Evidence on Listing Eligibility and Conservation Actions 2021

Elaeocarpus miegei Weibel

Current EPBC Act status: Not listed
Current TPWC Act status: Critically Endangered (D)

Proposed Action: Add to EPBC list
Nominated Status: Endangered B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv); D

Taxonomy

Scientific name:	*Elaeocarpus miegei* Weibel		
Common name:	N/A		
Family name:	ELAEOCARPACEAE	Fauna ☐	Flora ☒

Species Information

Description

Elaeocarpus miegei is a tall tree to 35 m, to 20 m in the N.T. occasionally reported to have buttresses at the base of the trunk. Indumentum is of fine appressed hairs on young stems and petioles or glabrous. Petiole 10-30 mm. Lamina oblanceolate, obovate to elliptic, 40-170 mm long, 20-75 mm wide; base cuneate, margin crenate-dentate, apex obtuse, rounded or acute; glabrous or with few appressed hairs beneath; discolorous, domatia rare or absent. Inflorescence borne amongst or behind the leaves, racemose, to 100 mm long, minutely hairy or glabrous. Bracts caducous. Pedicel to 10 mm long. Sepals 4 or 5, 4.5-5 mm long, 0.5-1 mm wide, sparsely pubescent or glabrous. Petals 4 or 5, obovate or oblong-obovate, c. 5 mm long, 1.5-2.5 mm wide, white/cream; glabrous, apex variously divided. Disk hairy. Stamens 8 -15, between disk and ovary, c. 2-3 mm long (hairiness not known), anther connective sharply pointed. Ovary glabrous or rarely hairy; style tapered, 2-3 mm long, glabrous. Fruit ellipsoid, c. 17 mm long, c. 12 mm diam., glabrous, bright blue. Stone probably smooth, slightly winged.

In the Northern Territory (NT) it is distinguished from *Elaeocarpus arnhemicus* by longer petals (3 – 3.5 mm in *E. arnhemicus* and 5 mm long in *E. miegei*) and leaf shape (elliptic, acute and usually acuminate in *E. arnhemicus*; obovate and obtuse in *E. miegei*) (Kerrigan & Dixon 2011). Additional taxonomic and genetic studies are needed to establish if NT plants are conspecific with those from New Guinea or if they actually represent an endemic, undescribed taxon.

Distribution

In Australia, the species occurs only on the Tiwi Islands where it is recorded from 11 wet rainforest patches, two on Melville Island and nine on Bathurst Island. These rainforest patches are geographically close to each other (less than 30 km between patches) and demographic connectivity among patches and between islands is expected. The Tiwi Islands are connected hydrogeomorphically by two regional aquifers that occur on both islands, a shallow aquifer system covering most of the two islands (the Van Diemen Sandstone and overlying laterite and alluvium) and a deep, confined sandstone aquifer within the Moonkinu Member of the Bathurst Island Formation (NT Government 2003). The most serious plausible threat to the species across its distribution in Australia is habitat modification due to agricultural and horticultural development associated with land-use intensification.

Outside of Australia, *Elaeocarpus miegei* occurs in New Guinea and the Solomon Islands (Coode 1981; Conn and Damas 2006+). In Australia, the species occurs only on the Tiwi Islands and not on nearby Cobourg Peninsula (northern NT) or on Cape York (northern Queensland), the latter two locations being much closer to other populations in New Guinea. The species' fleshy fruits are likely dispersed by frugivorous birds. The restricted distribution within Australia and notable absence of the species in similar suitable habitat in the NT and QLD, however, indicates that while long-distance movement of fruits is plausible, the contemporary occurrence of long-distance dispersal events that result in successful recruitment is extremely rare. Long-distance dispersal from New Guinea to the Tiwi Islands may have occurred during periods of lower sea level over the past million years, such as during the last ice age when New Guinea rivers drained into the then inland, freshwater Lake Carpentaria with its westward flowing outlet. The Australian regional population, however, is considered unlikely to experience any significant immigration of propagules from extra-Australian populations in a time scale relevant to a conservation assessment. Consequently, the Australian population is considered to be isolated from conspecific populations outside the region and, thus, the IUCN Red List Categories and Criteria are applied to the Australian population without modification.

Adequacy of Survey

Survey effort for this species is deemed adequate. The Tiwi Islands have been subject to intense botanical survey effort. The one degree grid cell covering the species' extent of occurrence has 286 plant records per square kilometre, the fourth-highest collection density for the NT. Monsoonal rainforests across the NT, including those of the Tiwi Islands, have been relatively well sampled as part of an intensive survey of the NT's rainforest estate (Russell-Smith 1991; Liddle *et al*. 1994). Prior to 1999, *E. miegei* was known in Australia from two rainforest sites on Melville Island and from six rainforest sites on Bathurst Island. These records were derived from rainforest floristic surveys conducted by the NT Herbarium between 1987 and 1990. A number of major botanical survey programs have occurred on the Tiwi Islands since 1999. A comprehensive assessment of the biodiversity and conservation values of the Tiwi Islands was conducted between 1999 and 2002 (Woinarski *et al*. 2003). As part of this assessment, an extensive collection of plant specimens for pharmaceutical evaluation was conducted in 1999 - 2002 by the NT Herbarium. Surveys of Tiwi Island threatened plants in 2007 – 2008 and of threatened plants on northern Bathurst Island in 2014 were also conducted (Liddle et al. 2008; Cowie *et al*. 2014). The 1999 – 2002 and 2007 – 2008 surveys were broad in scope and did not report any new records of *E. miegei.*

Relevant Biology/Ecology

Flowers January – July. Fruits year round.
Elaeocarpus miegei is a groundwater-dependent species. It grows in permanently moist soils in rainforest patches naturally supplied with water from perennial springs. It is usually found on permanently wet organic substrates, in the wettest part of the forest.

Threats

Threat *(describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)*	Extent *(give details of impact on whole species or specific subpopulations)*	Potential Impact *(what is the level of threat to the conservation of the species)*
Current and potential threat. Habitat modification through land development for Forestry and Agriculture. Increasing development for forestry and agriculture is inferred to modify the	The entire regional population of the species is under current and potential threat from habitat modification due to development and the interactive impacts of natural hydrological system modification and grassy weed infestation.	High

species' habitat, increase abstraction of surface water and groundwater drawdown, and increase vulnerability to grassy weed infestation. No current Water Allocation Plan exists for Bathurst Is. or Melville Is. Increased drawdown may reduce aquifer recharge and alter natural flow regimes, including reduced flow from springs in the dry season. The modification of natural flow regimes may directly impact habitat quality and the survival, establishment and resilience of *E. miegei* that is restricted to spring-fed wet rainforests. Decline in habitat quality is inferred arising from the spread of introduced perennial grass species (past, current and future), including Gamba Grass (*Andropogon gayanus*) and perennial Mission Grass (*Cenchrus polystachios*). These species are listed as a Key Threatening Process under the EPBC Act (DEWHA, 2009) because they modify landscape fire regimes to the detriment of biodiversity. Although the impact of these invasive species on *Elaeocarpus miegei* has not been studied directly, these high biomass species are present adjacent to *E. miegei* habitat and have the potential to establish and transform this habitat. Perennial Mission Grass has been implicated in the decline of rainforests around Darwin due to altered fire regimes (Panton, 1993). Gamba and Mission Grasses increase fuel loads (e.g. Setterfield et al. 2010) resulting in the establishment of a positive grass-fire-feedback and reduced habitat quality for *E. miegei*.	On-ground survey and monitoring programs for Tiwi threatened plant species should consult with and involve Tiwi people, and provide on-going training in ongoing management of threatened plants and their habitats as per the recommended actions in the draft Recovery Plan for Tiwi threatened plants (Liddle et al. 2008). One geographical area of the whole population (Melville Island) is under current threat from habitat modification due to development. Increasing water abstraction due to forestry and agriculture is likely to escalate the impact of the threat on Melville Island and extend the threat to Bathurst Island. All individuals in the Australian population of *E. miegei are* therefore under potential threat of natural hydrological system modification. The entire Australian population of *E. miegei* is under current and potential threat from encroachment by invasive grassy weed species. Gamba Grass (*Andropogon gayanus)* on Bathurst Is. and perennial Mission Grass (*Cenchrus polystachios*) are present in open forests on the Tiwi Islands and have the potential to spread rapidly over the majority of vegetation types on the islands and outcompete recruiting native species. The interaction betweenf land development for forestry and agriculture with increased water abstraction and weedy grass infestation is inferred to reduce habitat quality and drive habitat loss. Indigenous cultural importance as pertains to the species *E. miegei* is not refered to here because, as for many rainforest plants on the Tiwis, *E. miegei* is not considered or valued that way and therefore such a statement is considered inappropriate. See *Puruntatameri et al. 2001* for a comprehensive documentation of Tiwi biocultural knowledge with reference to rainforest plants.	
Natural System Modifications – Increase in fire intensity Past, current and potential threat. IUCN Threats Classification Scheme ver. 3.2: 7.1.1 The rainforest patches that *E. miegei* inhabits are small in size, are dependent upon continuous availability of water, and	The entire Australian population of *E. miegei* faces potential threat from disturbance by changed fire regimes.	High

are embedded within a highly flammable sclerophyllouos landscape. Changed fire management from traditional early dry season, low intensity fires to late dry season, high intensity fires may severely impact wet rainforests.		
Severe Weather – Cyclones Past, current and potential threat. IUCN Threats Classification Scheme ver. 3.2: 11.4 The Australian population of *Elaeocarpus miegei* on the Tiwi Islands is inherently susceptible to stochastic events by virtue of its small AOO, small population size, restricted localised occurrences and high habitat specificity. Stochastic events may include, but not be limited to, cyclones and storms which result in damage or loss of established individuals and changed habitat conditions for recruitment. The intensity of tropical cyclones is projected to increase under future climates (http://www.bom.gov.au/cyclone/climatology/trends.shtml)..	The entire Australian population of *E. miegei* may be severely impacted by a single stochastic event.	Medium
Invasive species – feral animals Current and potential threat. IUCN Threats Classification Scheme ver. 3.2: 8.1.2 Habitat disturbance. Both pigs (*Sus scrofa*) and buffalo (*Bubalus bubalis*) are present on the Tiwi Islands and have the potential to affect recruitment of rainforest species including *Elaeocarpus miegei* through grazing, trampling of vegetation and soil compaction, or rooting of juvenile plants (Russell-Smith and Bowman, 1992; Woinarski et al., 2007).	Bathurst Island, including the rainforest habitat where *E. miegei* occurs, is under current threat from habitat disturbance by pigs. Melville Island, particularly to the south and east, is under current threat from habitat disturbance by buffalo. The whole regional population of *E. miegei* on the Tiwi Islands (Bathurst and Melville Islands) is at potential future risk from disturbance by pigs and buffalo. There is no currently active program for control of feral animals on the Tiwi Islands beyond incidental hunting by Traditional Owners, for example.	Medium

Determination of IUCN parameters

The regional population of *Elaeocarpus miegei* on the Tiwi Islands has an Extent of Occurrence of 288 km^2 based on the minimum convex polygon method and an Area of Occupancy of 36 km^2 based on a 2 km x 2 km grid cell size and calculated following the minimisation methods of Lee et al. (2019). The area of suitable habitat in rainforest patches and actual area occupied by the

species are smaller than this. The total extent of potential habitat on the Tiwi Islands is 176 km^2 and the area inhabited by *E. miegei* is 0.66 km^2.

The most serious plausible threat to *E. miegei* is development for land-use intensification causing natural system modification and weed encroachment. Based upon current published data on regional residual native vegetation cover an estimated 396 km^2 of land area has been cleared on the Tiwi Islands. The interaction of increased water drawdown and invasibility by grassy weed species as a result of land development is inferred to threaten the whole Australian regional population of *E. meigei*. *Elaeocarpus miegei* is a groundwater-dependent species with less than 250 mature individuals known from the regional population. Water allocation plans and water drawdown modelling are not available for Bathurst Island or Melville Island such that the number of locations is applied in this assessment on the basis of hydrological modification

The species occurs on Melville Island and Bathurst Island, two geographically separate areas that are connected hydrogeomorphically by two regional aquifers that occur on both islands, a shallow aquifer system covering most of the two islands (the Van Diemen Sandstone and overlying laterite and alluvium) and a deep, confined sandstone aquifer within the Moonkinu Member of the Bathurst Island Formation (NT Government 2003).

Reduced groundwater discharge to the wet rainforests in which *E. miegei* occurs may result in a) the direct mortality of established individuals through a reduction in the hydroperiod required to support the species; b) reproductive failure of individuals and lack of recruitment to the population due to ecological stress or unsuitable conditions for seed germination and establishment; and c) increased susceptibility of the preferred habitat to potential impacts from other plausible threatening processes (fire regime and invasive weedy grasses) as a result of a progressively drying habitat.

There are no available data to assess genetic exchange among individuals of *E. miegei* on the Tiwi Islands. The dispersal and pollination vectors of *E. miegei* on the Tiwi Islands are unknown. Frugivory and seed dispersal by verterbrates including birds and rats is plausible and common to other members of the genus (NSW NPWS 2003) and tropical forest communities (Corlett 2017). One regional population is therefore defined based upon the close geographic proximity of the 11 sites in which *E. miegei* is recorded (EOO of 288 km^2; Figure 2) and the potential connectivity among rainforest patches supporting demographic exchange across sites.

The considerable survey effort for *E. miegei* on Melville Island and Bathurst Island during 1987 - 2014, the high detectability of this tree species and minimal number of mature individuals observed at known sites during threatened species surveys (Liddle and Elliott 2008) support survey estimates that the population size of *E. miegei* is less than 250 mature individuals. It is acknowledged that further survey of potential habitat may revise the number of mature individuals. Applying a precautionary but realistic approach to uncertainty in the current population estimates, the number of mature individuals is considered to be less than 250 individuals and likely to exceed 50, and thus meets the threshold for Endangered under criterion D.

Summary of IUCN attributes

EOO	288 km^2	AOO	36 km^2 (2 x 2km grid method).	Generation length	Unknown; > 5 years likely.

No. locations	2	Severely fragmented?	Yes ☐ No ☒ Unknown ☐
No. subpopulations	1	No. mature individuals	< 250

Percentage global population within Australia	Unknown
Percentage population decline over 10 years or 3 generations	Unknown

Figure 1. *Elaeocarpus miegei* (images left M. Armstrong, right I.D. Cowie)

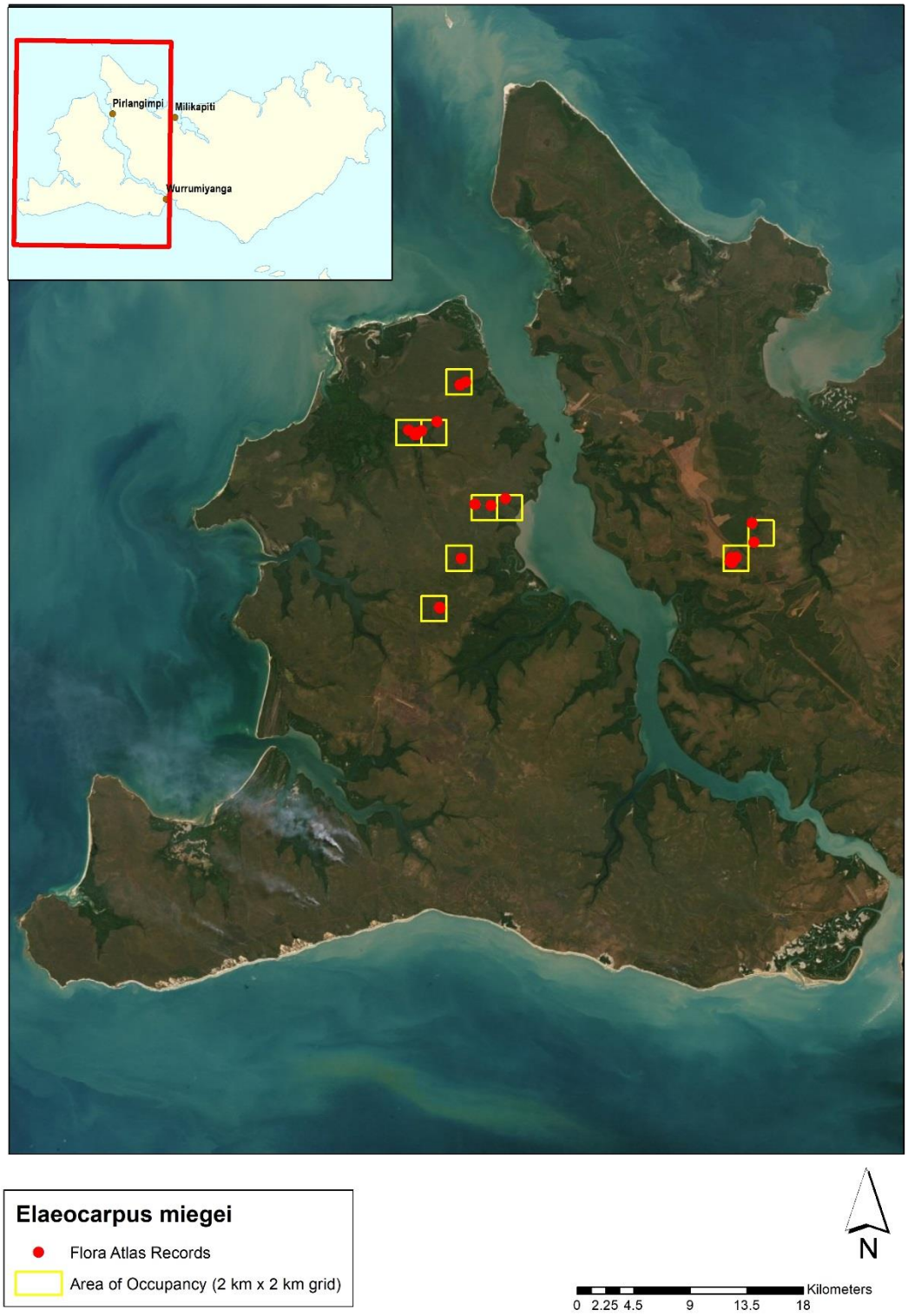

Figure 2. Distribution of *Elaeocarpus miegei* on the Tiwi Islands of northern Australia (west: Bathurst Island; east: Melville Island). Data are *E. miegei* records (red filled circles) within the minimum area of occupancy of nine 2 km x 2 km grid cells.

Assessment of available information in relation to the listing Criteria

Criterion A. Population size reduction (reduction in total numbers) Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	**Endangered Severe reduction**	**Vulnerable Substantial reduction**
A1	**≥ 90%**	**≥ 70%**	**≥ 50%**
A2, A3, A4	**≥ 80%**	**≥ 50%**	**≥ 30%**

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(*a) cannot be used for A3*]

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

based on any of the followin

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Evidence:
The generation length of *Elaeocarpus miegei* is unknown but is expected to be more than five years, based on generation times of other *Elaeocarpus* species in NT (Ian Cowie, NT Herbarium, pers. comm. 2021). Considering the substantial survey effort applied to *E. miegei*, its restricted habitat on the Tiwi Islands and the non-cryptic nature of the species, it is considered that the number of juveniles in the Australian population is 250 – 500 and the number of mature individuals is less than 250 (Kerrigan et al 2007; Liddle and Elliott 2008; Cowie et al. 2014). It is recognised that further survey may revise the number of mature individuals. Applying a precautionary but realistic approach to uncertainty, the number of mature individuals is considered to be less than 250. If hydrological system modification and weed encroachment increase due to development for land-use intensification, substantial reduction to at least 30% of the regional population is suspected to be met in the future on the basis of a decline in the quality of habitat. There are however insufficient quantitative data available to establish the pace of population reduction that is suspected to be met in the future. Therefore this species is not assessed against this criterion.

Criterion B. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy			
	Critically Endangered Very restricted	**Endangered Restricted**	**Vulnerable Limited**
B1. Extent of occurrence (EOO)	**< 100 km²**	**< 5,000 km²**	**< 20,000 km²**
B2. Area of occupancy (AOO)	**< 10 km²**	**< 500 km²**	**< 2,000 km²**
AND at least 2 of the following 3 conditions indicating distribution is precarious for survival:			
(a) Severely fragmented OR Number of locations	**= 1**	**≤ 5**	**≤ 10**

(b)	Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals
(c)	Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations;(iv) number of mature individuals

Evidence:
In Australia, *Elaeocarpus miegei* is restricted to wet rainforest on the Tiwi Islands. The total area of the Tiwi Islands is 7481 km^2, and the extent of rainforest patches totals 176 km^2. The EOO of the regional population based on the minimum convex polygon method is 288 km^2 which includes areas of unsuitable habitat (woodland, ocean). The species has an AOO of 36 km^2 based on a 2 km x 2 km grid cell size and calculated following the minimisation methods of Lee et al. (2019). The total area occupied by the species is estimated at 0.66 km^2. Studies elsewhere within the rainforest estate of the Northern Territory have demonstrated the important role of mobile fauna such as fruit eating birds and bats as a conduit of seeds and pollen between rainforest patches. Thus, while individual subpopulations of plants may appear too small to be viable in the long-term, the conservation of species such as *E. miegei* is dependent upon retention and maintenance of the mosaic of habitat patches, along with the bird and bat populations that link the plant subpopulations in these patches together (Price *et al*. 1998).

The most serious plausible threat to *E. miegei* is development for forestry and agriculture causing natural system modification and weed encroachment. The interaction of increased water drawdown and invasibility by grassy weed species as a result of land development is inferred to threaten the whole Australian regional population of *E. meigei*.

Reduced groundwater discharge to the wet rainforests in which *E. miegei* occurs may result in a) the direct mortality of established individuals through a reduction in the hydroperiod required to support the species; b) reproductive failure of individuals and lack of recruitment to the population due to ecological stress or unsuitable conditions for seed germination and establishment; and c) increased susceptibility of the preferred habitat to potential impacts from other plausible threatening processes (fire regime and invasive weedy grasses) as a result of a progressively drying habitat.

Continuing decline in the quality of rainforest habitat is inferred to be likely under to multiple threatening processes (Table 1). The invasive introduced weed species Gamba Grass, *Andropogon gayanus*, and Perennial Mission Grass, *Pennisetum polystachion*, are present in open forests on the Tiwi Islands and have the potential to extend over much of the islands. These species pose a serious threat by increasing fuel loads, leading to increased fire intensity (Rossiter et al., 2003), extensive changes in the community structure and critical changes in soil chemistry and potential degradation of rainforest habitat (Panton, 1993).

The rainforest patches of the Tiwi Islands are small in size, dependent upon continuous availability of water and are embedded within a highly flammable open forest landscape. Changed fire management resulting in a shift from early dry season, low intensity fires to late dry season, high intensity fires may cause severe disturbance to and degrade *E. miegei* habitat (Russell-Smith and Bowman 1992).

Both pigs (Bathurst Island) and buffalo (Melville Island) are present and have the potential to directly affect recruitment of *E. miegei* through grazing, trampling of habitat or rooting of juveniles (Russell-Smith and Bowman 1992; Woinarski et al., 2007).

The Australian population of *E. miegei* on the Tiwi Islands is inherently susceptible to stochastic events by virtue of its small AOO, small population size and restricted localised occurrences and high habitat specificity. Resilience of the species to stochastic events including cyclones is likely to be increasingly degraded due to serious threats including invasion by grassy weeds and water flow modification.

Based on the evidence presented above, *E. miegei* has a restricted geographic distribution with an EOO of less than 5000 km^2 and an AOO of less than 500 km^2 and thus meets the subcriteria

for listing as Endangered (B1, B2). The population is subject to multiple serious plausible threats and inferred continuing decline in the quality of habitat due to land modification and weed encroachment. Less than five locations is plausible on the basis of the geographically restricted extent of the population within small rainforest patches (less than 30 km between 11 rainforest patches within 176 km^2 of habitat) and acknowledging multiple plausible threats (land modification, weed invasion, feral animals and cyclone events).There is no evidence that the population is severely fragmented. *Elaeocarpus miegei* is therefore eligible for listing as **Endangered B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv)** under this criterion.

Criterion C. Population size and decline			
	Critically Endangered Very low	**Endangered Low**	**Vulnerable Limited**
Estimated number of mature individuals	**< 250**	**< 2,500**	**< 10,000**
AND either (C1) or (C2) is true			
C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	**Very high rate 25% in 3 years or 1 generation (whichever is longer)**	**High rate 20% in 5 years or 2 generation (whichever is longer)**	**Substantial rate 10% in 10 years or 3 generations (whichever is longer)**
C2 An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	**≤ 50**	**≤ 250**	**≤ 1,000**
(a) (ii) % of mature individuals in one subpopulation =	**90 – 100%**	**95 – 100%**	**100%**
(b) Extreme fluctuations in the number of mature individuals			

Evidence:
The regional population of *E. miegei* in Australia has a restricted geographic distribution on the Tiwi Islands and is estimated to contain less than 250 mature individuals, applying a precautionary but realistic approach to uncertainty in population estimates (Kerrigan et al 2007; Liddle and Elliott 2008; Cowie et al. 2014). There is inadequate quantitative evidence available of continuing decline, however, to assess the species against this criterion.

Criterion D. Number of mature individuals			
	Critically Endangered Extremely low	**Endangered Very Low**	**Vulnerable Low**
D. Number of mature individuals	**< 50**	**< 250**	**< 1,000**
D2. *Only applies to the VU category* Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	**D2. Typically: AOO < 20 km^2 or number of locations ≤ 5**

Evidence:

The species is known from 11 geographically close sites on the Tiwi Islands (AOO of 36 km^2; 2 km x 2 km grid cell size) and the whole Australian population is under threat from habitat modification.Refer to Appendix A for a summary of subpopulation information. The total extent of potential rainforest habitat on the Tiwi Islands is 176 km^2. Plausible threats impacting the whole population include land development, invasive grassy weeds (Gamba Grass and Perennial Mission Grass), changed fire management practices leading to increased fire intensity, grazing, rooting and habitat disturbance by feral animals and stochastic cylone events.

Considering the substantial survey effort applied to this species during 1987 - 2014, its restricted habitat on the Tiwi Islands and the non-cryptic nature of the species, it is considered that the number of juveniles in the Australian population is 250 – 500 and the number of mature individuals is less than 250 (Kerrigan et al 2007; Liddle and Elliott 2008; Cowie et al. 2014). It is acknowledged that further survey within the total extent of rainforest habitat (176 km^2) may revise the number of mature individuals. Applying a precautionary but realistic approach to uncertainty in survey estimates, the number of mature individuals is considered to be less than 250 and more than 50.

Based on the evidence presented above, the area of occupancy is restricted to rainforest patches within the 176 km^2 extent of potential habitat and is not expected to increase substantially with further survey. The whole population is considered to contain less than 250 mature individuals. *Elaeocarpus miegei* is therefore eligible for listing as **Endangered (D)** under this criterion.

Criterion E. Quantitative Analysis			
	Critically Endangered Immediate future	**Endangered Near future**	**Vulnerable Medium-term future**
Indicating the probability of extinction in the wild to be:	**≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)**	**≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)**	**≥ 10% in 100 years**

Evidence:
There are insufficient quantitative data available to assess the species against this criterion.

Summary

Elaeocarpus miegei is a groundwater-dependent tree species that occurs in permanently wet rainforest. The Australian population of *E. miegei* is confined to only 11 rainforest patches on Bathurst Island and Melville Island in the NT. Considering the substantial survey effort applied to this species, its restricted habitat on the Tiwi Islands and the non-cryptic nature of the species, and applying a precautionary but realistic approach to uncertainty in current population size estimates, it is estimated that the number of mature individuals in the whole regional population is less than 250 and likely to exceed 50. The regional population is restricted to the total area of potential rainforest habitat on the Tiwi Islands (176 km^2) and further survey is unlikely to substantially increase the extent of occurrence or area of occupancy. *Elaeocarpus miegei* is therefore eligible for listing as **Endangered B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv); D.**

Management and Recovery

Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?	Yes ☐	No ☒

List all relevant recovery or management plans (including draft, in-preparation, out-of-date, national and State/Territory recovery plans, recovery plans for other species or ecological communities, or other management plans that may benefit or be relevant to the nominated species).

-

List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.

-

List further recommended management or research actions, if any, that would benefit the conservation of the species.

- Stakeholder involvement and engagement in species conservation management, including updating land owners and site managers of the population and stakeholder consultation about options for conservation management and protection of the species.

Recommended recovery actions for Tiwi threatened plant species (Liddle et al. 2008) relevant to *Elaeocarpus miegei*:

- Involve the Tiwi people in the implementation and ongoing refinement of this recovery plan
  - Establish a recovery team to guide implementation of this recovery plan
  - Conduct further field surveys and expand long-term plant population monitoring
  - Eradicate/control the exotic Gamba Grass from the Tiwi Islands
  - Control the exotic Perennial Mission Grass on the Tiwi Islands
  - Manage fire adjacent to rainforest habitat, particularly in the first two years post cyclone
  - Act to ensure an adequate and ongoing spring-fed water supply to maintain rainforests
  - Eradicate feral pigs on Melville Island

- Manage fire intensity and frequency in the surrounding environment to protect the rainforest from fire.
- Assess and address the threat from invasive grass species.
- Collect and propagate in botanic gardens to benefit the ex situ conservation of the species.
- Establish a monitoring program at four or more sites to track and analyse changes in recruitment and loss of adult plants due to threatening processes, the progression of threatening factors and efficacy of management actions.
- Further research on the demographic and genetic structure of the regional population in Australia is required.

Consistency with CAM MOU

Consistent with Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding, it is confirmed that:	
• this assessment meets the standard of evidence required by the Common Assessment Method to document the eligibility of the species under the IUCN criteria;	Yes ☒ No ☐
Comments:	

• surveys of the species were adequate to inform the assessment;		Yes ☒ No ☐
Comments:	See section above under **Adequacy of survey**	
• the conclusion of the assessment remains current and that any further information that may have become available since the assessment was completed supports or is consistent with the conclusion of the assessment.		Yes ☒ No ☐
Comments:		

Nomination prepared by:	Dr Caroline Chong Threatened Species Botanist, Flora and Fauna Division, Department of Environment, Parks and Water Security, Northern Territory Government
Contact details:	
Date submitted:	9 April 2021
If the nomination has been refereed or reviewed by experts, please provide their names and contact details:	
Professor Stephen Garnett, RIEL Charles Darwin University Dr Chris Pavey, Senior Research Scientist, CSIRO Land and Water Dr Alaric Fisher, Executive Director, Flora and Fauna Division, Department of Environment, Parks and Water Security, Northern Territory Government Ian Cowie, Chief Botanist, NT Herbarium, Flora and Fauna Division, Department of Environment, Parks and Water Security, Northern Territory Government Dr Catherine Nano, Director Ecosystem Management, Flora and Fauna Division, Department of Environment, Parks and Water Security, Northern Territory Government Dr Tony Griffiths, Director Species Management, Flora and Fauna Division, Department of Environment, Parks and Water Security, Northern Territory Government Nicholas Cuff, A/Director Information and Advice, Flora and Fauna Division, Department of Environment, Parks and Water Security, Northern Territory Government	

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	Appendix A: Summary of subpopulation information						
Site, Location or subpopulation	Land tenure	Survey information: Date of survey	No. mature individuals	Area of subpopulations	Site / habitat Condition	Threats	Specific management actions
Melville Island, Site 161, -11.49013, 130.54615		31 Aug 2006	1	< 0.5 km^2	Intact	Habitat modification through land development and grassy weed species; changing fire regime; cyclones; habitat disturbance by feral animals	Control plan for perennial grassy weed species including Gamba Grass (*Andropogon gayanus*) and perennial Mission Grass (*Cenchrus polystachios*); Ongoing population monitoring to determine demographic trends and regeneration; Maintain spring-fed water supply to rainforest habitat; Manage fire adjacent to rainforest habitat, including in the first two years post cyclone
Melville Island, Site 594, -11.54923, 130.32257		30 May 2007	1	< 0.5 km^2	Intact	Ibid.	Ibid.
Melville Island, Site 607, -11.42066, 130.30807 Melville Island, Site 608, -11.42058, 130.30813 Melville Island, Site 609, -11.42144, 130.30782		2 June 2007	Approx. 12 mature individuals >= 5 m tall across sites; approx. 10 juveniles	< 0.5 km^2	Intact	Ibid.	Ibid.

Melville Island, Site 610, -11.42132, 130.30778 Melville Island, Site 611, -11.42158, 130.30772 Melville Island, Site 612, -11.42164, 130.30778							
Melville Island, Site 706, -11.51906, 130.53149 Melville Island, Site 707, -11.51901, 130.5315 Melville Island, Site 708, -11.51908, 130.53131 Melville Island, Site 709, -11.51913, 130.53131 Melville Island, Site 710, -11.51903, 130.53124 Melville Island, Site 711, -11.51908, 130.5312 Melville Island, Site 712, -11.51891, 130.53126 Melville Island, Site 713, -11.51895, 130.53129 Melville Island, Site 714, -11.51905, 130.53123 Melville Island, Site 715, -11.5189, 130.53112		7 June 2007	2 or more mature individuals; > 100 juveniles	< 0.5 km^2	Intact	Ibid.	Ibid.

Melville Island, Site 725, -11.51902, 130.5315							
BIRF12a, Dudwell Creek system, northern Bathurst Island, approx. 23km N of Wurankuwu., -11.41286288, 130.3224167 BIRF5a, North-eastern Bathurst Island approx. 17.5km NE of Wurankuwu., -11.47380856, 130.3487875		25 Oct 2014	0 mature individuals; 30+ juveniles	< 0.5 km^2	Intact	Ibid.	Ibid.
Melville Island, Site 637, -11.38611, 130.33911 Melville Island, Site 638, -11.38612, 130.33924 Melville Island, Site 639, -11.38615, 130.33928		3 June 2007	3 mature individuals	< 0.5 km^2	Intact	Ibid.	Ibid.
Melville Island, Site 651, -11.51815, 130.53014 Melville Island, Site 652, -11.51808, 130.53015 Melville Island, Site 653, -11.51806, 130.53019		6 June 2007	1 mature; 12 juveniles	< 0.5 km^2	Intact	Ibid.	Ibid.

Melville Island, Site 654, -11.51813, 130.53029 Melville Island, Site 655, -11.51811, 130.53037 Melville Island, Site 656, -11.51856, 130.53115 Melville Island, Site 691, -11.51813, 130.53029 Melville Island, Site 700, -11.51808, 130.53015							
BIRF13a, Lower Dudwell Creek system approximately 22km N of Wurankuwu., Bathurst Island, -11.41872256, 130.3020339 BIRF13d, Lower Dudwell Ck. system, approx. 22km N of Wurankuwu, Bathurst Island., -11.42217436, 130.3065679		23 October 2014 30 October 2014	Information not available Approx. 20 mature individuals; 250 juveniles	< 0.5 km^2	Intact	Ibid.	Ibid.
BIRF4a, "North-eastern Bathurst Island, approx. 19km NE of Wurankuwu.		31 Oct 2014	0 mature individuals; 1 juveniles	< 0.5 km^2	Intact	Ibid.	Ibid.

", -11.469875, 130.370557							
BIRF5c, Bathurst Island, -11.474727, 130.360263		29 Oct 2014	2 mature individuals; 25+ juveniles	< 0.5 km^2	Intact	Ibid.	Ibid.
JRS_RF_RF1238, -11.51339, 130.3384, JRS_RF_RF1241, -11.54959, 130.32299, JRS_RF_RF144, -11.50418, 130.54728, JRS_RF_RF227, -11.51518, 130.53089, JRS_RF_RF728, -11.3841, 130.3433, JRS_RF_RF733, -11.4195, 130.3114		Late 1980s	Information not available	< 0.5 km^2	Intact	Ibid.	Ibid.