Conservation translocation of banded and Shark Bay rufous hare-wallaby to Dirk Hartog Island, Western Australia

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Introduction

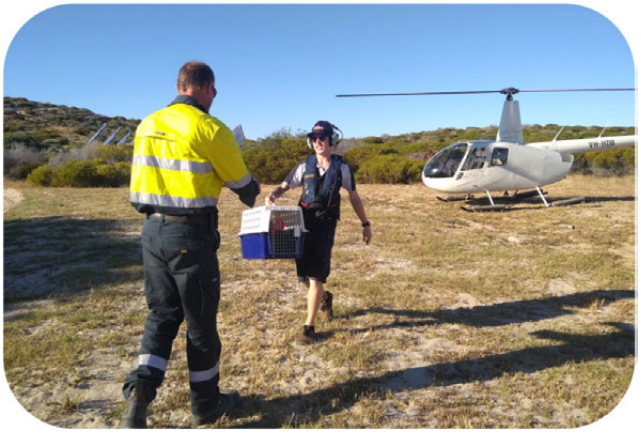
The Banded hare-wallaby (*Lagostrophus fasciatus fasciatus*) and Shark Bay rufous hare-wallaby (*Lagorchestes hirsutus bernieri*) are two small macropodid marsupials, listed as Vulnerable by the IUCN and under Australian Commonwealth and Western Australian state legislation. Although similar in appearance and behavior, these species are not closely related, with banded hare-wallabies the sole-living representative of the subfamily Lagostrophinae. Both taxa disappeared from the Australian mainland after European occupation, at least partially as a result of predation by non-native Red foxes (*Vulpes vulpes*) and Feral cats (*Felis catus*) (Woinarski *et al*., 2012), and the only remaining natural populations were found on Bernier and Dorre Islands in Shark Bay, Western Australia.

Subsequently, Banded hare-wallabies have been successfully translocated to Faure Island (also in Shark Bay) and Australian Wildlife Conservancy's Mt. Gibson Sanctuary, but the Shark Bay subspecies of Rufous hare-wallaby has never been translocated. Dirk Hartog Island is a large island (63,300 ha) in Shark Bay and while there are anecdotal reports that both taxa previously occurred there, no physical evidence (historical or subfossil specimens) were ever obtained. The successful eradication of Sheep (*Ovis aries*), Goats (*Capra hircus*) and Feral cats from Dirk Hartog Island by 2017 represented an opportunity to establish new populations of both taxa.

Banded hare-wallaby on Bernier Island © DBCA

Goals

- Establish new populations of both Banded and Rufous hare-wallabies.
- Maximize genetic



Hare-wallabies arriving by helicopter © DBCA

diversity of founder population of both taxa.

- Create a large, viable and genetically diverse populations of both taxa leading to delisting as threatened fauna.
- Re-establish ecosystem engineering processes mediated by the two taxa (e.g. browsing, grazing, modification of vegetation structure).
- Create a sufficiently robust and genetically diverse population which will provide a preferable source site for future reintroductions to other locations.

Success Indicators

- *Short-term:* Greater than 50% survival of translocated hare-wallabies in first four months.
- *Short to medium-term:* Body weight and condition maintained over nine months.
- *Short to medium-term:* There is evidence of recruitment in first nine to 36 months.
- *Long-term:* The area of occupancy increases.
- *Long-term:* Greater than 90% genetic diversity maintained after 10 years.

Project Summary

Feasibility: Dirk Hartog Island is geographically proximal to the only natural populations of both these taxa, with just 30 km separating the island from Dorre Island. Bernier and Dorre Islands have ostensibly similar vegetation to Dirk Hartog Island and all three islands fall within the same Interim Biogeographic Regionalization for Australia (IBRA) bioregion (Yalgoo). Since the destocking of sheep and goats commenced in 2005, vegetation has begun to recover with 38% of the island showing significant recovery (van Dongen *et al*., 2019). The subsequent removal of cats further increased the likelihood that the island could support hare-wallabies. While no specimens or subfossil remains have ever been obtained of either taxon from Dirk Hartog Island (Baynes, 1990), there is strong anecdotal evidence that both did once occur on the island (Shortridge, 1909).

Although formerly a pastoral property, Dirk Hartog Island became a National Park in 2009 and is managed by the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA). However, the former pastoral lessees retain a small freehold property on the island and operate a vehicle barge which

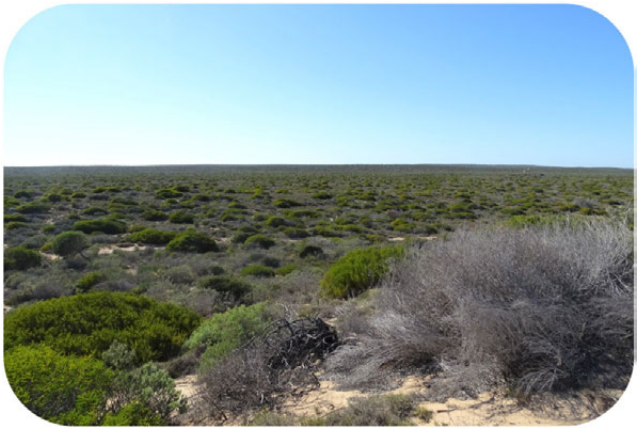
permits public access to the island. Visitor numbers to the island are generally low with a maximum of 20 vehicles permitted in the National Park at any time.

Implementation: A trial translocation of 12 individuals of each taxon took place on 29th and 30th August 2017, in a 2:1 female to male sex ratio. The focus of the trial was to better understand the challenges that a translocation of these taxa would entail, before commencing a full-scale release. Animals were transferred by charter vessel (approximately five hours journey) and Rufous hare-wallabies were treated with a sedative (diazepam) to assist with maintaining animals in a calm state. Both species received selenium and vitamin E, which are thought to play a role in minimizing the risk of capture myopathy. All 24 individuals were fitted with radio-telemetry collars and were monitored daily by ground radio-tracking for 12 weeks post-release. After this period, collared individuals were recaptured for assessments of condition and collar-fit. Monitoring was reduced to once every 4 - 6 weeks by fixed-wing aircraft to assess ongoing survival and animals were recaptured in May 2018 for collar removal and health-checks.

After the success of the 2017 trial, a full-scale translocation was commenced in September 2018 with 90 Banded hare-wallabies and 50 Rufous hare-wallabies released, this time in even sex ratios. Again, 12 individuals of each taxon were fitted with collars and monitored in the same fashion. However, the translocation of animals from Bernier and Dorre Islands employed the use of a helicopter, reducing journey time to approximately 30 minutes, while also minimizing other negative sensory stimuli.

Post-release monitoring: During the trial translocation, Rufous hare-wallabies underwent significant weight-loss in the first 12 hours after capture, with an average of 13% reduction (up to 18%). It was assumed this related to stress-related urination and hypersalivation. By comparison, Banded hare-wallabies did not show significant weight loss. This was followed by the first mortality four days post-release, with a male Rufous hare-wallaby found dead. A subsequent necropsy indicated capture myopathy as the cause of death. However, no further mortalities were recorded until collars were removed in May 2018. Recaptures of collared hare-wallabies found most were in average or above-average condition and six Banded hare-wallabies and 10 Rufous hare-wallabies were recorded as having pouch young.

Rufous hare-wallabies slowly regained weight but only three exceeded



Hare-wallaby release habitat © DBCA

their original capture weight (although some animals would have lost weight after weaning joeys).

During the full-scale translocation, initial weight-loss in Rufous hare-wallabies was minimal (average 3% in first 12 hours) and this was largely attributed to the shorter time and reduced stressors in transit by helicopter. No mortalities of collared hare-wallabies were recorded in the full-scale translocation in 2018, but a road-kill rufous hare-wallaby was discovered by rangers in May 2019. Signage has been erected to encourage visitors to the island to slow down outside of daylight hours but the risk of vehicle collisions with hare-wallabies and other wildlife may need to be better articulated to the public.

Major difficulties faced

- Management of translocation stress, particularly in Rufous hare-wallabies, was a major consideration. This species is vulnerable to mortality through capture or stress myopathy (Cole *et al*., 1993), which is initiated by exertional stress.
- Capture of hare-wallabies on Bernier and Dorre Islands involved hand-netting at night using a spotlight to locate animals. This, and the need to access the islands by sea at night was a major challenge, especially when hampered by inclement weather.
- Intensive post-release monitoring was made more challenging by large over-night movements, particularly by Rufous hare-wallabies.

Major lessons learned

- Whether originally native to Dirk Hartog Island or not, both Banded hare-wallabies and Rufous hare-wallabies adapted quickly to their new environment and thrived.
- Reducing time in transit and employing a transport medium with less negative sensory stimuli (noise, motion, scent) helps minimize stress, particularly for vulnerable species like Rufous hare-wallabies.
- Hare-wallabies can be fitted with telemetry-collars without causing mortality from entanglement, assuming due care is used to achieve optimal collar-fit.
- Both Banded hare-wallabies and Rufous hare-wallabies undertake large movements during the initial post-release period but often return to their initial release location.
- Vehicles represent a potential source of mortality for hare-wallabies on Dirk Hartog Island, which is something that will need to be managed.

Success of project

Highly Successful*	Successful	Partially Successful	Failure

*** - ranking for both Banded hare-wallaby and Shark Bay rufous hare-wallaby**

Reason(s) for success:

- Successful removal of sheep, goats and cats from Dirk Hartog Island.
- Highly suitable habitat at release sites.
- Trial translocation undertaken initially to help inform and improve strategies for full-scale translocation.
- Expertise of field-team with collaring and handling of hare-wallabies and administering drugs.
- Large translocation numbers in a rapid, intense translocation session.

References

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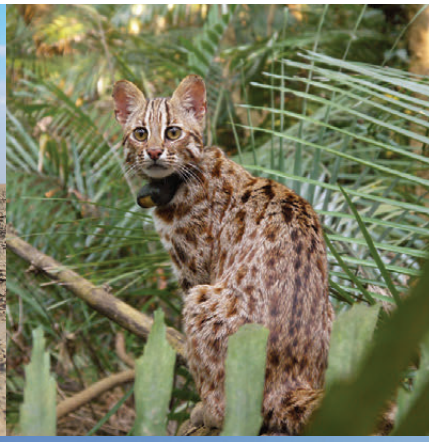

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