

Bridled naitail wallabies in Taunton National Park (Scientific): Habitat requirements of a recovering population in a mosaic of mixed-age vegetation

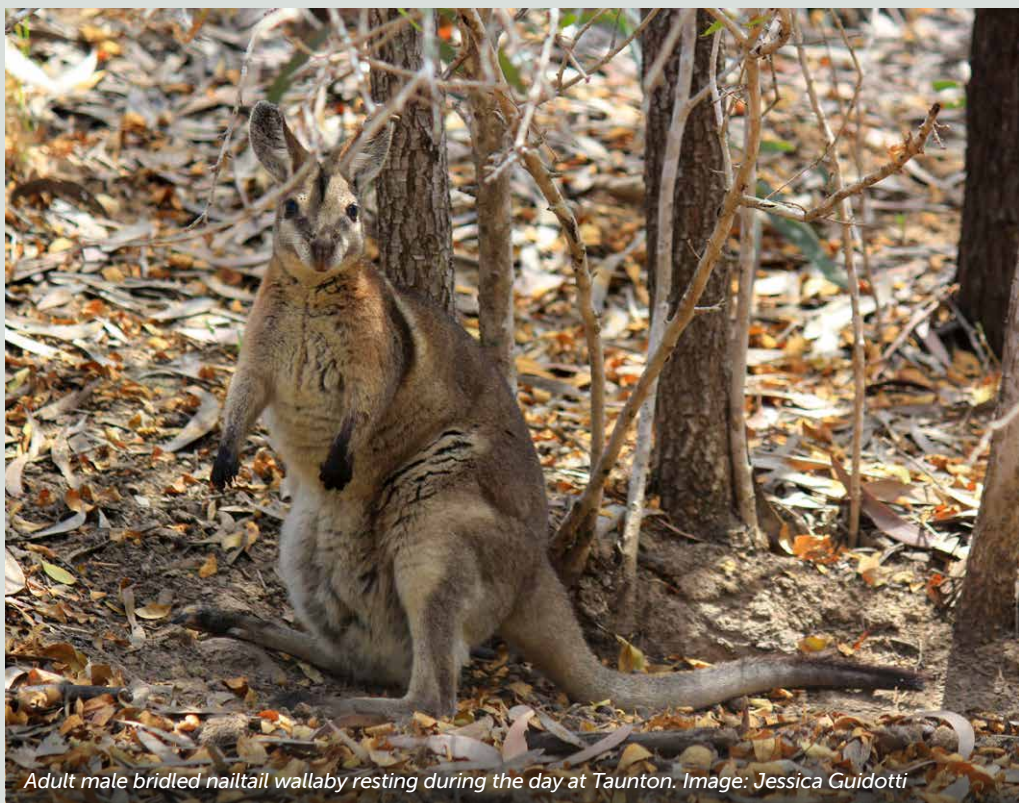
In brief

Once widespread across eastern Australia, the last remaining wild population of bridled naitail wallabies occurs at Taunton National Park (Scientific) (hereafter, Taunton) which is managed by the Department of Environment and Science (DES).

Feral cat and dog control is a key management strategy used by DES to support the recovery of the bridled naitail wallaby. Targeted, intensive cat control using baiting, trapping and shooting, has been conducted by DES on Taunton since 2013. In recent years there has been a three-fold increase in the core population of the bridled naitail wallaby population, which occurs in the north-east section of Taunton. There is some evidence that the population is more concentrated in this area of Taunton now than it was in the 1980s, largely because sub-populations in other parts of Taunton have decreased. Analysis of the distribution of the bridled naitail wallaby in relation to vegetation age may help managers to plan timing of vegetation management to increase habitat suitability in less-used areas of Taunton, thus increasing the potential of the population to expand even further and grow more with ongoing predator control.

Using aerial photographs and ground truthing via vegetation transects we created detailed maps of vegetation change in the last four decades since the species was rediscovered at Taunton. We assessed how the distribution of bridled naitail wallabies has been associated with vegetation type and age. We confirmed that young, dense regrowth and remnant brigalow woodland have been the species' preferred habitats, and changes in bridled naitail wallaby

distribution appear to have tracked vegetation age. Intermediate-aged brigalow has been less preferred. This suggests that manipulation of vegetation structure could improve habitat, for example, thinning of intermediate-aged brigalow in less-used areas of Taunton may improve the value of these areas for bridled naitail wallabies by facilitating growth of understorey grasses, shrubs and forbs, which provide both shelter and food for the wallabies.



Adult male bridled naitail wallaby resting during the day at Taunton. Image: Jessica Guidotti



Background

At the time of European arrival, bridled nailtail wallabies (*Onychogalea fraenata*) were common and widespread west of the Great Dividing Range from Queensland to western Victoria and possibly into South Australia. Habitat loss, hunting for fur, shooting (as they were believed an agricultural pest), competition with sheep, and introduced predators, such as the red fox, drove rapid and widespread declines. The species was believed extinct for 36 years.

In 1973, the bridled nailtail wallaby was rediscovered by a fencing contractor on grazing land in what is now Taunton National Park (Scientific). Following the rediscovery of the population, the Taunton property (4500 ha) was acquired in 1979 by the Queensland Government for the conservation of the bridled nailtail wallaby. The adjoining property of Red Hill was purchased in 1984, and the two properties (together 11,626 ha) became Taunton Reserve, which was gazetted as a National Park (Scientific) in 1992.

Taunton is not open to the public. It contains remnant and regenerating brigalow forest, open grassy eucalypt woodlands and other acacia-dominated ecosystems. In 2020, there were around 1500 bridled nailtail wallabies here, which is ~85% of the global population. Three successful translocated populations have been established; one in the wild at Avocet Nature Reserve (QLD) and two in feral predator-proof fenced conservation reserves at Pilliga State Conservation Area and Scotia Sanctuary (NSW).

Ongoing threats to the population at Taunton include predation by feral cats and dogs, and pasture limitation due to droughts and competition with buffel grass. Foxes would be a major threat to the wallaby if they were to establish in the park. Bridled nailtail wallabies are especially vulnerable to predators due to their small size and tendency to freeze and rely on hiding in vegetation cover when there is danger, rather than flee. Regenerating brigalow provides dense cover. Juvenile wallabies often hide in ground-level vegetation or fallen timber away from their mothers, and are particularly at risk from feral cat predation (Fisher 2000, Fisher and Goldizen 2001). Trapping, shooting and baiting by DES has reduced cat and dog predation pressure on bridled nailtail wallabies and resulted in an increase in the core population at Taunton from around 200 in 2013 to approximately 1200 in 2020.

Historical clearing of brigalow vegetation in Queensland has led to a highly altered and fragmented landscape. According to Cameron (2005), the Taunton property was released for development under the government 'Brigalow Development

Scheme' through a ballot block lease in 1969, and clearing of the Taunton property part of Taunton National Park started in mid 1972. By late 1976, 400 ha had been cleared from the Taunton property and, in 1977–78, 3000 ha was cleared. The Taunton property purchase by DES occurred the next year in 1978. There is less detailed information on the timing and area of clearing on the neighbouring Red Hill property, but some of it was developed much earlier. According to Cameron (2005), 'Redhill' station lease appears on a 1884 map, and in 1885 half of the property was termed 'dense brigalow scrub'. Rosewood scrub in the central western section of Red Hill station was cleared, and the timber used for fencing and sawmilling in the 1950s. Other than this, the timing of clearing of the Red Hill (western) part of Taunton National Park is unknown, although Cameron (2005) cites information that around a quarter of the current National Park area had been cleared and sown with buffel grass before DES purchased Taunton in 1979.

The current population size of bridled nailtail wallabies at Taunton is believed to be the highest it has been since Taunton became a national park, but their distribution remains mainly concentrated in the north-eastern section. There is evidence from previous studies that they were more widespread across the two former properties when it was first assessed in the 1980s. A better understanding of the association between vegetation age, type and distribution would inform vegetation management and planning, to benefit bridled nailtail wallaby population growth and expansion.

Juvenile bridled nailtail wallaby at dusk at Taunton National Park. Image: Jessica Guidotti





Research aims

This research aimed to map changes in vegetation structure over time, particularly brigalow. We aimed to: 1) determine how vegetation attributes have changed with age, particularly brigalow, and including the relatively poorly known Red Hill section of the National Park; and 2) assess how changes in bridled naitail wallaby distribution have been associated with vegetation age classes at Taunton.

What we did

This project was a partnership between researchers from The University of Queensland and the Queensland Department of Agriculture and Fisheries, and the DES (Department of Environment and Science). Field work was conducted in Taunton, in eastern central Queensland in 2017–18.

To investigate the habitat preferences, we collected data on vegetation type, age, height, canopy structure and understory structure in on-ground vegetation surveys (102 vegetation transects 100 m x 10 m, allocated systematically to ensure that all vegetation types and ages were represented). To examine

vegetation changes over time and assess associations between age and attributes of major vegetation types at Taunton, we compared historical aerial photographs showing distribution of vegetation patches and clearing dates with current vegetation attributes. We assessed a series of aerial photographs from 1952 to 2018 to identify the year when clearing occurred in discrete patches of vegetation. We compared habitat attributes with wallaby distributions and population sizes (published estimates of population size, and estimates in 2017–18 based on spotlighting and trapping during this study).

Key findings

Major periods of clearing included 1963, when sections in the south-east dominated by poplar box and Moreton Bay ash vegetation were cleared (total area cleared 1151.6 ha). In 1973, large sections along the southern boundary of the park were cleared, consisting of brigalow, mountain yapunyah and Dawson gum-dominated vegetation (total area cleared 1521.4 ha). The vegetation types most affected by clearing have been Dawson gum and brigalow. Half of the Taunton property (total area 1890.4 ha) was 'pulled' (cleared) in 1978 (before the property was purchased by DES), and 744.4 ha of brigalow was cleared around the northern cattle yards and in the centre of the Red Hill property in 1985.

Bridled naitail wallabies showed an overall preference for dense, young

brigalow regrowth (between 6 and 13 years old) and mature remnant brigalow patches. Peak habitat suitability indicated by historical wallaby population density occurred in brigalow regrowth around 13 years old. Suitable shelter and food availability were also highest in these types and ages of vegetation.

High stem densities in intermediate-aged brigalow regrowth patches can slow the recovery of brigalow woodlands towards a mature structure, because high stem density increases competition for nutrients, water and light. Thinning some areas of intermediate-aged brigalow (preferably using chemical methods to avoid soil disturbance, which might encourage grass) has reduced stem density in experiments, and resulted in canopy height increases and

growth of understory grasses, shrubs and forbs (Dwyer and Mason 2018). A similar method of vegetation manipulation in some patches of dense regrowth would be one possible option at Taunton, to increase shelter and food in some areas with intermediate-aged brigalow that are currently less-used by bridled naitail wallabies.

One method that we used to assess distribution and population attributes of bridled naitail wallabies during this study was camera trapping. We found many identifying features in the appearance of individual bridled naitail wallabies. We successfully used camera trap images to uniquely identify individuals. This method may be useful for non-invasive monitoring in the future.



Implications

The findings of this research build on earlier studies of habitat variables and preferences. Information on how fast vegetation at Taunton has changed in structure as the population distribution of bridled nailtail wallabies has changed can inform aspects of habitat management for bridled nailtail wallaby conservation at Taunton, and other (translocated) populations of the species.

The age and structure of vegetation patches influence the likelihood of presence, and the population density of bridled nailtail wallabies. Both young regrowth and mature remnant patches of brigalow have been important habitat types for bridled nailtail wallabies.

Juvenile bridled nailtail wallaby at night at Taunton. Image: Jessica Guidotti



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Further Information

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