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

INTERIM RECOVERY PLAN NO. 298

Grevillea fuscolutea

INTERIM RECOVERY PLAN

2010 – 2015

May 2010

Department of Environment and Conservation
Manjimup

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.

IRPs 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, and by ensuring that conservation action commences as soon as possible and, in the case of Critically Endangered (CR) taxa, always within one year of endorsement of that rank by the Minister.

This IRP will operate from May 2010 to April 2015 but will remain in force until withdrawn or replaced. It is intended that, if the species is still ranked Vulnerable (VU) this IRP will be reviewed after five years and the need for further recovery actions assessed.

This IRP was given regional approval on 15 January 2010 and was approved by the Director of Nature Conservation on 3 May 2010. 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 at May 2010.

IRP PREPARATION

This IRP was prepared by Cassidy Newland[1]

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ACKNOWLEDGMENTS

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

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Roger Hearn	Regional Ecologist, DEC, Warren Region, Locked Bag 2, MANJIMUP, WA 6258
Robyn Luu	Project Officer, Species and Communities Branch, DEC.
Andrew Brown	Threatened Flora Coordinator, Species and Communities Branch, DEC.

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

Cover photograph by Cassidy Newland

CITATION

This IRP should be cited as:
Department of Environment and Conservation (2010) *Grevillea fuscolutea* Interim Recovery Plan 2010-2015. Interim Recovery Plan No. 298. Department of Environment and Conservation, Perth, Western Australia.

SUMMARY

Scientific Name:	***Grevillea fuscolutea***	**Common Name:**	
Family:	PROTEACEAE	**Flowering Period:**	April – October
DEC Region:	Warren	**DEC District:**	Frankland
Shire:	Denmark	**Recovery Team:**	Warren Region Threatened Flora Recovery Team (WRTFRT)
NRM Region:	South Coast NRM Inc		

Illustrations and/or further information: DEC (2008) *Western Australian Herbarium FloraBase 2 – Information on the Western Australian Flora* (Accessed 2008). Department of Environment and Conservation, Western Australia. http://www.calm.wa.gov.au/science/; Keighery, G.J., (1992) Taxonomic review of the *Grevillea drummondii* Meissn. species group (Proteaceae). *Nuytsia* 8:228-229; Hearn, R.W., Meissner, R., Brown, A.P., Macfarlane, T.D. and Annels, T.R. (2006) *Declared Rare and Poorly Known Flora in the Warren Region*. Department of Environment and Conservation, Perth, Western Australia.

Current status: *Grevillea fuscolutea* was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in December 2008 and is currently ranked Vulnerable (VU) under World Conservation Union (IUCN 2001) Red List criterion D2 as the population has a restricted area of occupancy of less than 20 km^2. The species is not currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Description: An erect open, much-branched shrub to 2.5 m tall with densely tomentose branchlets when young, becoming glabrous with age. New growth is ferruginous. Leaves are grey-green, oblanceolate to linear, 41-78 mm long by 7-12 mm wide with margins recurved, midrib prominent and a short black mucro. The petiole is 3-5 mm long. Flowers are in axillary racemes, usually five on short peduncles, the rachis densely pubescent. Bracts are 3-4 mm long. Pedicles are 4-6 mm long, orange-ferruginous and hirsute. The perianth is 6-8 mm long, golden yellow with orange hairs, inside and glabrous except for a ring of hairs in the throat. The style is, 6-7 mm long and yellow with orange-red hairs. *Grevillea fuscolutea* is closely related to *G. fistulosa* but differs in having a ring of hair in the perianth, and yellow instead of red flowers. (Hearn *et al*., 2006)

Habitat requirements: *Grevillea fuscolutea* grows in shallow siliceous sands over granite in a mixed low heath of *Cryptandra congesta, Allocasuarina humilis, Andersonia sprengelioides, Acacia triptycha, Borya longiscapa, Neurachne alopecuroides, Mesomelaena stygia, Hibbertia microphylla, Conostylis pusilla, Hemigenia podalyrina, Melaleuca scabra, Taxandria linearifolia, Dillwynia laxiflora, G. cirsiifolia, Verticordia plumosa* and *Gastrolobium brownii.*

Habitat critical to the survival of the species, and important populations: Given that *Grevillea fuscolutea* is ranked as VU, 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 *G. fuscolutea* includes the area of occupancy of the 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/ecological communities: Recovery actions implemented to improve the quality or security of the habitat of *Grevillea fuscolutea* will also improve the status of associated native vegetation. The species occurs in association with two Declared Rare Flora species *Cryptandra congesta* (Vulnerable) and *Laxmannia grandiflora* subsp. *brendae* (Vulnerable), and two Priority 2 species *Borya longiscapa* and *Verticordia endlicheriana* var. *angustifolia*. *G. fuscolutea* also falls largely within the Mt Lindesay Threatened Ecological Community (Mt Lindesay TEC).

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

Role and interests of indigenous people: According to the Department of Indigenous Affairs Aboriginal Heritage Sites Register no populations occur in or near a currently registered Aboriginal Heritage site. However, the species occurs around granite outcrops and these are known to be culturally significant sites to Indigenous people. Input and involvement is being sought through the South West Aboriginal Land and Sea Council (SWALSC) to assist in the identification of potential Indigenous management responsibilities. As this is not expected to be completed before the approval of the IRP, further

consultation has been included as a recovery action to ensure there has been Indigenous engagement in relation to the recovery actions posed in this plan.

Affected interests: All known populations are on Crown land vested in the Conservation Commission and managed by DEC.

Social and economic impacts: The implementation of this recovery plan is unlikely to cause any social and economic impacts as all populations are on DEC managed land.

Evaluation of the Plans Performance: DEC, in conjunction with the Warren Region Threatened Flora Recovery Team (WRTFRT) 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 is to be reviewed following four years of implementation.

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

1. Staff at DEC's Frankland District are aware of the Declared Rare status of *Grevillea fuscolutea* and manage it as such.
2. Staff from DEC's Frankland District regularly monitor this species and manage threatening processes where possible.
3. A small portion of the granite habitat of *Grevillea fuscolutea* is treated with aerial applications of phosphite every two years (commenced 2005) to reduce the impact of *Phytophthora cinnamomi* on species composition, reproduction and community health/ integrity. The phosphite program will be extended to some of the granites on Little Lindesay known to contain *Grevillea fuscolutea*.
4. The occurrence of the majority of known populations has been mapped in the field.
5. Surveys of potential habitat outside the known distribution have been undertaken to locate new populations or extend the known distribution of the species.
6. Demography attributes of known populations and population extents have been documented following field surveys.

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

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

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

Recovery actions

1. Coordinate recovery actions
2. Monitor populations
3. Liaise with relevant Indigenous groups
4. Close vehicle access to Little Lindesay and Mt Lindesay
5. Conduct further surveys
6. Map habitat critical to the survival of *Grevillea fuscolutea*
7. Collect seed from *Grevillea fuscolutea*
8. Obtain biological and ecological information
9. Develop and implement a fire management strategy

10a. Determine *Phytophthora cinnamomi* susceptibility

10b. Map and monitor dieback fronts

10c. Apply phosphite to currently uninfected granite systems

11. Monitor and control grazing activity
12. Monitor hydrological conditions
13. Promote awareness
14. Review this plan and assess the need for further recovery actions

1. BACKGROUND

History

Grevillea fuscolutea was first collected by William Webb in 1879 and later (1980) by a Forests Department survey team. It was then recollected from the same general area over subsequent years. Recognised as being part of the *Grevillea drummondii* complex, it was named as distinct by Greg Keighery in 1992. Despite extensive surveys, it has only been recorded from a few populations north of Denmark (Hearn *et al*., 2006, Keighery 1992). Previously listed as Priority 2 it was nominated for listing as DRF in 2007 after extensive pre-nomination survey work determined the species was confined to an area of less then 15 km², across the slopes of Mt Lindesay and Little Lindesay.

Description

An erect open, much-branched shrub to 2.5 m tall with densely tomentose branchlets when young, becoming glabrous with age. New growth is ferruginous. Leaves are grey-green, oblanceolate to linear, 41-78 mm long by 7-12 mm wide with margins recurved, midrib prominent and a short black mucro. The petiole is 3-5 mm long,. Flowers are in axillary racemes, usually five on short peduncles, the rachis densely pubescent. Bracts are 3-4 mm long. Pedicles are 4-6 mm long, orange-ferruginous and hirsute. The perianth is 6-8 mm long, golden yellow with orange hairs, inside and glabrous except for a ring of hairs in the throat. The style is, 6-7 mm long and yellow with orange-red hairs. *Grevillea fuscolutea* is closely related to *G. fistulosa* but differs in having a ring of hair in the perianth, and yellow instead of red flowers. (Hearn *et al*., 2006)

Flowering period: April to October.

Distribution and habitat

Grevillea fuscolutea is a narrow endemic confined to the Mt Lindesay – Little Lindesay landform north of Denmark. It is found on the fringes of granite outcrops amongst a mixed low scrub comprising *Cryptandra congesta, Allocasuarina humilis, Andersonia sprengelioides, Acacia triptycha, Borya longiscapa*, *Neurachne alopecuroides*, *Mesomelaena stygia*, *Hibbertia microphylla*, *Conostylis pusilla*, *Hemigenia podalyrina*, *Melaleuca scabra*, *Taxandria linearifolia*, *Dillwynia laxiflora*, *G. cirsiifolia*, *Verticordia plumosa* and *Gastrolobium brownii*. The species *Cryptandra congesta* and *Borya longiscapa* are also narrow endemics confined to the same landform and most of their range is now recognised as the Mt Lindesay Threatened Ecological Community.

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

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1A Mt Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
1B Mt Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
1C Mt Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
1D Mt Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
2A Little Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
2B N of Little Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
2C E of Little Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
3 SW of Little Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
4 SW of Little Lindesay	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
5A S of Mt Lindesay summit	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
5B SSW of Mt Lindesay summit	Frankland	Denmark	Conservation Commission of WA/ Freehold	National Park/ Private Property	DEC/ Landowners
5C SSW of Mt Lindesay summit	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
6A WSW of Mt Lindesay summit	Frankland	Denmark	Conservation Commission of WA	National Park	DEC

6B WSW of Mt Lindesay summit	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
7 WNW of Mt Lindesay summit	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
8A W of Mt Lindesay summit	Frankland	Denmark	Conservation Commission of WA	National Park	DEC
8B WNW of Mt Lindesay summit	Frankland	Denmark	Conservation Commission of WA	National Park	DEC

Populations in **bold text** are considered to be Important Populations.

Biology and ecology

The biology and ecology of *Grevillea fuscolutea* remains largely unknown as the species was not formerly described until 1992. The following characteristics have been collated from population monitoring.

Grevillea fuscolutea is a narrow endemic confined to the Mt Lindesay landform. It can generally be found growing in shallow yellow sandy clay soils which are frequently amongst areas of fine granitic gravel. The vegetation is generally low and open with a few exceptions. In a few populations the species has been found to extend up to 10 m into adjacent jarrah woodland, and in one population is found along both sides of a granitic gully which is cut through outcropping granite, where along with *Gastrolobium brownii* and other shrubs it forms part of a thicket.

Grevillea fuscolutea flowers almost all year round with a lull over summer, and appears to release its seed as soon as the fruits mature. However while it produces ample seed, recruitment is generally low during the inter-fire period and mortality of seedlings tends to be high. In areas where competition for habitat is high there appears to be almost no recruitment.

Grevillea fuscolutea has been reported to be killed by fire, regenerating from seed with the first established seedlings reaching reproductive maturity in the fourth year after fire. It has been noted that, as with a number of granite associated species on Mt. Lindesay, germination is spread over about 3 years, not all in the first winter post fire (Hearn *et al*. 2006).

Threatening processes

Grevillea fuscolutea was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in December 2006 and is currently ranked Vulnerable (VU) under World Conservation Union (IUCN 2001) Red List criterion D2 as it is restricted to an area of occupancy of less than 20 km². The species is not currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Threats include:

- **Inappropriate fire regimes** - fire has been reported to kill the majority of plants burnt, with regeneration occurring from seed. As a result, burnt populations remain vulnerable to further fire until plants have matured and the seed stock has been replenished sufficiently to enable replacement of the original population and account for mortality rates. As such, the occurrence of fire before the re-establishment of the soil seed bank is a serious threat to the species. It is however to be noted that vegetation in many of the plant communities in which *Grevillea fuscolutea* occurs, are often open and discontinuous making it unlikely that all mature individuals will be burnt by a single fire event.
- **Drought** is a serious threat to the species. Its highly restricted occurrence on shallow soils fringing granite outcrops, makes it vulnerable to any loss of available habitat through the effects of drought. As with other narrow endemics associated with the Lindesay landform, it can be expected that occurrences on slopes with a more westerly and northerly aspect will receive a greater intensity of solar radiation and therefore such occurrences are likely to be the first to be affected by drought.
- ***Phytophthora cinnamomi*** is considered a threat to *Grevillea fuscolutea*. While the susceptibility of the species to *P. cinnamomi* is unknown, plant deaths of unknown cause have occurred in dieback infested areas. *P. cinnamomi* is also indirectly a threat to the species through the degradation of habitat critical to its survival.

- **Vehicle access** threatens Subpopulations 1a, 1b, 2a, 2b, and 2c. An old 4WD vehicle access track runs from Stan Road to Little Lindesay and Mt Lindesay where it connects to the end of the Mt Lindesay walk trail. Past use of the track has contributed to the spread of *Phytophthora cinnamomi*, and has degraded the granite communities along the start of the track where Subpopulations 2a, 2b and 2c occur. While the track is officially closed it is still used regularly by motorbikes and occasionally by 4WDs. Use of the Mt Lindesay walk trail as a return track by motorbikes threatens Subpopulations 1a and 1b.

- **Recreational access** through trampling and disturbance from people walking and exploring the granite outcrops is a minor threat. It is expected to have the greatest impact on populations which occur in swales and soil pockets on large granite outcrops, where people have disturbed vegetation to explore the larger granite outcrops. Recreation is expected to be a greater threat following fire when seedling regeneration sees the population at its most vulnerable.

The intent of this plan is to provide actions that will deal with immediate threats to *Grevillea fuscolutea*. 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 of plants	Area m²	Condition	Threats
1A Mt Lindesay	National Park	2006 4,700	80,000	Moderate	Drought, dieback, recreational access, inappropriate fire regimes, vehicle access
1B Mt Lindesay	National Park	2006 6,000	240,000	Healthy	Drought, dieback, recreational access, inappropriate fire regimes, vehicle access
1C Mt Lindesay	National Park	2006 800+	10,000	Healthy	Drought, dieback, inappropriate fire regimes
1D Mt Lindesay	National Park	2005 200	7,000	Healthy	Drought, dieback, inappropriate fire regimes
2A Little Lindesay	National Park	2006 5000	300,000	Healthy	Drought, dieback, inappropriate fire regimes, recreational access, vehicle access
2B N of Little Lindesay	National Park	2006 2,200	40,000	Healthy	Drought, dieback, inappropriate fire regimes
2C E of Little Lindesay	National Park	2006 530	26,000	Healthy	Drought, dieback, inappropriate fire regimes, recreational access, vehicle access
3 SW of Little Lindesay	National Park	2006 13,000	350,000	Healthy	Drought, dieback, inappropriate fire regimes
4 SW of Little Lindesay	National Park	2006 4,000	30,000	Healthy	Drought, dieback, inappropriate fire regimes
5A S of Mt Lindesay summit	National Park	2007 4,500	60,000	Healthy	Drought, dieback, inappropriate fire regimes
5B SSW of Mt Lindesay summit	National Park/ Private Property	2006 30	3,000	Moderate	Drought, dieback, inappropriate fire regimes
5C SSW of Mt Lindesay summit	National Park	2006 120	350	Healthy	Drought, dieback, inappropriate fire regimes
6A WSW of Mt Lindesay summit	National Park	2007 450	38,000	Healthy	Drought, dieback, inappropriate fire regimes
6B WSW of Mt Lindesay summit	National Park	2007 640	16,000	Healthy	Drought, dieback, inappropriate fire regimes
7 WNW of Mt Lindesay summit	National Park	2005 N/A	18,000	Healthy	Drought, dieback, inappropriate fire regimes
8A W of Mt Lindesay summit	National Park	2006 1,200	45,000	Moderate	Drought, dieback, inappropriate fire regimes
8B WNW of Mt Lindesay summit	National Park	2006 100	6,000	Moderate	Drought, dieback, inappropriate fire regimes

Guide for decision-makers

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

species, its habitat or potential habitat, or the local surface and ground water 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 *Grevillea fuscolutea* is ranked as VU, 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 *G. fuscolutea* 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/ecological communities

Recovery actions implemented to improve the quality or security of the habitat of *Grevillea fuscolutea* will also improve the status of associated native vegetation. The species occurs in association with two Declared Rare Flora species *Cryptandra congesta* (Vulnerable) and *Laxmannia grandiflora* subsp. *brendae* (Vulnerable), and two Priority 2 species *Borya longiscapa* and *Verticordia endlicheriana* var. *angustifolia*. *Borya longiscapa* is expected to undergo a conservation status review this year. These taxa are listed in the table below:

Table 3: Conservation-listed flora species occurring in habitat of *Grevillea fuscolutea*

Species name	Conservation Status (Western Australia)
Cryptandra congesta	DRF, Vulnerable
Laxmannia grandiflora subsp. *brendae*	DRF, Vulnerable
Borya longiscapa	Priority 2
Verticordia endlicheriana var. *angustifolia*	Priority 2

For a description of the priority categories see Atkins (2006)

Grevillea fuscolutea falls largely within the Mt Lindesay Threatened Ecological Community (Mt Lindesay TEC) (see table below).

Table 4: Threatened Ecological Community (TEC) in which *Grevillea fuscolutea* occurs in association

Community Name	Conservation status (WA)
Mt Lindesay – Little Lindesay Vegetation Complex	Endangered

For a description of the TEC categories see DEC (2007)

International Obligations

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

Role and interests of indigenous people

According to the Department of Indigenous Affairs Aboriginal Heritage Sites Register no populations occur in or near a currently registered Aboriginal Heritage site. However, the species occurs around granite outcrops and these are known to be culturally significant sites to Indigenous people. Input and involvement is therefore being sought through the South West Aboriginal Land and Sea Council (SWALSC) to assist in the identification of potential Indigenous management responsibilities. As this is not expected to be completed before the approval of the IRP, further consultation has been included as a recovery action to ensure there has been Indigenous engagement in relation to the recovery actions posed in this plan.

Affected interests

All known populations are on Crown land vested in the Conservation Commission and managed by DEC.

Social and economic impacts

The implementation of this recovery plan is unlikely to cause any social and economic impacts as all populations are on DEC managed land.

Evaluation of the Plans Performance

DEC, in conjunction with the Warren Region Threatened Flora Recovery Team (WRTFRT) 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 is to be reviewed following four years of implementation.

2. RECOVERY OBJECTIVE AND CRITERIA

Objective

The objective of this IRP 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 have increased or the number of individuals within populations have increased by ten percent or more over the term of the plan.

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

3. RECOVERY ACTIONS

Existing recovery actions

Staff at DEC's Frankland District are aware of the Declared Rare status of *Grevillea fuscolutea* and manage it as such.

Staff from DEC's Frankland District regularly monitor this species and manage threatening processes where possible.

A portion of the granite habitat of *Grevillea fuscolutea* is treated with aerial applications of phosphite every two years (commenced 2005) to reduce the impact of *Phytophthora cinnamomi* on species composition, reproduction and community health/ integrity. The phosphite program will be extended to granites on Little Lindesay known to contain *Grevillea fuscolutea*.

The occurrence of the majority of known populations has been mapped in the field.

Surveys of potential habitat outside the known distribution have been undertaken to locate new populations or extend the known distribution of the species.

Demography attributes of known populations and population extents have been documented following field surveys.

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 WRTFRT will coordinate recovery actions for *Grevillea fuscolutea* and other DRF in their region. They will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Warren Region) through the WRTFRT
Cost: $1,500 per year

2. Monitor populations

Grevillea fuscolutea populations will be monitored annually. Data will be collected on population demography variables such as age structure, mortality, recruitment, reproductive processes and distribution. Threatening processes will also be monitored and efforts made to mitigate or reduce impacts where possible, e.g. from disturbance events, native herbivore grazing, feral pigs, recreational activities, weed encroachment, fire management activities and drought.

Action: Monitor populations
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $3,500 per year

3. Liaise with relevant Indigenous groups

Grevillea fuscolutea occurs in habitat which is suspected to be culturally sensitive and Indigenous consultation will be undertaken.

Action: Liaise with relevant Indigenous groups
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $1,500 per year

4. Close vehicle access to Little Lindesay and Mt Lindesay

Use of the informal vehicle access track which runs from Stan Rd to Little Lindesay and Mt Lindesay has degraded the granite ecosystems that harbour Subpopulations 2a, 2b and 2c. This access has also led to motorbikes continuing down the walk trail and threatening Subpopulations 1a and 1b. While the track is officially closed illegal vehicle access needs to be addressed to prevent further damage to populations and associated habitat.

Action: Close vehicle access to Little Lindesay and Mt Lindesay
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $2,000 in year 1

5. Conduct further surveys

Surveys supervised by DEC staff, with assistance of volunteers, should be conducted during the species' flowering period. Many areas of Mt Lindesay have been searched and new populations found. However, due to the time required to do this, there still remain other potential areas of habitat.

Action: Conduct further surveys
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $4,000 per year

6. Map habitat critical to the survival of *Grevillea fuscolutea*

It is a requirement of the EPBC Act that spatial data relating to habitat critical to the survival of the species be determined and this habitat is alluded to in Section 1. Some of the habitat has been mapped as a result of survey

work and population mapping. However, extended potential habitat that could be important has not been considered in detail. 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 *Grevillea fuscolutea*
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $2,000 in year 2

7. Collect seed from *Grevillea fuscolutea*

Seed collection will be ongoing to obtain material from as wide a range of individuals as possible for *ex situ* conservation at DEC's Threatened Flora Seed Centre (TFSC). It is recommended that the availability of seed in storage is reviewed prior to the approval of the planned burn.

Action: Collect seed from *Grevillea fuscolutea*
Responsibility: DEC (Frankland District, TFSC) through the WRTFRT
Cost: $3,300 per year

8. Obtain biological and ecological information

To enable a scientific basis for its management in the wild, research is required to provide a sound understanding of the biology and ecology of *Grevillea fuscolutea*. It is proposed that the design of Action 10 below be included within this study to maximise the value of the information gathered. It is recommended that the planned burn not be undertaken until this project has commenced. This study will be rigorous and replicable and will include:

- Defining the habitat requirements of the species.
- Determining the reproductive methodology, phenology and seasonal growth of the species.
- Investigating the population genetic structure, levels of genetic diversity and minimum viable population size.
- Longevity of plants, and time taken to reach maturity.
- Determining the response of the species to disturbance.

Action: Obtain biological and ecological information
Responsibility: DEC (Frankland District, Science Division) through the WRTFRT
Cost: $15,000 per year

9. Develop and implement a fire management strategy

Fire is due to be introduced in to the Mt Lindesay TEC in Autumn 2009. Some subpopulations of *Grevillea fuscolutea* will be deliberately excluded from the burn and others will be within the burn area, but may not necessarily burn as a result of the discontinuous nature of the habitat and its general inability to carry fire. The appropriate permits will be required to be obtained before the burn occurs. Post burn monitoring will be required to determine whether the habitat has burnt and if it has, how the population responds.

The prescribed burn will provide an opportunity to obtain baseline information for developing a fire management strategy which will be developed by DEC's Frankland District in consultation with relevant authorities and land managers and the WRTFRT. This strategy should incorporate other priority and threatened species in the district.

Action: Develop and implement a fire management strategy
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $2,900 in first year, and $1,700 in years 2-5

10. Determine *Phytophthora cinnamomi* susceptibility and manage the spread and impact of the pathogen on the ecological community

Phytophthora cinnamomi is present within the habitat of the species, however the susceptibility of *Grevillea fuscolutea* is not known. Root and soil samples will be taken from any plants that have recently died in suspect areas. Significant fronts will be mapped and monitored in the vicinity of critical habitat, particularly following fire management activities. Aerial phosphite application will be used to target high priority areas and reduce the spread of *P. cinnamomi* into currently uninfected areas within the ecological community.

10a. Determine *Phytophthora cinnamomi* susceptibility

Action: Determine *Phytophthora cinnamomi* susceptibility
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $1,500 in year 1

10b. Map and monitor dieback fronts

Action: Map and monitor dieback fronts
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $3,000 per year

10c. Apply phosphite to currently uninfected granite systems

Action: Apply phosphite to currently uninfected granite systems
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $10,000 in years 1, 3 and 5 (to expand current project to Little Lindesay).

11. Monitor and control grazing activity

Where deemed necessary as a result of monitoring (Recovery Action 2), control of grazing from feral pigs, rabbits and kangaroos within the Mt Lindesay area will be undertaken.

Action: Control grazing from pigs, rabbits and kangaroos
Responsibility: DEC (Frankland) through the WRTFRT
Cost: $3,000 per year

12. Monitor hydrological conditions

It is expected that drying conditions could lead to a reduction in the annual growth of the species and the decline of existing plants. Monitoring of yearly rainfall, month of break of the dry season and summer rainfall should be recorded in conjunction with Recovery Action 2.

Action: Monitor hydrological conditions
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $5,000 in first year, then $1,500 each following year

13. Promote awareness

The presence of *Grevillea fuscolutea* and other species in the Mt Lindesay TEC are poorly known amongst the general public. Promoting awareness is likely to help protect them and raise the value placed on them by the community.

Action: Promote awareness
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $1,500 per year

14. Review this plan and assess the need for further recovery actions

If *Grevillea fuscolutea* is still ranked as VU (or a higher threatened rank) 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 this plan and assess the need for further recovery actions
Responsibility: DEC (Frankland District) through the WRTFRT
Cost: $2,000 in year 5

Table 5. Summary of recovery actions

Recovery Actions	Priority	Responsibility	Completion date
Coordinate recovery actions	High	DEC (Warren Region) through WRTRFT	Ongoing
Monitor populations	High	DEC (Frankland District) through WRTFRT	Ongoing
Liaise with relevant Indigenous groups	High	DEC (Frankland District) through WRTFRT	Ongoing
Close vehicle access to Little Lindesay and Mt Lindesay	High	DEC (Frankland District) through WRTFRT	2009
Conduct further surveys	High	DEC (Frankland District) through WRTFRT	Ongoing
Map habitat critical to the survival of *Grevillea fuscolutea*	High	DEC (Frankland District) through WRTFRT	2010
Collect seed from *Grevillea fuscolutea*	Medium	DEC (Frankland District, TFSC) through WRTFRT	Ongoing
Obtain biological and ecological information	Medium	DEC (Frankland District) through WRTFRT	Ongoing
Develop and implement a fire management strategy	Medium	DEC (Frankland District) through WRTFRT; relevant authorities	Developed by 2009 with implementation ongoing
Determine *Phytophthora cinnamomi* susceptibility	Medium	DEC (Frankland District) through WRTFRT	2009
Map and monitor dieback fronts	Medium	DEC (Frankland District) through WRTFRT	Ongoing
Apply phosphite to currently uninfected granite systems	Medium	DEC (Frankland District) through WRTFRT	2014
Monitor and control grazing activity	Medium	DEC (Frankland District) through WRTFRT	Ongoing
Monitor hydrological conditions	Medium	DEC (Frankland District) through WRTFRT	Ongoing
Promote awareness	Low	DEC (Frankland District) through WRTFRT	Ongoing
Review this plan and assess the need for further recovery actions	Low	DEC (Frankland District) through WRTFRT	2014

4. TERM OF PLAN

This IRP will operate from May 2010 to April 2015 but will remain in force until withdrawn or replaced. If the species is still ranked as Vulnerable or higher after five years, the need for further recovery actions will be determined.

5. REFERENCES

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Keighery, G.J., (1992) Taxonomic review of the *Grevillea drummondii* Meissn. species group (Proteaceae). *Nuytsia* 8:228-229.

World Conservation Union (2001) *IUCN Red List Categories: Version 3.1. Prepared by the IUCN Species Survival Commission*. IUCN, Gland, Switzerland and Cambridge, UK.

6. TAXONOMIC DESCRIPTION

Keighery, G.J., (1992) Taxonomic review of the *Grevillea drummondii* Meissn. species group (Proteaceae). *Nuytsia* 8:228-229.

Open erect *shrub* to 1.2 m tall and 1.5 m wide, with an indumentum of hairs, new growth densely ferruginous (young leaves yellow-green). *Branchlets* angular to terete, densely tomentose at first, at length almost glabrous. *Leaves* oblanceolate-linear, with a short black mucrones 0.5-1.5 mm long, 7-12 mm wide, 41-78 mm long, narrowed to petiole of 3-5 mm, margins recurved, midrib prominent above and below, with a prominent marginal vein, upper surface hirsute when young, becoming dark green and almost glabrous, lower surface white, densely tomentose with matted hairs. *Flowers* in axillary sub-umbellate racemes, usually 5 flowers on very short peduncles, rachis densely pubescent. *Bracts* linear, acute, 3-4 mm long, abaxial surface white tomentose, adaxial brown, glabrous, caducous when inflorescence in bud. *Pedicels* 4-6 mm long, orange-ferruginous, hirsute. *Perianth* yellow with deep orange hairs, 6-8 mm long, swollen bellow middle, limb globular recurved, and covered with dense white hairs, inside glabrous except for a ring of hairs in the throat. *Gynoecium* 7-9 mm long. *Style* yellow with orange red hairs, 6-7 mm long. *Ovary* densely hirsute with white hairs, c. 1 mm long. *Stipe* c. 0.5 mm long, sparsely pubescent, torus oblique. *Nectary* c. 1 mm long, yellow. *Pollen presenter* becomes orange as stigma matures, orbicular, lateral and vertical, sparsely pubescent on dorsal side, stigmatic area a small cone below centre on ventral side. *Fruit* not seen.

Flowering period: April to October, perhaps all year with a spring peak.