

Draft Revision (2009)

Flora and Fauna Guarantee Action Statement No. 144

Dwarf Kerrawang *Rulingia prostrata*

Description

Dwarf Kerrawang (*Rulingia prostrata* Maiden & Betche) is a tap-rooted, prostrate shrub, with trailing branches up to 2 m long. Leaves are alternate, oval shaped and are up to 5 cm long and 3 cm wide with toothed edges. Flowers are white or pink, and appear in spring clustered at the end of simple stalks (Walsh & Entwisle 1996).

Distribution

Dwarf Kerrawang is endemic to south-eastern Australia. The species' stronghold appears to be in Victoria, but some populations occur in New South Wales (Fox 2006). In Victoria, Dwarf Kerrawang is confined to a small area in the Gippsland Lakes hinterland, from Blond Bay State Game Reserve near Bairnsdale to Holey Plains State Park near Rosedale (James 2000). The largest population (approximately 100 000 plants) is at Providence Ponds Flora and Fauna Reserve (Fox 2006). However, population size may not indicate the importance of a site; the species appears capable of significant increases in number after fire and the Providence Ponds site once held only nine plants.

Habitat

In Victoria Dwarf Kerrawang typically grows on peaty soils on the margins of ephemeral wetlands and lakes. Pithy Sword-sedge (*Lepidosperma longitudinale*) often dominates this habitat (James 2002). Other associated species include Blady Grass (*Imperata cylindrica*), Prickly Tea-tree (*Leptospermum continentale*) and Spreading Rope-rush *Empodisma minus* (James 2000). Native vegetation surrounding the swampy habitat can include the nationally endangered Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*) Grassy Woodland, the vulnerable Coastal Manna Gum (*E. viminalis* subsp. *pyroriana*) woodland (Damp Sands Herb-rich Woodland) and White Stringybark (*E. globoidea*) dominated Lowland Forest (James 2002).

Dwarf Kerrawang has also been found growing in altered environments including in swampy areas within pine plantations and on the banks of farm dams (Fox 2006; Douglas, Nieuwland & Reside 2009).

Life history and ecology

There is a lack of scientific knowledge of the ecology, life history and demography of the Dwarf Kerrawang, including its recruitment strategy. It appears to rely on disturbance, such as fire or flooding, for seed germination. Large increases in numbers have been recorded at some populations after these events (Fox 2006). Dwarf Kerrawang has also been found growing on several sites where soil disturbance has occurred (e.g. on a dam wall at Moormung Flora and Fauna Reserve). Trials to cultivate the species at the Melbourne Royal Botanic Gardens (RBG) found that it germinates best after the seeds were nicked or scarified. This suggests that the seeds are long-lived (e.g. remain viable in the soil for decades), and that germination is triggered when physical and/or chemical ageing thins the seed coat enough for water to enter the seed (N. Walsh pers. comm. 2009). Dwarf Kerrawang flowers from October to November (Carter & Walsh 2008).

Conservation status

National conservation status

The Dwarf Kerrawang has been listed as "critically endangered" under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Victorian conservation status

The Dwarf Kerrawang has been listed as "threatened" under the *Flora and Fauna Guarantee Act 1988*.

The Dwarf Kerrawang is considered "endangered" in Victoria according to DSE's *Advisory List of Rare or Threatened Plants in Victoria* (DSE 2005).

Threats

Across the Gippsland Plain, wetlands have been extensively cleared and drained for agriculture (Commonwealth of Australia 1999 in Douglas, Nieuwland & Reside 2009). Overall, only 10% of pre-1750 native vegetation on the East Gippsland Red Gum Plains remains, often in isolated patches. This has fragmented and depleted Dwarf Kerrawang populations; it is now very rare. Dwarf Kerrawang has disappeared from several locations in Victoria, and the habitat of many extant populations is highly disturbed (James 2002).

<i>Standard threat</i>	<i>Source Of Threat</i>	<i>Explanation</i>
Competition	Invasion by environmental weeds	Introduced and native weeds threaten most populations in Victoria. The main species are Burgan (<i>Kunzea ericoides</i>), an invasive native shrub that rapidly colonises disturbed sites; Blackberry (<i>Rubus</i> spp) and the introduced grass Kikuyu (<i>Pennisetum clandestinum</i>) (James 2000; Fox 2006).
Habitat fragmentation	Timber harvesting	One site on private land is under pine plantation and is threatened by timber harvesting.
Herbivory	Animals - introduced herbivores	Grazing by European Rabbits (<i>Oryctolagus cuniculus</i>) threatens populations on public and private land (James 2000; Fox 2006). Domestic stock damage populations on private land (Fox 2006). Illegal grazing has also been detrimental at Billabong Flora Reserve.
Herbivory	Animals - other species	Native wildlife, such as Common Wombats (<i>Vombatus ursinus</i>), Eastern-grey Kangaroos (<i>Macropus giganteus</i>) and Swamp Wallabies (<i>Wallabia bicolor</i>) graze on Dwarf Kerrawang populations at some sites on public and private land in Victoria.
Inappropriate fire regimes.	Fire – frequency.	Positive responses to fire have been recorded for Dwarf Kerrawang in Victoria recently. For example, at Providence Ponds FFR after a fire in 2004 the Dwarf Kerrawang population increased from nine plants to an estimated 100 000. Conversely, sites with small populations tend to be those that have not been burnt for many years (e.g. >10 years). However, there is little direct evidence to link population decline to lack of fire. It is unknown what fire regime (frequency, season, intensity and scale) is suitable for Dwarf Kerrawang management.
Soil disturbance (physical).	Construction/maintenance - road, rail or utility.	Earthworks and vehicle movement on and near some populations may damage or destroy plants, affect natural drainage patterns and degrade habitat.
Soil disturbance (physical).	Soil erosion.	Soil erosion associated with timber harvesting and earthworks threatens some populations on private land.
Surface water - quantity/regime.	Water - level / flow changes.	Dwarf Kerrawang often grows on wetland margins and drainage lines, or on areas where the water table is close to the surface. Changes in water flow across the Gippsland Plain, e.g. caused by farm dam construction and drainage works, may have left these swampy areas much drier than pre-European conditions (Fox 2006). Drying-out of sites may alter habitat and impact on the Dwarf Kerrawang. Recent drought conditions have exacerbated these problems.

Important populations

<i>Location name</i>	<i>Land manager</i>	<i>Catchment</i>	<i>Bioregion</i>
Blond Bay State Game Reserve (SGR)	Parks Victoria	East Gippsland	Gippsland Plain
Holey Plains State Park (SP)	Parks Victoria	West Gippsland	Gippsland Plain
Providence Ponds Flora and Fauna Reserve (FFR)	Parks Victoria	West Gippsland	Gippsland Plain
Billabong Flora Reserve (FR)	Parks Victoria	West Gippsland	Gippsland Plain

Other locations include: Billabong West Reserve, Bush Family Reserve, Dutson Downs, Frair's Reserve, Moormung Flora and Fauna Reserve (FFR), Monkey Creek, Deep Water Morass, and populations on private land at Fernbank, Meerlieu and Brunyee Swamp.

Past management actions

<i>Action</i>	<i>Result explanation</i>
Control introduced animals.	Trust for Nature has controlled rabbits at Bush Family Reserve, through baiting (poisoned oats), ripping burrows and shooting.
Negotiate application of conservation covenant.	Trust for Nature purchased Bush Family Reserve and Billabong West Reserve and has covenanted both properties.
Assess habitat characteristics and/or condition.	Within Ben Winch Swamp (Holey Plains SP) soil disturbance and changes in hydrology have permanently changed habitat at some sites - here Dwarf Kerrawang populations are declining. At Bush Family Reserve, stock, kangaroo and rabbit grazing has degraded populations. Drought conditions are exacerbating swamp degradation.
Liaise with government agencies.	West Gippsland Threatened Flora Group provided West Gippsland CMA with information on Dwarf Kerrawang. West Gippsland CMA is aware of the management needs of the species.
Conduct survey to determine abundance/extent.	Surveys were conducted from 2003-08 at Billabong FR, Brunyee Swamp, Bush Family Reserve, Holey Plains SP (Ben Winch Swamp), and Moormung FFR. All results are in the Victorian Rare or Threatened plant population monitoring database (VROTPop) and the Flora Information System (FIS).
Conduct survey to locate additional populations.	A survey was completed at Bush Family Reserve in 2005 at eight sites (results are in VROTPop). In 2008 the wetlands of Gippsland Water's Dutson Downs property were surveyed for the presence of Dwarf Kerrawang. Seventeen new populations were found, representing at least 718 plants. Several new populations have been found within Holey Plains SP and Blond Bay SGR since 2003-4; these populations appeared post wildfire/fuel reduction burn.
Liaise with private landholders.	Liaison has been conducted with all landholders with Dwarf Kerrawang occurring on their property, most are willing to actively manage the site for conservation purposes.
Assess habitat suitability.	Plants were found at a privately-owned site at Meerlieu; landowner is unknown.
Assess threats.	Threats assessed at Deep Water Morass and Billabong FR. Burgan is a major threat at Billabong FR, while grazing by stock and rabbits and weed invasion pose a severe threat to the Deep Water Morass population.
Collect reproductive material.	In 2005 seeds were collected from Holey Plains SP for the Millennium Seedbank at Kew and the Victorian Conservation Seedbank at the RBG. The RBG is cultivating the species and has included it in its rare plants bed.
Apply ecological burning.	Parks Victoria carried out a prescribed burn in autumn 2004 at Providence Ponds FFR. The burn was for the management of the threatened New Holland Mouse (<i>Pseudomys novaehollandiae</i>) (Fox 2006). As part of a trial to obtain data on the response of Dwarf Kerrawang to fire and grazing,

	DSE burnt experimental plots at Blond Bay SGR in 2008. Smoked water was applied separately to other plots. Monitoring is continuing.
Develop or amend planning scheme overlays and schedules.	When implementing planning processes, Wellington Shire Council and East Gippsland Shire Council have access to a database which includes all known Dwarf Kerrawang populations as biosites.
Manage environmental weeds.	At Bush Family Reserve, African Love Grass (<i>Eragrostis curvula</i>), Burgan and Blackberries are controlled annually, e.g. through spraying. Pines (<i>Pinus radiata</i>) have been removed from Ben Winch Swamp. In 2005 Parks Victoria controlled Burgan at Moormurng FFR. A private landholder at Meerlieu used BushTender funding to control Fog Grass (<i>Holcus lanatus</i>) around the Dwarf Kerrawang population on his land.
Conduct survey to confirm existing records.	From 2003-08 surveys were conducted at Ben Winch Swamp, Bush Family Reserve, Deep Water Morass, Moormurng FFR, Monkey Creek, Providence Ponds FFR, and on private land at Fernbank and Meerlieu. Plants were found at each site, except for Ben Winch Swamp (plants were found there in 2006 but not in 2007).
Review conservation status.	The National conservation status of Dwarf Kerrawang has changed from vulnerable to endangered.
Undertake periodic surveillance monitoring of populations.	Dwarf Kerrawang is monitored regularly at the Billabong West Reserve. Since 2000, three VROTop surveys have been carried out at Brunyee Swamp.
Negotiate voluntary acquisition or exchange of land.	DSE purchased Ben Winch Swamp in June 2007 and added it to Holey Plains SP.
Erect/maintain cages, fences or other structures to exclude native animals.	Trust for Nature constructed exclosures at Bush Family Reserve and Billabong West Reserve to protect Dwarf Kerrawang populations from kangaroos and wallabies. A private landholder at Meerlieu used funding from the BushTender program to fence off a Dwarf Kerrawang site. Parks Victoria also has exclosure plots at Billabong FR and Holey Plains SP.
Undertake detailed population monitoring and collect demographic information.	As part of the burn/smoked water trials at Blond Bay SGR, baseline population data were collected on the number of existing Dwarf Kerrawang plants in each plot. The height and number of Burgan plants was also recorded. Two seasons' monitoring has been undertaken.

Conservation objectives

Long term objective

To ensure that the Dwarf Kerrawang can survive, flourish and retain its potential for evolutionary development in the wild.

Objectives of this Action Statement

- To improve condition of habitat.
- To secure populations or habitat from potentially incompatible land use or catastrophic loss.
- To increase knowledge of biology, ecology or management requirements.

Intended management actions

The intended management actions listed below are further elaborated in DSE's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities.

<i>Standard objective</i>	<i>Targets</i>	
To improve condition of habitat.	<ul style="list-style-type: none"> • Measurable seedling recruitment/vegetative regeneration and a measurable reduction in plant deaths. 	
<i>Action</i>	<i>Details</i>	<i>Responsible agents</i>
Apply ecological burning.	Remove enclosure fences temporarily from Billabong FR and patch burn.	Parks Victoria
Control introduced animals.	Control rabbits at Billabong FR, Brunyee Swamp and Bush Family Reserve.	Trust For Nature, Parks Victoria
Erect/maintain cages, fences or other structures to exclude native animals.	Fence off those plants currently outside the fenced dam at Billabong West. Control shrubby vegetation in exclusion plots at Holey Plains SP. Seek funding for temporary fencing at Billabong FR (to minimise grazing pressure after ecological burn), and for follow-up management of vegetation (to control grasses and shrubs).	Trust For Nature, DSE Statewide Services - Gippsland, Parks Victoria
Identify weed management priorities and develop detailed plan.	Identify weed management priorities i.e. pines, Burgan and pasture grasses across sites.	DSE Statewide Services - Gippsland
Manage environmental weeds.	Manage weed infestations, especially Burgan, at key sites as appropriate.	Trust For Nature, DSE Statewide Services Gippsland region, Parks Victoria

<i>Standard objective</i>	<i>Targets</i>	
To secure populations or habitat from potentially incompatible land use or catastrophic loss.	<ul style="list-style-type: none"> • No avoidable destruction or damage to known Dwarf Kerrawang populations and habitat. 	
<i>Action</i>	<i>Details</i>	<i>Responsible agents</i>
Develop or amend planning scheme overlays and schedules.	Incorporate locations of Dwarf Kerrawang populations and their core habitat into relevant local planning schemes and environmental significance overlays and apply planning provisions to ensure their protection.	Wellington Shire Council, East Gippsland Shire Council

Erect/maintain structures to restrict or control access.	Prevent vehicle access to population at Moormung FFR and identify an alternative water point for fire fighting.	DSE Statewide Services - Gippsland, Parks Victoria
Incorporate actions to protect and/or manage item into Biodiversity Action Plans (BAPs) or other local plans.	Incorporate actions to protect, enhance and restore Dwarf Kerrawang habitat into the West Gippsland and East Gippsland Regional Catchment Strategies or its subordinate strategies via Biodiversity Action Plans.	West Gippsland CMA, East Gippsland CMA
Liaise with private landholders	Contact landholders and managers and inform them of the presence and significance of the Dwarf Kerrawang, seeking their co-operation.	DSE Statewide Services - Gippsland
Negotiate application of conservation covenant and other land management agreements with landholders	Work with landholders to initiate land management agreements under the <i>Victorian Conservation Trust Act 1972</i> , the <i>Planning and Environment Act 1987</i> and the <i>Conservation, Forests and Lands Act 1987</i> .	DSE Statewide Services - Gippsland, Trust for Nature, East Gippsland Shire Council

<i>Standard objective</i>	<i>Targets</i>	
To increase knowledge of biology, ecology or management requirements.	<ul style="list-style-type: none"> • Demonstrable improvement in knowledge of ecological and biological requirements of Dwarf Kerrawang. • Application of this knowledge to improve <i>in situ</i> management techniques to better protect populations and promote regeneration and recruitment. 	
<i>Action</i>	<i>Details</i>	<i>Responsible agents</i>
Acquire baseline population data.	Conduct detailed field and desktop surveys to acquire baseline population data, including: the area and extent of target populations; estimates of the number, size and structure of target populations and; inferences or estimates of population change.	DSE Statewide Services - Gippsland
Analyse population trends.	Determine population growth rates and complete modelling for important populations.	DSE Statewide Services - Gippsland
Assess habitat characteristics and/or condition.	Accurately survey known habitat and collect floristic and environmental information describing community condition. Within its distribution in Victoria, compare the habitat characteristics (e.g. soil and fire history) of swamps where Dwarf Kerrawang occurs with those of swamps where it does not occur.	DSE Statewide Services - Gippsland
Assess threats.	Assess threats at all known site at least once every three years.	DSE Statewide Services - Gippsland, Parks Victoria, Trust for Nature
Conduct survey to determine abundance/extent.	Continue to search known and potential habitat to better define the distribution and size of populations.	Trust For Nature, DSE Statewide Services - Gippsland
Conduct survey to locate suitable habitat.	Identify and survey potential habitat, using ecological and bioclimatic information indicating habitat preference.	DSE Statewide Services - Gippsland
Identify research priorities and facilitate their implementation.	Promote research into the recruitment strategy, biology and ecology of Dwarf Kerrawang, which will provide information to guide managers on how to best manage the species.	DSE Statewide Services - Gippsland
Undertake detailed population monitoring and collect demographic information.	At Blond Bay SGR and Holey Plains SP measure population trends and responses against recovery actions by collecting demographic information including recruitment and mortality, timing of life history stages and morphological	DSE Statewide Services - Gippsland

	data. Individual plants should be marked permanently and measured for annual growth and crop of flower/fruit.	
Undertake periodic surveillance monitoring of populations.	Periodically carry out VROTPop surveys to monitor populations, threats and actions at all known sites at least once every three years, particularly at Billabong West, Brunyee Swamp, Bush Family Reserve, and at the private land site at Fernbank.	Trust For Nature, DSE Statewide Services - Gippsland
Undertake research into management requirements.	Continue monitoring of experimental management trials at Tussock Swamp at Blond Bay SGR.	DSE Statewide Services - Gippsland

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