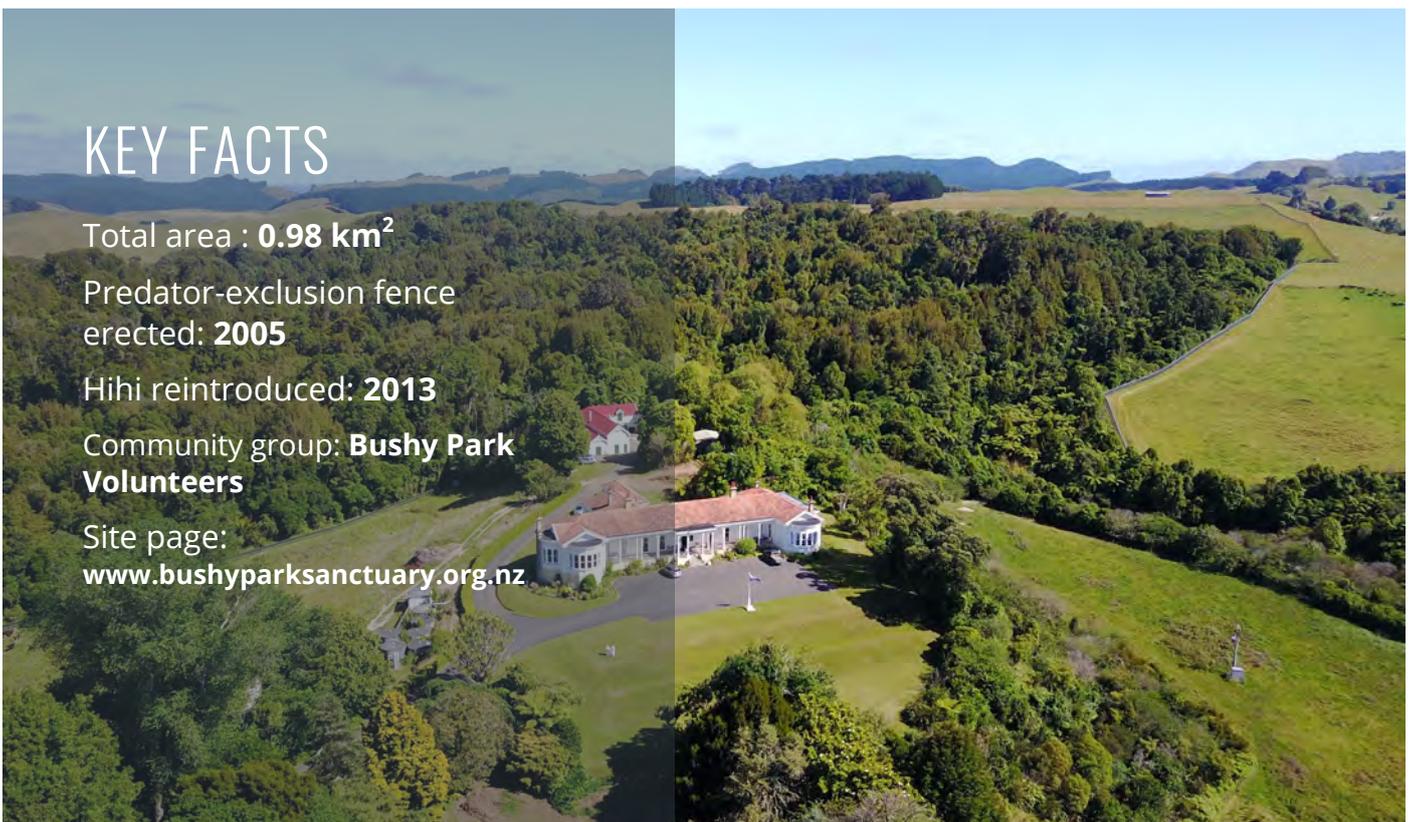
Total area : **0.98 km²**

Predator-exclusion fence erected: **2005**

Hiihi reintroduced: **2013**

Community group: **Bushy Park Volunteers**

Site page:
www.bushyparksanctuary.org.nz



MAUNGATAUTARI

BACKGROUND

Sanctuary Mountain Maungatautari is a mainland ecological island located nearby Cambridge in the North Island of New Zealand. Maungatautari Mountain was first made into a reserve in 1912 after the wildlife service survey found the forest to be of high significance.

Surrounded by the world's longest pest-proof fence at 47 km, the fence encloses 3,400 ha of habitat on the mountain. The fence prevents all mammalian pests, pets and livestock from getting over, under or through it and onto the mountain. Fourteen mammalian pests have now been eradicated from inside.

Maungatautari's ancient forest offers a sanctuary for populations of many of our most endangered species – from birds to bats, frogs to reptiles, tuatara to giant weta.



NEWS

The monitoring of the hihi population at Maungatautari is more difficult than at other sites because of the size and extent of the mature forest. Although it is these challenging conditions that we expect to make an ideal habitat for the birds. This year the population of hihi has at least 28 males and 11 females. Our monitoring suggests the population is holding about steady but is small. We are currently working to understand why the population isn't growing.

Recent research findings show that, despite a more mature and diverse forest, reproductive success is highly influenced by access to supplementary food (see research highlights). This mirrors findings across reintroduced hihi populations. These monitoring insights have been made possible from essential funding support to Maungatautari Ecological Island Trust by DOC's Community Conservation Partnerships Fund.

PERFORMANCE



39 adults in the population



Number of fledglings unknown



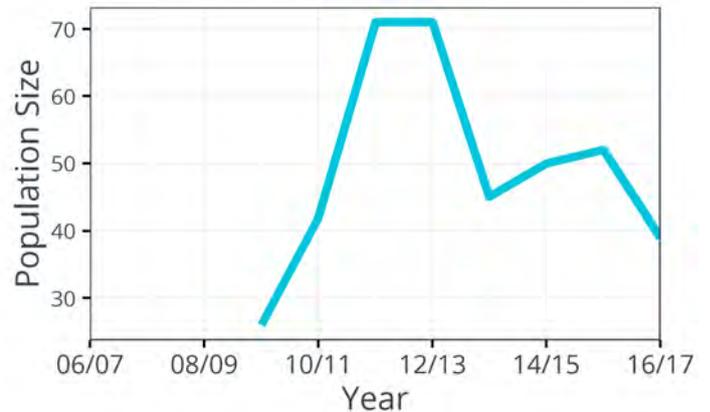
100 litres of sugar water provided



0% of nests in nest boxes



12000 visitors to the site



This graph shows only raw counts of the minimum number of hibi found in the pre-breeding season. Maungatautari is a difficult site to monitor because of its size and terrain. The challenge for us and a great result for the birds is that they nest in natural cavities and many don't use supplementary feeders. This means we can't easily catch and put colour bands on them to know who we are counting.

KEY FACTS

Total area : **34 km²**

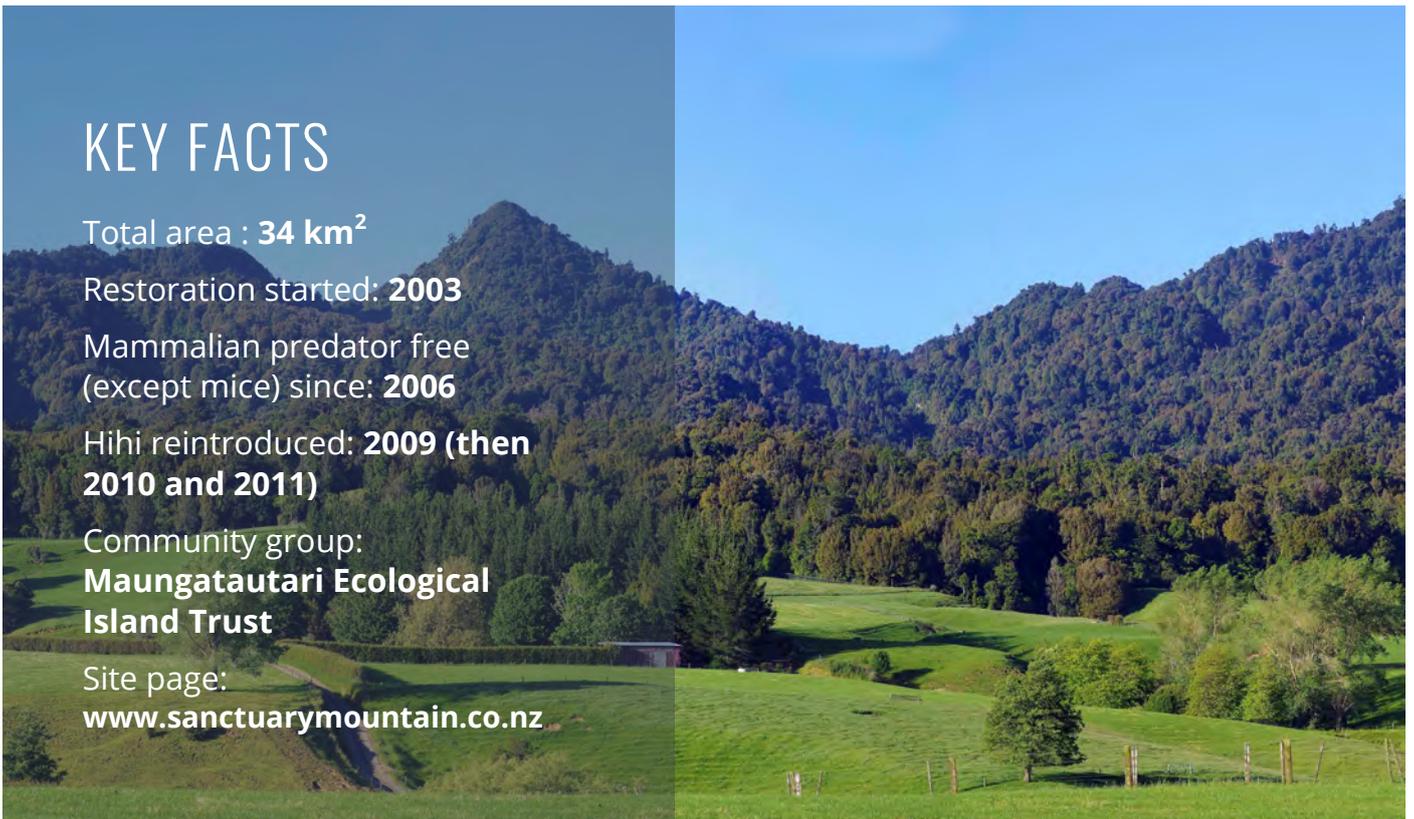
Restoration started: **2003**

Mammalian predator free (except mice) since: **2006**

Hihi reintroduced: **2009 (then 2010 and 2011)**

Community group:
Maungatautari Ecological Island Trust

Site page:
www.sanctuarymountain.co.nz



HAUTURU

BACKGROUND

Located 80 km north-east of Auckland, Hauturu or Little Barrier is described as "the most intact ecosystem in New Zealand". Established as a nature reserve in 1895, it is considered to be one of the most important reserves of its kind in the world. Entry is strictly by permit only.

The island is managed in partnership between Ngati Manuhiri and the Crown, by the Auckland region of the Department of Conservation. Hauturu is an iconic site for Ngati Manuhiri and is of cultural, spiritual and historic significance. The island's name comes from its highest point "the windblown summit of Toi".

Hauturu's 3,083 hectare landmass makes it one of New Zealand's largest offshore island reserves. It is home to a greater number of endangered birds than any other island in the country, two species of bat, an endemic giant weta, reptiles that include the northern tuatara, and over 400 species of native plants.



NEWS

This is our only natural population of hihi and it is therefore of incredible importance. The recovery group is interested in learning more about the population so that we can protect it and make best use of it in the national recovery of the species.

This year we begin a study to help answer an important management question. How connected is the hihi population across the island? If connected we have a more simple job if we would like to move hihi to other sites for genetic management (inbreeding and genetic drift). In contrast, if the population is divided then we may not be representing the available genetic diversity of hihi in our current translocation approach. This would mean careful planning to correct any current missing genetic diversity in reintroduced populations and a different approach to any future sites we establish. This work is made possible because of funding support provided by The Little Barrier Island (Hauturu) Supporters Trust.



PERFORMANCE



3000 adults estimated in the population



Number of fledglings unknown



No sugar water provided



No nest boxes provided



228 visitors to the site



KEY FACTS

Total area : **30.83 km²**

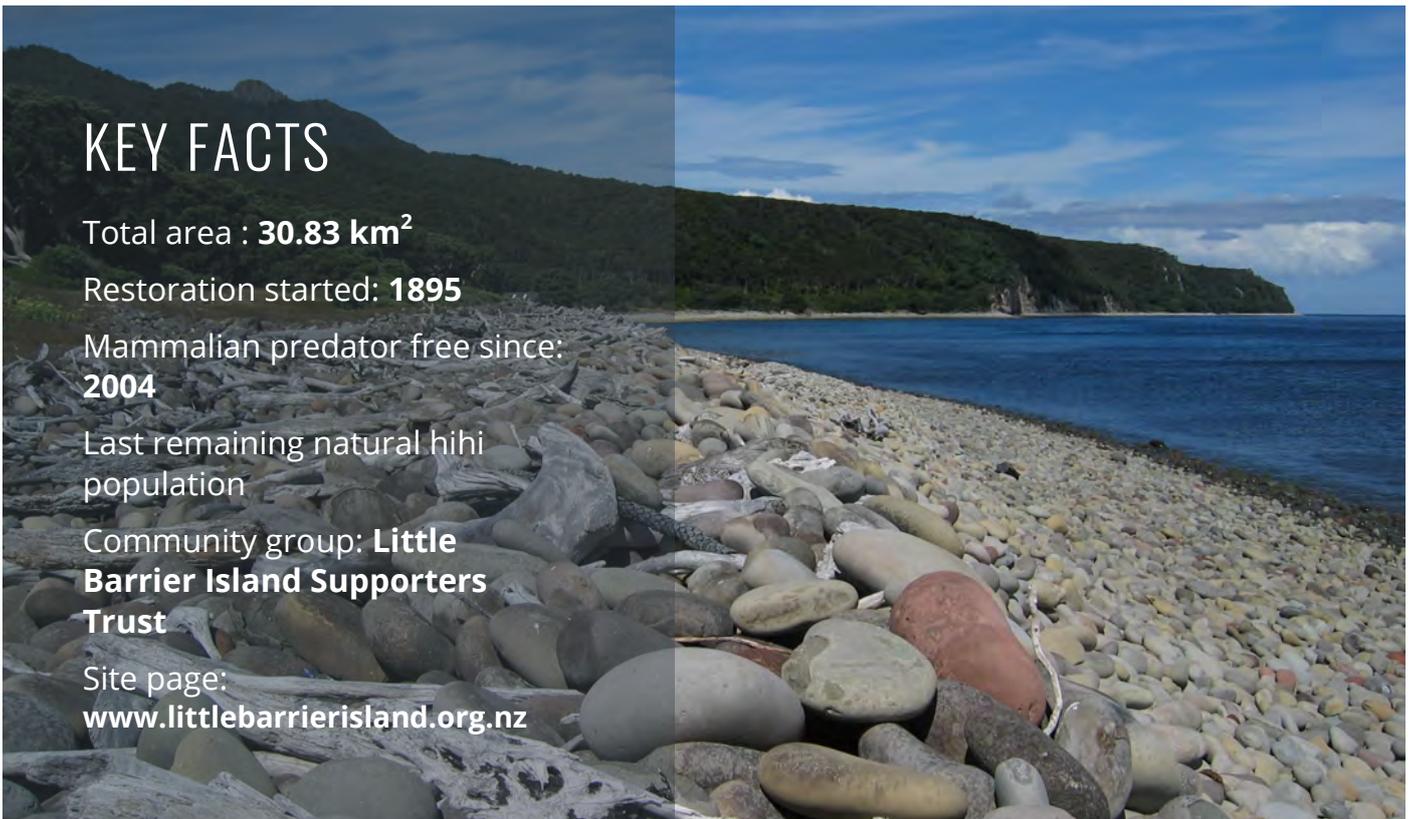
Restoration started: **1895**

Mammalian predator free since: **2004**

Last remaining natural hihi population

Community group: **Little Barrier Island Supporters Trust**

Site page:
www.littlebarrierisland.org.nz



RESEARCH HIGHLIGHTS

Hihi conservation is supported by a range of academic partners integrated within the recovery group. Academic partners help provide the evidence and specialist tools needed to guide hihi management

DISEASE RISK ANALYSIS FOR TRANSLOCATION OF HIHI TO BUSHY PARK

Hihi conservation relies heavily on establishing new populations via reintroduction and then periodically supporting these with additional birds (e.g. for genetic management). In each case it is important to recognize that these movements can include the host and all of its associated parasites. Every move therefore creates disease risks to the individual hihi being moved, to hihi that may already be at the release site and to other species at the release site.

Toni Dalziel and colleagues explore alternative methods to assess disease risks using the recent translocation of hihi from Tiritiri Matangi to Bushy Park. Each method produced slightly different risk outcomes and justifications for these. Toni's paper provides insight into the pros and cons of the current qualitative disease risk analyses. This is important as reintroduction practitioners grapple with the conservation gains of using translocation and the unavoidable (disease) risks they involve.

REFERENCE

Dalziel, A.E., Sainsbury, A.W., McInnes, K., Jacop-Hoff, R. & Ewen, J.G. (2017) A comparison of disease risk analysis tools for conservation translocations. *Eco-health* 14 Supplement 1: 30-41.

OFFSPRING SEX RATIO AND HATCHING ASYNCHRONY ON TIRITIRI MATANGI

Unfortunately, it is unlikely that all eggs laid by hihi go on to generate new recruits for the population. It remains unknown why some chicks die when their siblings survive to fledge the nest. Environmental conditions might alter the breeding behaviour of the parents. Understanding links between the environment and hihi chick survival may help to improve population growth.

Kirsty Macleod and colleagues used a supplementary feeding experiment to test if one biochemical influences hihi parenting. Carotenoids are important for maintaining health, but also provide the ingredients for hihi males' bright yellow feathers. Mothers with better access to carotenoids might consequently produce more sons, or it might help improve chick health and survival. While the experiment suggested no changes in sex ratios, it did reveal that hihi mothers' behaviour during egg laying has consequences for chick survival.

REFERENCES

MacLeod, K.J., Brekke, P., Tong, W., Ewen, J.G. & Thorogood, R. (2016) Do mothers bias offspring sex ratios in carotenoid-rich environments? *Behavioral Ecology* 28: 131-137.

MacLeod, K.J., Brekke, P., Ewen, J.G. & Thorogood, R. (2016) Minutes matter: brief hatching asynchrony adversely affects late-hatched hihi nestlings, but not life beyond the nest. *Animal Behaviour* 119: 111-118.





SUPPLEMENTARY FEEDING IMPROVES PRODUCTIVITY AT MAUNGATAUTARI

Supplementary feeding is the key form of support provided to establishing hihi populations following their translocation to new sites. In many cases this commitment continues in the long term to support as large a population as possible, or one that can then cope with frequent harvesting. A key example is 22 years of supplementary feeding hihi on Tiritiri Matangi and being able to use this as a source population for translocation.

In 2009 the first hihi were reintroduced to Maungatautari. It is hoped that this site will support a large hihi population without intensive management, including supplementary feeding. Lydia and colleagues compare the reproductive success of female hihi that use supplementary food to those that don't and reveal one possible reason for this. Counter to our predictions we find that non-feeder using females have a much lower reproductive success.

REFERENCE

Doerr, L.R., Richardson, K.M., Ewen, J.G. & Armstrong, D.P. (2017) Effect of supplementary feeding on reproductive success of hihi (stitchbird, *Notiomystis cincta*) at a mature forest reintroduction site. *New Zealand Journal of Ecology* 41: 34-40.

HIHI TEMPERAMENT AND DISPERSAL AT MAUNGATAUTARI

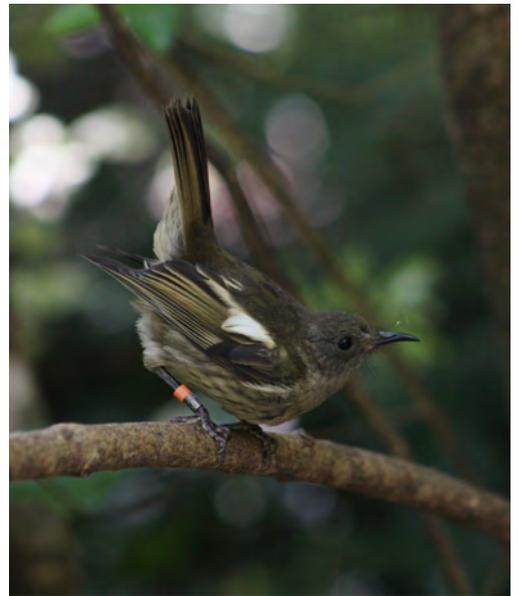
Over recent years there has been a growing realisation that individual differences in temperament can influence survival, reproduction and dispersal in wild animals. Temperament, in turn, could therefore have a major impact on the success of reintroductions or reinforcement releases.

Kate Richardson and colleagues studied natal dispersal in the first three years after hihi were reintroduced to Maungatautari. Natal dispersal distance varied widely, but on average males moved further than females. Males that distressed called during handling (a measure of their temperament) dispersed further than those that did not. Hihi at Maungatautari are establishing in clusters across the site but there continues to be gene flow between these clusters driven by males of a particular temperament. It is early days but we are learning how temperament shapes establishment patterns in reintroduced populations

REFERENCE

Richardson, K.M., Ewen, J.G., Brekke, P., Doerr, L.R., Parker, K.A., Armstrong, D.P. (2017) Behaviour during handling predicts male natal dispersal distances in an establishing reintroduced hihi (*Notiomystis cincta*) population. *Animal Conservation* 20: 135-143.





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