Science for Saving Species

Research findings factsheet

Project 2.3.2

Threatened Species Recovery Hub

National Environmental Science Programme

Trial translocations of the blue-tailed skink to Christmas Island and the Cocos (Keeling) Islands

In brief

Conservation translocations are increasingly being used to improve the conservation status of threatened species. Historically, translocated populations have had low success rates due to limited knowledge about factors important to the species' establishment. The threatened blue-tailed skink (*Cryptoblepharus egeriae*) is endemic to Christmas Island and is listed as Extinct in the Wild by the IUCN. We trialled two reintroductions of the blue-tailed skink on Christmas Island, and two assisted introductions of the blue-tailed skink on the Cocos (Keeling) Islands of Pulu Blan and Pulu Blan Madar.

Reintroductions on Christmas Island were undertaken into a fenced enclosure to minimise the threat posed by the introduced wolf snake (*Lycodon capucinus*). The initial trial on Christmas Island failed possibly due to predation from introduced giant centipedes (*Scolependra subspinipes*) and inappropriate habitat quality. We eradicated centipedes and improved the habitat prior to the second more successful reintroduction.

The assisted introduction trials to Pulu Blan and Pulu Blan Madar resulted in significantly different survival rates in the first 12-months post release. On Pulu Blan the skinks have established within preferred habitat and continued to increase, whilst the population on Pulu Blan Madar rapidly declined immediately after release. The cause of the skink decline on is thought to be due to the formation of supercolonies of yellow crazy ants (*Anoplolepis gracilipes*). Christmas Island National Park intervened by baiting the island targeting yellow crazy ants, and at 12-months post-release the population had increased.

Our research shows that if blue-tailed skinks can establish; they can breed, forage for food and undergo rapid population growth. Our early results suggest that translocations can be used to increase the conservation status of this species; however, long-term success cannot be guaranteed. Ongoing research on early detection and control of introduced predators is critical for ongoing success.

Blue-tailed skink. Image: Jon-Paul Emery

Background

Conservation translocations, both reintroduction and assisted introductions, are being increasingly used to improve the conservation status of threatened species. They are commonly used in attempts to either re-establish locally extinct species or, if threats cannot be mitigated, to establish populations outside their known range. Historically, translocated populations have experienced low success rates, primarily due to limited knowledge about factors important to their establishment, including habitat preferences, founder sizes and the threats responsible for their decline not being removed or adequately managed.

The key aim of most translocations is to establish self-sustaining populations; however, this typically can take several years. Interim or short-term success indicators can be used as proxies to assess whether a translocated population is tracking towards becoming a self-sustaining population. Additionally, the development of interim indicators can provide insights into the factors that might affect establishment and allow for real-time management.

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CHRISTMAS ISLAND NATIONAL PARK

Background (continued)

The blue-tailed skink (*Cryptoblepharus egeriae*) is endemic to Christmas Island and they are among the most threatened reptile species globally. They are the only reptile species listed globally as Extinct in the Wild by the IUCN. This species underwent rapid declines in the 1990s and 2000s, and was brought into captivity by Christmas Island National Park and Taronga Zoo in 2010 to establish insurance populations. Captive breeding has been very successful, with over 1000 individuals of blue-tailed skinks across the two captive-breeding facilities.

Main aim of the research

We supported Christmas Island National Park in undertaking trial reintroductions of the blue-tailed skink on Christmas Island, and the assisted introduction of the blue-tailed skink to the Cocos (Keeling) Islands. On the Cocos (Keeling) islands, we aimed to determine if the survival of captive animals sourced from Christmas Island differed to those sourced from Taronga Zoo. Overall, we aimed to assess whether reintroductions and conservations translocations are suitable conservation measures for the blue-tailed skink.

What we did

We collaborated with Christmas Island National Park to plan, implement and monitor the translocations of blue-tailed skinks on Christmas Island and the Cocos (Keeling) Islands between 2017 and 2020. On Christmas Island, the introduced wolf snake (*Lycodon capucinus*) was considered a serious threat to reintroduction success, whereas potential threats were largely unknown for the Cocos (Keeling) Islands.

The blue-tailed skinks for the reintroduction trials on Christmas Island were sourced from captive populations on Christmas Island. The skinks for the conservation introduction trials on the Cocos (Keeling) Islands were sourced from both Taronga Zoo and Christmas Island.

Reintroductions onto Christmas Island were undertaken into a large fenced enclosure (2600 m^2) to minimise the ongoing threat posed by the introduced wolf snake. We initially released 137 individuals in 2017. However, post-release monitoring revealed a significant decline in the population, and six months after reintroduction no blue-tailed skinks could be found. This was most likely due to predation from introduced giant centipedes and unsuitable habitat. We rectified these issues and undertook a second trial reintroduction in 2018, releasing another 170 individuals.

For the Cocos (Keeling) Island trials, we undertook two assisted translocations on separate islands, Pulu Blan and Pulu Blan Madar, in September 2019 and March 2020. Black rats were eradicated from both islands prior to the releases. Three hundred skinks were relocated in each translocation, with half from Taronga Zoo and half from Christmas Island. We used two different captive populations to maximise genetic diversity.

For all trials we monitored survival, population trends, dispersal, habitat use, body condition and breeding. We used tracking ink cards (animals leave footprints on an ink card) and visual surveys to monitor dispersal and potential predators and monitored the survival, habitat use and body condition through a mix of mark-recapture, visual observations and systematic habitat sampling. We also used remote sensing cameras on the Cocos (Keeling) Islands to detect potential predators.

JP Emery constructing habitat structure in the reintroduction site. Image: Brendan Tiernan

Key findings

On Christmas Island, the reintroduced blue-tailed skinks failed to establish in the first trial. Post-release monitoring and subsequent experiments revealed that introduced giant centipedes and poor habitat quality were the likely cause of reintroduction failure. We were able to eradicate the centipedes and improve habitat complexity before the second trial.

In the second trial, in the first month post-release we found a high rate of survival (>75%) and approximately 80% of released females were already gravid. Ongoing monitoring revealed that the population had doubled after two years. Up until December 2020 the population was doing well; however, monitoring between January - April 2021 revealed a sudden population crash due to the invasion of several wolf snakes into the site. Unfortunately, the snakes could not be located and removed quick enough and the remaining 171 blue-tailed skinks were captured and returned temporarily to captivity. Subsequent management is aimed at improving the fence design and removing wolf snakes prior to returning skinks to the site.

In the first few months following release, for both translocations, the body condition of the blue-tailed skinks declined. However, over time body condition was found to gradually increase. Our monitoring suggests that the initial decline in body condition is an artefact of the individuals coming from captivity, where they have access to plenty of food. Importantly, the initial condition loss does not appear detrimental to long-term survival. We also determined that within the reintroduction site, the skinks favoured areas with rocks and logs and avoided open areas of bare ground.

On the Cocos (Keeling) Island of Pulu Blan, we found evidence of successful breeding and population growth within six months post-release in the first trial. Ongoing monitoring has revealed substantial population growth, and we found no difference in the survival between the Taronga Zoo and Christmas Island release cohorts. We also found that skinks that were released into pemphis plant habitat dispersed far less than individuals released into coconut habitat

By comparison, on Pulu Blan Madar, we detected a significant population decline immediately post-release. Within the first month after release, we found the island had been heavily invaded by yellow crazy ants (*Anoplolepis gracilipes*). Activity monitoring on the tracking cards and visual surveys revealed that the skinks were restricted to the coast, likely because of the yellow crazy ants. Christmas Island National Park responded quickly with island-wide baiting that largely reduced yellow crazy ant numbers and are continuing to monitor and routinely bait the ants to achieve eradication. The skink population has since started to slowly recover and have dispersed across the island. An additional translocation of 250 individuals (125 from each captive source) took place in June 2021 to supplement the population. Like on Pulu Blan, we found no difference in survival between individuals sourced from Christmas Island and Taronga Zoo.

The trial results on Christmas Island and on the Cocos (Keeling) Islands showed considerable differences.

On Christmas Island, the eradication of giant centipedes and the increase in habitat complexity before the second trial is likely to have improved the population growth of blue-tailed skinks. Likewise, on Pulu Blan Madar, the reduction in yellow crazy ants appears to have improved the translocation outcomes.

Collectively, our research from the four translocations and conservation introductions shows that if blue-tailed skinks can establish, they will breed, forage for food and undergo rapid population growth. Despite the mixed results, our early results suggest that both translocations into large enclosures on Christmas Island and conservation introduction onto the Cocos (Keeling) Islands can increase the conservation status of this species. This is important, as blue-tailed skinks have been in captivity for over 10 years, and it is generally considered that captive animals do not survive as well in translocations as wild animals.

Monitoring the condition of the released blue–tailed skinks. Image: Jon-Paul Emery

LEFT: Outdoor exclosures containing captive populations on Christmas Island. Image: Jon-Paul Emery

Implications

Our findings contribute new knowledge on how to monitor blue-tailed skinks, and the factors that will improve translocation success for this Extinct in the Wild species in the future. We found that translocation success, for both reintroduction and conservation introduction, requires good planning, monitoring, community engagement and communication. On the Cocos (Keeling) Islands, we consulted and engaged with the local community from the beginning of the project. This has led to local tourism operators taking people to the islands to show them blue-tailed skinks and highlighting their conservation value.

The identification of giant centipedes on Christmas Island and yellow crazy ants on the Cocos (Keeling) Islands as threats to the persistence of blue-tailed skinks can be incorporated into future translocations of the skinks. We found that strategic post-release monitoring was vital to the success of these reintroductions. Monitoring allowed us to identify threats quickly and inform managers who could respond appropriately.

Knowledge of blue-tailed skink habitat requirements and preferences could help evaluate habitat suitability for further translocations, and this will assist in identifying other islands that could best support blue-tailed skinks. We incorporated preliminary habitat preference information into a second reintroduction site on Christmas Island, and this showed promising results prior to the invasion of wolf snakes into the site.

While these translocations have seen short-term success, long-term success cannot be guaranteed. The recent invasion of wolf snakes into the first release site on Christmas Island highlights this. We recommend ongoing research to determine other potential factors that impact translocation success, for example, whether there are interactions with introduced geckos (e.g., competition or predation), which are widespread on both Christmas and the Cocos (Keeling) Islands. Finding better methods for early detection of wolf snakes and centipedes into release sites and/or better ways to eradicate them will be critical for ongoing success.

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Further Information

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