Department of Environment and Conservation

Western Wildlife

July 2006
Vol. 10, Number 3

NEWSLETTER OF THE LAND FOR WILDLIFE SCHEME

REGISTERED BY AUSTRALIA POST PRINT POST: 606811/00007

QUOKKA HABITAT MANAGEMENT AND FIRE IN THE SOUTH-WEST

Marika Maxwell

The quokka is a very elusive creature so it is no wonder that so many people believe that they are only found on Rottnest Island. In truth the quokka has always been on the mainland but its nocturnal behaviour and habitat preferences mean that is it rarely seen. The quokka (*Setonix brachyurus*) has a rounded body with grey-brown fur and a relatively short and almost hairless tail with rings similar to that of rats. They have small rounded ears and a wide face. The adult head-body length can reach up to 55cm. Adult females range from 1.6-3.3kg and males 2.5-4.5kg.

The species is declared threatened under the WA Wildlife Conservation Act because it has declined in numbers and extent.

On the mainland quokkas once occurred along the coast and adjacent high-rainfall forested areas from Jurien Bay to 50km east of Albany. Now they are mainly restricted to higher rainfall areas of the south-west. Isolated populations exist on the Darling Plateau to the east of Perth, south through the jarrah and karri forests and along the coast to Two Peoples Bay. There is also a population in the Stirling Range.

Quokka populations are more at threat to the north of their geographical extent than in the southern areas. In the north quokkas are found in smaller isolated populations in suitable habitat, while in the higher rainfall areas they are not confined to gully systems or swamps. For example, within the Nannup / Bridgetown area, quokkas are often sighted away from the creek lines because they can move around relatively protected from predators under the dense understorey of species such as *Bossiaea aquifolium* (water bush) that extends throughout the forest.

The distribution and conservation of the quokka was recently reviewed by one of the Department of Environment and Conservation's predecessors, CALM, and the quokka was shown to have suffered a decline in geographic range in the 1930s. Predation by the fox was identified as a major cause of the initial decline, while ongoing predation, habitat destruction and modification through altered fire regimes have contributed to their continued decline. It is considered that predator control alone is insufficient to ensure the long-term conservation of the quokka - there is a requirement for habitat management as well.

The quokka is habitat specific, occurring in densely vegetated creek lines over much of its range. The dense vegetation provides overhead cover from aerial predators and impenetrable dense ground cover protection from ground predators such as foxes and cats. Generally quokkas remain hidden during the day and at night venture out to more open areas to forage, however they tend not to travel across cleared areas, such as paddocks. Quokkas have a varied diet but a PhD study of quokkas in the northern jarrah forest found that *Dampiera* and *Thomasia* shrubs compose a large part of their diet.

A quick and quite reliable method for determining

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Quokka habitat and fire

presence of quokkas is through the identification of characteristic runnels (tunnels used by quokkas through thick and dense understorey vegetation along creek lines), combined with the presence of quokka droppings (scats) within the runnel. Tracks can also be used as a sign of quokka presence and this is an ideal observation method in sandy substrates and after rain. These observations allow for activity levels to be inferred based on the freshness and number of runnels and the quantity of scats in the area. (Fig 1)

Fig 1: a quokka runnel under sedges

Other animals create tunnels through dense riparian vegetation including quenda, rabbits and feral pigs. The latter are a significant threat to the quokka. They create large tunnels, often opening up and destroying quokka runnels when present. They also cause extensive digging and uprooting of plants, destroying or significantly modifying the habitat. They are also known to eat small animals if they get a chance.

Quokka survey by monitoring runnels has been adopted as a suitable technique by the agency and a rapid broad scale survey was recently conducted over the entire southern forest. It recorded the presence / absence of quokka, dominant associated plant species, vegetation condition and disturbance factors such as feral pig damage. In my area, from Leeuwin-Naturaliste National Park to Bridgetown, over 650 sites within creek lines have been inspected and about a quarter have shown signs of quokkas.

Within this area quokkas are mostly found within ti-tree dominated creeks and swamps. The most commonly recorded species include an overstorey of *Eucalyptus megacarpa* (bullich), *E. patens* (blackbutt) over *Taxandria linearifolia* (swamp peppermint) and other ti-tree sp. including *Astartea* sp., as well as *Acacia divergens*, *Mirbelia dilatata* (holly-leaved mirbelia) and *Hakea lasianthoides*, over sedges such as *Lepidosperma tetraquetrum* and *Gahnia decomposita*, as well as other small shrubs including *Hypocalymma cordifolium* and *Thomasia* sp. Sites are often surrounded by an understorey of *Taxandria parviceps* and / or water bush. This survey has provided the agency with very valuable information on the distribution of quokkas, location of high priority areas, habitat requirements and threatening processes and has allowed management of the species on a larger scale.

The quokka is also fire regime specific. Inappropriate fire regimes are a threat to the species as wildfires can cause local extinction, while long unburnt – or, conversely, too frequently burnt – creek lines result in unsuitable habitat conditions. A quokka's habitat must contain vegetation that provides refuge from predators as well as adequate food. The structure of the habitat, not necessarily its age, is the key factor in maintaining quokkas within a site. Structure within the creek line or swamp varies with the dominant flora species present and this is different over the quokkas' range. Once an area becomes very old much of the understorey collapses and protection from predators is not provided and the creek becomes unsuitable for quokka inhabitation. A specific mosaic of mature vegetation (for daytime refuge) and recently burnt vegetation (for food) appears to provide optimal habitat.

Interim guidelines for quokka management in regards to fire have been developed by the agency, based on the best scientific knowledge available to date and operational requirements. The management recommendations aim to use fire as a tool to create and maintain a mosaic of specific fuel ages and to ensure suitable habitat is available for dispersing quokkas. A landscape approach has been applied to ensure patches of suitable habitat are within the quokkas' dispersal range and interpatch distances are short. At the most simplified this is achieved by protecting known quokka populations and 'healthy' suitable quokka habitat from fire whilst regenerating unsuitable (senescing) and unoccupied quokka habitat.

In addition, the agency has adopted the concept of adaptive management with its fire operations for quokka management, that is, the results are monitored and future actions will be adapted based on operational outcomes.

These adaptive management guidelines have been implemented in this area over the last two years for a number of prescribed burns where quokkas or potential quokka habitat have been identified. The broad scale survey results provided the baseline information and more extensive survey work identified areas to be excluded from fire where quokka activity was high and vegetation structure suitable. Strategies adopted to protect creek lines involved utilising existing roads as physical barriers, or using the moist conditions within creek lines to prevent riparian vegetation burning.

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A sequence of monitoring photos

Fig 2: Within creekline, pre-burn, 23/10/04

Fig3: Immediately post-burn, 3/11/04

Fig 4: Regenerating vegetation, 24/5/06

In some areas creek lines were prescribed for a burn mosaic to achieve a patchwork of burnt and unburnt areas. Other creeks were targeted for burning to regenerate the senescing vegetation. Strategies were adopted based on the quokkas' dispersal and colonisation potential. Sites have also been selected within these prescribed burns to monitor regeneration of the vegetation and quokka activity. (Figs 2-4 - Photo point on Ellis Creek).

In each situation immediate 1080 hand baiting has been conducted to control foxes and cats and then continued on a monthly basis for a year or until the vegetation provided adequate refuge from predators. All of these burns have been within 'Western Shield' aerially baited zones. Feral pigs have also been monitored and control programs conducted where necessary. All personnel involved in the prescribed burn are briefed to ensure that the desired outcomes are achieved and, as a measure of field performance, all quokka sightings are recorded during the burn. Operational guidelines are also in place to ensure quokka habitat is not disturbed by mechanical sources such as firebreaks or tracks through riparian zones. These actions are to be avoided as they allow increased access opportunities for predators and also act as a barrier to quokka movement within the creek line.

Thus fire can be utilised as a management tool for quokkas if applied correctly and the results monitored and adapted depending on the outcomes. However, fire cannot be used alone, but needs to be undertaken together with other management practices, including control of predators, feral pigs and weeds.

If you think you may have quokkas on your property in the south-west area and you would like management advice, please contact your local *LFW* Officer.

Marika Maxwell is Nature Conservation Officer with DEC based at Kirup

[A list of references will be supplied on request – *Ed.*]

Community Workshop, Blythe Reserve, Dunsborough

A community workshop was held in Dunsborough last March to discuss the management of some local bushland, Blythe Reserve, which is in the middle of suburban developments and is only a hectare in size. It has houses on three sides and the community hall, golf course and primary school to the north.

Lots of people use the reserve. Primary school students use it as an educational facility for environmental studies; local residents walk through it on their way to the beach and tourists are sent there by the tourist bureau to look at the array of wildflowers throughout the year.

Blythe Reserve is a listed Threatened Ecological Community, Marri Woodlands Type 3B. It also has a 'Priority' plant species and there is habitat for quendas and western ringtail possums which are both listed as 'Vulnerable'. Thus, despite its small size, it is a very important piece of bushland.

Prompted by the local community, the Shire of Busselton has recognised the status of the reserve and has asked LFW to assess it and write a management plan. Comments on the plan have been called for from the community to ensure everyone has input into how this reserve is to be managed for conservation, biodiversity protection and community values. The workshop was part of this process. It was well attended and the issues, discussions and comments raised have been incorporated into the management plan which will be presented to the community for final input later in the year.

Cherie Kemp