



Consultation Document on Listing Eligibility and Conservation Actions

***Ptilotus pyramidatus* (pyramid mulla-mulla)**

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Ptilotus pyramidatus* (pyramid mulla-mulla) for inclusion on the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* (EPBC Act) threatened species list in the Critically Endangered category; and
- 2) the necessary conservation actions for the above species.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the EPBC Act or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Draft information for your consideration of the eligibility of this species for listing as Critically Endangered starts at page 4 and information associated with potential conservation actions for this species starts at page 7. To assist with the Committee's assessment, the Committee has identified a series of specific questions on which it seeks your guidance at page 9.

Responses are to be provided in writing either by email to:
species.consultation@environment.gov.au

or by mail to:

The Director
Marine and Freshwater Species Conservation Section
Wildlife, Heritage and Marine Division
Department of the Environment
PO Box 787
Canberra ACT 2601

Responses are required to be submitted by 22 January 2016.

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General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at: <http://www.environment.gov.au/biodiversity/threatened/index.html>.

Public nominations to list threatened species under the EPBC Act are received annually by the department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at: <http://www.environment.gov.au/biodiversity/threatened/pubs/guidelines-species.pdf>.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at: <http://www.environment.gov.au/biodiversity/threatened/nominations.html>.

To promote the recovery of listed threatened species and ecological communities, conservation advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at: <http://www.environment.gov.au/biodiversity/threatened/recovery.html>.

Information about this consultation process

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

Ptilotus pyramidatus

pyramid mulla-mulla

Taxonomy

The species is conventionally accepted as *Ptilotus pyramidatus* (Moq.) F. Muell (CHAH, 2012). The species was considered extinct until collected in Perth in late 2010 for the first time in 160 years (Davis, 2012). Initially described as a new species *Ptilotus christineae*, Davis (2012) confirmed that *P. pyramidatus* is conspecific with *P. christineae* and the latter name must therefore be considered a junior synonym.

Species/Sub-species Information

Description

Ptilotus pyramidatus (pyramid mulla-mulla), is a member of the family Amaranthaceae and is a small, perennial herb that grows to a height of about 8 cm. The erect stem is smooth with indistinct pink ribs. The leaves are oblong 8-35 mm long, smooth or with very sparse hairs. The flowers, clustered into a spike, are white with pink margins about 3-5 cm long. Flowers have a short stalk and have five white stamens ageing to pink. Flowering occurs in early October but seeds were not seen (Davis & Tauss, 2011).

The pyramid mulla-mulla is clearly distinguished from other *Ptilotus* species in the Swan Coastal Plain by the combination of its slender rhizome, spatulate leaves, erect flowering shoot, five fertile stamens and wetland habitat (Davis & Tauss, 2011).

Distribution

The pyramid mulla-mulla is known from two locations: the original collection site; and the current site of rediscovery in the Kenwick area of south-east Perth in Western Australia (Davis, 2012). The species occurs in the Greater Brixton Street Wetlands (GBSW), is extremely localised and its total area of occupancy is less than 0.2 ha (Davis & Tauss, 2011). The original collection occurred at a location several hundred kilometres east of Perth between the Murchison River and West Mount Barren, but the precise locality is unknown (e.g. Brown et al., 1998 cited in DotE, 2015).

The Greater Brixton Street Wetlands and about 400 ha of the adjoining rural lands have been searched in several intensive, multi-season surveys (e.g. Tauss & Weston, 2010 cited in Davis & Tauss, 2011) and no other occurrences of the pyramid mulla-mulla have been found. It is unlikely that other populations will be located in the Swan Coastal Plain as the habitat of this species is scarce and has been thoroughly explored due to its high conservation values (Davis & Tauss, 2011).

The pyramid mulla-mulla is currently known from only one population consisting of three small clumps of individuals growing within a few metres of each other. As it is a rhizomatous species, it is possible that these “clumps” could be interconnected and hence be one individual plant.

Relevant Biology/Ecology

The pyramid mulla-mulla inhabits a seasonally inundated flat (floodplain) at an elevation of about 6.5 m above sea level (Davis & Tauss, 2011). The site is underlain by pale grey, muddy-sand to sandy-mud alluvium of the Pinjarra Plain. The regional, unconfined groundwater in most of this area of the GBSW is generally at about ground level in late winter. At a local scale, the hydrology and stratigraphy of the wetlands is complex with small, confined aquifers and shallow aquitard layers of ferricrete or calcareous muds or clays that rainwater rests on for varying lengths of time (V & C Semeniuk Research Group, 2001 cited in Davis & Tauss, 2011). In 2010,

despite record-breaking low rainfall in the region, the site inhabited by the species was shallowly inundated for a short period in winter (Davis & Tauss, 2011).

The pyramid mulla-mulla is recorded in patchy *Melaleuca acutifolia* open scrub over *Verticordia plumosa* var. *brachyphylla* and *Hypocalymma angustifolium* open heath over *Meeboldina cana*– *Chorizandra enodis* open rushes and sedges and mid-dense, species-rich native annual herbs and geophytes (Davis & Tauss, 2011).

Threats

The pyramid mulla-mulla is threatened by off-road vehicles; hydrological change; nutrient enrichment of groundwater; invasive naturalised alien plants particularly harlequin flower (*Sparaxis bulbifera*), cape tulip (*Moraea flaccida*) and Coolatai grass (*Hyparrhenia hirta*), which are prevalent in the area; habitat degradation caused by rabbits (*Oryctolagus cuniculus*) and too frequent fires (Davis & Tauss, 2011).

The current municipal drainage scheme does not consider the environmental water requirements of the vegetation in the GBSW. Subsequent to the extensive vegetation clearing in the Yule Brook catchment and the resulting increase in the volume of runoff, the brook was excavated to mitigate the flooding of adjacent properties and to convey rainwater (part of which previously infiltrated into the groundwater in the GBSW) directly into the Canning River (Davis & Tauss, 2011). The GBSW are thus no longer subject to natural, regular flooding and alluvial sediment supply from the Yule Brook. A number of other excavated drains, firebreaks and vehicle tracks in the area intersect some of the local, shallow aquifers and also contribute to the dewatering of the wetlands (V & C Semeniuk Research Group, 2001 cited in Davis & Tauss, 2011). The adverse impact of these changes on the hydrological regime of the GBSW will be exacerbated by the trend towards a drier climate that is now evident in the Swan Coastal Plain. The GBSW are within land owned by the Western Australian Department of Planning but are earmarked for conservation purposes (K Atkins, pers. comm., 2015). There is no overall plan to manage the wetlands, to ameliorate the impacts of the surrounding land uses on the native vegetation and to guide local planning authorities (Davis & Tauss, 2011).

Assessment of available information in relation to the EPBC Act Criteria and Regulations

Criterion 1. 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	<i>based on any of the following</i>		(a) direct observation [except A3]
A2			(b) an index of abundance appropriate to the taxon
A3			(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
A4			(d) actual or potential levels of exploitation
			(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Evidence:

The species was rediscovered in 2010 and has been absent from the herbarium records for a period up to 160 years and therefore, no abundance data are available that would provide quantitative evidence of a decline over time.

The data presented above appear to be insufficient to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 2. 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 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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:

As the species is only known from a single location, the extent of occurrence is the same as the area of occupancy which is estimated to be less than 0.01 km², and thus within a single 2 km² grid square. Therefore, the species' distribution is subject to declines in response to threats posed by weed invasion and hydrological change, however, there is no evidence to demonstrate the required continuing decline or extreme fluctuations necessary to meet the conditions under this criterion.

The data presented above appear to be insufficient to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 3. 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 species was rediscovered in 2010 after being considered extinct and is known from only three plants possibly connected to one rhizome.

The data presented above appear to be insufficient to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 4. Number of mature individuals

	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
Number of mature individuals	< 50	< 250	< 1,000

Evidence:

The pyramid mulla-mulla is currently known from only one population consisting of three small clumps of individuals growing within a few metres of each other. There is a possibility that the three clumps originate from a single rhizome.

The data presented above appear to demonstrate that the species is **eligible for listing as Critically Endangered** under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 5. 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:

As the species was rediscovered in 2010 after being presumed extinct, a population viability analysis has not been undertaken, and there are insufficient data to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Conservation Actions

Recovery Plan

A decision about whether there should be a recovery plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

Conservation and Management Priorities

The species is currently listed as **Critically Endangered** under the Western Australian state legislation, the *Wildlife Conservation Act 1950*. The GBSW wetland habitat the species is found in is currently freehold land and, though earmarked for conservation purposes, there is no management plan associated with the area. Any future conservation management for the wetlands will need to take the priorities and actions listed below into consideration.

Habitat loss disturbance and modifications

- Prevent habitat disturbance. As the numbers of plants are so few, controlling access to the area, especially by off-road vehicles, is important to preserve the plants from inadvertent damage. This could be included as part of wider protection for the GBSW area as a whole.

Invasive species

- Rabbits are identified as a threat due to the habitat disturbance they cause. A rabbit control strategy for the wetlands area should be developed to minimise the chance for such disturbance.
- Harlequin flower (*Sparaxis bulbifera*), cape tulip (*Moraea flaccida*) and Coolatai grass (*Hyparrhenia hirta*) are known to be present in the area and any weed control strategy should include methods to control their spread in the GBSW.

Fire

- Though the species is identified as being threatened by too frequent fires, the appropriate fire management regime for protecting and promoting recruitment in the GBSW key habitat is not yet identified. Such a regime could include ensuring buffers to prevent wildfire or managed fire from impacting the habitat unless prescribed fire is being used following sound scientific evidence of the critical need for such a fire.
- Any fire regime should include a carefully planned weed management strategy and demonstrated funding to ensure post-fire monitoring and weed control actions occur.

- Provide maps of the GBSW area, including the locations of the pyramid mulla-mulla, to local and state Rural Fire Services and seek inclusion of mitigation measures in bush fire risk management plan/s, risk register and/or operation maps.

Water Quality

- Hydrological change and nutrient enrichment of groundwater are listed as threats to the re-discovered species. The wetlands area that is the species' habitat will require that any relevant management plan consider the hydrological regime and protect the inputs and outflows of the GBSW to ensure the wetlands habitat is maintained. Management plans should include addressing water quality issues and the connection of the system to related catchment and riparian systems.

Survey and Monitoring priorities

- The re-discovery of the species has been in an area already surveyed and the originally described species location is unknown. It is unlikely that dedicated surveys will find more plants in the GBSW, however, any surveys planned in similar wetland habitat should be an opportunity to locate more pyramid mulla-mulla plants.
- Any management plan for the GBSW should include the existing plants as part of a monitoring regime that can keep a watch on their status and health, including the effectiveness of management actions and the need to adapt them if necessary.

Information and research priorities

- Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful recruitment/establishment.
- More precisely assess the species ecological requirements including the persistence of the species (recruitment/regeneration) and the relative impacts of threats on these processes.
- Investigate options for enhancing or establishing additional populations including by undertaking germination experiments.
- Identify optimal fire regimes for regeneration (vegetative regrowth and/or seed germination), and response to other prevailing fire regimes. Fire trials should only be undertaken as a last resort when all other means of regeneration of the species has been investigated and, in addition, all weed management and fire impacts including the timing of fire impacts are fully understood.

References cited in the advice

Council of Heads of Australasian Herbaria (CHAH) (2012). Australian Plant Census.

Available on the Internet at: <http://www.anbg.gov.au/chah/apc/>

Davis, R.W. (2012). *Ptilotus christineae* is synonymous with the previously Presumed Extinct taxon *P. pyramidatus*. *Nuytsia* 22(5):335.

Davis, R.W. & C. Tauss (2011). A new and rare species of *Ptilotus* (Amaranthaceae) from a suburban wetland of the eastern Swan Coastal Plain, Western Australia. *Nuytsia* 21(3):97-102.

Other sources cited in the advice

Atkins, K (2015). Threatened Species Manager, Department of Parks and Wildlife, WA. Personal communication.

Department of the Environment (DotE) (2015). *Ptilotus pyramidatus*. In: Species Profile and Threats Database. Department of the Environment: Canberra.

Available on the Internet: <http://www.environment.gov.au/sprat>

Consultation questions for species

Biological information

1. Can you provide any additional or alternative references, information or estimates on longevity, average life span, generation length, recruitment or regeneration processes?

Population size

2. Has the survey effort for this species been adequate to determine its national adult population size? If not, please provide justification for your response.
3. Do you accept the estimate of the total population size of the species? If not, please provide justification for your response.

Evidence of total population size change

4. Please provide (if known) any additional evidence which shows the population is stable, increasing or declining.

Current Distribution/range/extent of occurrence, area of occupancy

5. Is the distribution as described valid? If not, please provide justification for your response and provide alternate information.
6. Do you agree that the way the current extent of occurrence and/or area of occupancy has been estimated is appropriate? Please provide justification for your response.

Change in status/rate of change

7. Is the information used to identify the nationally threatened status of the species robust? Have all the underlying assumptions been made explicit? Please provide justification for your response.

General

8. Can you provide additional data or information relevant to this assessment?
9. Have you been involved in developing this nomination? If so in what capacity

Threats

10. Do you agree that the threats listed are correct and that their effect on the species is significant?
11. To what degree are the identified threats likely to impact on the species in the future?
12. Can you provide additional or alternative information on threats, past, current or potential that may adversely affect this species at any stage of its life cycle?
13. Can you provide supporting data/justification or other information for your responses to these questions about threats?

Management

14. What planning, management and recovery actions are currently in place supporting protection and recovery of the species? To what extent have they been effective?
15. Can you recommend any additional or alternative specific threat abatement or conservation actions that would aid the protection and recovery of the species?
16. What individuals or organisations are currently, or potentially could be, involved in management and recovery of the species?

For every newly listed species, the minister is required to make a decision on whether to develop a recovery plan for the species.

17. Do you have information to offer that may help the minister in making this decision about whether to have or not have a recovery plan? Note that if the minister decides to have a recovery plan for this species, further consultation will be undertaken on the contents of the plan.