

Monitoring and translocation of banded and rufous hare-wallabies

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Background

The banded hare-wallaby (*Lagostrophus fasciatus*) and rufous hare-wallaby (*Lagorchestes hirsutus*) are small macropodid marsupials currently threatened with extinction. Both the banded hare-wallaby and Shark Bay rufous hare-wallaby (*L. h. bernieri*) are listed as vulnerable. The central Australian rufous hare-wallaby (mala) (*L. h. undescribed subspecies central Australia*) is listed as endangered. All three taxa occur in Western Australia.

Naturally occurring wild populations of both the banded hare-wallaby and the Shark Bay rufous hare-wallaby are restricted to Bernier and Dorre Islands in Shark Bay and mala to one small population in the Tanami Desert in the Northern Territory. Introduced predators are understood to have been a critical factor in their widespread decline but successful translocations have established new populations of all three taxa on predator-free islands or in fenced enclosures on the mainland.

Translocations to new sites remain an important recovery action for these taxa to help reduce their risk of extinction. Effective monitoring of both established and translocated populations is critical for tracking the recovery of these species, though both species of hare-wallabies have traits that make this challenging.

Key considerations for monitoring and translocation of hare-wallabies include:

- Hare-wallabies are trap-shy and not readily captured using conventional methods, particularly in the presence of more trappable species. Hand-netting at night is the typical capture method.
- Hare-wallabies (particularly rufous) are vulnerable to capture/stress myopathy which is a major risk factor when trapping or translocating these species and is usually fatal.
- Distance sampling using spotlight surveys provides an alternative method of monitoring the wallabies, but this method is labour-intensive.
- Hare-wallabies fitted with radio-telemetry collars may be vulnerable to limb entrapment or entanglement with vegetation.

Monitoring of banded and Shark Bay rufous hare-wallabies on Bernier and Dorre Islands and the translocation and post-release monitoring of both species to Dirk Hartog Island National Park between 2017 and 2019 allowed for an assessment and refinement of monitoring and translocations procedures.



Banded hare-wallaby (top), Shark Bay rufous hare-wallaby (middle) and mala (bottom). Photos C Sims, C Buters and S Turner (DBCA).

Findings

- Hare-wallabies are unlikely to be captured using live-capture trapping methods (e.g. Sheffield or Thomas traps), unless deliberately targeted by pre-feeding and/or are habituated to being lured into traps.
- Distance sampling methods from spotlighting surveys are more effective than trapping but may be limited by the difficulty in obtaining a minimum of 60 detections to obtain robust population estimates. This is particularly relevant to Bernier and Dorre Islands, where access is difficult and time to complete surveys limited, and in newly established populations where densities may initially be low.
- Camera traps can be useful for identifying areas where hare-wallabies are present, but detections may be infrequent, particularly of banded hare-wallabies, possibly due to their small home-ranges and preference for dense vegetation. Hare-wallabies do not reliably approach cameras with food lures.
- Acute stress in these species during handling may manifest through fluid loss from excess urination and hypersalivation, potentially leading to substantial weight loss (≤ 18 percent of body weight in about 12 hours recorded in rufous hare-wallabies). This can be managed using sedatives (diazepam), anti-diuretics (atropine) and reducing time and disturbance during transit between capture and release sites.
- Intensive monitoring of translocated hare-wallabies using radio-telemetry collars (12-13 weeks) found that survivorship was high with just one mortality recorded (adult male rufous hare-wallaby, four days post-release) out of 48 animals. Capture myopathy was confirmed as cause of death through rapid retrieval of the carcass and performing a necropsy and taking histology samples in the field. Every effort was made to achieve optimal collar fit and this resulted in no evidence of entrapment or entanglement being recorded, although some animals showed signs of minor injury (e.g. small sores).
- Faecal DNA sampling may be an alternative non-invasive approach to estimate population density, even in areas where both banded and rufous hare-wallabies co-exist. *In-situ* DNA degradation trials indicated that DNA can be successfully extracted from faecal pellets (scats) after ≥ 21 days exposure to ambient environmental conditions. Microsatellite markers have been identified that discriminate between these species and a pilot study collecting scats along transects in areas where both species occur have indicated good success in amplifying DNA from samples of unknown age and identifying scats to species.

Management implications

- Translocations of all three hare-wallaby taxa considered here are likely to remain important recovery actions for these species throughout Australia. However, to maximise the positive outcomes for both conservation and animal welfare, translocations should make provision for:
 - minimising transfer times between source and release areas
 - intensive post-release monitoring, including radio-tracking, to assess survivorship
 - use of sedatives and anti-diuretics to help reduce stress and its physiological effects
 - minimising additional stressors during captivity.
- Monitoring of hare-wallaby populations should focus on less invasive methods, such as camera traps, distance sampling and faecal DNA monitoring. Faecal DNA monitoring has the advantage of providing information at the individual level, as well as robust data for mark-recapture analyses.
- If using collars for transmitter attachment, collar fit must be optimal to avoid entrapment or entanglement but not affect breathing, and allow room for growth.
- Mortalities should be investigated as soon as possible to determine cause of death and whether capture myopathy is implicated. It is recommended that a necropsy be performed in the field and samples taken for subsequent histopathology analysis.