

Calotis moorei **Recovery Plan**



Draft for Public Comment

February 2005



Natural Heritage Trust

Helping Communities Helping Australia

An Australian Government Initiative



Department of
**Environment and
Conservation (NSW)**

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NSW Department of Environment and Conservation
43 Bridge Street
(PO Box 1967)
Hurstville NSW 2220
Tel: 02 95856444
www.dec.nsw.gov.au

For further information contact
Threatened Species Unit, Western Directorate.
NSW Department of Environment and Conservation
P.O. Box 2111
Dubbo NSW 2830
Tel 02 6883 5349

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Department of Environment and Conservation Recovery Planning Program

Calotis moorei
Draft Recovery Plan

**Prepared in accordance with the New South Wales
*Threatened Species Conservation Act 1995***

February 2005

Executive Summary

This is the formal draft NSW, and Commonwealth Recovery Plan for *Calotis moorei*. The plan considers the conservation requirements across the known range, identifies actions that should ensure long term viability and the agencies responsible for these actions.

Calotis moorei is listed on Schedule 1 (endangered) of the NSW *Threatened Species Conservation (TSC) Act, 1995*, and on Part 1 (endangered) of the Commonwealth *Environmental Protection and Biodiversity Conservation (EPBC) Act, 1999*.

C. moorei is a small multibranched daisy restricted to one property west of Louth, NSW. Surveys have not been conducted more widely and *C. moorei* may occur at other locations.

Proposed recovery actions are:

- A survey of potential habitat
- Genetic analysis to resolve the taxonomy
- Reassessment of the conservation status
- Monitoring of population status
- Investigation grazing impacts if required
- Seed storage if required

This recovery plan will be implemented over a 5 year period. Actions are estimated to cost \$60,000.

I now invite you to make a written submission to the DEC regarding this draft recovery plan by 8th April 2005. Please refer to Appendix 2 for details on how to make a submission. Following consideration of comments the plan will be finalised by the DEC and submitted to the Director General and the Minister for the Environment.



SIMON A Y SMITH
Deputy Director General
Environment Protection and Regulation Division

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1 Current Conservation Status

Calotis moorei is listed on Schedule 1 (endangered) of the NSW *Threatened Species Conservation (TSC) Act*, 1995, and on Part 1 (endangered) of the Commonwealth *Environmental Protection and Biodiversity Conservation (EPBC) Act*, 1999.

2 Description

Calotis moorei is described as an erect to ascending perennial herb to 45 cm high, septate-hairy. Basal leaves not known; cauline leaves usually spatulate or oblanceolate to obovate, to 7 cm long, 2-14 mm wide, margins coarsely toothed or lobed, sessile; upper leaves lanceolate to ovate, often entire; with septate hairs. Heads 6-9 mm in diameter, solitary, terminal; involucre bracts ovate, septate-hairy, also glandular hairy on margins; receptacle ovoid, with scales. Ray florets yellow; ligule 4.5-5.8 mm long. Achenes 1.3-2.2 mm long, tuberculate, glabrous, wingless; pappus of 3-8 barbed awns of equal or unequal length, fused and expanded at the base, hairy within cup (Everett 1992).

Phillip Short described the species in 1991, accepting the specific status “with some reservations” (Short 1991). Short believed that the species may be a “hybrid apomict which is produced from time to time in disturbed habitats” – meaning that the species is a hybrid and reproduces asexually.

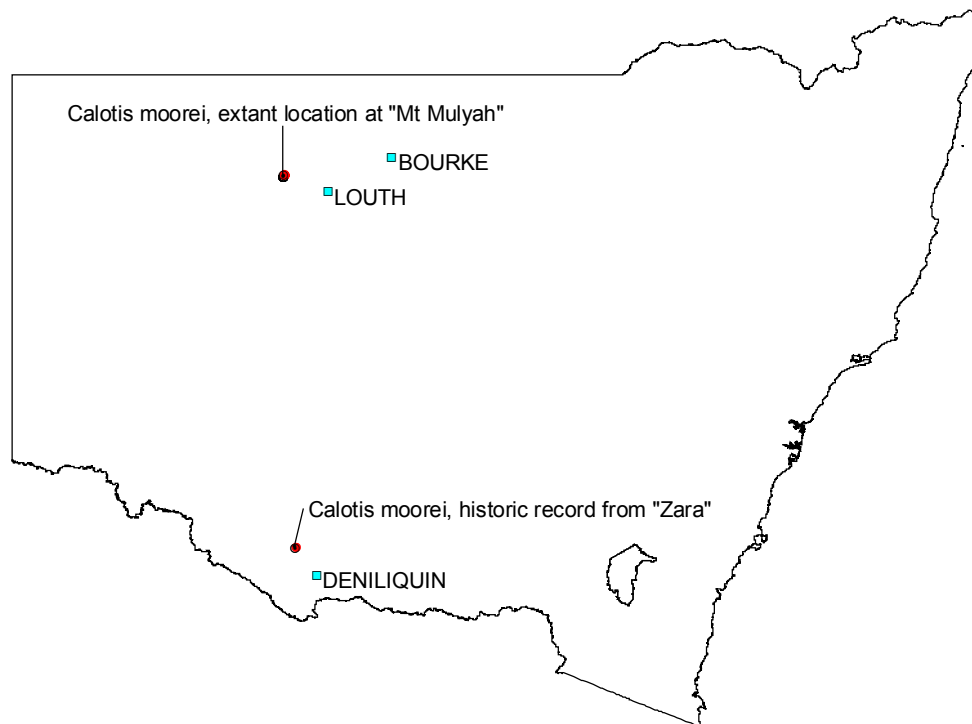
It is not apparent from the article whether Short was aware that the species was growing among a large population of *Calotis cymbacantha*. The only differences between the species appear to be the number of awns on the achene (seed). Otherwise, in the field, the plants appear to be identical. *Calotis cymbacantha* possesses two awns, whereas *Calotis moorei* has between four and eight awns. Few specimens have been found with three awns, and in these specimens only some achenes in each flower head are three awned, possibly suggesting a single gene difference between the species (Joy Everett pers. comm.). Genetic study is required to resolve this question.

3 Distribution & abundance

All but one of the specimens of *Calotis moorei* have been collected from “Mt Mulyah”, west of Louth. The other collection was made in 1913 from a property near Deniliquin called “Zara”. *Calotis cymbacantha* has only been collected a few times in the Riverina, which marks the very eastern edge of its range. It is unlikely that *Calotis moorei* will prove to be any more common in the region.

There are eight collections from Mt Mulyah between 1967 and 1990 in the Australian National Herbarium in Canberra. There appear to be 3 different localities at Mt Mulyah. One of these was examined in 2003, near the homestead. Forty five *Calotis moorei* were located in this area, but this count was not exhaustive.

Map showing the location of *Calotis moorei*:



4 Tenure

C. moorei occurs on perpetual lease at Mt Mulyah. Zara is private property.

5 Habitat

C. moorei grows on sandy soils at Mt Mulyah. Soils at the Zara locality are not known, however Porteners (1993) describes an enclosure at Zara that is on a sandhill. It may be that the habitat is similar.

Vegetation near the homestead at Mt Mulyah site is predominantly a herbfield and grassland, with only a few shrubs. It is likely that originally the area supported *Acacia cambagei* (gidgee) woodland, however other stands of gidgee on the property did not support any populations of *C. moorei*.

C. moorei was found growing among a large population of the closely related species *Calotis cymbacantha*. The other populations of *C. cymbacantha* observed tended to occur in open areas away from stands of trees or shrubs. At this stage *C. cymbacantha* appears to be the best indicator of occurrence of *C. moorei*.

Mt Mulyah is operated in conjunction with the adjacent property Pelora. Together the area is about 49,000 ha. At present there are 4,000 sheep on both properties but in “normal” seasons about 10,000 would be carried (Ben Bullen pers. comm.).

6 **Biology**

C. moorei is described as a perennial herb. Some plants observed in September 2003 appeared to be drying out. Collected specimens did not exhibit the well developed root system normally associated with perennial herbs. Specimens have been collected from July to April, suggesting that plants may persist in good seasons.

There is no specific information about the biology and ecology of *C. moorei*. Short noted that conspicuous yellow ray florets are generally associated with cross pollination, and considered this likely with *C. moorei*. The closely related *C. cymbacantha* is said to be edible to stock (Cunningham et al. 1982). This is only likely prior to flowering. Once the seed heads have developed, the plant becomes very spiny.

7 **Legislative context**

The TSC Act provides a legislative framework to protect and encourage the recovery of threatened species, endangered populations and endangered ecological communities in NSW. Under this legislation the Director-General of the Department of Environment and Conservation has a responsibility to prepare Recovery Plans for all species, populations and ecological communities listed as endangered or vulnerable on the TSC Act schedules. Similarly, the *Environmental Protection and Biodiversity Conservation* (EPBC) Act requires the Commonwealth Minister for the Environment to ensure the preparation of a Recovery Plan for nationally listed species and communities, or adopt plans prepared by others including those developed by State agencies. Both Acts include specific requirements for the matters to be addressed by Recovery Plans and the administrative process for preparing Recovery Plans.

This Recovery Plan has been prepared to satisfy both the requirements of the TSC Act and the EPBC Act and therefore will be the only Recovery Plan for the species. It is the intention of the Director-General of DEC to forward the final version of this Recovery Plan to the Commonwealth Minister of the Environment for adoption, once it has been approved by the NSW Minister for the Environment.

7.1 **Recovery Plan Implementation**

The TSC Act requires that a public authority must take any appropriate measures available to implement actions included in a Recovery Plan for which they have agreed to be responsible. Public authorities identified as responsible for the implementation of Recovery Plan actions are required by the TSC Act to report on measures taken to implement those actions. In addition, the Act specifies that public authorities must not make decisions that are inconsistent with the provisions of the Recovery Plan

Public authorities responsible for the implementation of this Recovery Plan are the NSW Department of Environment and Conservation.

The EPBC Act specifies that a Commonwealth agency must not take any action that contravenes a Recovery Plan.

7.2 Environmental Assessment

The New South Wales *Environmental Planning and Assessment Act 1979* (EPA Act) requires that consent and determining authorities, and the Director-General of the Department of Environment and Conservation, as a concurrence authority, consider relevant Recovery Plans when exercising a decision-making function under Parts 4 and 5 of the EPA Act. Decision-makers must consider known and potential habitat, biological and ecological factors and the regional significance of individual populations.

The clearing of native vegetation in NSW is subject to consent from the Department of Infrastructure, Planning and Natural Resources in accordance with the *Native Vegetation Conservation Act 1997*. This Act is integrated with the EP&A Act and requires that threatened species are taken into account by the consent authority when considering clearing applications under Part 4 of the EP&A Act. Any clearing applications that are within the predicted range of *C. moorei* and contain suitable habitat will need to consider the impact of the proposal on this species.

The EPBC Act regulates actions that may result in a significant impact on nationally listed threatened species and ecological communities. It is an offence to undertake any such actions in areas under State or Territory jurisdiction, as well as on Commonwealth-owned areas, without obtaining prior approval from the Commonwealth Environment Minister. As *C. moorei* is listed nationally under the EPBC Act, any person proposing to undertake actions likely to have a significant impact on this species should refer the action to the Commonwealth Minister for the Environment for consideration. The Minister will then decide whether the action requires EPBC Act approval.

Guidelines are available from Environment Australia to assist proponents in determining whether their action is likely to have a significant impact. In cases where the action does not require approval under the EPBC Act, but will result in the death or injury of *C. moorei* and the plant occurs in, or on Commonwealth land, a permit issued by the Commonwealth Minister under the EPBC Act will be required.

The Environment Minister can also delegate the role of assessment and approval to other Commonwealth Ministers under a Ministerial Declaration, and to the States and Territories under bilateral agreements. The development of a bilateral agreement between NSW and the Commonwealth is not yet complete, but when in place will avoid the need for duplication of environmental assessment.

7.3 Critical Habitat

The TSC Act makes provision for the identification and declaration of Critical Habitat. It is an offence to damage Critical Habitat (unless the action is exempted under the provisions of the TSC Act) and a Species Impact Statement is mandatory for all developments and activities proposed within declared Critical Habitat. Since routine agricultural activities are exempted from the TSC Act, and these are the activities with the most potential to impact upon *C. moorei*, little benefit would be obtained from a listing of critical habitat.

Under the EPBC Act, Critical Habitat may be registered for any nationally listed threatened species or ecological community. When adopting a Recovery Plan the Federal Minister for

the Environment must consider whether to list habitat identified in the Recovery Plan as being critical to the survival of the species or ecological community. Any action that is likely to have a significant impact on a listed species occurring within registered Critical Habitat is still subject to referral and approval under the EPBC Act.

At this stage it would be premature to nominate any habitat as being critical to the survival of *C. moorei*. The taxonomy requires confirmation from genetic analysis and the distribution is poorly known. The species could prove to be as widespread as *Calotis cymbacantha*.

7.4 Role and interests of indigenous people

Indigenous communities involved in the regions affected by this plan have not yet been identified. Implementation of recovery actions under this plan will include consideration of the role and interests of indigenous communities in the region.

8 Management Issues

8.1 Threats

There are no obvious threats to the population at Mt Mulyah. The population may not be in decline.

A very small localised population is inherently at risk from chance events. If the species proves to be confined to Mt Mulyah, and the population is small, precautionary measures will be required. Small populations are also more susceptible to adverse genetic influences, such as inbreeding depression.

Grazing is a potential threat to the populations at Mt Mulyah. It is unclear to what extent this threat is real. In 2003, none of the plants found appeared to have been grazed. When mature, the plant is unlikely to be palatable due to the sharp, woody awns on the seeds. In dry times, the plant persists as seed in the soil and so would be unaffected by even heavy grazing pressure. Impacts are most likely following emergence until maturity. At this time heavy stocking rates could be detrimental.

The current stocking rate of 8.2 sheep/km² is less than half the average of 21/km² for the area between Wanaaring and Louth, as estimated by Landsberg and Stol (1996). This stocking rate does not appear to be affecting the population observed near the homestead, even though it is less than 500 m from an artesian bore. In the same study Landsberg and Stol found there were 24 goats/km² and 11 kangaroos/km². Both may contribute to grazing influence on *C. moorei*, either directly, or indirectly by reducing other preferred forage, thereby transferring interest to herbs such as *C. moorei*.

Short (1991) mentioned the collector, C.W.E. Moore, proposed that invasion of *Dodonaea viscosa* subsp. *angustissima* (narrow-leaf hop bush) may be responsible for the absence of regeneration of *C. moorei* since 1984. Herbaceous species are suppressed under a heavy cover of narrow-leaf hop bush. The area occupied by the extant population is very open and unlikely to become dominated by narrow-leaf hopbush due to the proximity to the homestead. Elsewhere on the property there are extensive open areas where *C. cymbacantha* occurs, presumably indicative of appropriate habitat. Hop bush regeneration could not be construed as a major threat.

8.2 Social and economic consequences

The costs of the recovery of *C. moorei* are not great. If other populations exist and the species is considered secure, minimal resources may be needed to ensure the survival of the species. If Mt Mulyah is the only site of significance in NSW the recovery program costs will include survey, genetic analysis and perhaps investigation of the population biology of *C. moorei*. Exclosures might be necessary if grazing was demonstrated a threat, but their cost is likely to be minor in terms of lost production.

9 Species ability to Recover

It is unlikely that populations of *C. moorei* will decline irrespective of recovery measures. The species appears to be fecund, and may prove to be widespread. If the species occurs at more locations in NSW, monitoring the status of populations may be all that is required, or even a change of conservation status may be appropriate.

10 Recovery objectives and performance criteria

10.1 Specific objectives are:

1. Understand the distribution of *C. moorei* in NSW.
2. Clarify the taxonomy between *C. moorei* and *C. cymbacantha*.
3. Improve the understanding of the biology of *C. moorei*

10.2 Recovery performance criteria:

1. The size and status of the remaining populations are known.
2. The taxonomy of *C. moorei* and *C. cymbacantha* is resolved.
3. The biology of *C. moorei* is sufficiently well understood to predict the likely impacts of grazing and other potential threats, and introduce appropriate ameliorative measures.

11 Recovery Actions

11.1 Action 1 Survey

Survey the potential habitat of *C. moorei* in NSW. For each site record population size, threats and major associated species. This survey can only be conducted in appropriate seasons.

Outcome: The distribution, population size(s) and threats to *C. moorei* in NSW are known.

11.2 Action 2 Genetic analysis

Conduct appropriate tests to determine whether *C. moorei* is genetically distinct from *C. cymbacantha*.

Outcome: The taxonomic status of the species is known.

11.3 Action 3 Reassess conservation status

If survey shows that the population of *C. moorei* in NSW is very large, and threatening processes are not having a major impact on the species a reassessment of conservation status is warranted. It may be that the species could be removed from Schedule 1 (endangered) and placed on Schedule 2 (vulnerable). If the species is considered secure a nomination to remove from the *C. moorei* from the Schedules of the TSC Act and the EPBC Act could be prepared.

Outcome: The conservation status is reassessed after survey and appropriate action taken.

11.4 Action 4 Monitoring

The populations are monitored to improve the understanding of life history, and determine fecundity and recruitment.

Outcome: Life history and population demographics are better understood.

11.5 Action 5 Investigate grazing

The monitoring may give some indication of the likely impacts of grazing. If plants are found that suggest grazing may be a threat, further investigation using exclosures may be warranted.

Outcome: The influence of grazing is understood.

11.6 Action 6 Seed storage

If the species is confined to Mt Mulyah it would be prudent to store seed to prevent extinction in the event of a catastrophe.

Outcome: Seed is placed in secure storage.

12 Implementation

The following table allocates responsibility for the implementation of recovery actions specified in this plan to relevant government agencies for the period 2003 to 2005.

Table 3: Implementation schedule

Section	Description	Responsibility for implementation	for Cost	Timeframe	Priority
11.1	Survey potential habitat	DEC	20,000	2004??	1
11.2	Genetic analysis	DEC	15000	2004-2005	1
11.3	Reassess status	DEC	0	2005	1
11.4	Monitoring	DEC	10000	2004-2007	1
11.5	Investigate grazing	DEC	2000	2005-2007	1
11.6	Seed storage	DEC	3000	2005	1
11.7	DEC implementation	DEC	10000	2004-2007	1
Total			\$60,000		

13 Preparation details

This plan was prepared by Geoffrey Robertson, Senior Threatened Species Officer.

14.1 Date of last amendment

No amendments have been made to date.

14.2 Review date

This plan will be reviewed within five years of the date of publication.

15 References

Cunningham, G.M., Mulham, W.E., Milthorpe, P.L., Leigh, J.H. (1992) *Plants of Western NSW*. Inkata Press: North Ryde.

Everett, J (1992) *Calotis*. In Harden, G.J. (ed.) *Flora of New South Wales. Volume 3* New South Wales University Press: Sydney.

Landsberg, J. & Stol J. (1996) Spatial distribution of sheep, feral goats and kangaroos in woody rangeland paddocks. *Rangeland Journal* 18: 270-291.

Porteners, M. F. (1993) The natural vegetation of the Hay Plain: Booligal-Hay and Denliquin-Bendigo 1:250000 maps. *Cunninghamia* 3(1): 1-122.

Short, P.S. (1991) A new species of *Calotis* R. Br. from NSW. *Muelleria* 7(3): 405-410.

16 Personal Communications

Ben Bullen: – caretaker, “Mt Mulyah”

Joy Everett: Botanist, Royal Botanic Gardens, Mrs Macquaries Rd. Sydney.

17 Acknowledgments

Many thanks to:

Lyle, Robyn and Ben Bullen of Mt Mulyah for information, accommodation and assistance.

Joy Everett from the Royal Botanic Gardens for taxonomic advice and information.

Appendix 1 – Location details

Species	Date	Easting	Northing	Number	Collector
Calotis moorei	17-Sep-03	263393	6642938	1	G. Robertson
Calotis moorei	17-Sep-03	263517	6642901	2	G. Robertson
Calotis moorei	18-Sep-03	263510	6643023	1	G. Robertson
Calotis moorei	18-Sep-03	263548	6643016	1	G. Robertson
Calotis moorei	18-Sep-03	263558	6643016	1	G. Robertson
Calotis moorei	18-Sep-03	263558	6643017	6	G. Robertson
Calotis moorei	18-Sep-03	263564	6643012	1	G. Robertson
Calotis moorei	18-Sep-03	263555	6643004	3	G. Robertson
Calotis moorei	18-Sep-03	263553	6643005	2	G. Robertson
Calotis moorei	18-Sep-03	263555	6643011	1	G. Robertson
Calotis moorei	18-Sep-03	263552	6643005	1	G. Robertson
Calotis moorei	18-Sep-03	263548	6643005	1	G. Robertson
Calotis moorei	18-Sep-03	263560	6643019	1	G. Robertson
Calotis moorei	18-Sep-03	263557	6643020	1	G. Robertson
Calotis moorei	18-Sep-03	263553	6643019	1	G. Robertson
Calotis moorei	18-Sep-03	263548	6643024	1	G. Robertson
Calotis moorei	18-Sep-03	263545	6643017	1	G. Robertson
Calotis moorei	18-Sep-03	263546	6643023	2	G. Robertson
Calotis moorei	18-Sep-03	263541	6643024	1	G. Robertson
Calotis moorei	18-Sep-03	263541	6643034	1	G. Robertson
Calotis moorei	18-Sep-03	263542	6643045	1	G. Robertson
Calotis moorei	18-Sep-03	263556	6643047	1	G. Robertson
Calotis moorei	18-Sep-03	263562	6643041	1	G. Robertson
Calotis moorei	18-Sep-03	263563	6643038	1	G. Robertson
Calotis moorei	18-Sep-03	263566	6643039	5	G. Robertson
Calotis moorei	18-Sep-03	263567	6643028	2	G. Robertson
Calotis moorei	18-Sep-03	263580	6643036	1	G. Robertson
Calotis moorei	18-Sep-03	263572	6643057	1	G. Robertson
Calotis moorei	18-Sep-03	263576	6643058	1	G. Robertson
Calotis moorei	18-Sep-03	263701	6643105	1	G. Robertson

Appendix 2 - Making a submission on this Draft Recovery Plan

You are invited to make a written submission to the DEC regarding this draft recovery plan. To make your submission as effective as possible, please:

- refer to the section or action of the plan you wish to address;
- briefly explain the reasons for your comments;
- provide source information or examples where possible; and
- provide your name and address to enable receipt of your submission to be acknowledged.

The DEC will consider all written submissions received during the period of public exhibition and must provide a summary report of those submissions to the Minister for the Environment prior to final approval of this recovery plan.

Please note, that for the purposes of the NSW *Privacy and Personal Information Protection Act 1998* any comments on this draft recovery plan, including your personal details, will be a matter of public record and will be stored in the DEC records system. Following approval of the plan by the Minister, copies of all submissions, unless marked “confidential”, will be available, by arrangement, for inspection at the DEC office responsible for the preparation of the recovery plan.

Should you not wish to have your personal details disclosed to members of the public once the recovery plan has been adopted, please indicate below that you wish your personal details to remain confidential to DEC and not available for public access. Further information on the *Privacy and Personal Information Protection Act 1998* may be obtained from any office of the DEC or from the website: www.environment.nsw.gov.au

Submissions should be received no later than the advertised date. Submissions should be addressed to:

The Director General
Department of Environment and Conservation (NSW)
c/- *Calotis moorei* Recovery Plan Coordinator
Threatened Species Unit
PO Box 2111,
Dubbo NSW 2830
Ph: (02) 6883 5347



Department of
**Environment and
Conservation (NSW)**

43 Bridge Street
Hurstville 2220
(02) 9585 6444