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Applying Structured Decision Making to management of the reintroduced hihi population in Bushy Park



Female hihi. Photo by Author.

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ABSTRACT

The use of Structured Decision Making (SDM) for choosing optimal management actions in reintroduction projects has been recently pioneered by the North American whooping crane *Grus americana* programme. SDM requires projecting population dynamics under different scenarios to predict outcomes of management strategies. In this thesis, I applied SDM to a population of an endangered New Zealand forest bird, the hihi *Notiomystis cincta*, which was reintroduced to Bushy Park in March 2013 when 44 birds were released. My aim was to determine the optimal management of the Bushy Park population.

The need of this decision was triggered by Bushy Park Trust application for additional translocation of 15 females in order to reinforce the population. The Hihi Recovery Group developed four fundamental objectives, which included maximizing the number and persistence of female hihi in Bushy Park as well as to minimize the impact on the source population on Tiritiri Matangi Island and minimizing costs; and three management alternative actions, including the status quo and follow-up translocations of 15 females in either 2015 or 2016.

In order to project population dynamics under each alternative, I estimated the survival and reproduction rates of the Bushy Park population based on the 18 months of the monitoring data. Comparison of the survival rates of translocated juveniles and juveniles that were born in Bushy Park allowed distinguishing between age and post-release effects. Modelling indicated that translocated juveniles experienced post-release effects that resulted in the rapid population decline during the first 6 months. Survival rates were then used in population viability analysis in program OpenBUGS. An integrated population model was designed to model fecundity and the Bushy Park population dynamics over 10 years under the above-mentioned management alternatives. The median projections suggested a slow decline of the population under each management alternative, but with great uncertainty.

I used the novel approach for decision analysis, whereby uncertainty was incorporated into the decision. In one single model I combined the released population, the source population and the Simple Multi-Attribute Rating Technique for decision analysis. This approach showed that none of the alternatives were clearly preferred and the decision was sensitive to uncertainty in the projections.

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