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Returning Chatham Islands tui (*Prosthemadera novaeseelandiae chathamensis*) to Chatham Island

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Abstract The Chatham Islands tui (*Prosthemadera novaeseelandiae chathamensis*) is a large forest honeyeater with a threat ranking of nationally endangered. It is restricted to a single population commuting between Pitt and South East Islands, with an estimated global population of 260 adults. We carried out a translocation of 54 juvenile tui from South East Island (42 females, 12 males) to the Awatotara Valley, Chatham Island in March 2009 (14 birds) and February 2010 (40 birds). Tui were held captive in an aviary for 2-8 days on the source island, and 3-6 days at the release site. Tui lost weight in captivity prior to transfer, but birds held for longer periods recouped more weight than those held briefly. Post-release survival was high; all birds from the 2009 cohort survived their first winter to breed at the release site. Survival of the 2010 cohort was less (54%), but this may have been due to our reduced ability to detect birds following wider dispersal. This translocation was part of a community project and has seen unprecedented support from the Chatham Island community and is a major step forward in the development of community driven conservation in the Chatham Islands.

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Keywords Chatham Islands tui; translocations; captivity; soft release; post-release monitoring

INTRODUCTION

The Chatham Islands tui (*Prosthemadera novaeseelandiae chathamensis*) is a large (female 110 g, male 155 g) nationally endangered honeyeater currently recognised as a subspecies of the New Zealand tui (*P. n. novaeseelandiae*), although further study may show that it is a separate species (Higgins *et al*. 2001; Miskelly *et al*. 2008; Checklist Committee (OSNZ) 2010). With the extinction of the Chatham Island bellbird (*Anthornis melanocephala*) around 1906, the tui is the only extant honeyeater in the Chatham Is (Checklist Committee (OSNZ) 2010). Tui were widespread on Chatham I in the early 1900's. Chatham Islands tui survived human settlement of the island group and the mammalian predators they introduced. In the 1920's, tui were common on all parts of the island (Archey & Lindsay 1924), but numbers had started to decline by the 1930's. Fleming (1939) found tui less common in northern parts of Chatham I, but it was still plentiful in southern areas. Numbers continued to decline and by the 1970's tui were uncommon on Chatham I, with birds occurring only in low numbers in southern areas (Bell & Merton 1975). Since the early 1990's tui were all but absent from Chatham I, with only irregular sightings of birds, and it was extinct there as a breeding species. Tui have survived on Pitt and South East Is (also known as Rangatira I)

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with the population estimated at 260 birds in 1999. Most breeding occurs on South East I but all birds disperse to winter on Pitt I (Dilks 2004).

The decline in Chatham Islands tui has been attributed to habitat loss and predation by introduced mammals, especially cats (*Felis catus*), rats (*Rattus* spp.) and possums (*Trichosurus vulpecula*) (Aikman & Miskelly 2004). The impacts of the possum as a food competitor has probably been underestimated, and their spread mirrors the decline of tui. Possums were released at Kaingaroa in 1911 (Holmes 1993), and by the 1950's were as far south as Te One and Owenga (E. Dix, *pers. comm*.). By the 1970's, possums had reached the Waipurua catchment (Tisdall 1992). In 1920, tui were common throughout the island despite over 100 years coexistence with cats and rats, and forests which were degraded by grazing stock. Tui disappeared from northern areas as forest patches continued to decline from grazing and possums spread south across the island. Possums eat flower buds and unripe fruit, thereby reducing the amount of nectar and ripe fruit available to tui. This competition for food, especially in winter and perhaps to support breeding, is likely to have negatively impacted the tui population, and may have been a significant cause, along with nest predation, in the final decline and extinction of tui on Chatham I. Occasional sightings of tui reported from Chatham I are likely to be juveniles dispersing from South East I, however this does not occur regularly enough or in sufficient volume for tui to self re-colonise.

Tui play an important ecological role as pollinators, and being highly mobile are the main disperser of medium-sized fruits (Heather & Robertson 2005). Since the 1980's nearly 8000 ha of forest habitat has been protected in Crown Reserves or private conservation covenants on Chatham I, with significant recovery of vegetation in these areas (Miskelly 2008). As a result, the Chatham Islands Taiko Trust sought to re-establish tui on Chatham I to improve the long-term conservation status of this endangered subspecies, return an important forest ecosystem species, ensure future generations of people would be more readily able to see tui, and involve locals in a community-led conservation project. The release site was selected as it was identified as the best tui habitat on Chatham I (Dilks 2004), and had on-going possum and rat control since 2008 (Tuanui & Tuanui 2009). This paper details the translocation methodology, post-release monitoring and the outcome of the project.

METHODS

Community project

This project was the first species translocation project in the Chatham Is which was proposed, funded and implemented by a community conservation group. The Chatham Islands Taiko Trust had previously supported seabird translocations, but these were carried out by the Department of Conservation. In this project, the Taiko Trust applied for and received a permit from the Department of Conservation to translocate tui, developed a transfer operational plan, successfully accessed funding from the BirdLife Community Conservation Fund, and used contracted ornithologists and volunteers to undertake the project.

Capture

All tui were captured using mist-nets (30 mm mesh size) on South East I. Most nets were erected along water courses (Kokopu Creek) or seeps where tui were known to congregate to drink and bath. In addition, nets were set in low growing vegetation (primarily fruiting and flowering ngaio (*Myoporum semotum*)) on forest edges. In these sites the low stature of the vegetation meant nets could be set at a height likely to capture tui moving between bushes as they foraged.

Age and sex of translocated birds

Tui are known to be highly territorial (Higgins *et al.* 2001; Heather & Robertson 2005), and in order to reduce dispersal of translocated birds back to South East I only juvenile birds were targeted for translocation. It was anticipated that juvenile tui would be less likely to return to South East I as they should be dispersing from natal territories at that time. Tui were identified as juvenile by the lack of a wing notch on the eight primary feather (adults have a deep notch), lack of wing moult (most adults were in moult at the time), and unworn primaries (Onley 1986; Higgins *et al.* 2001; Dilks 2004).

An attempt was made to obtain an even sex ratio of tui for translocation. Sex of juvenile tui can be determined by measurement of the head-bill length, with birds with a head-bill length greater than 62 mm classified as male, and birds with less than this length as female (Dilks 2004).

Weighing and banding

On capture, all tui were weighed, head-bill length measured to determine sex, banded with a unique colour band combination, and then carried individually in cloth bags and released into the holding aviary. In 2009, 10 tui had radio transmitters (Sirtrack Limited, 8g VHF transmitter) attached to tail feathers to assist post-release monitoring. On release into the aviary, tui were offered sugar-water from feeders. In 2010, tui were weighed when re-captured from the aviary prior to transfer to Chatham I.

Maintenance in captivity

Tui were held in an aviary on South East I and at the release site in Awatotara Valley. On South East I the relatively small aviary (~3 x 4 m, and 2 m tall) was

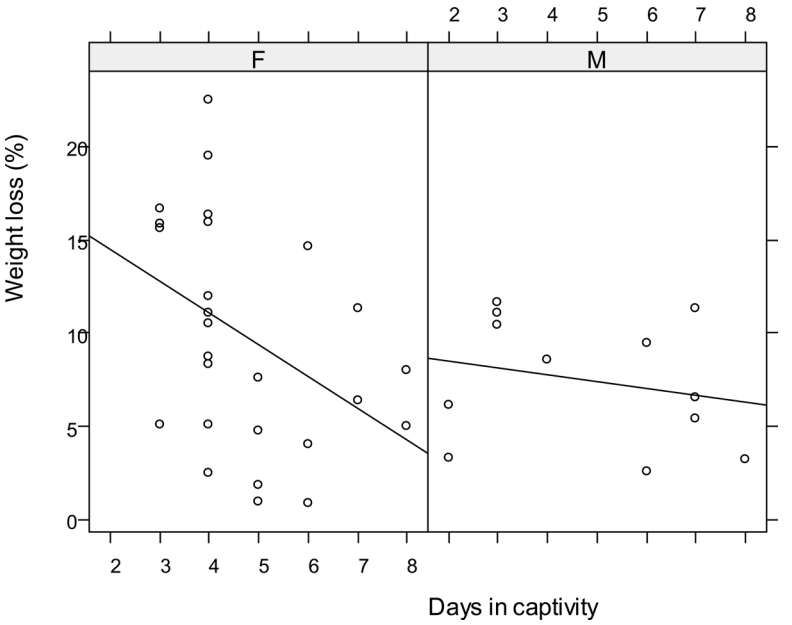

Fig. 1. Comparison of weight loss of 28 female (F) and 12 male (M) Chatham Is tui on Rangatira I, Feb 2010.

under the canopy and had part of the roof covered to provide shelter. In addition to perches underneath the shelter, fresh branches with dense foliage were secured in the corners to provide perches and cover for subordinate birds to hide. The floor was covered with a thick layer of leaf litter before use.

The Awatotara aviary was large (5 x 12 m and 5 m tall) and on the edge of the forest with a view across the valley. The aviary was covered with soft horticultural netting which was pulled over the top of 2 large trees. A small A-frame roof with a central perch was erected in the top of the tallest tree to provide shelter and a night roost site.

At both aviaries, tui always had fresh water available in 2 shallow containers, and sugar-water in 2 (South East I) or 4 (Awatotara) feeders. Sugar-water was made with 4 tablespoons of raw sugar and 1 tablespoon of vanilla Complan (Heinz Watties Limited) per litre of water. Tui were provided with fresh fruit (banana, orange and grapes) 3 times daily (dawn, midday and late afternoon). Branches with natural fruit were added to the aviary during each feeding session, but at levels which probably formed only a minor part of the diet of the captive birds.

Transfer

On the day of translocation, tui were re-captured in the South East I aviary at 11 am which enabled them to have sufficient time to feed before capture. Birds were caught using hand nets. In 2010, they were re-weighed after recapture, and placed into boxes, with 2 birds per box. Boxes were cardboard pet carry-boxes which were densely packed with twigs and foliage. This vegetation provided birds with perches and some cushioning in the event of sudden bumps during transportation. No water or food was provided.

Monitoring survival

Following release in the Awatotara Valley the netting was immediately removed from the aviary and sugar-water was continued to be supplied in these feeders plus in an additional feeder in the adjacent Krinige Valley. Observations were carried out regularly at feeders in order to record band combinations of translocated birds. During the 2009 translocation, birds with radio transmitters attached were followed regularly until the batteries failed (2-4 months) or transmitters fell off.

Statistical analysis

We investigated whether sex, time in captivity (days) or their interaction (as fixed factors) influenced weight loss (percentage weight loss as the response variable) of translocated tui while in captivity using a Generalised Linear Model. We checked that statistical assumptions of this test were met. Statistical analyses were undertaken using the programme R (Version 2.12.1; R Development Core team 2010).

RESULTS

Community participation

During the 2009 transfer, 6 locals were involved in aspects of the project, primarily in captive management and post-release monitoring. In 2010, this increased to 14 personnel, and included involvement in the capture of tui on South East I,

assisting with the transfer, captive management and post-release monitoring. The project generated widespread interest and large numbers visited the Awatotara aviary, especially on the day of release. In 2009, 45 people visited the aviary, and 120 people in 2010, including 90 on the day of release.

Weight loss in captivity

The number of days each tui (12 males, 28 females) spent in captivity on South East I in Feb 2010 ranged from 2 to 8 days. All tui lost weight following capture (Fig. 1), but weight loss was less the longer tui were held in captivity (t_1 = -2.574, P = 0.014). Although weight loss in males was less than in females (Fig. 1), this difference was not significant (t_1 = -1.788, P = 0.082), and no interaction between time held and sex was detected (t_1 = 1.404, P = 0.169).

Capture and transfer

In the 2009 transfer, 14 tui were captured during 10-11 Mar. All were juveniles (8 females, 6 males) and they were transferred to Awatotara Valley on 12 Mar. These birds were released from the holding aviary on 17 Mar.

During the 2010 transfer, 51 tui were captured during 4 – 13 Feb; 5 adults (4 females, 1 male) and 46 juveniles (34 females, 12 males). Of these, 40 juveniles (28 females, 12 males) were transferred in 2 batches, 32 on 11 Feb and 8 on 14 Feb. All birds were released from the Awatotara aviary on 17 Feb.

The transfer from South East I took 2.5 hours by boat to Owenga, and then a further hour by vehicle to the Awatotara Valley. All birds survived the transfer and appeared healthy when released into the aviary. However, 1 of the 2010 birds was found with a broken wing in the aviary 3 days after transfer and was euthanised.

Tui were released by pulling up one end of the netting, allowing birds to find their way out in their own time. In 2009, the birds exited together and all flew high above the canopy, remaining in the sky for 5 minutes before returning to the forest. In 2010, they slowly left the aviary individually or in small groups, with the last birds taking over 2 hours to leave and requiring more netting to be pulled off the aviary. Once all birds had exited the netting was quickly removed to allow tui access to sugar-water feeders. The 2009 birds did not return to the feeders during the 1st week after release, but radio tracking showed all birds to be within the Awatotara Valley. Birds started visiting the feeders in the 2nd week after release. In 2010, birds immediately visited the feeders after release.

Survival

All tui from both the 2009 and 2010 transfers were seen at sugar-water feeders in the Awatotara Valley during the first 2 weeks following release. The 2009 birds remained within the Awatotara, Krinige and Tuku Valleys during autumn and winter, and continued to visit sugar-water feeders throughout this period. Immediately after release 4 unbanded birds were seen with the banded translocated birds. In spring, birds dispersed to breed, with nesting attempts occurring in the Awatotara, Krinige and Tuku Valleys.

The 2010 birds began to disperse 2 weeks after release, with some of these settling into areas where landowners put up sugar-water feeders (Matakatau Creek, Manahu). Some dispersal also occurred when fledglings raised by the 2009 cohort in the Awatotara, Krinige and Tuku Valleys began leaving natal territories. Survivial of the 2010 cohort was difficult to determine as birds dispersed widely, but at least 21 (54%) were recorded alive at the start of spring, 6 months after release.

Breeding

On 9 Sep 2009, a tui was observed copulating and nest building in the Awatotara Valley. In 2009, at least 8 pairs of tui breed in the Awatotara, Krinige and Tuku Valleys (Fig. 2). Breeding continued until mid-Feb, with a recently-fledged brood seen in the Awatotara on 20 Feb 2010. Pairs reared 2 and sometimes 3 broods during the breeding season.

In 2010, breeding also begin in Sep, with nest building recorded on 18 Sep in the Awatotara Valley. Up to 16 pairs of tui bred in the Awatotara, Krinige and Tuku catchments, although additional pairs were reported from further afield (Fig. 2). Nesting continued until Mar 2011, with a brood of recently-fledged chicks seen in the Krinige on 3 Mar.

DISCUSSION

The tui translocation project generated unprecedented community involvement and support in the Chatham Is. In 2010, 14 locals directly assisted with the project and 120 people visited the project. This represents 2.3% and 19.7% of the Chatham's population; this would be equivalent to 10,000 assisting and 88,000 people supporting a similar project in Wellington (2006 census results; Chatham I population 609, Wellington 448,956, data from http://www.stats.govt.nz). This level of support is likely to be because the project was entirely initiated and run by the community, and highlights a significant step in the development of community conservation in the Chatham Is.

Tui proved to be robust birds, readily coping with the stresses of capture, handling, temporary captivity and transfer. Birds readily adapted to a captive diet, and although all birds lost some weight, weight loss declined the longer birds were held. This suggests that weight loss was primarily associated with stress of initial capture, being housed in close

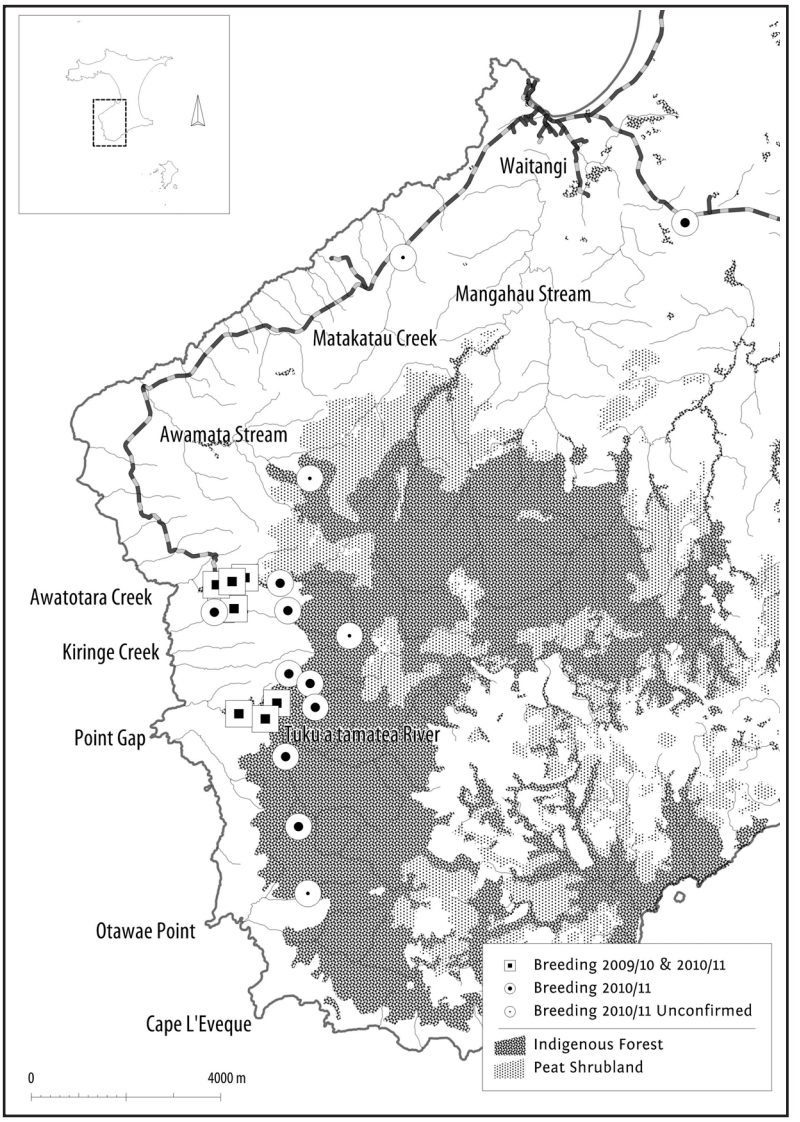

Fig 2. Location of breeding tui during 2009/10 and 2010/11 breeding seasons, in the Awatotora Valley release site and adjacent areas of southwest Chatham I.

confinement with other tui and learning to feed on novel foods. The longer they were captive the better able they were to obtain food and recoup lost weight.

Transferred tui had high survival; all the 2009 birds survived their 1st winter and were alive at the start of the breeding season (Sep). Although the survival rate for the 2010 birds was lower (54%), this is likely to be an underestimate because birds dispersed more widely and this reduced our ability to detect them. Wider dispersal of the 2010 birds probably occurred because the 2009 cohort occupied territories within the release area, and their offspring were naturally dispersing at the time. The robust nature of tui makes them a suitable species for community conservation groups to transfer for future projects to engage communities.

Translocated tui began breeding earlier and continued breeding longer than previously recorded for this species. Dilks (2004) found that tui breeding on South East I was linked to flax flowering, and only occurred after flax flowering started in Nov, and continued until late Jan in good flax-flowering years. The extended breeding season on Chatham I is likely to be a response to the more diverse forest and birds having year round access to sugar-water.

Possum control is likely to be important to ensure long-term survival of tui on Chatham I as most breeding is occurring in areas where possum control is carried out. Monitoring tui survival,

breeding success and diet in areas with and without possum control may further identify the significance of this threat. In the meantime continued advocacy in promoting fencing forest habitats and possum control will be important to ensure tui numbers continue to expand.

If tui numbers continue to increase and spread across Chatham I this will be a significant step for the conservation of this subspecies and should see a downgrading of its threat status. This would be the first time that a community conservation group has been the principal group responsible for improving the conservation status of an endangered species in New Zealand.

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LITERATURE CITED

Aikman, A.; Miskelly, C. 2004. *Birds of the Chatham Islands.* Wellington: Department of Conservation.

Archey, G.; Lindsay, C. 1924. Notes on the birds of the Chatham Islands. *Records of the Canterbury Museum 2*: 187-201.

Bell, B.D.; Merton, D.V. 1975. *Endemic birds of the Chatham Islands.* Unpublished Wildlife Service Report. Wellington: Department of Internal Affairs.

Checklist Committee (OSNZ). 2010. *Checklist of the birds of New Zealand, Norfolk and Maquarie Islands, and the Ross Dependency, Antarctica* (4th ed.). Wellington: Ornithological Society of New Zealand and Te Papa Press.

Dilks, P. 2004. Population status, breeding and ecology of Chatham Island tui (*Prosthemadera novaeseelandiae chthamensis*). *Notornis 51*: 217-227.

Fleming, C.A. 1939. Birds of the Chatham Islands. *Emu 38*: 492-509.

Heather, B.D.; Robertson, H.A. 2005. *The field guide to the birds of New Zealand* (2nd ed). Auckland: Viking.

Higgins, P.J.; Peter, J.M.; Steele, W.K. (Eds.) 2001. *Handbook of Australian, New Zealand and Antarctic birds. Volume 5: Tyrant-flycatchers to chats.* Melbourne: Oxford University Press.

Holmes, D. 1993. *My seventy years on the Chatham Islands.* Wellington: GP Print.

Miskelly, C. (Ed.) 2008. *Chatham Islands heritage and conservation*. Revised edn. Christchurch: Canterbury University Press.

Miskelly, C.M.; Dowding, J.E.; Elliott, G.P.; Hitchmough, R.A.; Powlesland, R.G.; Robertson, H.A.; Sagar, P.M.; Scofield, R.P.; Taylor, G.A. 2008. Conservation status of New Zealand birds, 2008. *Notornis 55*: 117-135.

Onley, D.J. 1986. A method of ageing the tui (*Prosthemadera novaeseelandiae*) and its use in assessing body measurements. *Notornis 33*: 45-49.

R Development Core Team (2010). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. URL http://www.R-project.org/.

Tisdall, C. 1992. Feeding ecology of parea (*Hemiphaga novaeseelandiae chathamensis*) and impacts of possums (*Trichosururs vulpecula*) on parea food plants. M.Sc. thesis, University of Otago, Dunedin.

Tuanui, B.; Tuanui, L. 2009. *Tuku predator control biodiversity funding programme, 2008 – 2009*. Unpublished report. Chatham Island: Tuku Farm. 30 p.