

**Approved Conservation Advice for  
Arnhem Plateau Sandstone Shrubland Complex ecological community**

(s266B of the *Environment Protection and Biodiversity Conservation Act 1999*)

This Conservation Advice has been developed based on the best available information at the time this Conservation Advice was approved; this includes existing plans, records or management prescriptions for this ecological community.

**Description**

The *Arnhem Plateau Sandstone Shrubland Complex* ecological community is a type of shrubland that contains a naturally large proportion of obligate-seeder<sup>1</sup> taxa (Russell-Smith et al., 2009c). The tree canopy of the ecological community is naturally absent to sparse, comprising scattered emergent tree species of variable composition and with a canopy cover typically less than 5%. The mid layer of vegetation is the dominant and most diverse vegetation layer of the ecological community. It is dominated by a diversity of medium to tall evergreen (Gill and Groves, 1981) sclerophyllous shrubs, many of which are obligate seeders. The ground layer consists of a diverse range of low shrubs, herbs and graminoids. Perennial grasses such as hummock (e.g. *Triodia* spp.) and mat-forming (e.g. *Micraira* spp.) grasses may be interspersed amongst the ground layer vegetation or become dominant in patches.

The ecological community is particularly associated with substrates of quartzose sandstone and occurs on rock pavements, through to shallow tenosols (skeletal to shallow sandsheets), typically with major rocky components but may also occur on laterised Cretaceous mudstone and greywacke sediments. Due to the dissected nature of the Arnhem Plateau, the ecological community occupies a complex position in the landscape and often abuts deep gorges and isolated gullies containing monsoon rainforest ecological communities. The *Arnhem Plateau Sandstone Shrubland Complex* may also intergrade with other ecological communities, such as eucalypt open forest, closed forest (Story, 1976) and open woodlands (savanna) in sites with greater soil depth and greater moisture-holding capacity (Russell-Smith et al., 2002).

**A more comprehensive description of the ecological community is contained in the Listing Advice (TSSC 2011) which is available on the Internet at:**  
<http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl>.

**Conservation Status**

The *Arnhem Plateau Sandstone Shrubland Complex* ecological community is eligible for listing as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). In 2011, the Minister considered the Threatened Species Scientific Committee's (TSSC) advice under section 189 of the EPBC Act and amended the list under section 184 to include the *Arnhem Plateau Sandstone Shrubland Complex*. The TSSC determined that this ecological community met four of the eligibility criteria for listing (TSSC, 2011). Criterion 2 was met as endangered because the very restricted geographic distribution, based on the fragmentation of remnants into small patch sizes, makes it likely that the action of a threatening process could cause it to be lost in the near future. Criterion 3 was met as endangered because, for native species that are likely to play a major role in the community (in this case the obligate-seeder group), there was a severe decline across large parts of the ecological community to the extent that restoration is not likely in the near future. The ecological community met criterion 4 as endangered because the reduction in integrity across much of the ecological community is severe as indicated by degradation and disruption

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<sup>1</sup> Obligate-seeders are plant species that recovers after disturbances, e.g. germination by seed after fire.

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of community processes. The ecological community also met criterion 5 as endangered because its rate of detrimental change is severe as indicated by the observed and projected decline of key native species, and the intensification in degradation or disruption of community processes.

### **Distribution and Habitat**

The *Arnhem Plateau Sandstone Shrubland Complex* ecological community occurs predominantly on the Arnhem Plateau massif and outlying or isolated rock platforms and outcrops. There are also localised occurrences on laterised Cretaceous mudstone and greywacke sediments on the Marawal Plateau which spans the common boundary between Kakadu and Nitmiluk National Park (Duff et al., 1991; Russell-Smith et al., 2002; NT Herbarium, 2011).

The core distribution of the ecological community lies within the Arnhem Plateau (ARP) bioregion (IBRA V6.1). The ecological community may also extend into these neighbouring bioregions where there are outlying plateaux and rock outcrops:

- Arnhem Coast (ARC);
- Central Arnhem (CA);
- Darwin Coastal (DAC);
- Daly Basin (DAB);
- Gulf Fall and Uplands (GFU); and
- Pine Creek (PCK)

This ecological community occurs wholly within the Northern Territory Natural Resource Management Region.

### **Threats**

The main identified threats to the *Arnhem Plateau Sandstone Shrubland Complex* are: inappropriate fire regimes and invasion by weeds and feral animals (TSSC, 2011).

The main potential threat to the *Arnhem Plateau Sandstone Shrubland Complex* is climate change.

The following EPBC Act listed Key Threatening Processes (and their associated Threat Abatement Plans), are considered relevant to Arnhem Plateau Sandstone Shrubland Complex:

- Invasion of northern Australia by gamba grass and other introduced grasses;
- Predation by feral cats;
- The biological effects, including lethal toxic ingestion, caused by cane toads (*Bufo marinus*); and
- Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases.

### **Research Priorities**

The major biodiversity gap for the Arnhem Plateau bioregion is inventory of the western Arnhem Land massif outside Kakadu National Park. Other research priorities include the assessment of relationships between biodiversity and threatening processes, leading to better developed adaptive management, and ongoing monitoring of the biota and its threatening processes. Research priorities that would inform future regional and local priority actions include:

- Support ongoing research aimed at assessing population sizes for key taxa, distribution, ecological requirements and the relative impacts of threatening processes.

- Implement or support research on the effects of fire patchiness on obligate seeder recruitment and understorey composition.
- Undertake research on the impact of wet season burning on soil erosion, herbaceous plants and faunal components of the ecological community.
- Undertake research into the extent and outcomes of traditional burning on vegetation distribution and patchiness, particularly along traditional walking routes.
- Support and enhance existing surveys for identification of sites of high conservation priority, suitable habitat, potential habitat and to gain a better understanding of variation across the ecological community.
- Support ongoing research aimed at managing invasive species such as non-native ants and control measures for cane toads (*Bufo marinus*).
- Support and enhance existing programs for the mapping, at an appropriate scale, of current remnants, including mapping of condition.
- Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment.

### **Priority Actions**

The following regional priority recovery and threat abatement actions can be done to support the recovery of the *Arnhem Plateau Sandstone Shrubland Complex*.

#### **Habitat Loss, Disturbance and Modification**

- Identify areas of particularly high conservation priority.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Ensure infrastructure works and maintenance activities (or other development activities) involving substrate or vegetation disturbance in areas where the *Arnhem Plateau Sandstone Shrubland Complex* occurs do not adversely impact on known patches.
- Manage any changes to hydrology that may result in changes to water run-off, sedimentation, seed spread or pollution.
- Manage any disruptions to water flows.
- Undertake appropriate seed collection and storage.

#### **Invasive Species**

- Develop and implement a management plan and/or align existing local, regional or Territorial management plans for the control of invasive fauna species in the region.
- Inform and support local landholders and managers to control invasive plants and animals.
- Ensure adequate funding and resources are allocated to the region for on-ground management of invasive plant and animal species.
- Support and align existing management plans (Kakadu National Park, Nitmiluk National Park, WALFA, Warddeken and Djelk Indigenous Protected Areas) for the control of weeds that affect fire regimes, particularly gamba grass (*Andropogon gayanus*), mission grass (*Pennisetum polystachion*), hairy fountain grass (*Pennisetum pedicellatum*) and rattlepod (*Crotolaria goreensis*), in the region.
- Identify and remove weeds in the local area, which could become a threat to the *Arnhem Plateau Sandstone Shrubland Complex*, using appropriate methods.
- Manage sites to prevent introduction of invasive weeds, which could become a threat to the *Arnhem Plateau Sandstone Shrubland Complex*, using appropriate methods.
- Ensure chemicals or other mechanisms used to eradicate weeds do not have an adverse effect on the *Arnhem Plateau Sandstone Shrubland Complex*.

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- Continue baiting or other appropriate actions to control population numbers of invasive animals, such as feral cats (*Felis catus*), particularly for known sites.

#### Fire

- Develop and implement a suitable fire management strategy for the *Arnhem Plateau Sandstone Shrubland Complex*.
- Identify appropriate intensity and interval of fire to promote the regeneration and maintenance of key components of the ecological community's vegetation.
- Ensure adequate funding and resources are allocated to the region for on-ground management of fire.

#### Conservation Information

- Develop more detailed environmental (in particular vegetation) mapping to determine the location and extent of the ecological community.
- Maintain liaison with leaseholders, Indigenous custodians, land and conservation reserve managers in areas where populations of the ecological community occur.
- Develop public education programs, for example, information products and signage, to help the public recognise the importance of the ecological community and responsibilities under the EPBC Act.
- Raise awareness of the *Arnhem Plateau Sandstone Shrubland Complex* within local communities.
- Identify and liaise with industries and other groups that have an interest in the region.

This list does not necessarily encompass all actions that may be of benefit to the *Arnhem Plateau Sandstone Shrubland Complex*, but highlights those that are considered to be of highest priority at the time of preparing the Conservation Advice.

#### **Existing Plans/Management Prescriptions that are Relevant to the Ecological Community**

No specific management plans exist for the *Arnhem Plateau Sandstone Shrubland Complex*. However, some traditional burning is still practiced on Indigenous Country on the Arnhem Plateau.

Bushfires NT (Department of Natural Resources, Environment, the Arts and Sport) is an umbrella organisation, with a planning and co-ordinating role in fire management as its primary purpose. Bushfires NT & the Bushfires Council are developing a Northern Territory bushfire management strategy.

The North Australian Indigenous Land and Sea Management Alliance (NAILSMA) is currently developing four landscape-scale savanna fire management projects focused on pursuing carbon trading opportunities for Indigenous land managers. These projects build on the precedent set with the West Arnhem Fire Management Agreement (WAFMA) and subsequent work on the Western Arnhem Land Fire Abatement project (WALFA).

The following management plans are relevant to the ecological community:

Kakadu National Park (2007). Kakadu National Park Management Plan 2007–2014.

Parks and Wildlife Commission of the Northern Territory (2002). Nitmiluk (Katherine Gorge) National Park Plan of Management.

Northern Territory Government (2010). Weed Management Plan for *Andropogon gayanus* (Gamba Grass).

Available on the internet at:

[http://www.nt.gov.au/nreta/natres/weeds/find/gamba/pdf/weed\\_notes\\_gamba\\_mar10.pdf](http://www.nt.gov.au/nreta/natres/weeds/find/gamba/pdf/weed_notes_gamba_mar10.pdf)

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Northern Territory Government (2006). Management of Mission Grass. Agnote No: F38.

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<http://www.nt.gov.au/d/Content/File/p/Weed/453.pdf>

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These prescriptions were current at the time of publishing; please refer to the relevant agency's website for any updated versions.

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Bowman DMJS, Walsh A and Prior LD (2004). Landscape Analysis of Aboriginal Fire Management in Central Arnhem Land, North Australia. *Journal of Biogeography* 31/2: 207–223 Published by: Blackwell Publishing.

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Fraser F, Lawson V, Morrison S, Christopherson P, McGregor S and Rawlinson M (2003). Fire management experiment for the declining Partridge Pigeon, Kakadu National Park. *Ecological Management & Restoration* 4: 94–102.

Gill AM and Groves RH (1981). Fire regimes in heathlands and their plant-ecological effects. In: *Ecosystems of the World 9B – Heathlands and related shrublands*. (Ed. R.L. Specht) pp. 61–84.

Gill AM, Williams RJ & Woinarski JCZ (2009). Fires in Australia's tropical savannas: Interactions with biodiversity, global warming, and exotic biota. In *Tropical Fire Ecology. Climate change, land use and ecosystem dynamics*. Ed. by M.A. Cochrane, pp. 113–141, Praxis Publishing Ltd, UK.

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Available on the internet at:

[http://caepr.anu.edu.au/system/files/cck\\_misc\\_documents/2011/01/Warddeken%20AR%202009-2010%20web.pdf](http://caepr.anu.edu.au/system/files/cck_misc_documents/2011/01/Warddeken%20AR%202009-2010%20web.pdf)

Woinarski J, Pavey C, Kerrigan R, Cowie I and Ward S (2007). Lost from our landscape. Threatened species of the Northern Territory. Northern Territory Dept. of Natural Resources, Environment and the Arts.