

**Approved Conservation Advice for
Burmannia sp. Bathurst Island (R.Fensham 1021)**

(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 and draft plans, records or management prescriptions for this species.

Description

Burmannia sp. Bathurst Island (R.Fensham 1021), family Burmanniaceae, formerly known as *Burmannia* sp. Melville Island (R.Fensham 1021), is a cryptic, herbaceous, leafless plant that grows up to 12 cm high (Kerrigan et al., 2007). It produces an annual, above ground inflorescence which is usually only open for a short time, but which may last up to several weeks in optimal conditions (Kerrigan et al., 2007). Most of the plant is translucent white, except for the flower, which has a yellow corolla (Kerrigan et al., 2007). The plant has a small underground corm from which flowers are likely to emerge annually; however, the flower is only open for a short time (Kerrigan et al., 2007). The species is saprophytic, gaining its nourishment directly from dead or decaying organic matter.

Burmannia sp. Bathurst Island (R.Fensham 1021) is only visible when in flower or fruiting, and has been recorded from surveys in July and November; however, recent field research indicates that it undergoes a mass flowering event in December and then continues to emerge in cohorts over coming weeks (Kerrigan et al., 2007). Surveys during the dry season do not yield many individuals (Kerrigan et al., 2007).

This species was originally listed as *Burmannia* sp. Melville Island (R.Fensham 1021), but following a change to the format, the currently accepted full name is *Burmannia* sp. Bathurst Island (R.Fensham 1021) NT Herbarium (Dixon, pers. comm., 2005, cited in CHAH, undated). This species is not yet officially described.

Conservation Status

Burmannia sp. Bathurst Island (R.Fensham 1021) is listed as endangered. This species is eligible for listing as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) as, prior to the commencement of the EPBC Act, *Burmannia* sp. Melville Island (R.Fensham 1021) was listed as endangered under Schedule 1 of the *Endangered Species Protection Act 1992* (Cwlth). The currently listed name of this species is *Burmannia* sp. Bathurst Island (R.Fensham 1021), as at 4 May 2007.

The species is also listed as endangered in the Northern Territory under the *Territory Parks and Wildlife Conservation Act 2000*.

Distribution and Habitat

Burmannia sp. Bathurst Island (R.Fensham 1021) is known only from five spring-fed rainforest patches in the north of Bathurst Island in the Northern Territory (Kerrigan et al., 2007). The total extent of wet rainforest on the Tiwi Islands is only approximately 26 km² (Woinarski et al., 2000), and distributed in very small, localised patches (Woinarski & Baker, 2002) with a mean area of approximately 1 hectare (0.01 km²) (Woinarski et al., 2003a). Very little is known about the ecology of this plant; however, it is recorded from wet rainforests, growing in permanently wet habitat that has probably been disturbed by occasional floodwater (Fensham, 1993), and out of damp peat in raised areas (Kerrigan et al., 2007).

Members of the genus apparently have a requirement for some degree of disturbance, probably through seasonal flooding (Fensham, 1993; Kerrigan et al., 2007). While the species may be able to persist in areas lightly disturbed by pigs, plants have been recorded

in areas of pig rooting only where the plants were protected within a network of sizeable tree roots (Fensham, 1993). The saprophytic habit requires soils with significant amounts of organic matter, and the species may not be able to establish on mineral soils (Fensham, 1993).

This species was recorded from only two populations in 1991 with a total size of between 500 and 2000 individuals, located in an area of approximately 40 hectares (0.4 km²) (Fensham, 1993). None were detected in the area during searches between 1998 and 2000, and only one population comprising six individuals was recorded in 2001 (Kerrigan et al., 2007). Monitoring and further surveys in 2006 re-located these two populations and found three new ones nearby (Kerrigan et al., 2007).

There are no formal conservation reserves on the Tiwi Islands (Woinarski et al., 2003a); the entire area is Aboriginal freehold land (held under the Tiwi Aboriginal Land Trust (Woinarski & Baker, 2002).

This species occurs within the Tiwi Cobourg IBRA Bioregion, and the Northern Territory Natural Resource Management Region. The distribution of this species is not known to overlap with any EPBC Act-listed threatened ecological community.

Threats

The main identified threat to *Burmannia* sp. Bathurst Island (R.Fensham 1021) is heavy disturbance and habitat degradation by feral pigs (Kerrigan et al., 2007). Feral pigs are common on Bathurst Island, where they cause widespread environmental damage in wet rainforests (Woinarski et al., 2000), and they are now also present on Melville Island (Tiwi Land Council, undated). Feral pigs are likely to dig up *Burmannia* plants to eat their small tubers, and the general rooting and disturbance by pigs in these wet rainforests may also negatively affect this species (Kerrigan et al., 2007). In rainforest patches on the Tiwi Islands, feral pigs can disturb the underlying natural water sources (altering water quality and flow), and consume such a high proportion of the fruits, seeds and seedlings of rainforest plants that recruitment is stopped (Woinarski et al., 2000). *Burmannia* sp. Bathurst Island (R.Fensham 1021) is also threatened by its restricted distribution and small population size. Woinarski et al. (2000) considered *Burmannia* sp. Bathurst Island (R.Fensham 1021) to be a high conservation priority.

The main potential threats to *Burmannia* sp. Bathurst Island (R.Fensham 1021) include:

- Forestry practices. High growth rates of timber plantations increase the demand on the groundwater level and reduce its level, which in turn would have greatest impact on the spring-dependent patches of wet rainforest, whose plants require continuous access to water/saturated soils (Woinarski et al., 2000). Fertilisers and pesticides used in plantations may also 'leak' into surrounding native vegetation (Woinarski et al., 2000).
- Inappropriate fire regimes. Surveys showed that approximately 38% of wet monsoon rainforest patches on the Tiwi Islands are severely disturbed by fire (Russell-Smith & Bowman, 1992, in Woinarski et al., 2003a). Inappropriate fire regimes on the Tiwi Islands are promoted by the increased presence of introduced grasses, which when dry cause hotter, more intense fires (Tiwi Land Council, undated).

Research Priorities

Research priorities that would inform future regional and local priority actions include:

- Continuing current research on the impact of disturbance by pigs, the environmental requirements of the species, and population dynamics (Kerrigan et al., 2007).
- Accurately identifying potentially suitable habitat and undertaking survey work to locate any additional populations. There is approximately 4.5 km² of wet rainforest on

Bathurst Island, and approximately 22 km² on Melville Island, (Woinarski et al., 2000). Surveys should continue on Melville Island, despite it not being recorded there after considerable sampling effort in wet rainforest patches (Woinarski & Baker, 2002).

- Initiating and managing research on the flow of freshwater springs (Tiwi Land Council, undated).
- Developing an appropriate weed management strategy that addresses reducing the current distribution of fire-promoting, introduced grasses, and preventing new introductions.
- Undertaking seed germination and/or vegetative propagation trials to determine the requirements for successful establishment.

Regional Priority Actions

The following regional priority recovery and threat abatement actions can be done to support the recovery of *Burmattia* sp. Bathurst Island (R.Fensham 1021):

Habitat Loss, Disturbance and Modification

- Retain all rainforest patches, and especially their hydrological integrity/water quality, by retaining native vegetation as a minimum 500 m buffer around each rainforest patch (Woinarski et al., 2000, 2003b). Ensure there is no disturbance in areas where *Burmattia* sp. Bathurst Island (R.Fensham 1021) occurs.
- Maintain a large region of each of Bathurst and Melville Islands relatively free of disturbance (Woinarski et al., 2000). Ensure that in areas of heavy disturbance; maintain relatively large areas of native vegetation in a continuous band around the development (Woinarski et al., 2000).
- Retain native vegetation in a buffer around all occurrences of this species (Woinarski et al., 2000).
- Manage any potential disruptions to natural water flows. Manage any potential threats to the integrity of the natural spring(s). Monitor groundwater levels.
- Establish a program with yearly monitoring of groundwater use by plantation forestry activities and rainforest condition near plantation areas (Woinarski et al., 2000). These results to inform a review every 12 months of the effectiveness of the 500 m vegetation buffer (Woinarski et al., 2000).
- Monitor known populations to determine the species' status.
- Develop and implement processes that prevent the introduction of new exotic pest species, such as a Quarantine Management Plan for the region (Tiwi Land Council, undated).
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if recovery is not evident.
- Develop a program that provides incentive for landowners to retain biodiversity values on their lands (Woinarski & Baker, 2002).
- Secure the localities where the species occurs in National Parks, Indigenous Protected Areas, or other land tenure formally managed for conservation, by negotiation and collaboration with Indigenous landowners and the Land Councils that represent them (Woinarski & Baker, 2002).
- Declare the localities where *Burmattia* sp. Bathurst Island (R.Fensham 1021) occurs as 'essential habitat' for biodiversity conservation, under the *Territory Parks and Wildlife Conservation Amendment Act 2000* (Woinarski et al., 2000).

Trampling, Browsing or Grazing

- Implement the threat abatement plan for grazing and habitat degradation by feral pigs (*Sus scrofa*) (DEH, 2005) in the region.

Fire

- Develop and implement an appropriate fire regime. Return to a more traditional burning regime, with two options: relatively sophisticated aerial incendiary burning, or through encouraging Aboriginal landowners to manage their estates more intensively (Woinarski & Baker, 2002). Incentives for Indigenous fire management could include payment (such as through ranger programs), and provision of vehicles (Woinarski & Baker, 2002).
- An appropriate fire regime would comprise fine-scale burning in the early to mid dry season, and a reduction in the incidence of hot late dry season fires (Woinarski & Baker, 2002), with probably around 20-33% of every clan estate burnt each year, but with the locations burnt varying substantially from year to year (Woinarski et al., 2003b).
- Develop an education program that illustrates the impacts of an inappropriate fire regime on biodiversity and conservation values (Woinarski & Baker, 2002).
- The distribution of fires on the Tiwi Islands should be monitored at least two-three times during the dry season, in order to describe long-term trends in fire regimes, and to highlight areas where fire regimes may be detrimental to biodiversity (Woinarski et al., 2003b). Fire histories can be compiled by interpretation of satellite imagery, as is done routinely by the Bushfires Council of the Northern Territory (Woinarski et al., 2003b)

Conservation Information

- Formally describe *Burmattia* sp. Bathurst Island (R.Fensham 1021) in a peer-reviewed scientific journal, including a description of the species and diagnosis, (detailing features that differentiate it from other members of the genus).
- Raise awareness within the local communities of *Burmattia* sp. Bathurst Island (R.Fensham 1021), and the damage and costs to biodiversity caused by feral pigs and inappropriate fire regimes. Such education programs may reduce the likelihood of deliberate introductions of feral pigs, and increase the likelihood of reporting new outbreaks (Woinarski & Baker, 2002).
- Work with local communities and the Northern land Council to encourage participation by Indigenous rangers in all aspects of the conservation of this species. Continue collaborative monitoring and survey projects between researchers from the Northern Territory Government and local Indigenous ranger groups (Kerrigan et al., 2007).

Local Priority Actions

The following local priority recovery and threat abatement actions can be done to support the recovery of *Burmattia* sp. Bathurst Island (R.Fensham 1021):

Habitat Loss, Disturbance and Modification

- Monitor the biodiversity impacts of local forestry developments (Woinarski et al., 2003b). Monitoring of wet rainforests should begin with a set of rainforest patches selected in impacted sub-catchments matched to a set in control sub-catchments, with the vegetation of each patch assessed through permanent transects extending across the patch edge (see Woinarski et al., 2003b). Refer to Woinarski et al. (2003b) for suggestions of sampling variables and comparable thresholds for assessment of required sample size and triggers for remedial management intervention.
- Protect populations of the listed species through the development of conservation agreements and/or covenants.

Trampling, Browsing or Grazing

- Control pigs on Bathurst Island, including a reduction in numbers (Woinarski et al., 2000); initiate a program including aerial shooting and trapping (Woinarski & Baker, 2002).

- Develop and implement a feral pig eradication program for Rangini on Melville Island (Tiwi Land Council, undated).
- Support the Tiwi Land Council policy stating that any pigs kept on Melville Island must be de-sexed, and pigs that are not de-sexed cannot be released onto the island (Tiwi Land Council, undated).
- Develop systems for alert, warnings, and response to any new outbreaks of feral pigs (Woinarski et al., 2003b).
- Where appropriate, manage total grazing pressure on private land at important sites through exclusion fencing or other barriers at all sites where *Burmattia* sp. Bathurst Island (R.Fensham 1021) occurs. Maintain the fencing already constructed to exclude pigs (Kerrigan et al., 2007).

Fire

- Maintain hazard reduction burning activities in the early dry season within plantation lease areas, and where fuel loads create an increased fire risk (Tiwi Land Council, undated).
- Refine the management of fuel loads based on the results of biodiversity monitoring (Tiwi Land Council, undated). Areas of high conservation value to be nominated as fire exclusion zones (Tiwi land Council, undated).

Animal Predation

- Control introduced pests (especially pigs) to manage threats at known sites on private land.

This list does not necessarily encompass all actions that may be of benefit to *Burmattia* sp. Bathurst Island (R.Fensham 1021), but highlights those that are considered to be of highest priority at the time of preparing the Approved Conservation Advice.

Existing Plans/Management Prescriptions that are Relevant to the Species

- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (DEH, 2005).

This prescription is current at the time of publishing; please refer to the relevant agency's website for any updated versions.

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