Government of **Western Australia**
Department of **Environment and Conservation**

Australian Government

INTERIM RECOVERY PLAN NO. 319

‘MINGENEW EVERLASTING’

(*Schoenia filifolia* subsp. *subulifolia*)

INTERIM RECOVERY PLAN

2011-2016

July 2011
Department of Environment and Conservation
Kensington

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: 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.

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

DEC is committed to ensuring that Threatened taxa are conserved through the preparation and implementation of Recovery Plans (RPs) or IRPs by ensuring that conservation action commences as soon as possible.

This plan will operate from July 2011 to June 2016 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked as Endangered (EN) in WA, this plan will be reviewed after five years and the need for further recovery actions assessed.

This plan was given regional approval on 14 September 2011 and was approved by the Director of Nature Conservation on 20 October 2011. The provision of funds identified in this plan is dependent on budgetary and other constraints affecting DEC, as well as the need to address other priorities.

This plan was prepared with financial support from the Australian Government to be adopted as a National Recovery Plan under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Information in this plan was accurate at July 2011.

PLAN PREPARATION

This plan was prepared by Nick Casson[1].

[1] Senior Ecologist, DEC Species and Communities Branch, Locked Bag 104, Bentley Delivery Centre, WA 6983.

ACKNOWLEDGMENTS

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

Alanna Chant	Conservation Officer (Flora), DEC Geraldton District
Andrew Brown	Threatened Flora Coordinator, DEC Species and Communities Branch
Amanda Shade	Assistant Curator (Nursery), Botanic Gardens and Parks Authority
Andrew Crawford	Principal Technical Officer, DEC Science Division

Thanks also to the staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information.

Cover photographs by Sue Patrick.

CITATION

This plan should be cited as:

Department of Environment and Conservation (2011) *Schoenia filifolia subsp. subulifolia* Interim Recovery Plan 2011-2016. Interim Recovery Plan No. 319. Department of Environment and Conservation, Western Australia.

SUMMARY

Scientific Name:	*Schoenia filifolia* subsp. *subulifolia*	**Common Name:**	Mingenew Everlasting
Family:	Asteraceae	**Flowering Period:**	September to October
DEC Region:	Midwest	**DEC District:**	Geraldton
Shire:	Mingenew	**NRM Region:**	Northern Agricultural
Recovery Team:	Geraldton District Threatened Flora Recovery Team (GDTFRT)	**IBRA Region:**	Geraldton Sandplain

Illustrations and/or further information: Brown, A., Thomson-Dans, C. and Marchant, N. (Eds) (1998) *Western Australia's Threatened Flora*; Wilson, P.G. (1992). The Lawrencella complex (Asteraceae: Gnaphalieae: Angianthinae) of Australia. Nuytsia 8(3), 361-377; Patrick, S. 2001 Declared Rare and Poorly Known Flora in the Geraldton District. Draft Western Australian Wildlife Management Program No. 26. CALM, Bentley; Western Australian Herbarium (1998−) *FloraBase − The Western Australian Flora*. Department of Environment and Conservation. http://florabase.dec.wa.gov.au/.

Current status *Schoenia filifolia* subsp. *subulifolia* was declared to be Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in 2003 and is ranked as Endangered (EN) in WA under International Union for Conservation of Nature (IUCN 2001) Red List criteria A2c; B1ab(iii); D due to the small number of populations, and a continuing decline in the number of mature plants and quality of habitat. The subspecies is listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as Endangered. The main threats to the subspecies are chemical drift, land degradation by stock, weed invasion, and salinity. Because the subspecies occurs on water-gaining areas, hydrological change is a threat and climate change may also be an issue.

Description: *Schoenia filifolia* subsp. *subulifolia* is an erect, annual herb to 30 cm high, with terete leaves (Wilson 1992). The inflorescence is of open corymbs, with the involucre hemispherical, c. 7 mm high, the innermost bracts with a yellow ovate lamina c. 5 x 2.5 mm. The fruit is a terete achene, the base not excavated. The terminal barbs of the pappus bristles are distinct, not densely clustered, and their tips are acute, not clubbed. It differs from the typical subspecies in having larger flower heads and with a hemispherical involucre. The achenes are larger, with more dense hairs.

Distribution and habitat: *Schoenia filifolia* subsp. *subulifolia* is known from three populations over a range of 50 km between Yandanooka and Mingenew. All populations are found in DEC's Geraldton District in the Northern Agricultural NRM Region. The species occurs in heavy soils on swampy flats, breakaways and crabholes (Western Australian Herbarium (1998−). However, it may have once been much more widespread in the Mingenew and Geraldton areas, and may now be restricted to small, swampy, areas that are unsuited to agriculture. Associated species include *Acacia* species, *Eucalyptus loxophleba, Hakea preissii* and other daisies such as *Waitzia acuminata* (DEC 2011).

Habitat critical to the survival of the species, and important populations: *Schoenia filifolia* subsp. *subulifolia* is ranked in WA as Endangered and, as it is only known from three locations, it is considered that all known habitat for wild populations is habitat critical to the survival of the species, and that all wild populations are important populations. Habitat critical to the survival of *Schoenia filifolia* subsp. *subulifolia* includes the area of occupancy of 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 *Schoenia filifolia* subsp. *subulifolia* will also improve the status of associated native vegetation, and the declared rare flora species *Wurmbea tubulosa*. *Schoenia filifolia* subsp. *subulifolia* does not occur within or adjacent to any known Threatened or Priority Ecological Community (TEC/PEC).

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. The 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 did not reveal any sites of Aboriginal significance within or adjacent to populations of *Schoenia filifolia* subsp. *subulifolia*. However, input and involvement has been sought through the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs to determine if there are any issues or interests. Indigenous opportunity for future involvement in the implementation of the Recovery plan is included as an action in this plan.

Social and economic impact and benefits: The implementation of this plan may cause some economic impact through the loss of production farmland, land available for development and the cost of implementing recovery actions (i.e. weed control, fencing) for populations occurring on private property. The occurrence of the subspecies in private property remnant vegetation may, however, assist the land owner in attracting funding support for the management of the bushland, and thus provide a benefit to the landowner for the broader landscape management of their land.

Affected interests: The protection of the taxon will affect private landholders and may affect mining interests.

Evaluation of the Plan's Performance: The DEC in conjunction with the Geraldton District Threatened Flora Recovery Team (GDTFRT) will evaluate the performance of this plan. 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 and have been considered in the preparation of this plan:

1. All stakeholders have been made aware of the existence of this species and its locations.
2. The landowner fenced Population 2 in 1989.
3. The landowners manage Populations 1 & 3 in collaboration with DEC. Population 1 was fenced in 2010. Both have been protected from crop spray.
4. A weed management plan has been prepared and implemented for Population 1.
5. Surveys resulted in the location of several populations.
6. Approximately 9,366 seeds collected from Population 1 in 2007 are stored in DEC's Threatened Flora Seed Centre.
7. The Botanic Gardens and Parks Authority (BGPA) hold seed from cultivated plants. Propagation from this seed stock at BGPA has proven reliable.
8. Staff from DEC's Geraldton District monitor populations as regularly as practicable.
9. An information sheet on the subspecies has been produced and distributed to the public.
10. The GDTFRT oversees the implementation of this plan and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Plan Objective: The objective of this 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 has increased and/or the number of mature individuals has increased by ten percent or more over the term of the plan.
Criteria for failure: The number of populations has decreased and/or the number of mature individuals has decreased by ten percent or more over the term of the plan.

Recovery actions

1. Coordinate recovery actions
2. Liaise with land managers
3. Impliment weed control
4. Collect seed
5. Restore habitat
6. Develop and implement a translocation proposal
7. Ensure long-term protection of habitat
8. Monitor populations
9. Undertake surveys
10. Map habitat critical to the survival of *Schoenia filifolia* subsp. *subulifolia*
11. Obtain biological and ecological information
12. Develop and implement a fire management strategy
13. Promote awareness
14. Review this plan

1. BACKGROUND

History

The first known collection of *Schoenia filifolia* subsp. *subulifolia* was made by J. Drummond (date and location unrecorded). Other collections were made between Mingenew and Yandanooka in 1904, between Geraldton and Walkaway in 1962, near Mingenew (Population 1) in 1998, north-east of Mingenew (Population 2) in 1999 and north-east of Yandanooka in 1999 (Population 3). The subspecies was formally named by P. Wilson in 1992 from a collection made at Champion Bay by P. Walcott.

Clearing for agriculture and infrastructure has lead to the disappearance of the subspecies from several of these localities. It was locally more abundant in the area of Population 3 prior to 2004, occurring on the southern Yandanooka-Melara Rd verges until shire grading and weed spraying lead to its demise.

There are currently three extant populations between Mingenew and Yandanooka, together comprising about 500 mature plants (subject to annual variation in flowering numbers).

Description

Schoenia filifolia subsp. *subulifolia* is an annual erect herb to 30 cm high, with terete leaves (Wilson 1992). The inflorescence is of open corymbs, with the involucre hemispherical, c. 7 mm high, the innermost bracts with a yellow ovate lamina c. 5 x 2.5 mm. The fruit is a terete achene, the base not excavated. The terminal barbs of the pappus bristles are distinct, not densely clustered, and their tips are acute, not clubbed. It differs from the typical subspecies in having larger flower heads and a hemispherical involucre. The achenes are larger, with more dense hairs.

Distribution and habitat

Schoenia filifolia subsp. *subulifolia* is known from three populations over a range of 50 km between Yandanooka and Mingenew. All populations are found in DEC's Geraldton District in the Northern Agricultural NRM Region. The subspecies occurs in heavy soils on swampy flats, breakaways and crabholes. However, it may have once been much more widespread in the Mingenew and Geraldton areas, and may now be restricted to small, swampy, areas that are unsuited to agriculture. Associated species include *Acacia* species, *Eucalyptus loxophleba*, *Hakea preissii* and other daisies such as *Waitzia acuminata*.

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

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1. NE of Mingenew	Geraldton	Mingenew	Freehold	Private property	Landowner
2. NE of Mingenew	Geraldton	Mingenew	Freehold	Private property	Landowner
3. Yandanooka	Geraldton	Mingenew	Freehold	Private property	Landowner

Note: Populations in **bold text** are considered to be important populations. Plants at Population 3 may be extinct.

Biology and ecology

Schoenia filifolia subsp. *subulifolia* flowers between September and October.

Seed demonstrates a limited form of dormancy and a relatively short life (Murray 1995, Choengsaat et al 1998). Immature seed (less than 6 months of age) requires storage at high temperatures in order to break short-term dormancy (Peishi et al 1999). When stored at ambient conditions viability and germinability decline after 24 months.

In cultivation, the subspecies exhibits reliable germination. No pre-treatments are required when sowing (Amanda Shade pers. comm.). The subspecies can also be grown from cuttings.

Plant size depends on rainfall. In drought years it is dwarfed but still sets some seed.

Threats

Schoenia filifolia subsp. *subulifolia* was declared to be Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in 2003 and is ranked as Endangered (EN) in WA under International Union for Conservation of Nature (IUCN 2001) Red List criteria A2c; B1ab(iii); D due to the small number of populations, and a continuing decline in the number of mature plants and quality of habitat. The subspecies is listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as Endangered. The main threats to the subspecies are chemical drift, land degradation by stock, weed invasion and salinity. Because the subspecies occurs on water gaining areas hydrological change is a threat and climate change may also be an issue. Threats include:

Fragmentation and isolation can pose increased risk of local extinction given the small population sizes. Extinction may already have occurred at Population 3.

Lack of genetic diversity within populations is likely to be a threat to the subspecies long-term survival given the isolation and small population sizes.

Agricultural activities including extensive clearing and altered land use are past and continuing threats. Farm activities such as maintaining fence lines/firebreaks, chemical drift and land degradation by stock can also impact the subspecies.

Land tenure may become an issue for management over the long-term as access to the private property for routine monitoring and implementing management actions is difficult. There is some risk that without access for management Population 2 may be over-run with weeds.

Weeds are a threat to Populations 1 and 3. Population 1 occurs in a depression at the edge of a paddock where it adjoins remnant vegetation and the area has become increasingly weed infested.

Grading and herbicide use are major threats to the subspecies which has declined following grading and spraying.

Secondary salinity is a potential threat to Population 2 which is in a low-lying area.

Hydrological change threatens populations. Disruption to water flow is likely to affect the water-gaining areas where the taxon occurs (especially Population 2).

Mining is a potential threat to Population 1 as its habitat is within a mining tenement.

Fire, either frequent or at the wrong time of year, could threaten populations. Frequent fire could favour the abundance of aggressive weed species. Fire when the plants are immature or still hold seed may also be a threat.

The intent of this plan is to provide actions that will deal with immediate threats to *Schoenia filifolia* subsp. *subulifolia*. Although climate change may have a long-term effect on the subspecies, 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. of plants	Current Condition	Current and potential threats
NE of Mingenew.	Private	1999 2004 2007 2007 2007 2008 2008 2009 2010	20 1000 100 750 100 200 500 500 500	Healthy	Weeds, Agricultural edge effects, drought, mining
2. NE of Mingenew.	Private	1999 2004 2007	30 200 0	Unknown	Weeds, Agricultural edge effects, salinity
3. NE of	Private	2004	20	Plants and habitat	Weeds, Agricultural edge effect, stock, drought.

Yandanooka		2007 2008	10 0	poor	

Note: Populations in **bold text** are considered to be important populations.

It is not possible to deduce accurate trends in population size based on surveys as the size of each population is subject to seasonal variation such as appropriate rainfall.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Proposed development and/or land clearing and on-ground works in the immediate vicinity of *Schoenia filifolia* subsp. *subulifolia* may require assessment.

Actions that could result in any of the following may potentially result in a significant impact on the species:

- damage or destruction of occupied or potential habitat
- alteration of the local surface hydrology or drainage
- reduction in population size
- a major increase in disturbance in the vicinity of populations

This subspecies is protected under the *Environment Protection and Biodiversity Conservation Act 1999* and by the Western Australian *Wildlife Conservation Act 1950*. The above potential impacts will be taken into account when assessing any actions that may take this subspecies or threaten its habitat when assessed under these Acts. Environmental impact assessment under either Part IV or Part V of the *Environmental Protection Act 1986* will also address these impacts as part of the broader assessment provisions available to this Act.

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

Schoenia filifolia subsp. *subulifolia* is ranked in WA as Endangered and, as it is only known from three locations, it is considered that all known habitat for wild populations is habitat critical to the survival of the subspecies, and that all wild populations are important populations. Habitat critical to the survival of *Schoenia filifolia* subsp. *subulifolia* includes the area of occupancy of 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.

Current estimates for the extent of occurrence and area of occupancy are estimated to be 35 km^2 and less than 0.002 km^2 respectively. For the two populations where area of occupancy was recorded, the total area recorded was 850 m².

Benefits to other species or ecological communities

Recovery actions implemented to improve the quality or security of the habitat of *Schoenia filifolia* subsp. *subulifolia* will also improve the status of associated native vegetation and the threatened flora species listed in the table below.

Table 3. Conservation–listed flora species occurring within 500m of *Schoenia filifolia* subsp. *subulifolia*

Species name	Conservation Status (WA)	Conservation Status (EPBC Act)
*Wurmbea tubulosa**	Vulnerable	Endangered

*Flowers in winter before *Schoenia filifolia* subsp. *subulifolia*.

Schoenia filifolia subsp. *subulifolia* does not occur within or adjacent to any known Threatened or Priority Ecological Community (TEC/PEC).

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. 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 did not reveal any sites of Aboriginal significance within or adjacent to populations of *Schoenia filifolia* subsp. *subulifolia*. However, input and involvement has been sought through the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs to determine if there are any issues or interests. Indigenous opportunity for future involvement in the implementation of the Recovery plan is included as an action in this plan.

Social and economic impacts and benefits

Implementation of this plan may result in some economic impact through the loss of production farmland and land available for development and the cost of implementing recovery actions (ie weed control, fencing) for populations on private property. The occurrence of the subspecies in private property remnant vegetation may, however, assist the land owner in attracting funding support for the management of the bushland, and thus provide a benefit to the landowner for the broader landscape management of their land.

Affected interests

The protection of the taxon will affect private landholder operations and may affect mining.

Evaluation of the Plan's Performance

The DEC in conjunction with the Geraldton District Threatened Flora Recovery Team (GDTFRT) will evaluate the performance of this plan. 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 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.

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

3. RECOVERY ACTIONS

Existing recovery actions

All stakeholders have been made aware of the existence of this subspecies and its locations. These notifications detail the current status of the species under the *Wildlife Conservation Act 1950* as Declared Rare Flora (DRF) and the associated legal obligations regarding its protection.

The landowners at Population 2 are aware of the plants susceptibility to spray-drift, weed competition and ongoing disturbance. The area has been fenced since 1989 to promote vegetation health and protect against salinity, and there is an Environmental Management System in place at the property.

Good relationships exist with the landholders at Populations 1 and 3 who allow access for management. The landowner at Population 3 participates in the Mingenew Herbarium group, DEC's "Land for Wildlife Scheme",

and attends some Threatened Flora Recovery Team meetings. In September 2007 the landowner at Population 1 agreed to fence the remnant and to avoid spraying near the population (RFRF).

In June 2010 Population 1 was fenced to prevent disturbance from livestock.

Measures implemented at Population 1 during 2010 include:

- Two rounds of selective herbicide application and manual weeding, enhanced by low rainfall;
- Perimeter planting of endemic species to assist in habitat restoration, hampered by low rainfall;
- Perimeter placement of brush to trap weed seed in run-off and promote habitat restoration;
- Procurement of weed matting to place over areas around DRF where weeds dominate;
- Two 2 m x 2 m quadrats installed to monitor the effectiveness of weed control, which were first assessed in 2010.

In 2010 the Geraldton Regional Herbarium group participated in a field trip to Population 1 to record all native and non-native plant species at the site.

Approximately 9,366 seeds were collected from Population 1 in 2007. Seeds are stored in DEC's Threatened Flora Seed Centre (TFSC) at –18°C.

The Botanic Gardens and Parks Authority hold seed from cultivated plants. Some of this seed has been germinated successfully (Amanda Shade pers. comm.).

Staff from DEC's Geraldton District monitor populations as regularly as possible.

An information sheet on the subspecies has been produced and distributed to the public.

The GDTFRT oversees the implementation of this plan 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 prior to 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 oversee the implementation of the recovery actions for *Schoenia filifolia* subsp. *subulifolia* and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $6,000 per year

2. Liaise with land managers

Staff from DEC's Geraldton District will liaise with appropriate land managers to ensure that populations of *Schoenia filifolia* subsp. *subulifolia* are not accidentally damaged or destroyed. Indigenous consultation will take place to determine if there are any issues or interests in areas that are habitat for the subspecies.

Action: Undertake liaison with land managers
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $2,000 per year

3. Implement weed control

Integration of weed control into farm and regional management plans could help address a key threat to this taxon, and promote steady improvement in the habitat condition.

Weed control should include:

- Application of specific herbicide – where grasses are dominant a grass-specific herbicide (eg Fusilade®) will be used and where broad leaf weeds occur in the surrounds a broad-spectrum non-residual herbicide (Glyphosate) will be used to spot spray. Herbicide application should be at least twice a year; after the first substantial winter rainfall, then again 6 weeks later. Further application may be considered if substantial rainfall occurs in late spring or summer. To ensure seed-bank depletion, regular application will need to be continued for longer than the number of years recommended for each weed species on Florabase.
- Weeds in proximity to DRF individuals should be removed manually. This should follow the same timing as herbicide application. Use of a sharp shovel is effective and prevents damage to and loss of DRF.
- Installation of weed matting following the first winter emergence of weeds, and in areas over-run by weeds.
- Development of a windbreak along those edges of the remnant that get prevailing winds.

Action: Implement weed control
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $6,000 per year, as required

4. Collect seed

Further seed collections are required both for long term storage and to ensure sufficient seed is available for possible re-stocking or to establish new populations in less degraded habitats. Given the low numbers of plants in the wild it will be necessary to minimise the seed harvest during any one year. The ready germination of the seeds means it is feasible to harvest a small number of seeds over several years and cultivate further seed from propagated plants.

Action: Collect seed
Responsibility: DEC (Geraldton District, TFSC), BGPA through the GDTFRT
Cost: $5,000 per year

5. Restore habitat

Restoration of habitat is required in tandem with weed control. Seed collection from habitat plants is planned for late 2011 followed by habitat restoration planting in 2012. Successive planting activity may be required, subject to the degree of improvement.

Action: Restore habitat
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $6,000 per year, as required

6. Develop and implement a translocation proposal

Translocation is desirable for the conservation of this species due to few extant populations. Direct seeding is likely to be effective given the easy germination of seed (A. Chant pers. comm.).

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). Translocations should meet the standards set in the Australian Network for Plant Conservation translocation guidelines (Vallee et al 2004). 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: Develop and implement a translocation proposal

Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $5,000 in year 4

7. Ensure long-term protection of habitat

Investigate formal conservation arrangements, management agreements and covenants on private land.

Action: Ensure long-term protection of habitat
Responsibility: DEC (Geraldton District, Land Unit); Department of Planning (DoP); Department of Mines and Petroleum (DMP), through the GDTFRT
Cost: $3,000 per year

8. Monitor populations

Monitoring of factors such as weed invasion, habitat degradation, hydrology (including salinity), population stability (expansion or decline in numbers or extent), pollinator activity, seed production, recruitment, and longevity is required.

Action: Monitor populations
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $10,000 per year

9. Undertake surveys

Further survey during the subspecies flowering period is a high priority. As this taxon was once widespread, it is likely that other populations exist in remnant vegetation on private property. All surveyed areas will be recorded and the presence or absence of the species documented to increase survey efficiency and reduce duplicate surveys (a composite map may help in this regard). The continued involvement of the Herbarium Group is important for increasing the survey capacity and helping develop a consistent approach to survey.

Action: Undertake surveys
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $5,000 in years 1, 3 and 5

10. Map habitat critical to the survival of *Schoenia filifolia* subsp. *subulifolia*

Spatial data relating to habitat critical to the survival of *Schoenia filifolia* subsp. *subulifolia* needs to be determined. Although this is alluded to in Section 1, it has not yet been fully mapped and will be addressed under this action. If additional populations are located, then habitat critical to their survival will also be determined and mapped.

Action: Map habitat critical to the survival of *Schoenia filifolia* subsp. *subulifolia*
Responsibility: DEC (SCB, Geraldton District) through the GDTFRT
Cost: $6,000 in year 2

11. Obtain biological and ecological information

Obtaining information on the biology and ecology of the subspecies provides a scientific basis for its management in the wild. Investigations should include:

1. Study of the soil seed bank dynamics and the role of various factors including disturbance, competition, drought, inundation and grazing in recruitment and seedling survival.
2. Determination of reproductive strategies, phenology and seasonal growth.
3. Investigation of reproductive success and pollination biology.
4. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.

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

12. Develop and implement a fire management strategy

If possible, fire will be prevented from occurring in the habitat of populations except where it is being used experimentally as a recovery tool. A fire response strategy will be developed that recommends fire frequency, intensity, season, and control measures.

Action: Develop a fire management strategy
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $10,000 in first year and $2,000 in subsequent years

13. Promote awareness

The importance of biodiversity conservation and the protection of *Schoenia filifolia* subsp. *subulifolia* will be promoted to the public. An information sheet that includes a description of the plant, its habitat type, threats, management actions, and photos has been produced, and will continue to be as appropriate. Formal links with local naturalist groups and interested individuals will also be encouraged.

Action: Promote awareness
Responsibility: DEC (Geraldton District, SCB, Strategic Development and Corporate Affairs Division) through the GDTFRT
Cost: $4,000 in year 1 and $2,000 in years 2-5

14. Review this plan

If *Schoenia filifolia* subsp. *subulifolia* is still ranked as Endangered at the end of the five-year term of this plan, the need for further recovery actions, or a review of this plan will be assessed and a revised plan prepared if necessary.

Action: Review this plan
Responsibility: DEC (SCB, Geraldton District) through the GDTFRT
Cost: $3,000 in year 5

Table 4. Summary of Recovery Actions

Recovery Action	Priority	Responsibility	Completion Date
Coordinate recovery actions	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Liaise with land managers	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Impliment weed control	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Collect seed	High	DEC (Geraldton District, TFSC), BGPA through the GDTFRT	Year 4
Restore habitat	High	DEC (Geraldton District) through the GDTFRT	Year 4
Develop and implement a translocation proposal	High	DEC (Geraldton District) through the GDTFRT	Year 4
Ensure long-term protection of habitat	High	DEC (Geraldton District, Land Unit); Department of Planning (DoP); Department of Mines and Petroleum (DMP), through the GDTFRT	Ongoing
Monitor populations	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Undertake surveys	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Map habitat critical to the survival of *Schoenia filifolia* subsp. *subulifolia*	High	DEC (SCB, Geraldton District) through the GDTFRT	Ongoing
Obtain biological and ecological information	Medium	DEC (Science Division, Geraldton District) through the GDTFRT	Ongoing
Develop and implement a fire management strategy	Medium	DEC (Geraldton District) through the GDTFRT	Developed by year 2 with implementation ongoing
Promote awareness	Medium	DEC (Geraldton District, SCB, Strategic Development and Corporate Affairs Division) through the GDTFRT	Ongoing

Review this plan	Medium	DEC (SCB, Geraldton District) through the GDTFRT	Year 5

4. TERM OF PLAN

Western Australia
This plan will operate from July 2011 to June 2016 but will remain in force until withdrawn or replaced. If the species is still ranked Endangered after five years, the need for further recovery actions and the need for a revised Plan will be assessed.

Commonwealth
In accordance with the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) this recovery plan will remain in force until revoked.

The plan must be reviewed at intervals of not longer than 5 years.

5. REFERENCES

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6. TAXONOMIC DESCRIPTION

Wilson, P.G. 1992 The Lawrencella complex (Asteraceae: Gnaphalieae: Angianthinae) of Australia. Nuytsia 8(3), 361-377

Schoenia filifolia (Turcz.) Paul G.Wilson subsp. *subulifolia* (F.Muell.) Paul G.Wilson

An annual erect herb to 30 cm high, with terete leaves. The inflorescence is of open corymbs, with the involucre hemispherical., c. 7 mm high, the innermost bracts with a yellow ovate lamina c. 5 x 2.5 mm. The fruit is a terete achene, the base not excavated. The terminal barbs of the pappus bristles are distinct, not densely clustered, and their tips are acute, not clubbed.

This subspecies differs from subspecies *filifolia* in having larger flower heads and with a hemispherical involucre. The achenes are larger, with more dense hairs.