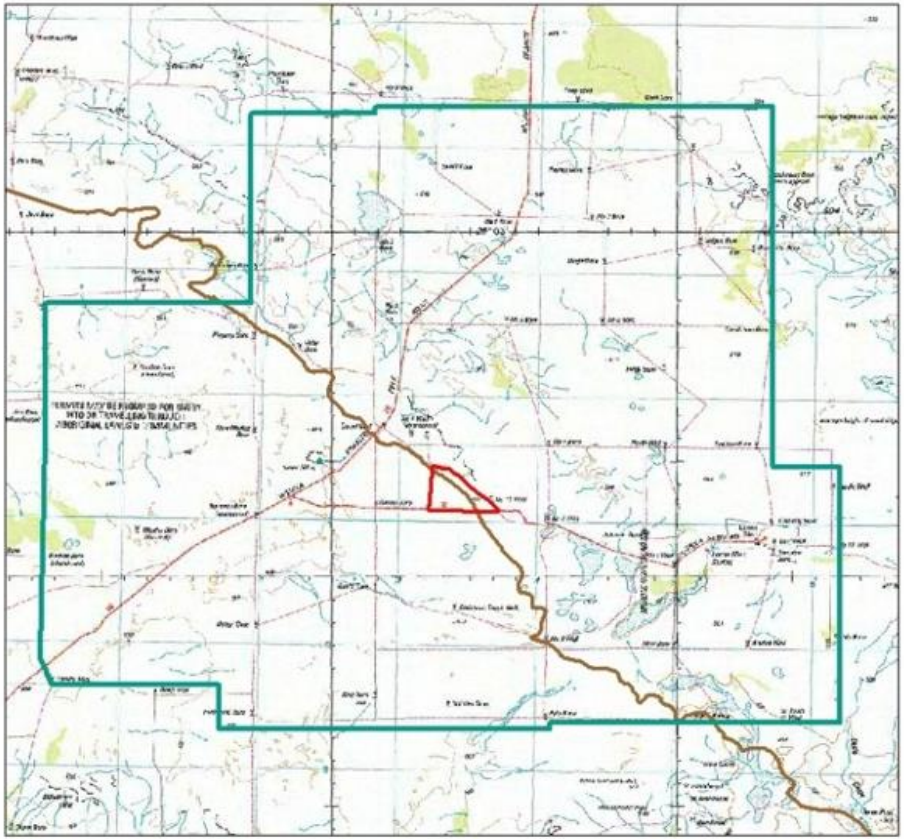
Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

TARLKA MATUWA PIARKU (ABORIGINAL CORPORATION) RNTBC

18 years of conservation at Matuwa Kurrara Kurrara



Legend

- LG
- LG pen boundary
- IBRA Vegetation - WA

N

0 2.5 5 10 15 20 Kilometers

Projection: Universal Transverse Mercator
MGA Zone 51. Datum: GDA94

Pastoral properties Lorna Glen and Earaheedy purchased by DBCA in 2000

WA Naturalists complete bird survey in 2000 and find 65 bird species Coates (2010)

2000

Lorna Glen and Earaheedy are destocked and watering points are turned off.

Goldfields DBCA Regional staff reduce feral herbivores and kangaroo numbers

Extensive biological survey at Matuwa by Cowan et al. in 2003: 84 bird species, 80 reptile species,16 small mammals, 5 frogs (Naturemap, 2017).

First aerial baiting trial for feral cats in 2003. Algar et al (2013)

In 2004, 11 permanent survey tracks for feral cats were established. The tracks varied in length from 10-16.5 km and were a minimum of 5 km apart. Tracks counted from ATV for 5 consecutive days. Track Activity Index (TAI) used to measure relative cat abundance on landscape.

2005

In 2006 searched caves for evidence of the normal species assemblage Baynes (2006). Bones, or pellets from predatory birds typically provide evidence.

Possum, Wayurta, *Trichosurus vulpecula* reintroduced to the open landscape in 2007

In October 2007 bilbies, Ninu, *Macrotis lagotis* are released SE of Pink Lake. Chapman (2013)

In 2007 start aerial baiting for feral cats over the whole area. Algar et al (2013)

Mala (*Lagochestes hirstutus*) were released into open landscape in 2008, but it was unsuccessful.

In late 2009, a 1,100 hectare predator-free pen is built to protect more susceptible species such as boodie and mala: 1.8m high fence with 2 solar-powered electric wires.

Solar powered electric fence on predator-free pen at Matuwa.

In 2009 a night parrot (*Pezoporus occidentalis*) is sighted in and near Matuwa when Eremophila sp. is seeding prolifically. Hamilton et al (2017)

Eremophila seeds. Photo: Neil Hamilton

2010

In 2010, 175 burrowing bettong, boodie (*Bettongia lesueur*) are translocated to the predator-free pen from Barrow Island and the Shark Bay Islands. Genetic analysis reveals asymmetrical breeding with smaller BI males being successful (Thavornkanlapachai et al, In Press).
Wild release of 26 boodies fails.

From 2011-13 68 mala introduced to the predator-free pen. Still present.

160 Golden bandicoots (*Isoodon auratus barrowensis*) translocated to the pen from Barrow Island in 2010. Population viability analysis suggests additional animals needed to prevent genetic erosion. Ottewell et al (2014)

Starting in 2011 Simon Cherriman has been researching diet, home-range and recruitment of wedge-tailed eagles (*Aquila audax*) at Matuwa, and teaching members of the Martu community about eagles.

Introduced Shark Bay mouse (*Pseudomys fieldi*) to pen in 2011 & 2012, but failed to establish.

Trapping inside and outside pen finds that mulgara move through the fence and pen provides some refuge. Read (2012)

April 2012 experiment that determined cotton bush (*Ptilotus obovatus*) grows more vigorously on active boodie (*Bettongia lesueur*) warrens Chapman (2015).

In 2013 start research on interactions among introduced predators. Their habitats and niche overlap. Wysong (2016)

Aug 2013 experiment that determined boodies (*Bettongia lesueur*) do disperse sandalwood seeds and probably facilitate recruitment Chapman (2015).

Horseback surveys, scat collection for genetic analysis, and track surveys in 2015 reveal ~600 bilbies resident at Matuwa. (Dziminski and Carpenter 2014; Burrows et al 2015; Parks and Wildlife 2016).

93 golden bandicoots are translocated from the predator-free pen into the wild in September 2015. Still present.

2015

BirdLife Australia and Neil Hamilton document bird species assemblage at Matuwa with an annual bird banding trip in spring. e.g. Bell et al (2015)

The Lorna Glen/Earaheedy area becomes Matuwa Kurrara Kurrara, an exclusive native title Indigenous Protected Area in 2015.

2016-17 Kurrara Kurrara fauna survey commenced; 53 reptile species, 9 small mammals and 2 frogs recorded so far

2018 →

Genetic analysis of brushtail possums suggests need for more landscape-level possum survey and maybe another introduction Semple et al (In press).

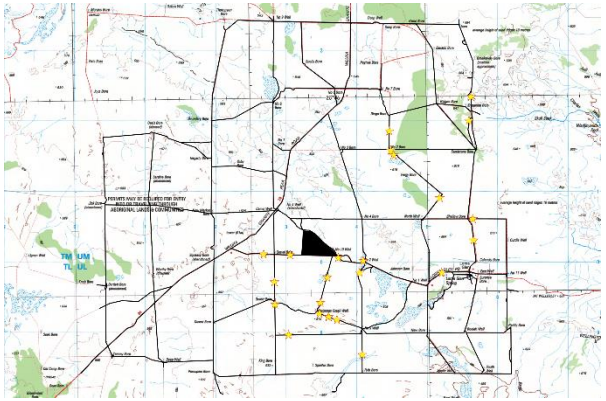
2000: Destocked, water turned off, herbivore control

2001-2006: Biological survey

- 36 species of non-volant mammals sub-fossil
- 13 extant
  - 3 Muridae
  - 6 Dasyuridae
  - 2 Macropodidae
  - echidna
- 6 maybe, but not recorded recently
- 12 locally extinct
- 5 totally extinct

- 154 species recorded since 2003

Photo: J. Jackson



2003-2009: Predator control

TAI < 10 cats/100km

2003-2009: Predator control

TAI < 10 cats/100km

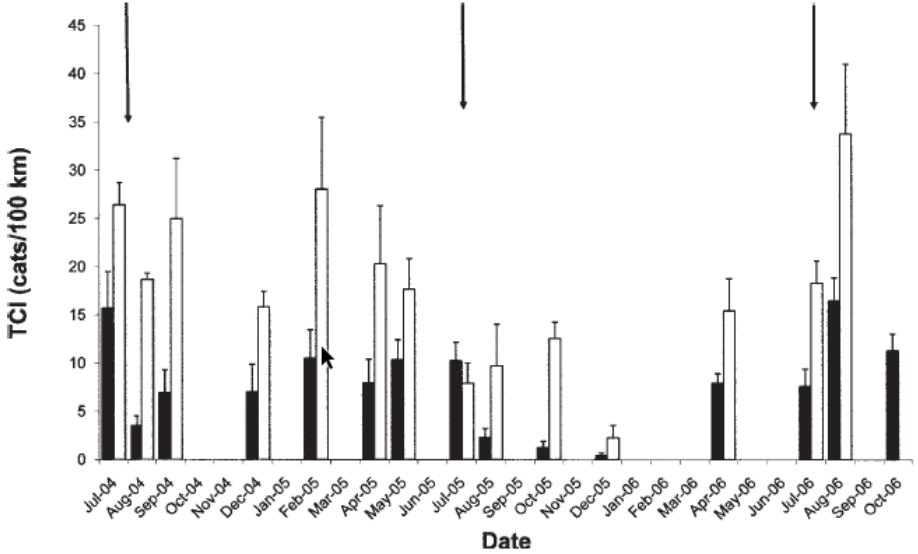


Figure 5. TCIs ± SE for each survey period across 2004–2006. Closed bars represent baited sites and open bars represent non-baited sites. No survey of the non-baited site was conducted in October 2006. Arrows indicate the timing of baiting programs.

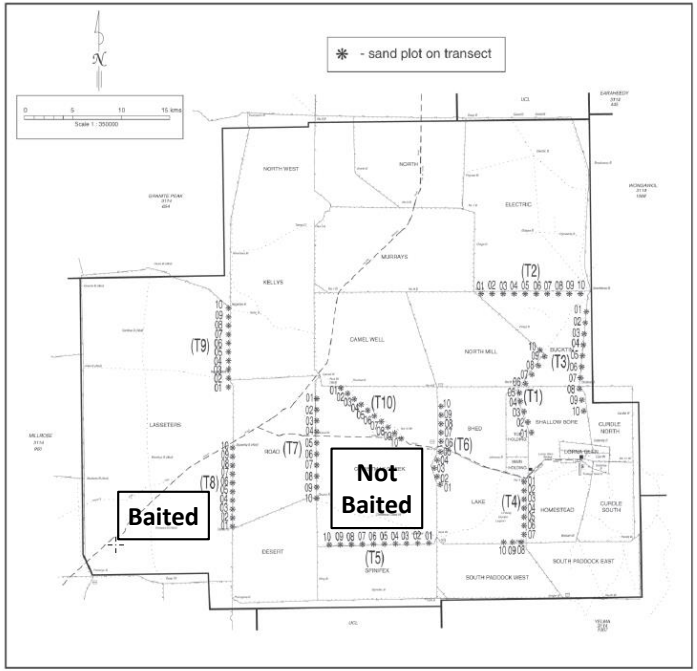
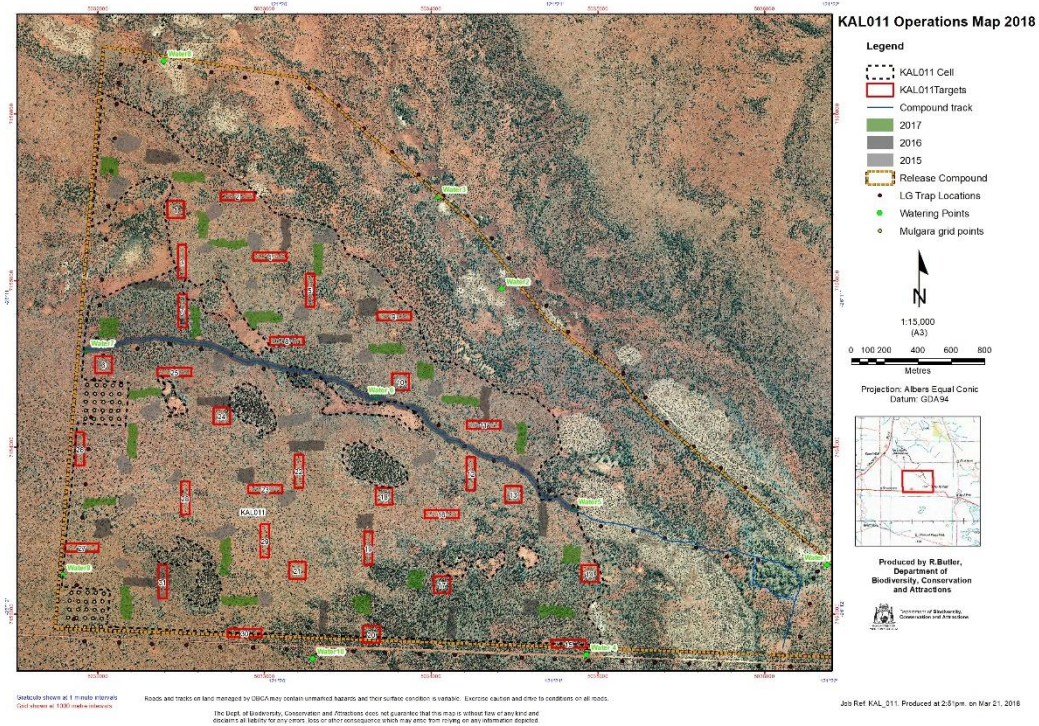


Figure 3. Location of the 10 permanent survey tracks (T1–T10) used in 2007–2009.

Algar et al. 2013

2006: Fire management plan



2007-2009: Bilby (Macrotis lagotis)

- 130 bilbies released from PCBC, RTD, and Thistle Islands, SA
- Source of bilby effected cause mortality
  - Captive bred PCBC animals and Thistle Island animals suffered starvation/dehydration
  - Fewer Thistle Island animals were lost to predation
- In 2016 bilby scat surveys detected 23 individuals in 4000ha
  - ~ 600-800 bilby in 104,000 ha suitable habitat

2007-2009: Brushtail possum (Trichosurus vulpecula)

- 2007: 8 possums released in *Eucalyptus camaldulensis*
- 2008: Another 63 released
- 2015: Extensive survey revealed possible isolated sub-populations
- Tissue samples (n=33) revealed recent bottlenecking with effective population size Ne~20 (Semple et al. unpub)

2009: Night parrot (Pezoporus occidentalis) sighted

- 1854: last specimen collected in WA, last sighting 1912

- 2009: First sighting in WA at Matuwa by K. Withnell, N. Hamilton and M. Onus
- 2016: First ARU recordings in WA at Matuwa
- 2017: Bruce Greatwich took first photo in WA
- 2017: First bird captured in WA by N. Hamilton, A. Burbidge, N. Leesburg, T. Douglas, and M. Holdsworth

- 163 years since last bird held

Photo: Bruce Greatwich

DNA collected.
Photo: N. Hamilton

2008-2012: Mala (Lagorchestes hirsutus)

- 29 released into old spinifex on open landscape in 2008, 16 tracked, cats took 55% within 10 weeks
- 34 released into enclosure 2011 another 12 in 2012
- Established but difficult to monitor due to high abundance of boodies and bandicoots.
- Spotlighting, DISTANCE sampling, camera-traps

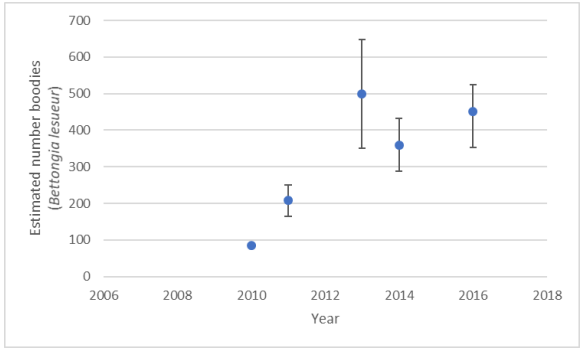

Photo: J. Dunlop

2009-2010: Predator-free enclosure

- 1,100 hectare predator-free pen
- 1.8m high fence
- 2 solar-powered electric wires
- Modified drainage berms
- Full-time volunteer caretakers

2010: Boodie (Bettongia lesueur)

- 86 Barrow Island boodies released into pen 2010
- 27 released to open landscape -> wild dog predation 8/16 in 2 weeks
- Asymmetrical introgression -> Favours smaller BI males
- Potential exceed carrying capacity
- Scatter-hoard sandalwood seeds
- Digging -> soil nutrient levels & plant biomass

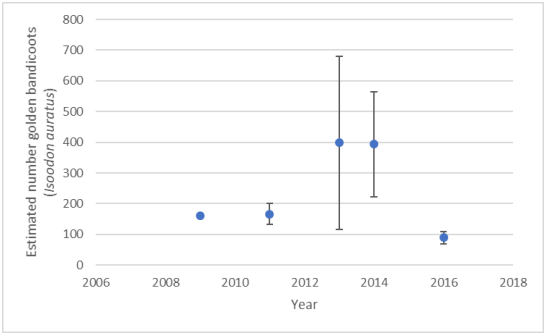


Extinct mainland, BI, and Dorre Island boodie skulls.

Arid Recovery, SA, boodie browsing

2009-2015: Golden bandicoot (Isoodon auratus)

- 160 Barrow Island golden bandicoots released into pen 2009
- 49 released to open landscape May 2012 -> 77% lost predation
- 93 released to open landscape 2015 -> intensive predator control
    - one caught in May 2017
- Genetic (PVA) predicts susceptible to genetic loss recommends population augmentation after 5-10 years (Ottewell et al. 2014)
- Tracking data: feed in both mulga and spinifex but primarily daytime refuge in spinifex



2011: Shark Bay mouse (Pseudomys fieldi)

- 37 released June 2011
- 51 released April 2012, 10 tracked
- Failed probably due to mulgara predation

2011: Wedge-tail eagle (Aquila audax)

- Worried about aerial predation -20 microchips retrieved
- Attach solar-powered GPS/Satellite Platform Transmitter Terminals to fledging eagles at Matuwa and Perth hills (S. Cherriman)
- Territories (~20-50 km^2) occur in rockier mulga shrublands NE Matuwa

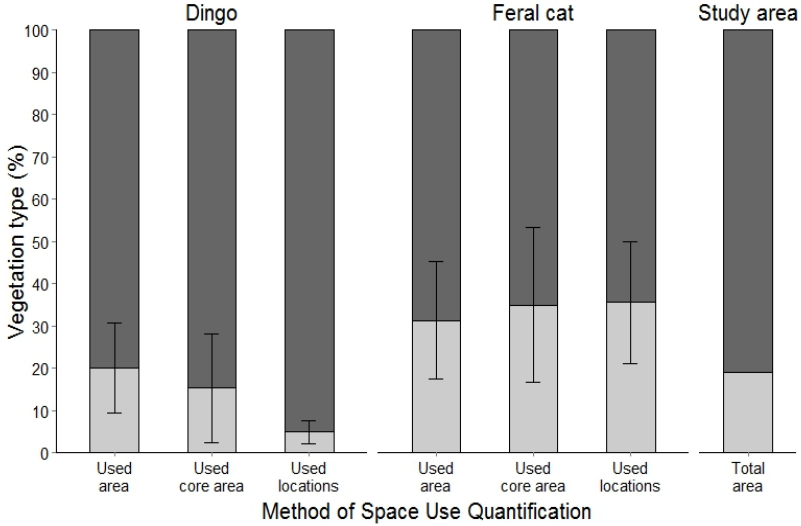
2012: Mulgara (Dasycercus blythi)

- Trapping and collaring inside and outside enclosure
- No significant difference in population numbers, morphometrics and home ranges of *D. blythi* inside and outside the pen, but the density of feral cats was not determined

Modified Elliot trap to reduce boodie and bandicoot interference

2013-2016: Mesopredator interactions

- Proportion of grassland (light grey) and woodland (dark grey) “used” by dingoes and feral cats
- Some habitat selection but no evidence of dingoes suppressing cat abundance



Wysong 2016

2015: Exclusive possession native title determination

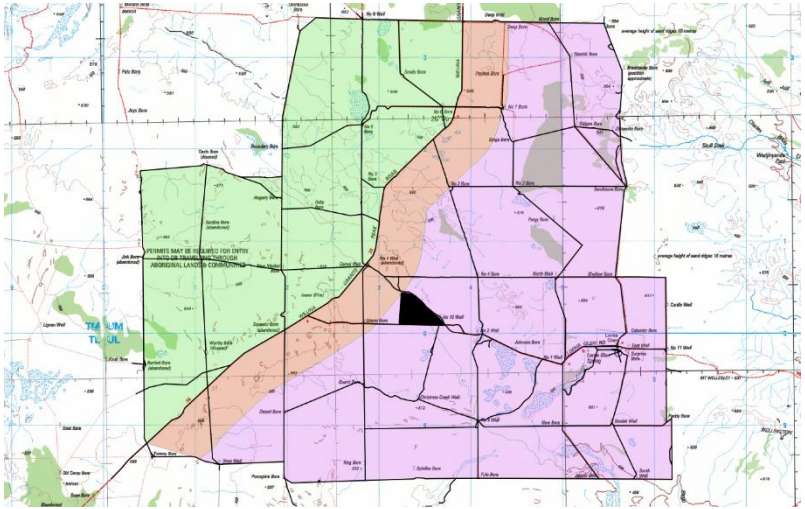
- Wiluna #2 Determination, September 2013
  - right of possession, occupation, use and enjoyment to the exclusion of others of the determination areas

2016: Malleefowl (Leipoa ocellata)

- First sighted at Matuwa in 2003
- 2016 first mound was recorded and courtship displays observed
- Now able to predict hatching dates
- One chick captured at mound translocated to the enclosure
- No method of tracking chick

2018-> To do

- Cost-benefit of cat control techniques?



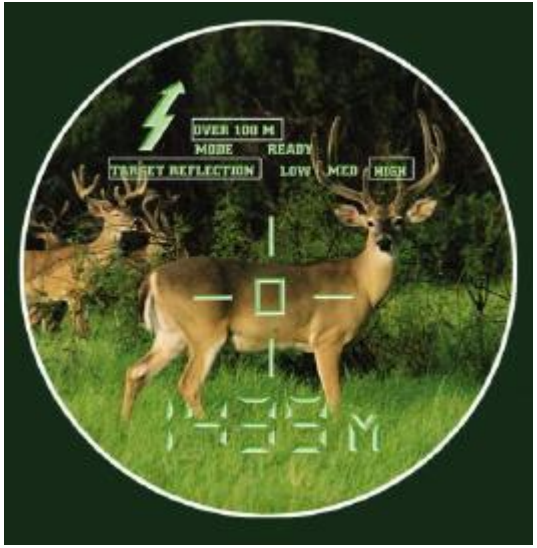
Camera-traps and track counts <10 tracks/100km

DBCA Western Shield aerial bait drop

DBCA volunteer Errol Thoomes with the trailer mounted ground baiting machine he designed and built (Burrows and Thoomes 2017).

2018-2023: To do

- Cost-benefit of cat control techniques?
- Monitor flora and fauna inside the predator-free pen



2018-2023: To do

- Cost-benefit of cat control techniques?
- Monitor flora and fauna inside the predator-free pen
- Monitor fauna populations across landscape when they are naturally at low density?
  - Is there competition among species inside the enclosure?

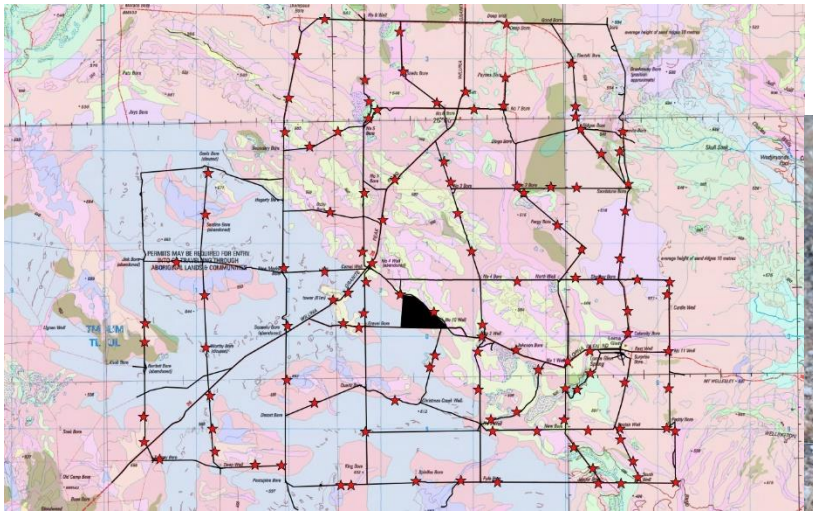
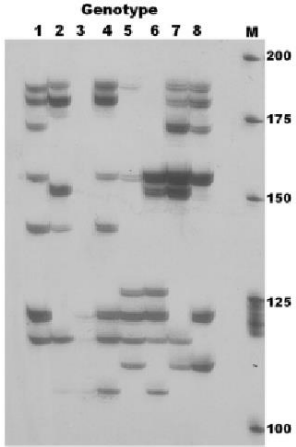
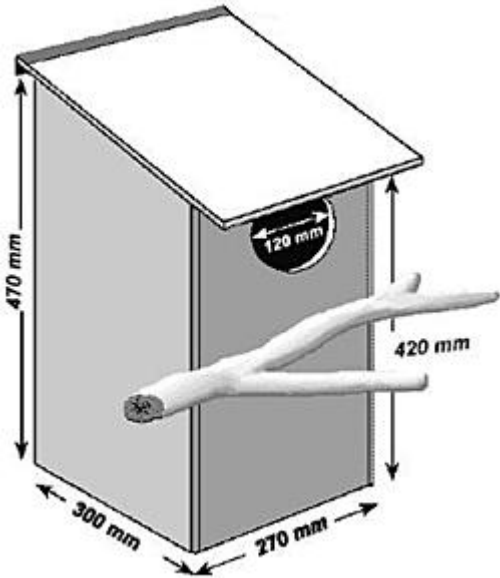


Photo: Erin Bowkett

2018-2023: To do

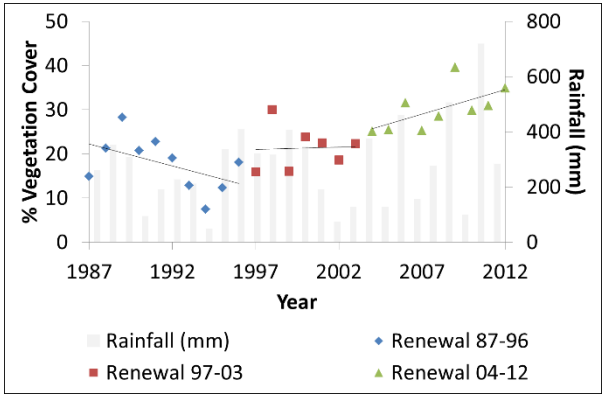
- Cost-benefit of cat control techniques?
- Monitor flora and fauna inside the predator-free pen
- Monitor fauna populations across landscape when they are naturally at low density?
- Genetic analysis suggests supplement populations of existing species
  - Do we need more animals or supplement habitat?
  - Lots of golden bandicoot DNA to work with





2018-2023: To do

- Cost-benefit of cat control techniques?
- Monitor flora and fauna inside the predator-free pen
- Monitor fauna populations across landscape when they are naturally at low density?
- Genetic analysis and supplement populations of existing species
- Measure the value of 20 years of herbivore control?



Lohr et al. 2014

2018-2023: To do

- Cost-benefit of cat control techniques?
- Monitor flora and fauna inside the predator-free pen
- Monitor fauna populations across landscape when they are naturally at low density?
- Genetic analysis and supplement populations of existing species
- Measure the value of 20 years of herbivore control?
- Reintroduce red-tail phascogale, pale field rat

2018-2023: To do

- Cost-benefit of cat control techniques?
- Monitor flora and fauna inside the predator-free pen
- Monitor fauna populations across landscape when they are naturally at low density?
- Genetic analysis and supplement populations of existing species
- Measure the value of 20 years of herbivore control?
- Reintroduce red-tail phascogale, pale field rat
- Release boodies on landscape or create leaky fence?
  - Investigate soft-release methods

2018-2023: Lots to do

- Cost-benefit of cat control techniques?
- Monitor flora and fauna inside the predator-free pen
- Monitor fauna populations across landscape when they are naturally at low density?
- Genetic analysis and supplement populations of existing species
- Measure the value of 20 years of herbivore control?
- Reintroduce red-tail phascogale, pale field rat
- Release boodies on landscape or create leaky fence?

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Thanks

Martu Traditional Owners

Dept. Parks and Wildlife staff (GFR, Sc. & Cons)

Volunteers

Homestead caretakers and operations staff.

Gorgon Gas Project – fauna translocation offset funding

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