

Taraiti

Sterna nereis davisae
New Zealand fairy tern

Life on idyllic sandy beaches



Nesting fairy terns. Malcolm Pullman Photography

Quickfacts

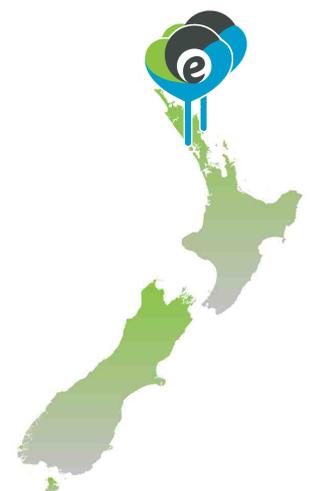
New Zealand's rarest endemic bird

Needs large undisturbed sandy beaches for nesting adjacent to shallow tidal estuaries or river mouths for feeding, places which are now rare

Needs protecting from predators and space from people

Shrinking beaches

The fate of New Zealand's rarest bird, the dainty taraiti (New Zealand fairy tern) is closely tied to the fate of New Zealand's sandy beaches. Many of New Zealand's often iconic northern sandy beaches are quite different now compared to 10 years ago, are even more different than they were 50 years ago, and are hugely different from 150 years ago. These differences are mainly due to how people now use our beaches and coasts: settlements and farms now butt up against the sand dunes (where exotic marram grass flourishes to protect the farms and settlements from wind-blown sand), a wide variety of exotic herbs and shrubs have spread beyond domestic gardens and now festoon the dunes, the sands are regularly travelled by four-wheel drive vehicles and crowds of sun and sea seekers, and exotic predators now roam the beaches day and night. Over the years these have all transformed New Zealand's spectacular beaches, from when the flat sandy beach stretched 200 to 300 metres from the waves to the crescent shaped dunes that were lightly covered in flags of toetoe grass, swathes of the golden eyebrows of Tangaroa - Ngā tukemata o Tāne/pingao and the tumbleweed heads of spinifex grass.



A number of original New Zealanders loved the wide, open sands of New Zealand's early beaches. As well as toetoe grass (*Austroderia splendida*), Ngā tukemata o Tāne (pingao sedge *Ficinia spiralis*) and the spinifex grass *Spinifex sericeus*, there were other plants, now much rarer and many of which are endangered, including sand daphne *Pimelea villosa*, Holloway's crystalwort *Atriplex hollowayi*, sand tussock *Poa billardiarei*, and others. Birds too enjoyed these wide beaches as they offered lots of space away from the waves where nesting birds could see predators long before they could get close and discover the carefully hidden eggs and chicks. The activity around the large and noisy colonies of terns and gulls, peppered with pairs of oystercatchers and New Zealand dotterel, would have been frenetic as birds departed for fishing grounds or returned with small fish, and noisy bickering between neighbours was constant.

Now however, many New Zealand's beaches are shadows of their former selves, being squashed between the waves and the immobile marram grass hillocks, and as a result having an over-steep profile in cross section.

Taraiti

The taraiti is one bird that has suffered more than most from the changes to New Zealand's sweeping northern beaches on which it nests. Its name, taraiti, is Maori for small tern (tara = tern, iti = small), and it is also commonly known as the New Zealand fairy tern *Sternula nereis davisae*. It is related to the Australian fairy tern *Sternula nereis nereis* and the New Caledonian fairy tern *Sternula nereis exsul* (but not the white fairy tern *Gygis alba*). As the Maori name suggests, it is the smallest of the four tern species that breed in New Zealand, and it is one of two terns endemic to New Zealand. Taraiti differs from other New Zealand terns in that it is a solitary nester and relies on the camouflage of its eggs and chicks to escape predators. The other tern species nest in large, noisy and conspicuous colonies and the parent birds mob predators to drive them away. The taraiti feeds on small fish and shrimps, which it catches by plunging from a hovering position above the water. Male and female taraiti look identical and courtship consists of display flights and the male feeding small fish to the female just prior to mating and egg-laying. They prefer to nest on large areas of bare sand that have a scattered cover of shells (particularly orange coloured shells, because these offer better camouflage for the eggs and young chicks) adjacent to an estuary where they hunt for fish. Two (rarely three) eggs are laid in a shallow scrape in the sand where there is a clear view through 360° so that predators can be detected before they get too close. A pair of taraiti can raise two chicks each summer, but if the nest fails they can retry up to three times (and on one occasion a fourth nest was attempted). The chicks are fluffy and bumble bee-sized when they hatch and are fed small fish (mostly *Favonigobius* gobies and small *Rhombosolea* flounder) and shrimps caught by their parents from shallow water in harbours, inlets and beside beaches. Older chicks sometimes eat sand-

hoppers (coastal amphipods) that they catch. Older chicks develop a russet black streaked crown and mottled sandy grey back and have a cunning strategy of lying in a scrape in the sand surrounded by shells where they are nearly invisible. The parents teach the young birds to fish once they can fly, which takes about another 2 months. After several months the juvenile bird becomes more independent and flocks together with other teenagers and the post-breeding adults, though single one-year old birds can move as far south as the Manawatu Estuary. Most birds spend the winter feeding and roosting in sheltered harbours and inlets, with most birds using the Kaipara Harbour.

Though never an abundant bird, taraiti once bred as far south as the mouths of Canterbury rivers and on beaches in Marlborough and around the North Island. Now there are only four northern beaches where taraiti nest regularly: Mangawhai (the main breeding site), Waipu, Papakanui and Pakiri, and it is very rare to see them south of Auckland or north of Whangarei. Taraiti have also nested recently at other sites such as Te Arai, but do not yet regularly breed there. The loss of taraiti is a result of a combination of changes to its nesting beaches, rats, stoats, cats and hedgehogs eating their eggs and chicks (the native harrier hawk and black-backed gull are also significant, but natural, predators of taraiti eggs and chicks), cats catching parent birds at night when incubating eggs or young chicks, and nest being disturbed by walkers or vehicles. When threatened, taraiti parents perform an aerial defence display and dive-bombing (which can include accurate defaecation!) to chase predators away, and the chicks freeze on the spot when they hear the parent's alarm call. Unfortunately this behaviour doesn't work well against mammalian predators who hunt by scent as well as by sight. And it definitely does not work against people (30,000 visit the beach at Mangawhai every summer), who could unwittingly trample the superbly camouflaged egg or chick. It works even less on the drivers of vehicles, who have no chance of spotting them. Taraiti will also sit on their nest if people are too close (e.g. sunbathing or picnicking nearby) and the unshaded eggs or small chicks die from overheating (or chilling on a cold day). Storms can destroy taraiti nests by washing away the eggs or chicks or covering them in sand and can prevent taraiti parents from catching enough fish to feed their chicks. Five older chicks died from starvation during a storm in 2014. Storms that coincide with high king or spring tides are particularly damaging. The effects of storms are worsened because most New Zealand beaches are now much narrower than what they used to be and consequently there is very little beach (if any) that does not get swamped. Coastal subdivisions and developments behind beaches have sometimes been controversial because of their potential to increase the disturbance of shorebirds like taraiti, and the owners of a new golf course at Te Arai are setting up a trust to manage shore birds in the area, and the removal of the pine forest to create the golf course may change the number and type of predators visiting the beach.

Prior to 1983, taraiti numbers were declining exponentially and only 10 taraiti (including three breeding pairs) survived. Even now it is highly endangered, with a population that

numbers about 40 birds and eleven breeding pairs – making it New Zealand's rarest endemic bird. But taraiti have been fortunate – a dedicated band of people have been working hard for many years to help save this delicate bird. And their work is successful: the population is slowly growing and in 2014 the fairy tern was voted New Zealand's favourite bird.

Taraiti conservation

In 1983, conservation efforts to protect the last taraiti birds began, with seasonal wardens using a combination of predator control, protection of nests from storm-driven waves, fencing of the nesting sites from vehicles and beach visitors, interpretive signage, and removing eggs to safe places. A Recovery Plan describing what needed to be done to save taraiti was written by the Department of Conservation (DOC) in 1997, and a second Recovery Plan was written in 2005. The 2005 Recovery Plan has five Goals:

1. Actively manage and protect all nests to produce 1–2 chicks per pair per annum and to protect the breeding birds so that the population increases by at least 1.5% per annum.
2. Raise public awareness and increase active support so that community and iwi are involved in nest protection and monitoring birds at sites where DOC has not the resources to manage.
3. Improve coordination and support to Ornithological Society of New Zealand (OSNZ) volunteers so they remain involved and feel valued.
4. Research on factors limiting recruitment of adults into the breeding population, the causes of unexplained loss of eggs and young chicks, and to assess the progress of the current conservation project.
5. When possible, undertake research that will assist in management of the population, including: clarifying the taxonomic status, genetic variation, effects of inbreeding, parental recognition of chicks and their care post-fledging, post-breeding movements as well as improvements to nest manipulations and captive rearing techniques.

A 2011 review of the taraiti conservation programme by the Royal Forest and Bird Protection Society of New Zealand recommended:

1. Improved management of the current nesting, feeding, flocking and roosting sites.
2. A significant increase in management and research effort (as largely outlined in the

- 2005 NZ fairy tern Recovery Plan).
3. Full legal protection of NZ fairy tern breeding habitat and enforcement of entry provisions is urgently required.
 4. Attracting or moving birds to new nesting sites.

Currently, a combination of effort between the local Iwi Ngatiwai, Ngati Whatua, Ngati Manuhere and Te Uri o Hau, local schools and communities, About Tern, NZ Fairy Tern Charitable Trust (NZFTCT), Te Arai Shorebirds Trust, the OSNZ and DOC are providing a network of wardens and trappers who patrol taraiti nesting beaches and temporarily fence off nesting areas, ensure that people and dogs do not get too close, and trap the predators that roam in the vicinity. The wardens also rescue eggs that are at high risk of being lost in storms, by slowly shifting and/or raising the nest or building a sand-bag wave barrier around the nest, or by artificially incubating the eggs at Auckland Zoo until the storm passes. Older chicks will also consume fish placed nearby by wardens as additional food during stormy periods. Good nesting sites are made safer from waves by the addition of extra shell material, and unsafe sites made unfavourable by the addition of seaweed and driftwood and fertile eggs are shared between the nesting pairs to maximise productivity. A key component of the recent success is the experience of the wardens and volunteers, some of who have worked on taraiti for several years during which they have learnt many innovative tricks – such as installing shade tunnels made from bottomless old plastic buckets at sites where there is no other sources of shade and providing near-fledging chicks with supplementary food when one of the parent birds died. One of the more unusual protections from people afforded taraiti at Papakanui is its use by the NZ Defence Force as a bombing range! The birds do not seem to mind the noise and explosions and the Defence Force supports the taraiti conservation project by providing accommodation. A Forest and Bird programme is underway to attempt to entice taraiti to once again nest on an island in the Kaipara Harbour by using decoy models and sound recordings. All taraiti chicks since 1991 have an individually-unique code of three plastic rings put on their legs together with a numbered metal ring. This allows the fate of the bird to be followed, and precise figures for mortality, breeding success and population growth can be calculated. The sex of each chick is also obtained by examining the DNA in a plucked feather.

This recent work has increased the number of taraiti by around 1.5% per annum, reduced the number of nests lost to predators from 32% to 12% and has reduced the overall risk of extinction within the next 50 years from 53% down to 39%. They also catch an impressive haul of predators – 38 rats, 63 hedgehogs, 7 stoats, 13 cats and 4 pigs were caught at Mangawhai over the 2013/14 summer.

Currently (2017) the taraiti project is again being reviewed by the Department of Conservation.

What next?

The threats to the survival of taraiti are:

1. Predators, particularly cats, hedgehogs, possums and rats.
2. Storm waves washing away nests or making it impossible for the parents to find food for their chicks.
3. People and vehicles disturbing birds when nesting.
4. Conflicting uses of beaches and harbour areas, occasionally even between different conservation purposes.

Successfully protecting taraiti from these threats must continue for the conservation programme to succeed. Ideally, this should be done by:

1. Keeping the number of predators around tern breeding colonies as low as possible. Predators are eating taraiti and their eggs and chicks. Exotic mammals are the most serious predators, particularly cats and hedgehogs. Possums are also a predator of shore birds at other sites. Luckily the adults do not often fall prey to predators. Because the nesting sites are areas where lots of people visit, the task of stopping predators eating eggs and chicks can only be achieved by using traps for public health and safety reasons, but this requires a sizeable network of traps and these traps also need to be replaced frequently due to the salty air. The traps also have to be regularly baited and any captures removed and disposed of appropriately. Currently, DOC employs a trapper at Papakanui and at Pakiri and Waipu both DOC and volunteers undertake the trapping, and the NZFTCT employs a trapper at Mangawhai (but the funding for this position is on an annual basis and not yet secured for 2016) who is assisted by a DOC warden and volunteers. The Te Arai Shorebirds Trust is funding trapping on private land adjacent to the Mangawhai Wildlife Refuge.

Purchasing extra traps costs around \$5,000 for each of the four sites. Traps have been obtained with assistance from Key Industries NZ Ltd ([link](#)). A further \$60,000 is required to support the Mangawhai trapper.

2. Protecting nests from storms.

The narrower and steeper beaches that are now found in many places of New Zealand leave little room for shore birds to nest safely away from large waves generated by storms, and many eggs and chicks are swept away. There are three measures that can be implemented to minimise this. Firstly, a barricade of sand bags is built, then the nest can be gradually shifted further up the beach or away from moving sand dunes one metre at a time (so that the parent birds don't lose track of their nest). Finally the eggs

can be rescued if a severe storm threatens and replaced with fake eggs and keeping the real eggs in an incubator at Auckland Zoo until the storm has passed and the eggs can be switched back.

Currently DOC employs wardens over the summer at Waipu, Mangawhai, Papakanui and Pakiri, who undertake nest protection. Volunteers assist with care of nests at Waipu, Mangawhai and Pakiri. A second incubator is likely to cost \$2,000 so that the eggs would not have to be transported into Auckland.

3. Keeping people a safe distance from nests.

Northland's warm white sandy beaches are very popular and are visited by thousands of people every summer. At some beaches people are frequently accompanied by dogs, and it is possible for vehicles to be driven on some of the beaches. Currently, areas where taraiti (and other shore birds) nest are marked with a bright tape fence and signs requesting people not to enter the area. These temporary fences are removed once nesting is finished and are re-erected each summer at the site where the birds chose to nest. In addition, wardens and volunteers patrol the areas and talk to people who are near the nesting areas, and watch that people do not cross the fence. Continued effort is needed from DOC and local authorities to balance the wishes of those wanting to take dogs or drive vehicles onto beaches, the conservation needs of nesting and feeding shorebirds, and those people who want a traditional beach visit. People are now usually very respectful of the established fenced-off areas.

The wardens at each site work closely with beach visitors to minimise disturbance to nesting areas.

4. Creating new, safer, breeding sites.

There are other, safer, sites where taraiti once nested – places like inner harbour sand islands where there are fewer visitors, predators and the waters are calmer. Forest and Bird is currently working on a project that is encouraging taraiti to return to one of these sites in the Kaipara Harbour by creating a shell bank and using decoy models and tapes of taraiti calls (a previous trial of decoy models on taraiti was promising). On-going predator control and care of nests will be required if taraiti do start nesting at this site. Another idea in development (see [link](#)) is the building of a nesting platform moored in a harbour which predators cannot swim onto.

It is not known how much it will cost to create a new breeding site.

5. Caring for taraiti feeding grounds.

Taraiti forage at sea, in some sand dune lakes, and in estuaries and harbours, some of which are heavily used by people. Care needs to be taken when undertaking certain types of work in these areas that could negatively affect the ability of taraiti to catch fish. Activities such as channel dredging, construction of marinas and mangrove clearance are often undertaken in these areas, and the effects of these on taraiti need to be better understood.

Undertaking an investigation into the impact of channel dredging and mangrove removal on taraiti is likely to cost at least \$390,000 over three years.

6. Regular meetings of northern beach care groups.

There are several groups undertaking conservation activities on northern beaches, but on occasions this conservation work may clash. There is a need for an annual meeting between beach care groups, in order to discuss their planned activities for the year and any potential conflicts with another group's plans.

An annual meeting of beach care groups is likely to cost \$10,000 over five years.

7. Developing realistic dummy taraiti eggs.

Using dummy eggs as replacements for real eggs when storms threaten nests is important in the management of taraiti. Previously hand-painted wooden eggs have been tried, but the birds did not find these acceptable – possibly because they lacked ultraviolet patterning. Wax-filled infertile eggs are currently used, but these are fragile and there are few available. Developing robust and realistic dummy eggs would allow a greater range of management techniques to be employed, such as replacing fertile eggs over the dangerous incubation period when eggs can be lost to bad weather or predators, artificially incubating the real eggs to the stage where they are ready to hatch and then returning them to the parents who have been incubating the dummy eggs for them to hatch and raise the chick.

Development of dummy taraiti eggs cost \$10,000 and was supported by the Endangered Species Foundation, WWF and Key Industries NZ Ltd with help from the University of Auckland.

UPDATE: In the 2016/17 season, the 3 pairs at Papakanui had produced 1 infertile and 2 fertile eggs which were removed as cat sign was seen nearby, the 1 pair at Te Arai produced 2 infertile eggs, the 3 pairs at Mangawhai produced 2 fertile eggs and 1 pair (inexperienced) is yet to nest and no pairs have nested so far at Pakiri. Nonbreeding and immature fairy terns have been seen visiting the artificial nesting area on Bird Island,

and one pair has displayed courtship behaviour there.

More information

- Website: New Zealand fairy tern charitable trust. [Link](#).
- Website: Forest & Bird fairy tern project. [Link](#).
- Website: Kiwi Conservation Club fairy tern page. [Link](#).
- Website: New Zealand birds online – fairy tern. [Link](#).
- Website: Fauna Recovery New Zealand fairy tern video monitoring. [Link](#).
- Website: Department of Conservation fairy tern page. [Link](#).
- Website: BirdLife International – fairy terns. [Link](#).
- Website: Wildlife Conservation Trust of New Zealand – Kaipara fairy tern project. [Link](#).
- Website: Wikipedia. [Link](#).
- Brochure: New Zealand fairy tern tara iti. Department of Conservation. [PDF](#).
- Article: Fairy tern tops seabird poll. Waikato Times, 27 November 2014. [Link](#).
- Scientific paper: Foraging ecology and choice of feeding habitat in the New Zealand fairy tern *Sternula nereis davisae*. By Stefanie M H Ismar, Tom Trnski, Tony Beauchamp, Sarah J. Bury, David Wilson, Robyn Kannemeyer, Mark Bellingham, Karen Baird. Bird Conservation International Vol. 24, pages 72-87, 2014.
- Scientific paper: Sightings of New Zealand fairy tern (*Sternula nereis davisae*) in the Kaipara Harbour following nest failure. Notornis Vol. 60, pages 183-185, 2013.
- Report: Issues and options for the conservation and recovery of the critically endangered New Zealand fairy tern. By June Brooks, Alison Davis, Karen Baird and Mark Bellingham. Royal Forest and Bird Protection Society of New Zealand. [PDF](#).
- Article: Away with the fairies. By Chris Lorigan. New Zealand Geographic, Issue 101, Jan. – Feb. 2010. [Link](#).
- Article: Girl power takes up fairy tern crusade. By Vaimoana Tapaleao. New Zealand Herald, 18 April 2008. [Link](#).
- Scientific paper: Post-fledging parental care of a juvenile New Zealand fairy tern (*Sterna nereis davisae*). By Jeannie M. Preddy. Notornis Vol. 55, pages 159-161, 2008.
- Scientific paper: Conservation of the endangered New Zealand fairy tern. By S.M. Ferreira, K.M. Hansen, G.R. Parrish, R.J. Pierce, G.A. Pulham, S. Taylor. Biological Conservation, Volume 125, pages 345-354, 2005.
- Report: New Zealand fairy tern (*Sterna nereis davisae*) recovery plan, 2005-15. By Katrina Hansen. Department of Conservation, Wellington, 2005. [PDF](#).
- Scientific paper: Predator control to enhance breeding success of the New Zealand fairy tern *Sterna nereis davisae*, North Island, New Zealand. By T. Wilson & K. Hansen. Conservation Evidence Vol. 2, page 89, 2005. [Link](#).
- Report: Fairy tern update. By Gwenda Pulham. Southern Bird, No. 9, page 9, 2004. [PDF](#)



Scientific paper: Attracting endangered species to 'safe' habitats: responses of fairy terns to decoys. By D. S. Jeffries & D. H. Brunton. *Animal Conservation* Vol. 4, pages 301-305, 2001.

New Zealand fairy tern (Tara iti) *Sterna nereis davisae* recovery plan: 1997-2002. Threatened Species Recovery Plan No. 23. Department of Conservation, Wellington, 1997. [PDF](#).

Scientific paper: Observations on the breeding of the New Zealand fairy tern. By G. Richard Parrish & Gwenda A. Pullman. *Tane* Vol. 35, pages 161-175, 1995.

Scientific paper: Population size, productivity and post breeding movements of the New Zealand fairy tern. By G. Richard Parrish & Gwenda A. Pullman. *Tane* Vol. 35, pages 175-181, 1995.

Photos



Storm-proofing fairy tern nest. David Wilson, DOC



Measuring fairy tern chick. David Wilson, DOC



New 3D-printed artificial fairy tern egg (L) with cracked real egg. David Patterson, ESF NZ

This webpage represents the views of the Endangered Species Foundation of New Zealand and not necessarily those of other individuals or organisations involved in the conservation of this species.

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