INTERIM RECOVERY PLAN NO. 290

NINGHAN VIOLET

(*Hybanthus cymulosus*)

INTERIM RECOVERY PLAN

2009-2014

November 2009

Department of Environment and Conservation
Kensington

GOVERNMENT OF WESTERN AUSTRALIA

Department of Environment and Conservation
Our environment, our future

FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (CALM) Policy Statements Nos. 44 and 50. Note: the Department of CALM formally became the Department of Environment and Conservation (DEC) in July 2006. DEC will continue to adhere to these Policy Statements until they are revised and reissued.

IRPs outline the recovery actions that are required to urgently address those threatening processes most affecting the ongoing survival of threatened taxa or threatened ecological communities, and begin the recovery process.

DEC is committed to ensuring that threatened taxa and threatened ecological communities are conserved through the preparation and implementation of Recovery Plans (RPs) or IRPs, and by ensuring that conservation action commences as soon as possible and, in the case of Critically Endangered (CR) taxa and communities, always within one year of endorsement of that rank by the Minister.

This IRP will operate from May 2009 to April 2014 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked CR, this IRP will be reviewed after five years and the need for further recovery actions assessed.

This IRP was given regional approval on 30 June 2009 and approved by the Director of Nature Conservation on 2 November 2009. The allocation of staff time and provision of funds identified in this IRP is dependent on budgetary and other constraints affecting DEC, as well as the need to address other priorities.

Information in this IRP was accurate as at November 2009.

IRP PREPARATION

This IRP was prepared by Rebecca Hayes[1], Kym Pryor[1] and Catherine Page[2]

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ACKNOWLEDGMENTS

The following people have provided assistance and advice in the preparation of this IRP:

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Andrew Crawford	Principal Technical Officer (Threatened Flora Seed Centre), DEC Science Division
Anne Cochrane	Senior Research Scientist (Threatened Flora Seed Centre), DEC Science Division
Bridgitte Long	Technical Officer (DRF Database), DEC Species and Communities Branch
Craig Stevens	Mt Gibson Sanctuary Manager, Australian Wildlife Conservancy
Pindiddy Aboriginal Corporation	Ninghan Station and Indigenous Protected Area
Sue Patrick	Former Research Scientist, DEC Science Division
Victoria Cunningham	Technical Officer (Threatened Flora Seed Centre), DEC Science Division

Thanks also to the staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information, and DEC's Species and Communities Branch for assistance.

Cover photograph by S.J. Patrick courtesy of the WA Herbarium

CITATION

This IRP should be cited as:

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SUMMARY

Scientific Name:	***Hybanthus cymulosus***	**Common Name:**	Ninghan violet
Family:	Violaceae	**Flowering Period:**	May-July
DEC Region:	Midwest	**DEC District:**	Geraldton
Shire:	Yalgoo	**Recovery Team:**	Geraldton District Threatened Flora Recovery Team (GDTFRT)

Illustrations and/or further information: Adams L.G. and George A.S. (1982) Violaceae, 2. Hybanthus, *Flora of Australia*, Australian Government Publishing Service Canberra 8: 106; Bennett E.M. (1972) A Revision of the Australian Species of *Hybanthus* Jacquin (Violaceae) *Nuytsia* 1(3): 218-241; Blackall W.E. and Grieve B.J. (1981) *How to Know Western Australian Wildflowers*, University of Western Australia Press pp 393-394; Department of Environment and Conservation (2008) *Western Australian Herbarium FloraBase 2 – Information on the Western Australian Flora*. Department of Environment and Conservation, Perth, Western Australia. http://www.dec.wa.gov.au/science/; Gardner C.A. (1936) *Journal of the Royal Society of Western Australia* 22: 125-126; Patrick, S. (2001) Declared Rare and Poorly Known Flora in the Geraldton District, *Wildlife Management Programs No. 26*, Department of Conservation and Land Management, Western Australia; Paul Armstrong and Associates (2004) *Vegetation Assessment and Rare Flora Search Between Perenjori and Mt Gibson Conducted September and October 2003*, unpublished report for Mt Gibson Iron Limited, West Perth.

Current status: *Hybanthus cymulosus* was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in April 2002 and is currently ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) criteria A2c; B1ab(iii)+2ab(iii) due to severe fragmentation of populations and the continuing decline in the area, extent and quality of habitat and number of mature individuals. *H. cymulosus* is not currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The main threats to the species are grazing by feral goats, small population size, wildfire, firebreak construction and track maintenance, drought and mineral exploration.

Description: *Hybanthus cymulosus* is a perennial herb to c. 90 cm tall, with alternate, narrow leaves 20-50 mm long and flat stipules 0.1-0.5 mm long, usually divided into three equal or irregular narrow lobes, giving the margin a jagged appearance. Leaves are usually green, but can turn a purple colour during drought. Flowers are in groups of three or more, each flower borne on an individual axis branching from a common axis in opposite formation. Flowers are close together and do not extend much beyond the leaves. The flowers have one broad lower petal, 9-15 mm long, pale violet with a yellow throat. The four lateral petals are narrow, pale violet, 2-4mm long. There are five lanceolate blue green sepals about 4-6mm long with a prominent mid-nerve. The capsule is 5 mm long, covered in minute lumps and contains 1-3 dark brown seeds. The species is similar to *H. floribundus*, from which it differs in having much larger flowers, narrow sepals and a cymose inflorescence.

Habitat requirements: *Hybanthus cymulosus* grows in red clay or clay loam over basalt, usually along drainage lines on the slopes of hills or in shaded areas beneath trees, over a small geographic range south-west of Paynes Find. Associated vegetation comprises open tall *Acacia* shrubland with *A. acuminata*, *Allocasuarina tessellata*, *A. dielsiana*, *Melaleuca radula*, *Grevillea subtiliflora*, *Dodonaea inaequifolia* and *Eucalyptus loxophleba*.

Habitat critical to the survival of the species, and important populations: Given that *Hybanthus cymulosus* is ranked as CR, it is considered that all known habitat for wild populations is critical to the survival of the species, and that all wild populations are important populations. Habitat critical to the survival of *H. cymulosus* includes the area of occupancy of the important populations; areas of similar habitat surrounding and linking populations (these providing potential habitat for population expansion and for pollinators); additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations; and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

Benefits to other species or ecological communities: Recovery actions implemented to improve the quality or security of the habitat of *Hybanthus cymulosus* will also improve the health of associated native vegetation including two DRF (CR) and four Priority flora. *H. cymulosus* does not occur within a Threatened Ecological Community (TEC).

International obligations: This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993 and will assist in implementing Australia's responsibilities under that convention. *Hybanthus cymulosus* is not listed under any specific international treaty, and therefore this plan does not affect Australia's obligations under any other international agreements.

Indigenous consultation: A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register has identified that there are no sites of Aboriginal significance at or near populations of *Hybanthus cymulosus*. However, involvement of the Indigenous community has been sought through the land managers, the Pindiddy Aboriginal

Corporation (PAC), to determine whether there are any issues or interests identified in the plan. Recovery actions identified within this plan refer to continued liaison and cooperation with the PAC. To date no issues have been identified.

Social and economic impact: All populations of *Hybanthus cymulosus* occur on pastoral leases and there is potential for the protection of the species to result in some economic impact due to stock exclusion. Three mineral exploration licences also cover the habitat of the species and there is potential for some economic impact should the owners of these licences wish to conduct exploration and future mining. Recovery actions refer to continued liaison between stakeholders with regard to populations located on these pastoral leases.

Affected interests: Stakeholders potentially affected by the implementation of this plan are the owners of the Pastoral leases and the holders of mineral exploration licences for areas where *Hybanthus cymulosus* occurs.

Evaluation of the plan's performance: DEC in conjunction with the Geraldton District Threatened Flora and Ecological Communities Recovery Team (GDTFRT) will evaluate the performance of this IRP. In addition to annual reporting on progress and evaluation against the criteria for success and failure, the plan will be reviewed following five years of implementation.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented –

1. Pastoral lease managers and the holders of mineral exploration licences have been made aware of the threatened nature of the *Hybanthus cymulosus*, its location and their legal obligations to protect it.
2. Grazing pressure on Mt Singleton has lessened following aerial mustering that has reduced sheep stocking levels from 18,000 in 1993 to around 2,300 in 2004.
3. In October 2004, a 3 m by 3 m mesh fence was erected around Population 6 of *Hybanthus cymulosus* to prevent damage from feral goats.
4. An area including Mt Singleton was declared as an IPA in October 2006 under World Conservation Union (IUCN) *Category III – Natural Monument: Protected Area managed for conservation of specific natural features* (700 hectares) and *Category IV – Habitat/Species Management Area: Protected Area managed mainly for conservation through management intervention*.
5. A goat proof fence was erected along the western, northern and northeastern border of the Indigenous Protected Areas surrounding a 50,000 hectare area around Mt Singleton.
6. DEC staff member Sue Patrick, conducted surveys for *Hybanthus cymulosus* over 11.5 days between April 1992 and April 2001.
7. Populations 3 to 6 have been regularly monitored by staff from DEC's Geraldton District since 2001 and Population 7 has been regularly monitored since being discovered in 2004.
8. The Threatened Flora Seed Centre currently holds three collections of *Hybanthus cymulosus* seed in storage with 131 seeds collected from Population 4, 119 seeds from Population 5 and 532 seeds from Population 7.
9. In 2001, Mt Gibson Station pastoral lease was purchased by the Australian Wildlife Conservancy (AWC), who aim to remove all stock and feral animals from the station (AWC 2006).
10. Staff from DEC's Geraldton District regularly monitor all populations of this species.
11. The GDTFRT will oversee the implementation of this IRP and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

IRP Objective: The objective of this Interim Recovery Plan is to abate identified threats and maintain or enhance *in situ* populations to ensure the long-term preservation of the species in the wild.

Recovery criteria

Criteria for success: The number of populations have increased and/or the number of mature individuals in populations have increased by ten percent or more over the term of the plan.

Criteria for failure: The number of populations have decreased and/or the number of mature individuals in populations have decreased by ten percent or more over the term of the plan.

Recovery actions

1. Coordinate recovery actions	9. Obtain biological and ecological information
2. Nominate *Hybanthus cymulosus* for listing as Critically Endangered under the Commonwealth EPBC Act	10. Conduct further surveys
3. Liaise with relevant land managers and Indigenous groups	11. Collect further seed and cutting material
4. Develop and implement a feral goat control strategy	12. Undertake weed control, monitor effectiveness and implement additional control if required
5. Monitor populations	13. Promote awareness
6. Confirm the location and existence of Populations 1, 2 and 8	14. Start the translocation process, if necessary
7. Develop and implement a fire management strategy	15. Review this IRP and assess the need for further recovery actions
8. Map habitat critical to the survival of *Hybanthus cymulosus*	

1. BACKGROUND

History

Hybanthus is a member of the Violaceae family which includes the well known pansies and violets. There are approximately 150 species of *Hybanthus* in the world, with 11 of these found in Australia (National Herbarium of NSW 2007).

Hybanthus cymulosus was first collected from the Mt Singleton area by W.E. Blackall and C.A. Gardner in July 1931, and formally described by Gardner in 1936. It was also included in *A Revision of the Australian Species of Hybanthus Jacquin (Violaceae)* by Bennett in 1972.

A further collection was made from Mt Singleton in 1953 and more collections were made on the track running up the northern slopes of Mt Singleton between 1967 and 1968, one of these being Population 1. Only one collection (Population 2) was made away from this range of hills some 10 km from Mt Singleton. However, this population has not been located since. Herbarium records from 1967 noted that vegetation was being grazed by stock.

Despite searches by DEC staff between 1992 and 2001, no plants were found on the Mt Singleton Range (Ninghan Station). In April 1992 there was evidence that the habitat was subject to heavy grazing by goats which were common at the time. In 1993, the property's pastoral lease was purchased for the Pindiddy Aboriginal Corporation (PAC) by the former Aboriginal and Torres Strait Islander Commission (ATSIC).

In July 1994, Populations 3 and 4 were found in the range to the north of Mt Gibson homestead. Although this area was in generally good condition, and contained low numbers of stock, both populations showed evidence of being grazed.

In August 2000, groups of goats were seen close to the highway on Ninghan Station, and it was recorded that the western end of the Mt Singleton Range was denuded of vegetation. The impact from grazing was particularly prominent between 2001 and 2004, partly due to drought conditions reducing vegetation regrowth.

The eastern end of the range on Mt Gibson Station was revisited in April 2001. The Australian Wildlife Conservancy had recently bought the pastoral lease. The area north of the homestead was burnt by wildfire in January 2001, and included part of the area where *Hybanthus cymulosus* was known to occur. However, it is unknown whether the populations were directly affected by this fire. The rains that soon followed produced strong vegetation regrowth, which then encouraged large numbers of goats into the area from Ninghan Station. These were controlled, reducing the degree of impact on the vegetation.

Surveys in August 2001 revealed one new population (Population 5) and relocated two other populations (Populations 3 and 4) on Mt Gibson Station. Another two new populations were located on Mt Singleton (Populations 6 and 8) both of which were being heavily grazed to less than 10 cm tall by goats. Normal sized plants were only found where they were sheltered by other shrubs or fallen branches.

Although goat grazing is still impacting *Hybanthus cymulosus* and other rare species on Mt Singleton, these species were seen to recover somewhat following good rainfall in 2004, provided they were protected during their active growth phase. Evidence to support this was noted in the *Ninghan Indigenous Protected Area Plan of Management 2004*, where it was stated that, "After three very dry years from 2001 to 2004 with very little plant growth response, early rains in 2004 prompted an early winter growth season, and inspections in June 2004 indicated that several of these plant populations were growing well" (Vital Options Consulting (2004). This report, however, did not identify which plant populations or species were growing well.

Surveys conducted by DEC staff in 2004 located Population 7 on Mt Gibson Station.

In October 2006, the PAC voluntarily declared two areas within Ninghan Station as Indigenous Protected Areas (IPAs). The Ninghan IPAs are currently managed in accordance with IUCN categories III and VI for conservation of biodiversity and associated cultural resources (DEWHA 2007b).

Hybanthus cymulosus is known from eight populations and approximately 634 mature plants. All populations are located on pastoral leases north east of Wubin in DEC's Geraldton District.

Description

Hybanthus cymulosus is a perennial herb to c. 90 cm tall, with alternate, narrow leaves, 20-50 mm long and flat stipules, 0.1-0.5 mm long, usually divided into three equal or irregular narrow lobes, giving the margin a jagged appearance. Leaves are usually green, but can turn a purple colour during drought. Flowers are in groups of three or more, each flower borne on an individual axis branching from a common axis in opposite formation. Flowers are close together and do not extend much beyond the leaves. The flowers have one broad lower petal, 9-15 mm long, pale violet with a yellow throat. The four lateral petals are narrow, pale violet, 2-4 mm long. There are five lanceolate blue green sepals about 4-6 mm long with a prominent mid-nerve. The capsule is 5 mm long, covered in minute lumps and contains 1-3 dark brown seeds (Gardner 1936).

The Greek name *Hybanthus* refers to the flower, where *hybos* is hump-backed, and *anthos* means flower. The name *cymulosus* comes from the Greek word *cyma* which refers to anything swollen, or a wave. The botanical definition of *cyme* refers to the flower-head where the central axis stops growing on the production of a flower and further flowers grow on lower stalks, i.e. the oldest flower is at the centre.

This species is similar to *Hybanthus floribundus*, from which it differs in its much larger flowers, narrow sepals and cymose inflorescence (Patrick 2001).

Distribution and habitat

The species is confined to a small area south west of Paynes Find where it grows in red clay or clay loam over basalt, usually along drainage lines or in shaded areas beneath trees on hill slopes. Associated vegetation is open tall *Acacia* shrubland of *A. acuminata*, *Allocasuarina tessellata*, *A. dielsiana*, *Melaleuca radula*, *Grevillea subtiliflora*, *Dodonaea inaequifolia* and sparse *Eucalyptus loxophleba*.

Table 1. Summary of population land vesting, purpose and manager

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1 North East of Wubin	Geraldton	Yalgoo	Non vested	Pastoral	Pindiddy Aboriginal Corporation
2 North East of Wubin	Geraldton	Yalgoo	Non vested	Pastoral	Australian Wildlife Conservancy
3 North East of Wubin	Geraldton	Yalgoo	Non vested	Pastoral	Australian Wildlife Conservancy
4 North East of Wubin	Geraldton	Yalgoo	Non vested	Pastoral	Australian Wildlife Conservancy
5 North East of Wubin	Geraldton	Yalgoo	Non vested	Pastoral	Australian Wildlife Conservancy
6 North East of Wubin	Geraldton	Yalgoo	Non vested	Pastoral	Pindiddy Aboriginal Corporation
7 North East of Wubin	Geraldton	Yalgoo	Non vested	Pastoral	Australian Wildlife Conservancy
8 North East of Wubin	Geraldton	Yalgoo	Non vested	Pastoral	Pindiddy Aboriginal Corporation

Populations in **bold text** are considered to be important populations

Biology and ecology

Hybanthus cymulosus has been recorded flowering in January, May, July and August.

There is little known about the biology and ecology of the species, and recovery actions refer to a need for research.

The species can recover from grazing once the threat is removed. On Mt Gibson Station, where goat-control has been implemented, Population 3 has increased from seven mature plants in 1994, to 250 mature plants in 2007. Since the fencing of Population 6 on Ninghan Station in October 2004, six new seedlings have appeared, although none have reached maturity.

Threats

Hybanthus cymulosus was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in April 2002 and is currently ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) criteria A2c; B1ab(iii)+2ab(iii) due to severe fragmentation of populations and the continuing decline in

the area, extent and quality of habitat and number of mature individuals. *H. cymulosus* is not currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The main threats to the species are grazing by feral goats, small population size, wildfire, firebreak construction and track maintenance, drought and mineral exploration.

- **Grazing** by feral goats (*Capra hircus*) and livestock is a serious threat to all populations. *Hybanthus cymulosus* appears to be palatable and historical evidence suggests that its extent of occurrence was much greater before the introduction of goats into the Mt Singleton area. Grazing removes new growth and reduces reproductive output.
- **Small population size** increases the likelihood of the population being adversely impacted on by a single event. Small populations are also at a greater risk of loss of genetic diversity and inbreeding depression.
- **Wildfire** is a potential threat as it is unknown how the populations of *Hybanthus cymulosus* will respond to fire. This is particularly the case where plants are found in isolated patches in very low numbers. Following a wildfire, grazing pressure is also likely to increase. Note, however, there is limited scope to control wildfires in pastoral country due to the inaccessibility of most sites, and fires are generally not controlled unless they threaten infrastructure.
- **Firebreak construction and track maintenance** is a potential threat to all populations that abut firebreaks and tracks.
- **Drought** is a threat to all populations of *Hybanthus cymulosus* and surrounding vegetation, and has the potential to increase grazing impact as food sources diminish.
- **Mineral exploration** is a potential threat to populations of *Hybanthus cymulosus*. All populations are located within areas that are covered by mining tenements with mineral exploration licences pending approval. Any clearing in association with the mineral exploration may directly or indirectly affect populations of *Hybanthus cymulosus*.
- **Weeds** are a minor threat. Although the current level of threat from weeds is low, if weed numbers increased (such as after fire) they may impact on *Hybanthus cymulosus* by competing for resources, degrading habitat, exacerbating grazing pressure, and increasing the risk and severity of fire.

The intent of this plan is to provide actions that will deal with immediate threats to *Hybanthus cymulosus*. Although climate change may have a long-term effect on the species, actions taken directly to prevent the impact of climate change are beyond the scope of this plan.

Table 2. Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants		Condition	Threats
1 North East of Wubin	Pastoral Lease	1967	-	-	Grazing, wildfire, drought
2 North East of Wubin	Pastoral Lease	1996	0	-	Grazing, wildfire, drought
3 North East of Wubin	Pastoral Lease	1994 2001 2007	7 c. 150 255	Moderate Moderate Healthy	Firebreak construction, grazing, wildfire, drought
4 North East of Wubin	Pastoral Lease	1994 2001 2007	1000+ 100+ 108	- Moderate Moderate	Grazing, small population size, wildfire, drought
5 North East of Wubin	Pastoral Lease	2001 2004 2007	25+ 150+ -	Poor Moderate Moderate	Grazing, small population size, wildfire, drought
6 North East of Wubin	Pastoral Lease	2001 2004 2006 2007	10+ 2(2) 2(c. 4) 2(6)	Poor Poor Moderate Healthy	Small population size, wildfire, drought, grazing
7 North East of Wubin	Pastoral Lease	2004 2007	100+ 119	Moderate Moderate	Grazing, drought, wildfire, small population size
8 North East of Wubin	Pastoral Lease	2001 2002	6 0	Poor Poor	Grazing, small population size, drought, wildfire

Populations in **bold text** are considered to be Important Populations; Note: ( ) = number of seedlings, - = not recorded.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Development and/or land clearing in the immediate vicinity of populations of *Hybanthus cymulosus* will require assessment. Developments or clearing should not be approved unless the proponents can demonstrate that their actions will have no significant

negative impact on the species, its habitat or potential habitat or on the local surface hydrology, such that drainage in the habitat of the species would be altered.

Habitat critical to the survival of the species, and important populations

Given that *Hybanthus cymulosus* is ranked as CR, it is considered that all known habitat for wild populations is critical to the survival of the species, and that all wild populations are important populations. Habitat critical to the survival of *H. cymulosus* includes the area of occupancy of the important populations; areas of similar habitat surrounding and linking populations (these providing potential habitat for population expansion and for pollinators); additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations; and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

Benefits to other species or ecological communities

Recovery actions implemented to improve the quality or security of the habitat of *Hybanthus cymulosus* will also improve the status of associated native vegetation which includes two DRF (CR) and four Priority Flora taxa. These taxa are listed in the table below.

Table 3. Conservation-listed flora species occurring in habitat of *Hybanthus cymulosus*

Species Name	Conservation Status (Western Australia)	Conservation Status (EPBC Act 1999)
Acacia imitans	Critically Endangered	-
Acacia unguicula	Critically Endangered	Critically Endangered
Allocasuarina tessellata	Priority 1	-
Grevillea scabrida	Priority 3	-
Grevillea subtiliflora	Priority 1	-
Micromyrtus racemosa var. *mucronata*	Priority 1	-

For a description of Priority categories see Atkins (2008).

Hybanthus cymulosus does not occur within a Threatened Ecological Community (TEC).

International obligations

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993 and will assist in implementing Australia's responsibilities under that convention. *Hybanthus cymulosus* is not listed under any specific international treaty, and therefore this plan does not affect Australia's obligations under any other international agreements.

Indigenous consultation

A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register has identified that there are no sites of Aboriginal significance at or near populations of *Hybanthus cymulosus*. However, involvement of the Indigenous community has been sought through the PAC to determine whether there are any issues or interests identified in the plan. To date no issues have been identified.

The PAC manages Ninghan Station, and together with Vital Options Consulting, has produced a comprehensive plan of Management for the IPA, which recognises the values of this and other species of rare flora within the IPA, and sets out management objectives to assist with the conservation of these species (Vital Options Consulting 2004). A 480 km^2 area was declared as an IPA in October 2006 (DEWHA 2007b). This area includes all known populations of *Hybanthus cymulosus* on Ninghan Station. The IPA program is part of Australia's National Reserve System Program which aims to establish a network of protected areas which includes a representative sample of all types of ecosystems across the country. With support from the IPA program, Indigenous landowners commit themselves to manage their lands for the protection of natural and cultural features in accordance with internationally recognised standards and guidelines (DEWHA 2007a). Recovery actions identified within this plan refer to continued liaison and cooperation with the PAC.

Social and economic impact

All populations of *Hybanthus cymulosus* occur on pastoral leases and there is potential for the protection of the species to result in some economic impact due to stock exclusion. Three mineral exploration licences also cover the habitat of the species and there is potential for some economic impact should the owners of these licences wish to conduct exploration and future mining. Recovery actions refer to continued liaison between stakeholders with regard to populations located on these pastoral leases.

Affected interests

Stakeholders potentially affected by the implementation of this plan are the owners of the Pastoral leases and the holders of mineral exploration licences for areas where *Hybanthus cymulosus* occurs.

Evaluation of the plan's performance

DEC in conjunction with the Geraldton District Threatened Flora and Ecological Communities Recovery Team (GDTFRT) will evaluate the performance of this IRP. In addition to annual reporting on progress and evaluation against the criteria for success and failure, the plan will be reviewed following five years of implementation.

2. RECOVERY OBJECTIVE AND CRITERIA

Objective

The objective of this IRP is to abate identified threats and maintain or enhance viable *in situ* populations to ensure the long-term preservation of *Hybanthus cymulosus* in the wild.

Criteria for success: The number of populations have increased and/or the number of mature individuals in populations have increased by ten percent or more over the term of the plan.

Criteria for failure: The number of populations have decreased and/or the number of mature individuals in populations have decreased by ten percent or more over the term of the plan.

3. RECOVERY ACTIONS

Existing recovery actions

Pastoral lease managers and the holders of mineral exploration licences have been made aware of the threatened nature of the *Hybanthus cymulosus*, its location and their legal obligations to protect it.

Grazing pressure on Mt Singleton has lessened following aerial mustering that has reduced sheep stocking levels from 18,000 in 1993 to around 2,300 in 2004. Around 9,000 feral goats were also removed from the property over a 10 year period between 1997 and 2007, with 1,300 of those removed since the installation of a goat proof fence.

In October 2004, a 3 m by 3 m mesh fence was erected around Population 6 of *Hybanthus cymulosus* to prevent damage from feral goats.

An area including Mt Singleton was declared as an IPA in October 2006 under World Conservation Union (IUCN) *Category III – Natural Monument: Protected Area managed for conservation of specific natural features* (700 hectares) and *Category IV – Habitat/Species Management Area: Protected Area managed mainly for conservation through management intervention* (47,000 hectares). A proposal to fence Mt Singleton was developed, and the Central Agricultural and Pastoral Aboriginal Corporation (CAPAC) assisted the PAC in preparing an application for funds through the Indigenous Protection Program. In 2006, $200,000 was granted to Ninghan Station IPA through the Australian Government's Natural Heritage Trust towards the fencing of a 50,000 hectare area surrounding Mt Singleton (NHT 2005). A goat proof fence was erected along the western, northern and northeastern border of the IPA. Funding is also being used for portable goat trap yards to aid the

ongoing removal of goats and other feral animals (DEWHA 2007b). A DEC Flora Conservation Officer liaised with the CAPAC and provided assistance.

DEC staff member Sue Patrick, conducted surveys for *Hybanthus cymulosus* over 11.5 days between April 1992 and April 2001. These surveys covered much of the Mt Singleton area, similar habitat close by, and hills west and north of Mt Singleton.

Populations 3 to 6 have been monitored by staff from DEC's Geraldton District since 2001 and Population 7 has been monitored since being discovered in 2004. An attempt was made to relocate Populations 2 and 8 in 1996 and 2002 respectively, without success.

The Threatened Flora Seed Centre currently holds 131 *Hybanthus cymulosus* seeds from Population 4, 119 seeds from Population 5 and 532 seeds from Population 7. All collections were made from Mt Gibson Station in October 2004.

In 2001, Mt Gibson Station pastoral lease was purchased by the Australian Wildlife Conservancy (AWC), who aim to remove all stock and feral animals from the station (AWC 2006). Many musters have occurred since purchasing the property, with the majority of stock now removed. Following the erection of a goat proof fence bordering the west, north and east boundaries of the Ninghan IPA in February 2007, 340 goats were removed from the northern boundary of Mt Gibson Station (southern border of the Ninghan IPA), contributing to the feral goat control measures carried out within the IPA. The mustering program for feral goats is ongoing in this area.

Staff from DEC's Geraldton District regularly monitor all populations of this species.

The Geraldton District Threatened Flira Recovery Team (GDTFRT) will oversee the implementation of this IRP and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Future recovery actions

Where recovery actions occur on lands other than those managed by DEC, permission has been or will be sought from appropriate owners/land managers prior to recovery actions being undertaken. The following recovery actions are generally in order of descending priority, influenced by their timing over the life of the plan. However this should not constrain addressing any of the actions if funding is available and other opportunities arise.

1. Coordinate recovery actions

The GDTFRT will coordinate the implementation of recovery actions for *Hybanthus cymulosus* and will include information on progress in their annual reports to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $1,400 per year

2. Nominate *Hybanthus cymulosus* for listing as Critically Endangered under the Commonwealth EPBC Act

Staff from DEC's Species and Communities Branch (SCB) will develop a Species Profile and Threats (SPRAT) and nomination form for this species, and forward it to the Commonwealth Department of Environment, Water, Heritage and the Arts for referral to the Threatened Species Scientific Committee (TSSC) for endorsement under the EPBC Act.

Action: Nominate *Hybanthus cymulosus* for listing as Critically Endangered under the Commonwealth EPBC Act
Responsibility: DEC (SCB)

Cost: $1,400 in the first year

3. Liaise with relevant land managers and Indigenous groups

Staff from DEC's Geraldton District will liaise with appropriate land managers to ensure that populations of *Hybanthus cymulosus* are not accidentaly damaged or destroyed during operations such as track and firebreak maintenace. Input and involvement will also be sought from Aboriginal groups that have an active interest in areas that are habitat of the species.

Action: Liaise with relevant land managers and Indigenous groups
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $1,000 per year

4. Develop and implement a feral goat control strategy

Grazing by feral goats (*Capra hircus*) threatens most populations of *Hybanthus cymulosus*. Mt Gibson Station has implemented a comprehensive feral goat control program. However, although aerial mustering is proving to be most successful in their control on Ninghan Station, a range of factors are inhibiting the total eradication of feral goats. One possible option is to fence populations most at risk from grazing. Methods of controlling grazing will be investigated and a control strategy developed, implemented and monitored for success.

Action: Develop and implement a feral goat control strategy
Responsibility: DEC (Geraldton District) through the GDTFRT, in partnership with land managers
Cost: $6,000 in year 1 for development and implementation; $3,700 in years 2-5 for implementation

5. Monitor populations

Monitoring of factors such as weed invasion, grazing, habitat degradation, population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity is essential. Populations will be inspected annually and Rare Flora Report Forms completed.

Action: Monitor populations
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $2,200 per year

6. Confirm the location and existence of Populations 1, 2 and 8

Surveys will be conducted to relocate Populations 1, 2 and 8 and collections made for lodging at the Western Australian Herbarium. Rare Flora Report Forms should be completed even if these populations no longer exist.

Action: Confirm the location and existence of Populations 1, 2 and 8
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $1,000 in year 1

7. Develop and implement a fire management strategy

Hybanthus cymulosus is thought to be killed by fire if it occurs during the plants' active growing period. To minimise future fire damage, it is important that a fire regime with appropriate frequency and season be applied to areas occupied by the species. The AWC has consulted with DEC's fire management branch and is currently preparing a fire management strategy for Mt Gibson Station. Opportunities may exist for DEC to work with AWC in the preparation and application of this plan over a wider area, including the Ninghan IPA.

Action: Develop and implement a fire management strategy
Responsibility: DEC (Geraldton District) through the GDTFRT, and relevant authorities
Cost: $2,100 in year 1 for development; $1,500 in years 2-5 for implementation

8. Map habitat critical to the survival of *Hybanthus cymulosus*

While this species is not currently listed under the EPBC Act, this is a future intention, and it is a requirement of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) (Section 207A) that spatial data relating to critical habitat be determined. Although critical habitat to the survival of the species is alluded to in Section 1, all the areas described have not yet been accurately mapped and will be addressed under this action. If additional populations are located, habitat critical to their survival will also be determined and mapped.

Action: Map habitat critical to the survival of *Hybanthus cymulosus*
Responsibility: DEC (Geraldton District) and SCB through the GDTFRT
Cost: $2,000 in year 1

9. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Hybanthus cymulosus* will provide a better scientific basis for management of the wild populations. An understanding of the following is particularly necessary for effective management:

- The pollination biology of the species.
- The requirements of pollinators.
- Soil seed bank dynamics, including seedbank location and viability.
- The role of natural disturbances (fire and physical), competition, rainfall and grazing in germination and recruitment.
- The reproductive strategies, phenology and seasonal growth of the species.
- The population genetic structure, levels of genetic diversity and minimum viable population size.
- Longevity of plants and time taken to reach maturity.

Action: Obtain biological and ecological information
Responsibility: DEC (Geraldton District, Science Division) through the GDTFRT
Cost: $10,000 per year

10. Conduct further surveys

Further surveys by DEC staff and, where possible, volunteers from the local community, wildflower societies and naturalists clubs will be conducted during the flowering period of *Hybanthus cymulosus* (May to July). Surveys should be concentrated in the Mt Singleton area, but should also include other areas of similar habitat nearby.

Summaries of areas surveyed will be sent to SCB and also retained at the relevant District Office as a record, regardless of whether the species is found.

Action: Conduct further surveys
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $3,500 in years 1, 3 and 5

11. Collect further seed and cutting material

It is necessary to store germplasm as an insurance policy against extinction in the wild. The germplasm stored will include seed and live plants in cultivation. Some seed has been collected from populations located on Mt Gibson Station, but additional collections are required from all populations to maintain an adequate representation of the genetic diversity of this species. The patterns of viability that emerge from standard tests on seed collected may indicate the need for other recovery actions. For example, if viability is consistently low, it may be appropriate to conduct some hand pollination trials. At this time, this is deemed unnecessary. Cuttings will also be collected to enhance the living collection at BGPA.

Action: Collect further seed and cutting material
Responsibility: DEC (TFSC, Geraldton District) through the GDTFRT

Cost: $4,500 per year, if required

12. Undertake weed control, monitor effectiveness and implement additional control if required

The current level of threat from weeds is low. However, if weed numbers increased (such as after fire) they may impact on *Hybanthus cymulosus* by competing for resources, degrading habitat, exacerbating grazing pressure, and increasing the risk and severity of fire. Recruitment is likely to be particularly affected. If during monitoring it is deemed that the threat from weeds has increased, weed control will be undertaken in consultation with the land managers. Regular monitoring will need to be conducted to ensure this does not become a major threat.

1. Monitor all populations for weed intrusions.
2. Select appropriate herbicides after determining which weeds are present.
3. Control invasive weeds by hand removal or spot spraying around plants of the *Hybanthus cymulosus* when weeds first emerge.
4. Schedule weed control to include spraying at other threatened flora populations within the area.
5. Regularly monitor weeds and implement additional weed control if required.

The tolerance of associated native plant species to herbicides at the site of *Hybanthus cymulosus* is not known and weed control programs will be undertaken in conjunction with research and in a manner that minimises negative impacts on associated native flora.

Action: Undertake weed control, monitor effectiveness and implement additional control if required
Responsibility: DEC (Geraldton District, Science Division) through the GDTFRT
Cost: $1,500 per year

13. Promote awareness

The importance of biodiversity conservation and the need for the long-term protection of wild populations of *Hybanthus cymulosus* will be promoted to the community through poster displays and the local print and electronic media. Formal links with local naturalist groups and interested individuals will also be encouraged. An information sheet will be produced, and will include a description of the plant, its habitat, threats, recovery actions and photos. This will be distributed to the public through DEC's Geraldton District office and at the offices and libraries of the Shires of Yalgoo, Mt Marshall, Perenjori and Dalwallinu. Such information distribution may lead to the discovery of new populations.

Action: Promote awareness
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $1,700 in year 1, $1,000 in years 2-5

14. Start the translocation process, if necessary

Translocation may be deemed desirable for the conservation of this species if attempts to control the feral goat population are not successful. If deemed necessary, a translocation proposal will be developed and suitable translocation sites selected. Information on the translocation of threatened plants and animals in the wild is provided in DEC's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna* (CALM 1995). All translocation proposals require endorsement by DEC's Director of Nature Conservation. Monitoring of translocations is essential and will be included in the timetable developed for the Translocation Proposal.

Action: Start the translocation process, if necessary
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $2,200 in year 5

15. Review this IRP and assess the need for further recovery actions

If *Hybanthus cymulosus* is still ranked as CR at the end of the five-year term of this IRP, the need for further recovery actions, or a review of this IRP will be assessed and a revised plan prepared if necessary.

Action: Review the IRP and the need for further recovery actions
Responsibility: DEC (Geraldton District and SCB) through the GDTFRT
Cost: $2,000 in year 5

Table 4. Summary of recovery actions

Recovery Actions	Priority	Responsibility	Completion date
Coordinate recovery actions	High	Geraldton District, GDTFRT	Ongoing
Nominate *Hybanthus cymulosus* for listing as Critically Endangered under the Commonwealth EPBC Act	High	Species and Communities Branch	2010
Liaise with relevant land managers and Indigenous groups	High	Geraldton District, GDTFRT	Ongoing
Develop and implement a feral goat control strategy	High	Geraldton District, GDTFRT, land managers	Developed by 2010 with implementation ongoing
Monitor populations	High	Geraldton District, GDTFRT	Ongoing
Confirm the location and existence of Populations 1, 2 and 8	High	Geraldton District, GDTFRT	2010
Develop and implement a fire management strategy	Medium	Geraldton District, GDTFRT, relevant authorities	Developed by 2010 with implementation ongoing
Map habitat critical to the survival of *Hybanthus cymulosus*	Medium	SCB, Geraldton District, GDTFRT	2010
Obtain biological and ecological information	Medium	Science Division, Geraldton District, GDTFRT	2014
Conduct further surveys	Medium	Geraldton District, GDTFRT	2014
Collect further seed and cutting material	Medium	TFSC, Geraldton District, GDTFRT	2014
Undertake weed control, monitor effectiveness and implement additional control if required	Low	Science Division, Geraldton District, GDTFRT	2014 if required
Promote awareness	Low	Geraldton District, GDTFRT	2014
Start the translocation process, if necessary	Low	Geraldton District, GDTFRT	Ongoing
Review this IRP and assess the need for further recovery actions	Low	SCB, Geraldton District, GDTFRT	2014

4. TERM OF PLAN

This IRP will operate from May 2009 to April 2014 but will remain in force until withdrawn or replaced. If the taxon is still ranked CR after five years, the need for further recovery actions will be assessed.

5. REFERENCES

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6. TAXONOMIC DESCRIPTION

Excerpt from Gardner CA (1936) *Journal of the Royal Society of Western Australia* 22: 125-126.

Hybanthus cymulosus Gardner sp. nov.

An erect shrub of 60-90 cms in height, with erect and spreading stems and almost divaricate branches, the bark pale, thin, but corky. Leaves mostly alternate, narrow-lanceolate to almost linear, soft, acute, tapering towards the base, uninerved, entire, stipules minute. Flowers large in axillary divaricate cymes consisting of from three to several flowers, the terminal flower soon deciduous; bracts similar in outline to the leaves but smaller; bracteoles small, linear, with recurved apices. Sepals united at the base, lanceolate, acuminate, three-nerved, the two lower petals smaller and narrower than the three upper ones. Petals pale violet, the four upper ones ovate-oblong, obtuse, shorter than the sepals, fimriate-ciliolate; lowest petals cuteate-obovate with a broad claw, retuse, saccate or gibbous at the base and bearded above the cavity, with two folds or callous ridges united into one above the claw of the petal; anthers subsessile, the filaments very short, the connective produced into an orange-coloured obovate retuse appendage as long again as the anther cells; style flattened, somewhat falcate, slightly exceeding the connective appendages. Capsule globular, black, slightly exceeding the calyx, with usually one flat minutely granular seed.

Leaves 2-4 cm long, 2-3 mm wide; cymes 3 cm long; flowers 1-1.3 cm long; sepals 3-4 mm long; upper petals slightly shorter; lowest petal 1-1.3cm long.