Ecological Fire Management Strategy

Department of Environment and Natural Resources

Purpose

This strategy focuses on fire risk management for the Sandhill Dunnart (SHD), identifying a number of issues that should be considered before, during and after fire. Potentially conflicting activities should be discussed with the Regional Ecologist.

Species Information

Rating VULNERABLE – *NPW Act 1972* and ENDANGERED – *EPBC Act 1999*

Identification This species is considerably larger than a house mouse (*Mus musculus*), and is characterised by a crest of stiff black hairs running along the ventral side of its tail. It is also noticeably larger than other Dunnart species, weighing 30-55g. The species has a plain grey dorsal coat with darker hairs interspersed throughout, with its ventral coat being distinctly white.

Distribution Within South Australia, SHD populations occur in the Cowell to Pinkawillinie region of upper Eyre Peninsula, and in the Yellabinna region of the southern Great Victorian Desert.

Habitat Inhabits dense clumps of Spinifex (*Triodia* spp.), hummock grasslands on sandy flats and sand dunes in arid and semi-arid areas.

On Eyre Peninsula, SHD's prefer semi-arid habitats characterised by parallel sand dunes comprising of open mallee with a diverse shrub layer and Spinifex. Dominant mallee species usually include Yorrell (*Eucalyptus gracilis*), Ridge-fruited Mallee (*E. incrassata*), Red Mallee (*E. oleosa*) and Beaked Red Mallee (*E. socialis*) with Scrub Cypress Pine (*Callitris verrucosa*).

Home Range SHD's are known to have an average home range size of 7.8 ha (varying between 1.8 ha to 19.0 ha).

Reproduction Anecdotally, females have been recorded with up to 5 young. Both males and females reach sexual maturity in their first year and the breeding season has been shown to occur from July to March, however more commonly mating occurs in September, with young born in September/October and weaned in December/January.

Dispersal An individual SHD has been recorded moving 1.9 kilometres in 2 hours. Limited data indicates that they can demonstrate fidelity to an area for at least 12 months. Young male SHD's are known to disperse in Summer and Autumn.

Longevity The total lifespan of the SHD in the wild is unknown, although retraps of at least 12 months have been recorded.

Sandhill Dunnart *(Sminthopsis psammophila)*

Photo: (left) P. Canty, (right) S. Doyle.

Predators Owls, carnivorous birds, foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) are known predators of the SHD.

Diet Predominantly insectivorous. Ants, beetles spiders, grasshoppers and grass comprise the bulk of the diet. Due to the reclusive nature of the SHD little else is known about its feeding habits.

Fire and Sandhill Dunnarts

Risks to Sandhill Dunnarts

Fire can directly kill SHD's through radiant heat, smoke and flame. Indirect impacts stemming from the loss of habitat including food, shelter, nesting sites and movement corridors are likely to have severe long term implications for populations.

Following fire, SHD's are highly susceptible to predation and extremes in weather because the density and structural diversity of the spinifex hummocks is reduced. Furthermore, individuals that are forced to disperse into unfamiliar habitat or unsuitable areas are probably at an increased risk of predation.

Quality of SHD habitat may decrease with declines in spinifex structure and density. This may occur if habitat is frequently burnt.

Habitat quality may also decrease if the structure and density of spinifex becomes open and sparse. This may occur over a long period of time. Such sites may improve in quality following fire. However, high frequency fire may inhibit key habitat features developing and thus affect habitat suitability.

Bushfires in arid and semi-arid spinifex vegetation can burn large areas of country. An entire population could potentially be lost due to a single widespread bushfire, although recolonisation of habitat is likely if there is sufficient habitat connecting the patch to nearby populations.

The overall risk to SHD populations from inappropriate fire regimes is considered high.

Sandhill Dunnart Fire Response

Spinifex is a key habitat component, as SHD's build a nest within the centre of the plant, which is both protected and insulated by the needles of the tussock. The SHD shows preference for large hummocks that form an intact mound, Stage 2, or have just started to die off in the centre, Stage 3, (Figure 1). Stage 4 and 5 have opened out and the centre of the plant is not protected by the needles, thus making the SHD vulnerable to prey. This type of spinifex constitutes only 5% of the available spinifex hummocks on sites occupied by the SHD on the Eyre Peninsula.

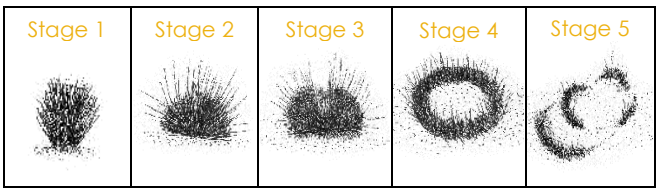

Figure 1. Spinifex life stages (Sketches by V. Reynolds)

Fire history is a critical influence of Spinifex survival, distribution and growth in the mallee and Spinifex landscapes. Spinifex rejuvenates from rootstock following fire and provides suitable habitat for the SHD within approximately 8 years. However, the growth and structure of Spinifex plants varies according to Spinifex species, rainfall, drainage, soil type and plant age. At approximately 20 years post fire spinifex starts to become sparse and open, Stage 4 and 5, due to competition for light due to shading from mallee and shrubs. Factors such as recent burning or absence of burning may render a location unsuitable for SHD's to inhabit.

Fire Management Objectives for Sandhill Dunnarts

- To minimise the risk of bushfires impacting on significant proportion of SHD populations and habitats.
- To minimise the risk of fire management activities, including prescribed burning and fire suppression impacting on the long term viability of SHD populations.
- To ensure sufficient SHD habitat is maintained by implementing appropriate fire regimes across known SHD habitat areas.
- To regenerate potential SHD habitats.

Strategies for Fire Management in Sandhill Dunnarts Areas

- Ensuring bushfire risk mitigation and suppression activities reduce the likelihood of population or significant habitat losses due to fire.
- Minimise the risk of a bushfire burning an entire known SHD population through strategic fuel reduction across the landscape.
- In particular, maintain at least 66% of SHD habitat within an area of contiguous habitat that is greater than 8 years post fire and less than 20 years post fire.
- Locate SHD refuge areas in periods of drought and maintain these as highest priority for protections, whilst promoting the regeneration of other new potential refuge areas.
- Trial the use of small scale prescribed burns to improve habitat in areas where habitat quality is perceived to have declined.

Risk Management - Prescribed Burning

Fire Management Planning

Preliminary planning

- Use maps of known SHD populations to assist in fire management planning.
- Include reference to this information in all relevant DENR Response Plans.
- Assign high quality SHD habitat to C-zones.

Risk assessment

- Prioritise fire management activities to protect key populations and those identified as being at greatest risk from bushfire.

Planning Prescribed Burns

- Only undertake prescribed burning of occupied habitat for strategic conservation purposes and with specific management advice for the SHD.
- Burnt areas are likely to be re-colonised by SHD's if there are patches of unburnt Spinifex nearby. Allow for levels of patchiness within the proposed burn for the provision of refuge, breeding habitat areas and connectivity to food sources.
- Conduct experimental burns in suitable mallee habitat to promote the growth spinifex as a means to gather new SHD fire response information.

Size of burn

Based on known SHD home range sizes:

- A mosaic of burnt and unburnt areas is required to provide suitable refuge for the SHD.
- Incorporate key linkage habitat areas and areas that may benefit from prescribed burning.

Timing, location & frequency of burn

- Prescribed burning of known SHD habitat should be avoided during breeding and weaning season (Jul – Mar).
- SHD habitat in C- zones should not be burnt more often than every 10 years.
- Prescribed burns in SHD habitat should not be located adjacent to habitat that has been burnt in the last 8 years.
- Promoting a mosaic of areas with different Spinifex age classes will provide regeneration areas to potentially develop as well as protecting core sites.
- Regenerating habitat and recovering populations must be protected from the adverse impacts of invasive pest animals and plants.

Risk Management - Bushfire

During Bushfires

Incident Management

- Technical advisors to be appointed to Incident Management Teams to advise planning bushfire suppression activities in or near SHD habitat.

Protect core local population sites

Bushfire suppression strategies and efforts should aim to protect local SHD populations and habitat by:

- preventing optimum SHD management sites from burning.
- preventing entire habitat patches from burning in a single fire event.
- ensuring SHD habitat is considered prior to back burning operations.

After Bushfires

Bushfire risk management

- If a bushfire burns one or more habitat patches in their entirety, risk management measures should be increased to protect remaining nearby populations and any prescribed burning should be undertaken with extreme caution.