Using translocation of North Island robins to counter effects of forest fragmentation in the central North Island of New Zealand

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Introduction

The purpose of most translocation projects is to preserve endangered species or restore the ecosystem of an area. In comparison this translocation is being used as a research tool, though it is hoped that the knowledge gained will help future conservation efforts. It is part of a wider set of research projects being undertaken by staff and post-graduate students at Massey University. The main pre-requisite for re-introduction is usually to reverse the habitat factors causing the initial loss of the species. However, in fragmented habitats, it is possible that species' distribution may be reduced by failure to re-colonize following chance extinctions, i.e., due to meta-population dynamics. In such cases, it may be possible to increase the distribution of the species through translocation alone. The main purpose of the translocations described in this case study was to develop methods for assessing whether translocation can be used to counter the effect of fragmentation. North Island (***Petroica longipes***) robins were used to trial this idea because; they are relatively easy to monitor and handle, they are found in a suitable study area (fragmented forest habitat in the central North Island of New Zealand), they are not currently considered to be endangered (although they have disappeared from most of their original range), and source robins for translocation were available in nearby commercial pine plantations which were due to be felled. The North Island robin is a small (26 - 32 g) forest dwelling, insectivorous bird. They are strongly territorial and sedentary, rarely leaving the territory once it is established, and form monogamous pairs that often last for life. The study area consists of native forest fragments (4 - 50 ha) on rolling hill country pasture near the township of Benneydale. The fragments have varying degrees of isolation from each other and with

North Island robin (*Petroica longipes*)

respect to a large conservation area and pine plantation to the east of the study area, and about 40% of fragments in the area contained robins at the start of the study. There are exotic predators present in the study area, mainly ship rats and stoats, which have reduced survival rates of robins to levels where their persistence is marginal.

Goals

- Overall Goal: To use re-introductions of North Island robins to assess whether translocation can be used to counter the effects of fragmentation.
- 2005 Objectives: Translocate robins to six unoccupied fragments, and obtain dispersal data for re-introduced birds.
- 2005 - 2006 Season Objectives: Obtain first year of reproduction data for fragments monitored (eight previously-occupied fragments, plus the six previously-unoccupied fragments that now have robins). Translocate robins to an additional six unoccupied fragments, and obtain dispersal data for second set of re-introduced birds.
- 2006 - 2007 Season Objectives: Obtain second year of reproduction data for all fragments (total of nine naturally occupied fragments, plus all 12 previously unoccupied fragments with robins from either set of re-introductions). Modeling of results being done by Yvan Richard as part of his postdoctoral fellowship.

Success Indicators

- Indicator 1: Survival and reproductive rates of re-introduced populations should be similar to those in previously occupied patches (accounting for density dependence), meaning absences were due to chance extinction and isolation rather than inferior habitat quality.
- Indicator 2: Immigration and emigration rates for animals re-introduced to isolated patches should be lower than those for less isolated patches.
- Indicator 3: Model based on the data collected should show that an increase in connectivity would increase the proportion of populations occupied in the long term.

Release site of North Island robins showing fragmented forest patches

Project Summary

Feasibility: North Island robins were selected as a suitable species for the study as they are easy to monitor and handle and they are not currently an endangered species. They have also been translocated several times in the past with very few problems. The area around Benneydale was selected as a suitable study area as it had a good sample of forest fragments, some of which already had robin populations and some which were unoccupied. There had been three years of previous research on robins in occupied fragments in the system by PhD students Yvan Richard and Rebecca Boulton. Their work provided good base data and comparative breeding data, and results showed that it was feasible that the distribution of robins was limited by isolation among forest fragments. Robins were available for translocation from the nearby pine plantation that was due to be felled within two years, meaning there would be no conservation "cost" even if the forest fragments they were translocated to turned out to be completely unsuitable. The study area was on private property, which was owned and managed by a local Maori trust. The trust has a strong interest in biodiversity conservation on their land, and was therefore supportive of the project, allowing easy access to the study area. Permission was necessary from the Department of Conservation, which administers the Wildlife Act, to carry out research, capture, handle and translocate an absolutely protected species. Because the translocations were over short distances (within 20 km), with natural movement of species between them, there were no issues to consider with respect to genetic provenance or inadvertent introduction of parasites or pathogens to new areas. Previous blood and fecal tests showed very low levels of disease.

Implementation: Robins were translocated over a three month period after the breeding season in both 2005 and 2006, with some additional birds translocated in 2007 to increase numbers in some patches. We initially searched the source areas to find robins, and then trained them to take meal worms. We later caught the birds by using meal worms to lure them individually under spring-loaded clap traps (a net springs from a vertical position to flat on the group when triggered). The time to capture an individual bird varied from about half an hour to several hours. On capture, birds were colour banded and fitted with Holohil BD-2 transmitters attached with an elastic Rappole harness around the pelvis (these transmitters have a battery life of about six weeks). Birds were then held in individual cardboard cat-carrying boxes (modified by fitting a perch and increasing ventilation) for a few hours or overnight, with mealworms and water provided in the boxes. Birds were translocated to release sites by 4WD vehicle, and always released early enough that they had a few hours to find food and a suitable roost before it got dark. Up to five pairs were translocated into each patch. We could determine sexes of some birds at the time of capture (e.g. because males >1 year old are darker than females or young males), and otherwise made a preliminary assessment based on measurements and found the true sex later using DNA from feather samples. We used this information to attempt to balance the sex ratio at each release site. This is one of the reasons that translocations were done in small numbers over a period of time, rather than a few mass translocations (as is more usual). Also we were learning as we went, locating and training birds, and the strategy spread the telemetry monitoring load.

Post-release monitoring: We tracked the translocated birds using telemetry until the transmitter batteries failed. Each bird was initially checked the day after release, then subsequently at least once per week (more often if they were dispersing from the release site). The birds were fed with meal worms where possible to re-establish their confidence, making it possible to re-capture them to remove the transmitters and easier to monitor them in the future. There were some difficulties with the radio tracking due to the limited range and strength of the signal, combined with the hilly landscape. If a bird was behind a small hill or in a gully, out of line-of-sight then there was no signal. It was often necessary to try from a number of different sites to locate a bird. This was particularly a problem when individuals left the release area, and several were never relocated. We searched the release sites and surrounding areas at the start of the next breeding season (September) to locate birds that had survived and remained in (or near) the release patches. We monitored all birds throughout the breeding season to obtain data on survival and reproduction (number of young raised to independence per female), and obtained similar data for robins in patches where they occurred naturally.

Summary of results: We translocated a total of 34 robins to six previously-unoccupied forest fragments in 2005, and 72 robins to seven previously-unoccupied forest fragments in 2006. This showed that it was possible to re-establish this species in small (<20 ha) habitat patches through short-distance (<10 km) translocations. The degree of dispersal from patches was highly correlated with patch isolation. The overall proportion of birds remaining in the target patches at the start of the next breeding season was relatively low (29%), but the numbers have been supplemented by natural colonists that appear to have been attracted by the translocated birds. We obtained data from 49 breeding robins in 10 previously unoccupied fragments over the last two years, and obtained similar data for 77 robins in naturally occupied fragments. So far, the previously unoccupied fragments have had a slightly higher reproductive rate than the naturally occupied fragments, but have had a lower adult survival rate and have been estimated to have a slightly lower finite rate of increase. This suggests that differences in habitat quality could have played some role in the distribution of robins among forest fragments in this landscape, but sample sizes are low at this stage and data collection still in progress. Previous analysis by Yvan Richard and Pierre-Yves Regnier has shown that dispersal of both juveniles and translocated birds is strongly correlated with connectivity of the forest fragments, and therefore that the rate at which robins naturally re-colonize fragments is also correlated with connectivity. Yvan Richard has constructed a simulation model for the system, and this model can be used to predict the long-term effects of translocation or landscape modification.

Major difficulties faced

- Although short-distance translocations to forest fragments are convenient in terms of logistics as well as genetic and disease considerations, they are problematic in that birds may easily leave those fragments and even return to their home territories. We therefore needed to translocate a large number of birds in order to establish a small number in the previously-unoccupied

fragments.

Major lessons learned

- Translocation lessons - where short-distance translocations are being carried out a large number need to be moved in order to establish a small population as birds may easily leave those fragments and even return to their home territories.
- Research lessons - analysis still being carried out.

Success of project

Highly Successful	Successful	**Partially Successful**	Failure
		√	

Reasons for success/failure:

- Study is not concluded, though initial results are looking promising.
- Robins have established and successful bred in most of the previously unoccupied fragments.