Management of Significant Flora Values in South-West Forests and Associated Ecosystems

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Table of Contents

Tables

Maps

Summary and Recommendations

The Draft Forest Management Plan (Conservation Commission 2002a) proposed a strategy to protect significant flora values through appropriate guidelines. This report provides advice to the Conservation Commission's Forest Management Plan Steering Committee to assist in the preparation of appropriate guidelines.

Significant flora values assessed in this report are areas of high flora species richness, centres of endemic flora, centres of relictual flora, centres of disjunct flora, Declared Rare Flora and Threatened Ecological Communities. The occurrences of the first four of these values were identified through the Comprehensive Regional Assessment (CRA) part of the Regional Forest Agreement process and there is currently no process for periodic updating of the information. Databases on Declared Rare Flora and Threatened Ecological Communities are maintained by the Department.

Recommendation 1: Maps of areas of high flora species richness, centres of endemic flora, centres of relictual flora and centres of disjunct flora and associated data-bases should be periodically updated at intervals of about 10 years to better reflect the status of current understanding of these values. The map of centres of disjunct flora is the highest priority for updating.

For the values of centres of endemic, disjunct or relictual flora species, the approach taken in this assessment was to (i) identify where these values occur, (ii) assess how adequately the value is reserved at both a regional and local level, (iii) review the management of each of the taxa that were determined in the CRA to be an endemic, disjunct or relictual taxa, and (iv) review the current and additional mechanisms proposed in the Draft Forest Management Plan that serve to protect these values.

For the values of high flora species richness, Threatened Ecological Communities and Declared Rare Flora, the approach taken in this assessment was to (i) identify where these values occur, (ii) assess how adequately the value is reserved at both a regional and, where appropriate, local level, and (iii) review the current and additional mechanisms proposed in the Draft Forest Management Plan that serve to protect these values.

At the regional level, significant flora values have adequate to high levels of representation in the proposed and existing formal and informal conservation reserve system, ranging from 57% reserved for centres of disjunct flora to 98% reserved for the national estate values of high flora species richness and centres of relictual flora.

Most areas of high flora species richness are now captured within the existing and proposed formal reserve system, particularly the occurrences in the Blackwood Plateau, the Shannon River east to Denmark, and the Helena Valley to the east of Perth. Additionally, many of the areas of high flora species richness within State forest occur within vegetation communities that are protected in informal reserves such as diverse ecotype zones and river and stream reserves. Occurrences in the Whicher Range and Scott River Plains are not well reserved.

Some 316 taxa are considered locally endemic, of which more than 70 percent (229 taxa) are Declared Rare Flora or Priority Flora. Declared Rare Flora will have

recovery plans or interim recovery plans prepared for them, with priority given to Critically Endangered taxa, and will be included in flora management plans prepared for an administrative region of the Department of Conservation and Land Management (CLM) that will also include Priority Flora. The implementation of these plans is considered an appropriate and adequate mechanism to protect these species. However, 23 of the locally endemic taxa that are Declared Rare Flora or Priority Flora are not specifically identified in a document to guide their management. Nevertheless, such taxa are managed in accordance with the management principles outlined in regional flora management plans. Some 60 taxa do not occur in State forest, 15 occur in State forest and are considered not at risk of decline, and 12 taxa occur in State forest areas and may be impacted by disturbance activities such as timber harvesting. This report identifies the threats and management requirements for these taxa.

Some 91 taxa are considered to have disjunct distributions, of which nearly half (42 taxa) are Declared Rare Flora or Priority Flora. Declared Rare Flora will have recovery plans or interim recovery plans prepared for them, with priority given to Critically Endangered taxa, and will be included in flora management plans prepared for an administrative region of the Department that will also include Priority Flora. The implementation of these plans is considered an appropriate and adequate mechanism to protect these species. However, two of the disjunct taxa that are priority taxa have no document to guide their management. Nevertheless, such taxa are managed in accordance with the management principles outlined in regional flora management plans. Some 31 taxa do not occur in State forest, 10 occur in State forest and are considered not at risk of decline, whereas eight taxa occur in State forest areas that may be subject to disturbance activities such as timber harvesting. This report identifies the threats and management requirements for these species.

Recommendation 2: The 23 endemic taxa and two disjunct taxa that are Declared Rare Flora or Priority Flora and have no document to guide their management:

- **should be managed according to the management principles outlined in the regional flora management plan;**
- **should have conservation statements prepared for them as a priority;**
- **should be addressed in flora management plans prepared on a Departmental administrative region basis when these plans are prepared or reviewed; and**
- **where disturbance activities may impact known populations of any of these taxa advice should be sought from the Regional Ecologist, Regional Nature Conservation Leader, Principal Botanist or other relevant expertise, so that the latest knowledge on the particular taxon and the impacts of disturbance activities on it are considered.**

Departmental officers may not be familiar with the distribution of species identified in this report and this lack of familiarity may limit consideration of conservation management of the taxa.

Recommendation 3: The Tables included in this report should be reviewed to include information for each taxon on the occurrence/s of the value to which the taxon contributes.

Recommendation 4: Planning checklists for disturbance activities should be revised to specifically identify the need to address the management requirements identified in this report for known populations of endemic and disjunct taxa that occur in State forest that may be impacted by disturbance activities. Known populations of the 12 identified endemic taxa should be approached and managed as for a Priority 4 taxon, where they are taken into account during planning, activities are designed to minimise impact on the population, and monitoring of the population is undertaken. Known populations of the eight identified disjunct taxa should be approached and managed as for a Priority 3 taxon, where they are taken into account during planning, activities are designed to ensure that local extinction does not occur, and monitoring of the population is undertaken. Advice should also be sought from the Regional Ecologist, Regional Nature Conservation Leader, Principal Botanist or other relevant expertise, so that the latest knowledge for each taxon and the impacts of disturbance activities on it are considered. The cost of monitoring (pre-disturbance and soon after the disturbance activity) of the population subject to the disturbance activity should be met by the proponent of the activity.

Most of the relictual taxa are relatively common and abundant and occur widely across State forest and the conservation reserve system, with concentrations in high rainfall areas and moisture gaining sites. Relictual species are considered to be adequately protected by the existing and proposed formal and informal reserve system and management practices in State forest.

For a number of the occurrences of areas of high flora species richness, centres of endemic flora species, centres of disjunct flora species, and centres of relictual flora species, reservation is limited and options for further protection on lands vested in the Conservation Commission are also limited. Options for protection of values in these areas include land purchase and covenants or other cooperative arrangements on private property or other public land. Regional plans and regional strategic and structure plans also offer opportunities to improve the protection of these values on land not managed by the Department.

Recommendation 5: CLM should seek to improve the protection of areas of high flora species richness, centres of endemic flora species, centres of disjunct flora species, and centres of relictual flora species, on non-CLM managed lands through land purchase, covenants, other cooperative arrangements and input to regional planning processes.

Where areas of high flora species richness, centres of endemic flora, disjunct flora or relictual flora, occur in proposed and existing formal conservation reserves the protection of these values should be addressed in area management plans for these conservation reserves. Analysis of the impacts of fire on these values should be undertaken as part of the fire and biodiversity project, which is currently underway. Where opportunities arise to analyse the impacts of other disturbance vectors on areas of high flora species richness, centres of endemic flora, disjunct flora or relictual flora, they should be utilised through conventional research approaches, adaptive management experiments and monitoring.

Recommendation 6: The issue of protecting areas of high flora species richness, centres of endemic flora, disjunct flora or relictual flora should be addressed in area management plans for conservation reserves, where relevant.

Recommendation 7: Analysis of the impacts of fire on areas of high flora species richness, centres of endemic flora, disjunct flora or relictual flora should be undertaken as part of the fire and biodiversity project.

A number of the locally endemic taxa and taxa with disjunct distributions have previously been on the list of priority taxa, but have been removed from the list due to their commonness and the lack of immediate threat to them. However, the long-term conservation of these taxa would be improved if they were included on a revised Priority Flora list that recognised the need for monitoring and ongoing conservation management of taxa with a very narrow range and/or disjunctions in distribution.

Recommendation 8: The Priority Flora list should be revised to recognise the need for monitoring and ongoing conservation management of taxa with a very narrow range and/or disjunctions in distribution.

For a number of locally endemic taxa and taxa with disjunct distributions that do not occur within State forest it is recommended they be considered for addition to the list of threatened and priority taxa.

Recommendation 9: A number of locally endemic taxa and taxa with disjunct distributions that do not occur within State forest should be considered for addition to the list of threatened and priority taxa.

Recovery plans or interim recovery plans are prepared for Threatened Ecological Communities and Declared Rare Flora, with priority given to Critically Endangered communities and taxa. Declared Rare Flora will also be included in flora management plans prepared for an administrative region of the Department. The implementation of these plans is considered an appropriate and adequate mechanism to protect these species. However, planning checklists for disturbance activities should be revised to include specific triggers and requirements to exclude Threatened Ecological Communities and Declared Rare Flora from areas subject to timber harvesting.

Recommendation 10: Planning checklists should be revised to include specific triggers and requirements that would exclude the locations of known Threatened Ecological Communities and Declared Rare Flora from timber harvesting.

Protection of all significant flora values that occur in State forest could be improved through implementation of proposed strategies in the Draft Forest Management Plan, namely:

- Undertake a comprehensive biological survey of the forest regions.
- Research the response of forest ecosystems to natural disturbance.
- Design and locate mature habitat zones throughout State forest.

- Identify, and ensure that management actions lead to the survival of all populations of threatened species and threatened ecological communities.
- Continue to develop and apply knowledge of the impacts of forest management practices on the key components of biological diversity and ecosystem function.
- Develop a comprehensive fire management plan.
- Refine the fire management plan through adaptive management.
- Continually improve protocols for the management of dieback.
- Monitor, and control, the impact of weeds, pests and disease.
- Protect forest values by adopting appropriate hygiene standards.
- Use only locally occurring species propagated from local seed sources.
- Focus timber harvesting for times when dry soil conditions prevail.
- Design and locate snig tracks to minimise the area of soil disturbance.
- Ensure that impacts on soils that arise from silvicultural treatments remain within acceptable limits.
- Monitor key characteristics of the environment and management operations and review and continually improve forest management.
- Undertake adaptive management trials to improve forest management.
- Continue to explore opportunities to refine forest management to the understood natural disturbance limits of the ecosystem(s) present.
- Develop, refine and implement a formal ISO 14001 accredited environmental management system.
- Develop mechanisms to provide for lower level management actions to be consistent with the objectives and strategies of the approved plan.
- Generate and transfer knowledge and develop the necessary skills and competencies in staff.
- Develop a comprehensive suite of operational guidance documents to control operations that incorporate best practice.
- Track the achievement of the objectives and strategies through the key performance indicators.
- Audit implementation of the approved plan.

Recommendation 11: The identified strategies should be included in the proposed Forest Management Plan that the Conservation Commission submits to the Minister for the Environment.

Introduction

The Draft Forest Management Plan (Conservation Commission 2002a) identifies the following proposed management strategy and background in relation to poorly represented vegetation complexes and other significant flora values:

> ***Management strategies***
>
> ***Manage areas containing vegetation complexes poorly represented in formal and informal reserves and other significant flora to protect these values through the appropriate guidelines.***

Background

The criteria for a CAR reserve system (see Appendix 6) do not set quantitative targets for vegetation complexes, as they do for forest ecosystems. However, vegetation complexes have been examined and used in reserve design to enhance representativeness, geographic replication, and protection of remnant elements of biodiversity within forest ecosystems.

Vegetation complexes were also used in the assessment of high conservation value forest to see if those complexes less well represented justified additional reservation as a component of high conservation value. The Conservation Commission generally took the view that protection of vegetation complexes that were less well represented in the reserve system could best be undertaken through site specific management.

Areas may also be especially significant in terms of providing linkages or corridors between formal reserves and may warrant specific consideration of that value in its management.

It is intended that areas of State forest containing vegetation complexes that are less well reserved and functioning as a corridor between formal reserves will receive more sensitive management. This could entail, for example ensuring the linkage zone or vegetation complex is not uniformly disturbed and having longer return cycles for disturbance operations.

Potential threats	*1. Management not sensitive to site specific values.*
Management actions	*1. Identify less well represented vegetation complexes and forest with significant value as a corridor between formal reserves.* *2. Develop management guidelines designed to protect the respective values.*

The Conservation Commission's Forest Management Plan Steering Committee requested advice from the Department on how other significant flora values could be protected through appropriate guidelines. The Department established a group of scientists to provide advice to the Steering Committee and this report imparts that advice.

Significant Flora Values

Significant flora values have been defined through the assessment of high conservation value forest and the advice on this issue from the Conservation Commission to the Minister for the Environment and Heritage (Conservation Commission 2002b). Significant flora values are:

- Areas of high flora species richness;
- Centres of endemic flora;
- Centres of disjunct flora;
- Centres of relictual flora;
- Declared Rare Flora; and
- Threatened Ecological Communities.

The first four of these values were identified through the comprehensive regional assessment and a description of the methods is contained in the report on the assessment of national estate values (Steering Committee 1998). Maps of these values are available in both a non-threshold form and a national estate threshold form. The application of a threshold for national estate purposes involved filtering the non-threshold occurrences of these values for areas within natural landscapes, or areas of high biophysical naturalness. These data and maps are not maintained for currency of the underlying information. Databases of Declared Rare Flora and Threatened Ecological Communities are managed and maintained by the Department.

Approach Used in This Assessment

For the values of centres of endemic, disjunct or relictual flora species, the approach taken in this assessment was to (i) identify where these values occur, (ii) assess how adequately the value is reserved at both a regional and local level, (iii) review the management of each of the taxa that were determined in the Comprehensive Regional Assessment (CRA) part of the Regional Forest Agreement process to be an endemic, disjunct or relictual taxa, and (iv) review the current and proposed mechanisms that serve to protect these values.

A review of the lists of endemic, disjunct or relictual flora species compiled during the RFA process has been undertaken, with taxa reviewed for their current distribution, conservation status and the community types in which they occur. Changes to taxonomy are noted.

Many of the taxa are already identified as taxa considered rare, threatened or requiring further work or long term monitoring (priority taxa).

For the values of high flora species richness, Declared Rare Flora and Threatened Ecological Communities, the approach taken in this assessment was to (i) identify where these values occur, (ii) assess how adequately the value is reserved at both a

regional and, where appropriate, local level, and (iii) review the current and proposed mechanisms that serve to protect these values.

Areas of High Flora Species Richness

Definition and importance

Maps of areas of high species richness were generated for the CRA using a computer model (SpModel) that predicts, on a species by species basis, their general distribution. The model used a one kilometre grid. Maps of areas of high species richness reflect concentrations of taxa in high rainfall, lower summer evapotranspiration areas on diverse regolith. These areas offer the best opportunity to represent in the conservation reserve system a large number of taxa and their associated communities, in concentrated areas.

There is currently no process for periodic updating of the information generated for the CRA. **It is recommended that the maps of areas of high flora species richness be periodically updated at intervals of about 10 years to better reflect the status of current understanding of this value.**

Occurrence

Map 1 shows two main areas, and several smaller or less rich areas, of significance for flora species richness that were identified through the CRA (Steering Committee 1998a, Steering Committee 1998b, Gioia and Pigott 2000). The two main areas are:

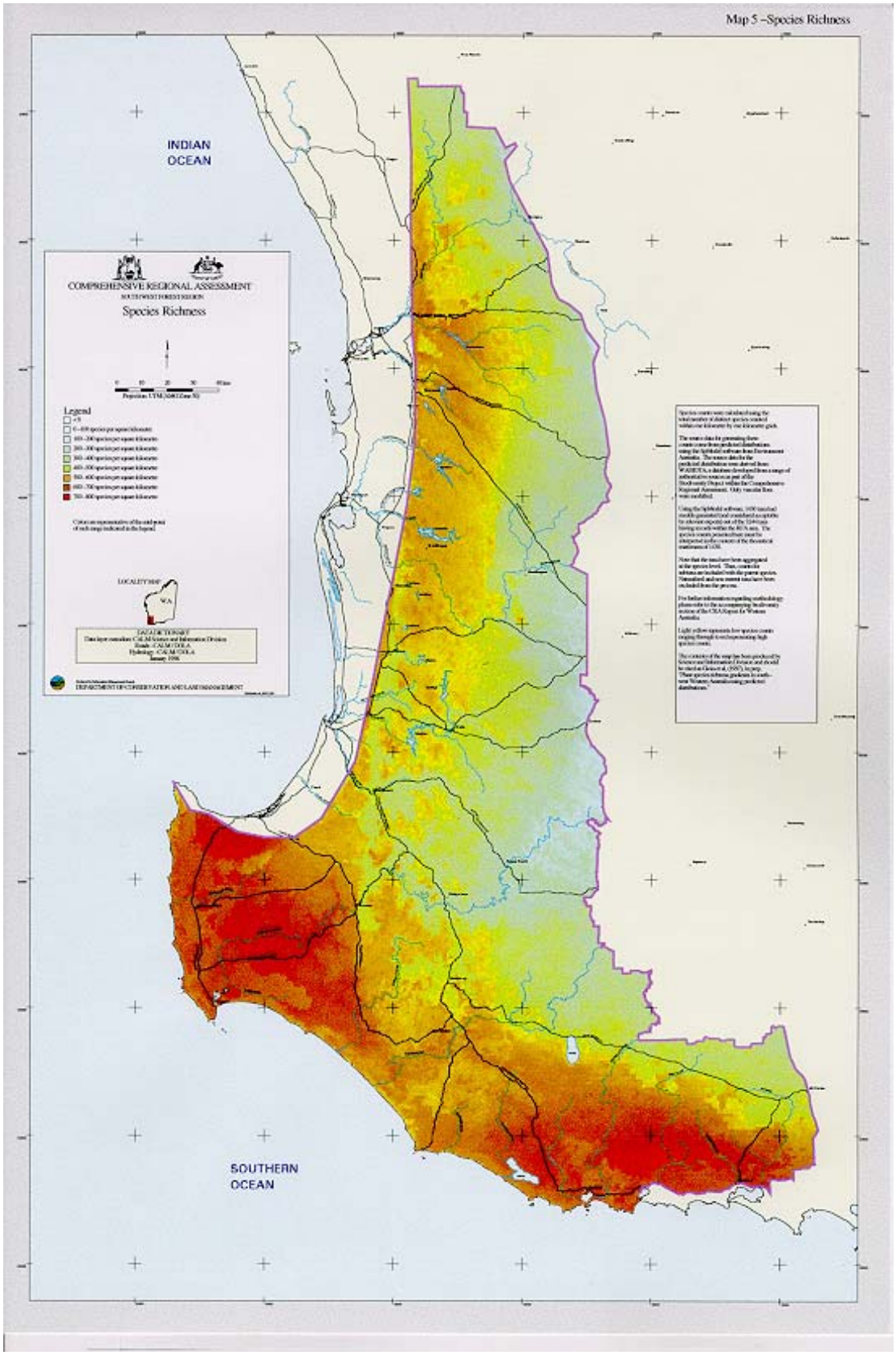
- areas of jarrah forest and associated vegetation types on the Blackwood Plateau in the proposed Blackwood River National Park, proposed Hilliger Forest Conservation Area and adjacent areas of State forest; and
- areas of shrub, herb and sedgelands and mixed tingle forest from the Shannon River east to Denmark, in the Shannon National Park, D'Entrecasteaux National Park and existing and proposed national parks of the Walpole Wilderness Area.

Other areas are:

- in the Whicher Range area, mostly on non-CLM managed lands;
- Scott River Plains, mostly on non-CLM managed lands; and
- Northern Darling Scarp and Darling Range, centered on the Helena Valley area, including proposed national parks and adjacent areas of State forest.

Reservation

Levels of reservation are 75% for areas of high flora species richness and 98% for areas of high flora species richness (national estate value).



Map 1: Flora species richness within the area of the Regional Forest Agreement (from Steering Committee 1998a).

Protection

Most areas identified with this value are now captured within the existing and proposed formal reserve system.

The formal reserves over the areas of jarrah forest on the Blackwood Plateau are considered to adequately protect the value. Additionally, many of the areas of high flora richness in State forest are within vegetation communities such as diverse ecotype zones and river and stream reserves that are protected in informal reserves.

The formal reserves over the areas of shrub, herb and sedgelands and mixed tingle forest from the Shannon River east to Denmark are considered to adequately protect the value.

The formal reserves over the Helena Valley to the east of Perth are considered to adequately protect the value. Additionally, many of the areas of high flora richness within State forest are within vegetation communities that occur in diverse ecotype zones, granite outcrops, and river and stream reserves that are protected in informal reserves.

For the Whicher Range and Scott River Plains, reservation is limited as are options for further reservation on lands vested in the Conservation Commission are also limited. Options for protection of values in these areas include land purchase and covenants or other cooperative arrangements on private property or other public land. Regional plans (e.g. Bushforever), usually led by the Department of Planning and Infrastructure, and regional strategic and structure plans (e.g. Greater Bunbury Structure Plan) also offer opportunities to improve the protection of these values on land not managed by CLM. **It is recommended that CLM work to improve the protection of areas of high flora species richness on non-CLM managed lands through land purchase, covenants, other cooperative arrangements and input to regional planning processes.**

Where areas of high flora species richness occur in proposed and existing formal conservation reserves **it is recommended that the issue of protecting this value be addressed in area management plans for these conservation reserves**. Additionally, **it is recommended that analysis of the impacts of fire on areas of high flora species richness be undertaken as part of the fire and biodiversity project**. Where opportunities arise to analyse the impacts of other disturbance vectors on areas of high flora species richness these should be utilised through conventional research approaches, adaptive management experiments and monitoring.

The protection of areas of high flora species richness in State forest could be improved through implementation of proposed strategies in the Draft Forest Management Plan, namely:

- Undertake a comprehensive biological survey of the forest regions as soon as resources permit.
- Research the response of forest ecosystems to natural disturbance, with a view to improving forest management practices.

- Design and locate mature habitat zones throughout State forest.
- Identify, and ensure that management actions lead to the survival of all populations of threatened species and threatened ecological communities.
- Continue to develop knowledge of the impacts of forest management practices on the key components of biological diversity and ecosystem function and maintain guidelines and other subordinate documents that prescribe measures to limit impacts to within acceptable levels.
- Develop a comprehensive fire management plan that achieves the forest management objectives.
- Refine the fire management plan by active participation in the proposed EPA review of fire management in the forest region and through adaptive management.
- Continually improve protocols for the management of *Phytophthora cinnamomi* and the disease caused by it.
- Monitor the impact of weeds, pests and disease on forest ecosystem health and vitality and where necessary and possible control the weed, pest or pathogen.
- Protect forest ecosystem health and vitality, biological diversity and other forest values by adopting appropriate hygiene standards, monitoring and where necessary controlling weed, pest and pathogen infestations.
- Ensure that only locally occurring species propagated from local seed sources are used in rehabilitation/regeneration areas, unless there are over-riding considerations that prevent it.
- Schedule silvicultural operations that require heavy machinery, including timber harvesting, for times when dry soil conditions prevail, except for specified circumstances.
- Design and locate snig tracks to minimise the area of soil disturbance.
- Ensure that impacts on soils that arise from silvicultural treatments to maximise the regeneration of commercial species remain within acceptable limits.
- Monitor key characteristics of the environment and management operations and review and continually improve forest management both routinely and through adaptive management trials as previously identified.
- Undertake adaptive management trials to improve forest management practices in the areas of prescriptions for river and stream buffers and key silvicultural treatments.
- During the term of the plan to continue to explore opportunities to refine forest management to the understood natural disturbance limits of the ecosystem(s) present, including specifically recognising and allowing for site specific variations.
- Develop, refine and implement a formal ISO 14001 accredited environmental management system.

- Develop mechanisms to provide for lower level management actions to be consistent with the objectives and strategies of the approved plan.
- Generate and transfer knowledge and develop the necessary skills and competencies in staff.
- Develop, make public and maintain a comprehensive suite of operational guidance documents to control operations that incorporate best practice taking account of the principles of ecologically sustainable forest management.
- Track the achievement of the objectives of the approved plan and the implementation of the plan's strategies through the key performance indicators and in other ways.
- Audit implementation of the approved plan and the compliance of operational guidance documents with the plan's objectives and strategies.

It is recommended that these strategies be included in the proposed Forest Management Plan that the Conservation Commission submits to the Minister for the Environment.

Centres of Endemic Flora Species

Definition and importance

The South West has a large flora and about 75% of it is endemic. Within this flora a significant number of taxa have narrow ranges and restricted habitat requirements and can be considered to be "narrow" or "local" endemics. These narrow endemics are taxa that are most vulnerable to change (climatic, hydrological or disease induced) or catastrophic events (land clearing, fire or flood). A very large number of these taxa are listed as being Conservation Taxa (Rare or Priority) by CLM.

In the absence of detailed life syndrome/vital attribute data for most taxa in the South West, an assessment of real vulnerability of each taxon is not possible. Taxa with a distribution that ranges less than 150 kilometres are considered to be locally endemic. Based on the list of endemic flora taxa compiled during the CRA, 316 taxa are considered to be locally endemic.

The assessment undertaken for this report is based on lists generated for the CRA, with a limited review of taxa using FloraBase maps and WAHerb location descriptors. Newly segregated taxa have not been included and taxa that may now be considered to have a more restricted range than was previously the understanding have not been included. Quality (precision and accuracy) of data in WAHerb and other data sources will have affected inclusion of some taxa and exclusion of other taxa at about the 150 kilometre limit.

There is currently no process for periodic updating of the information generated for the CRA. **It is recommended that the maps of centres of endemic flora species be**

periodically updated at intervals of about 10 years to better reflect the status of current understanding of this value.

Occurrence

Map 2 shows that this value occurs:

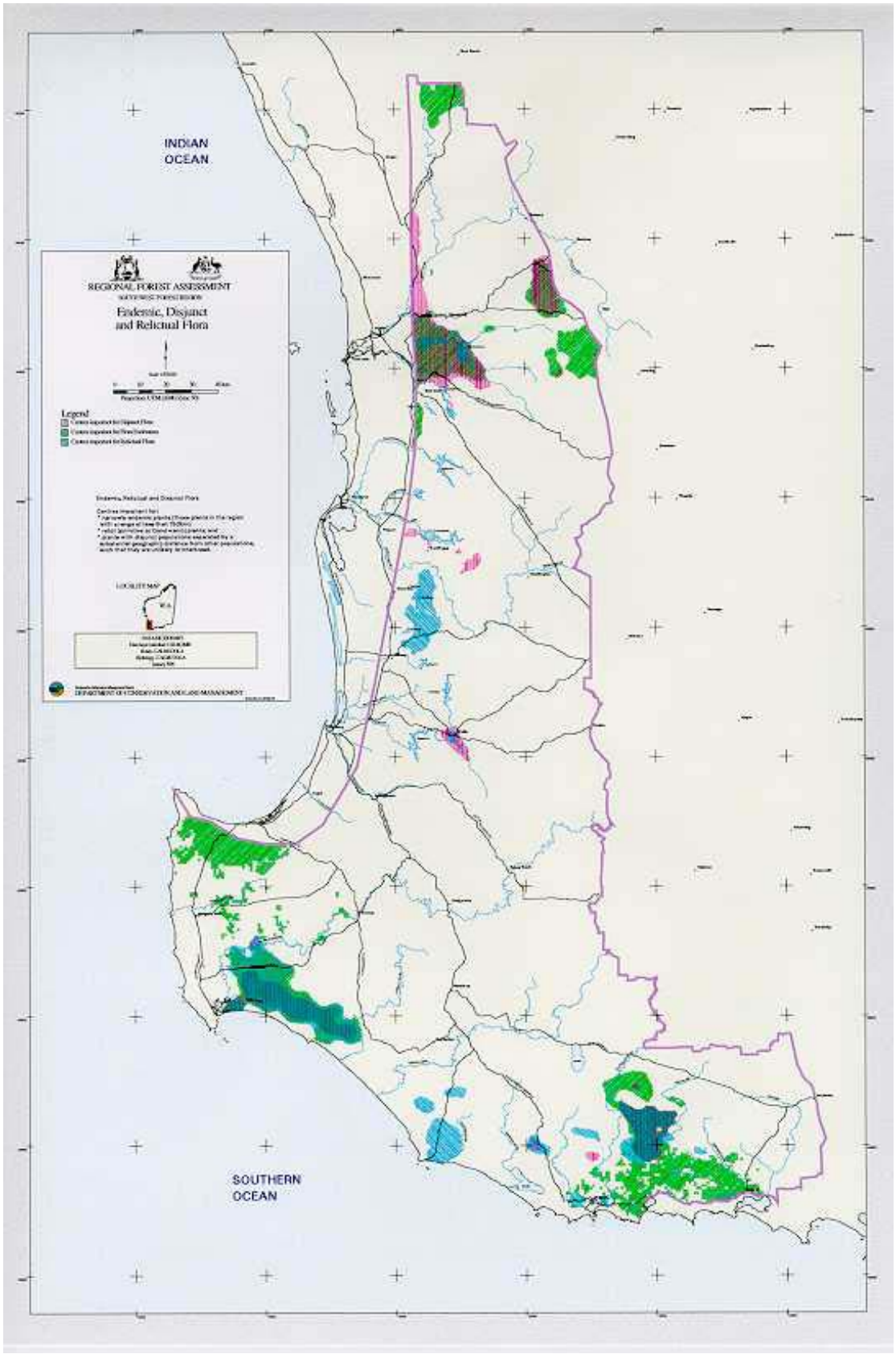
- near the northern boundary of the RFA region between Gingin and New Norcia mostly on non-CLM managed lands, but also including the Udumung Nature Reserve;
- near the eastern boundary of the RFA region between Great Eastern Highway and the Great Southern Highway mostly on non-CLM managed lands;
- near the eastern boundary of the RFA region including the eastern part of the proposed Wandoo National Park, and non-CLM managed lands to the east;
- to the east of Perth in the area of the John Forrest National Park and the proposed Mundaring, Pickering Brook, Canning and Helena Valley National Parks, and adjacent areas of State forest;
- along the Darling Scarp between Kelmscott and Jarrahdale in State forest;
- in the Whicher Range area, mostly on non-CLM managed lands;
- in scattered patches along the Margaret River and on the Blackwood Plateau to Nannup, on non-CLM managed lands and State forest;
- on the southern Blackwood Plateau through to the Scott River Plains and the Donnelly River, mostly on non-CLM managed lands but including parts of the Scott National Park, D'Entrecasteaux National Park, proposed Blackwood River National Park and proposed Hilliger Forest Conservation Area; and
- over a large area including a number of forest ecosystems between the Frankland River and Denmark, mostly in the existing and proposed national parks of the Walpole Wilderness Area, but also including a significant area on non-CLM managed lands between Walpole and Denmark.

Reservation

Levels of reservation are 65% for centres of endemic flora and 97% for centres of endemic flora (national estate value).

Protection

More than 70% of the taxa (229 of 316), particularly those with extremely limited ranges (high degree of local endemism), are Declared Rare Flora or Priority Flora. Declared Rare Flora will have recovery plans or interim recovery plans prepared for them, with priority given to Critically Endangered taxa, and will be included in flora



Map 2: Centres of endemic, disjunct and relictual flora as mapped through the Comprehensive Regional Assessment.

management plans prepared for an administrative region of the Department that will also include Priority Flora. The implementation of these plans is considered an appropriate and adequate mechanism to protect these taxa. Table 1 lists these species and identifies documents that guide the management of these taxa. However, 23 of the locally endemic taxa that are Declared Rare Flora or Priority Flora have no document to guide their management (Table 2). Nevertheless, such taxa are managed in accordance with the management principles outlined in regional flora management plans. **It is recommended that:**

- **the taxa continue to be managed according to the management principles outlines in the regional flora management plan;**
- **conservation statements be prepared for these 23 taxa as a priority;**
- **flora management plans prepared on a Departmental administrative region basis should address these 23 taxa when these plans are prepared or reviewed; and**
- **where disturbance activities may impact known populations of any of these 23 taxa advice should also be sought from the Regional Ecologist, Regional Nature Conservation Leader, Principal Botanist or other relevant expertise, so that the latest knowledge on the particular taxon and the impacts of disturbance activities on it are considered.**

A number of the locally endemic taxa have previously been on the list of priority taxa, but have been removed from the list due to their commonness and a lack of immediate threat to them. However, the long-term conservation of these taxa would be improved if they were included on a revised Priority Flora list that recognised the need for monitoring and ongoing conservation management of taxa with a very narrow range. **It is recommended that the Priority Flora list be revised to recognise the need for monitoring and ongoing conservation management of taxa with a very narrow range.**

A significant number of the remaining taxa (60) do not occur within State forest and are now confined to the existing and proposed formal conservation reserve system or are on other tenures not managed by CLM (Tables 3 and 4).

Many taxa subject to this assessment occur solely within the existing and proposed formal conservation reserve system and **it is recommended that the issue of protecting centres of endemic flora be addressed in the area management plans for these conservation reserves**. Additionally, **it is recommended that further analysis of these taxa in relation to the impacts of fire be undertaken as part of the fire and biodiversity project**. Where opportunities arise to analyse the impacts of other disturbance vectors on centres of endemic flora these should be utilised through conventional research approaches, adaptive management experiments and monitoring.

For a number of locally endemic taxa that do not occur within State forest **it is recommended they be considered for addition to the list of threatened and priority taxa** (Table 4).

Table 5 identifies 15 locally endemic taxa that occur within State forest but which are considered not to be at risk of decline. This judgement is the result of a combination of factors including the prevalence/dominance of the taxa within its range, the habitat types within which it occurs are informal reserves within State forest (diverse ecotype zones, wetlands, rock outcrops) and life histories.

Table 6 identifies 12 taxa that occur in State forest areas that could be impacted by disturbance activities. Potential threats and management requirements are identified for these taxa (Table 7). While not deemed Declared Rare Flora or Priority Flora based on total numbers or numbers of populations, these taxa are potentially vulnerable to large-scale disturbance or a number of smaller disturbances in their local areas. **It is recommended that planning checklists for disturbance activities be revised to specifically identify the need to address the management requirements for known populations of these taxa. Known populations should be approached and managed as for a Priority 4 taxon, where they are taken into account during planning, activities are designed to minimise impact on the population and monitoring of the population is undertaken. Advice should also be sought from the Regional Ecologist, Regional Nature Conservation Leader, Principal Botanist or other relevant expertise, so that the latest knowledge on each taxon and the impacts of disturbance activities on it are considered. The cost of monitoring (pre-disturbance and soon after the disturbance activity) of the population subject to the disturbance activity should be met by the proponent of the activity**.

For a number of the occurrences of centres of endemic flora species, reservation is limited and options for further protection on lands vested in the Conservation Commission is also limited. Options for protection of values in these areas include land purchase and covenants or other cooperative arrangements on private property or other public land. Regional plans (e.g. Bushforever), usually led by the Department of Planning and Infrastructure, and regional strategic and structure plans (e.g. Greater Bunbury Structure Plan) also offer opportunities to improve the protection of these values on land not managed by CLM. **It is recommended that CLM work to improve the protection of centres of endemic flora species on non-CLM managed lands through land purchase, covenants, other cooperative arrangements and input to regional planning processes.**

The protection of endemic flora species in State forest could be improved through implementation of proposed strategies in the Draft Forest Management Plan, as listed above in the section on areas of high flora species richness. **It is recommended that these strategies be included in the proposed Forest Management Plan that the Conservation Commission submits to the Minister for the Environment.**

Departmental officers may not be familiar with the distribution of endemic taxa identified in Tables 1 to 7 of this report and this lack of familiarity may limit consideration of conservation management of the taxa. **It is recommended that Tables 1 to 7 of this report be reviewed to include information for each taxon on the occurrence/s of the value to which the taxon contributes.**

Centres of Disjunct Flora Species

Definition and importance

Species with disjunct distributions have been very significant in the evolution of the south-west flora, particularly through the Quaternary. Breeding isolation (which requires consideration of breeding systems, pollen and seed dispersal mechanisms, and habitat requirements) over extended periods is the main element in consideration for inclusion in the list of disjunct taxa.

In the forest areas of the south-west there are a series of patterns of disjunctions which can be characterised by scale, geography and habitat. Disjunctions occur: between eastern and Western Australia; where populations are separated by more than 150 kilometres, because of climate or soils, e.g. Scott River to Albany Ironstone species; where populations are separated by 50 - 150 kilometres, because of soils or habitats, e.g. Scott Coastal Plain to Swan Coastal Plain. Disjunctions can naturally occur at a range of scales because of the occurrence of specific habitats such granite rocks, lakes or permanent wetlands. Clearing of native vegetation may induce disjunctions.

The list of disjunct taxa generated for the CRA was conservative given a lack of understanding of detailed life history syndromes and breeding systems for most taxa, and holes in distribution data reflecting collecting effort. Subsequent flora survey work has led to increased knowledge of the distribution of many taxa, with some now probably not considered disjunct and others needing to be added to the list. A limited review has been done for this report. A more comprehensive review is warranted. A component that needs further review is the group that constitutes outliers from main distributions, particularly those that have primary distributions outside the area of interest for this report.

There is currently no process for periodic updating of the information generated for the CRA. **It is recommended that the maps of centres of disjunct flora species be periodically updated at intervals of about 10 years to better reflect the status of current understanding of this value.**

Occurrence

This value occurs in a limited number of areas throughout the region (Map 2). Areas with this value include:

- areas of Swan Coastal Plain and Darling Scarp vegetation to the north-east of Perth through to the Helena Valley and Kalamunda. Most of the western part of this occurrence is on non-CLM managed lands whereas the remainder includes State forest and proposed national parks to the east of Perth;
- small patches in State forest near Dwellingup;
- the Collie Coal Basin, in State forest and non-CLM managed lands;
- a small area in the proposed Blackwood River National Park;

- the Scott River Plains, mostly on non-CLM managed lands, but including parts of the Scott National Park, D'Entrecasteuaux National Park and a proposed nature reserve;
- a small area of mixed jarrah and shrubland north of Mt Pingerup in existing and proposed national park;
- a small area of mixed Yellow Tingle forest north of Walpole in existing and proposed national park; and
- mixed jarrah and shrubland between the Frankland and Kent rivers, centered on Lake Surprise in proposed national park.

In addition to the centres identified in the CRA, plant ecologists also consider that the Whicher Range and Gingin escarpment areas have a high concentration of disjunct taxa, and are worthy of special consideration. Both areas are mostly non-CLM managed lands.

Reservation

Levels of reservation are 57% for centres of disjunct flora and 97% for centres of disjunct flora (national estate value).

Protection

Based on a review of the list of disjunct flora taxa compiled during the CRA, 91 of the CRA's 109 taxa are considered to have a disjunct distribution. Table 8 shows those taxa that were considered during the CRA to be disjunct taxa but are no longer considered as such.

Nearly half of the taxa (42 of 91) are Declared Rare Flora or Priority Flora (Table 9). Declared Rare Flora will have recovery plans or interim recovery plans prepared for them, with priority given to Critically Endangered taxa, and will be included in flora management plans prepared for an administrative region of the Department that will also include Priority Flora. The implementation of these plans is considered an appropriate and adequate mechanism to protect these taxa. However, two of the disjunct taxa that are priority taxa do not have a document to guide their management (Table 10). Nevertheless, such taxa are managed in accordance with the management principles outlined in regional flora management plans. **It is recommended that:**

- **the taxa should continue to be managed according to the management principles outlined in the regional flora management plan;**
- **conservation statements be prepared for these two taxa as a priority;**
- **flora management plans prepared on a Departmental administrative region basis should address these two taxa when these plans are prepared or reviewed; and**
- **where disturbance activities may impact known populations of these two taxa advice should also be sought from the Regional Ecologist, Regional**

Nature Conservation Leader, Principal Botanist or other relevant expertise, so that the latest knowledge for each taxon and the impacts of disturbance activities on it are considered.

A number of the taxa with disjunct distributions have previously been on the list of priority taxa, but have been removed from the list due to their commonness and a lack of immediate threat to them. However, the long-term conservation of these taxa would be improved if they were included on a revised Priority Flora list that recognised the need for monitoring and ongoing conservation management of taxa with disjunct distributions. **It is recommended that the Priority Flora list be revised to recognise the need for monitoring and ongoing conservation management of taxa with disjunct distributions.**

A significant number of the remaining taxa (31) do not occur within State forest and are now confined to existing or proposed formal conservation reserves or are on other tenures not managed by CLM (Table 11).

For those taxa that occur within the existing and proposed formal conservation reserve system **it is recommended that the issue of protecting centres of disjunct flora be addressed in the area management plans for these conservation reserves**. Additionally, **it is recommended that further analysis of these taxa in relation to the impacts of fire be undertaken as part of the fire and biodiversity project**. Where opportunities arise to analyse the impacts of other disturbance vectors on centres of disjunct flora these should be utilised through conventional research approaches, adaptive management experiments and monitoring.

For two taxa with disjunct distributions that do not occur within State forest **it is recommended they be considered for addition to the list of threatened and priority taxa** (Table 12).

Table 13 identifies 10 taxa with disjunct distributions that occur within State forest but which are considered not to be at risk of decline. This judgement is the result of a combination of factors including the prevalence/dominance of the taxa within its range, the habitat types within which it occurs are informal reserves within State forest (diverse ecotype zones, wetlands, rock outcrops) and life histories.

A number of taxa (8) occur in State forest areas and could be impacted by disturbance activities (Table 14). Potential threats and management requirements are identified for these taxa (Table 15). **It is recommended that planning checklists for disturbance operations be revised to specifically identify the need to address the management requirements for known populations of these taxa. Known populations should be approached and managed as for a Priority 3 taxon, where they are taken into account during planning, activities are designed to ensure that local extinction does not occur and monitoring of the population is undertaken. Advice should also be sought from the Regional Ecologist, Regional Nature Conservation Leader, Principal Botanist or other relevant expertise, so that the latest knowledge for each taxon and the impacts of disturbance activities on it are considered. The cost of monitoring (pre-disturbance and soon after the disturbance activity) of the population subject to the disturbance activity should be met by the proponent of the activity**.

For the occurrences of centres of disjunct flora species north-east of Perth, on the Scott River Plains, Whicher Range and Gingin escarpment, reservation is limited and options for further protection on lands vested in the Conservation Commission are also limited. Options for protection of values in these areas include land purchase and covenants or other cooperative arrangements on private property or other public land. Regional plans (e.g. Bushforever), usually led by the Department of Planning and Infrastructure, and regional strategic and structure plans (e.g. Greater Bunbury Structure Plan) also offer opportunities to improve the protection of these values on land not managed by CLM. **It is recommended that CLM work to improve the protection of centres of disjunct flora species on non-CLM managed lands through land purchase, covenants, other cooperative arrangements and input to regional planning processes.**

The protection of disjunct flora species in State forest could be improved through implementation of proposed strategies in the Draft Forest Management Plan, as listed above in the section on areas of high flora species richness. **It is recommended that these strategies be included in the proposed Forest Management Plan that the Conservation Commission submits to the Minister for the Environment**.

Departmental officers may not be familiar with the distribution of taxa with disjunct distributions identified in Tables 8 to 15 of this report and this lack of familiarity may limit consideration of conservation management of the taxa. **It is recommended that Tables 8 to 15 of this report be reviewed to include information for each taxon on the occurrence/s of the value to which the taxon contributes.**

Centres of Relictual Flora Species

Definition and importance

Relictual taxa include several classes of taxa considered relictual or primitive. They include taxa with "primitive" reproductive systems (gymnosperms, ferns and fern allies), monotypic genera (often considered to be end of line taxa of almost extinct genera) and taxa considered to be primitive or basal within their clades (families / genera/sub genera). The relatively low number of taxa in these groups (particularly in WA) and their genetic distance from our dominant modern flora make them important within the total breadth of biodiversity, and hence for conservation.

While some relictual taxa have evolved to cope with changed environments and radiated recently (e.g. *Callitris*), many are still dependant on niches (generally moister and subject to less variability) reflecting environmental conditions close to those that prevailed during the Gondwanan era or to that which existed during the late Tertiary. A number of relictual taxa are Declared Rare Flora or Priority Flora, others have disjunct distributions. Many are relatively common.

Ongoing monitoring of changes to taxonomy, particularly in the area of monotypics is considered desirable as some taxa considered monotypic (genera with a single species represented in it) under current taxonomy may well be reduced to synonymy with

other genera under new analysis (e.g.. *Diplopogon* and *Jansonia* pending) or have additional species recognized within it.

There is currently no process for periodic updating of the information generated for the CRA. **It is recommended that the maps of centres of relictual flora species be periodically updated at intervals of about 10 years to better reflect the status of current understanding of this value.**

Occurrence

Map 2 shows that this value occurs in:

- small areas to the east and south-east of Perth in the Helena Valley and near the Canning River. One occurrence is partly in Kalamunda block, but largely in non-CLM managed lands. Other occurrences are mostly on State forest;
- high rainfall forest areas between Waroona and Harvey, mostly on State forest;
- a small area in the Collie Coal Basin, largely on non-CLM managed lands;
- the southern Blackwood Plateau through to the Scott River Plains and the Donnelly River, a large part of which is on non-CLM managed lands, and including parts of the Scott National Park, D'Entrecasteaux National Park, proposed Blackwood River National Park, proposed Hilliger Forest Conservation Area, and adjacent areas of State forest;
- shrub, herb and sedgeland ecosystems in the Windy Harbour and Gardiner River area, mainly in existing and proposed national parks;
- a small area of mixed jarrah and shrubland north of Mt Pingerup in existing and proposed national park;
- mixed jarrah and shrublands around Granite Peak in the Mt Frankland National Park;
- karri/Yellow Tingle forests west of Walpole and karri and red tingle forests east of Walpole, mostly in existing and proposed national park;
- mixed jarrah and shrubland between the Frankland and Kent rivers, centered on Lake Surprise in proposed national park;
- mixed jarrah and shrubland in the headwaters of the Styx River and on Mt Lindesay in proposed national park; and
- an area to the west of Denmark, largely on non-CLM managed lands.

Reservation

Levels of reservation are 69% for centres of relictual flora and 98% for centres of relictual flora (national estate value).

Protection

Tables 16 and 17 list taxa considered to be relictual.

Unlike with the endemic and disjunct taxa, not many of these taxa are on the list of Declared Rare Flora or Priority Flora. Most of the relictual taxa are relatively common and abundant and occur widely across State forest, the conservation reserve system and areas of remnant native vegetation.

One significant pattern is an association with sites with high moisture. The greatest majority of relictual flora taxa occur in high rainfall areas and/or within wetter parts of the landscape such as swamps, rivers or the base of rock or granite outcrop areas.

Relictual species on CLM-managed lands are considered to be adequately protected by the existing and proposed formal conservation reserve system as well as the informal reserve system that protects diverse ecotype zones and habitat such as swamps, wetlands, rivers and rock/granite outcrops.

Many taxa subject to this assessment occur solely within the existing and proposed formal conservation reserve system and **it is recommended that the issue of protecting centres of relictual flora be addressed in the area management plans for these conservation reserves**. Additionally, **it is recommended that further analysis of these taxa in relation to the impacts of fire be undertaken as part of the fire and biodiversity project**. Where opportunities arise to analyse the impacts of other disturbance vectors on centres of relictual flora these should be utilised through conventional research approaches, adaptive management experiments and monitoring.

For the occurrences of centres of relictual flora species west of Kalamunda block, in the Collie Coal Basin, on the Scott River Plains and west of Denmark, reservation is limited and options for further protection on lands vested in the Conservation Commission is also limited. Options for protection of values in these areas include land purchase and covenants or other cooperative arrangements on private property or other public land. Regional plans (e.g. Bushforever), usually led by by the Department of Planning and Infrastructure, and regional strategic and structure plans (e.g. Greater Bunbury Structure Plan) also offer opportunities to improve the protection of these values on land not managed by CLM. **It is recommended that CLM work to improve the protection of centres of relictual flora species on non-CLM managed lands through land purchase, covenants, other cooperative arrangements and input to regional planning processes.**

The protection of relictual flora species in State forest could be improved through implementation of proposed strategies in the Draft Forest Management Plan, as listed above in the section on areas of high flora species richness. **It is recommended that these strategies be included in the proposed Forest Management Plan that the Conservation Commission submits to the Minister for the Environment**.

Departmental officers may not be familiar with the distribution of relictual taxa identified in Tables 16 and 17 of this report and this lack of familiarity may limit

consideration of conservation management of the taxa. **It is recommended that Tables 16 and 17 of this report be reviewed to include information for each taxon on the occurrence/s of the value to which the taxon contributes.**

Declared Rare Flora and Threatened Ecological Communities

Definition and importance

The Department has statutory responsibility for flora conservation and particular responsibility for threatened flora. Section 23F of the *Wildlife Conservation Act 1950* prohibits the 'taking' of Declared Rare Flora (generally referred to as threatened flora) by any person on any land throughout the State without the consent in writing of the Minister for the Environment. Under the terms of the Act, 'taking' includes direct injury or destruction by human hand or machine and such activities as allowing stock to graze on the flora, introducing pathogens that attack it, altering water tables such that the flora is deprived of adequate soil moisture or is inundated, allowing air pollutants to harm foliage. A breach of this provision may lead to a fine of up to $10,000. The flora provisions of the Act are binding on the Crown. The 'Schedule of Declared Rare Flora' is reviewed annually and published in the government gazette. The most recent gazettal was 9 April 2002.

A number of criteria are used to identify Declared Rare Flora. These are related to the taxon being well defined and readily identifiable and the extent to which the taxon's distribution in the wild has been recently determined by competent botanists. The status of a threatened plant in cultivation has no bearing on the matter. The legislation only refers to the status of the plant in the wild.

Declared Rare Flora may be extant or presumed extinct (after CALM 1997 and Atkins 2003):

Declared Rare Flora — Extant Taxa (R): Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been declared under Section 23F of the *Wildlife Conservation Act 1950* to be "rare flora".

Declared Rare Flora — Presumed Extinct Taxa (X): Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been declared under Section 23F of the *Wildlife Conservation Act 1950* to be "rare flora".

A Declared Rare Flora and Priority Flora List is published each year by CLM (Atkins 2003). Priority Flora are taxa that are either under consideration for declaration as rare flora but are in need of further survey, or are flora that have been adequately surveyed but require continued monitoring. The list recognises four categories of Priority Flora:

Priority One — Poorly Known Taxa (1): Taxa which are known from one or a few (generally < 5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, or the plants are under threat, e.g. from disease, grazing by feral animals. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as "rare flora", but are in urgent need of further survey.

Priority Two — Poorly Known Taxa (2): Taxa which are known from one or a few (generally < 5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as "rare flora", but are in urgent need of further survey.

Priority Three — Poorly Known Taxa (3): Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as "rare flora", but are in urgent need of further survey.

Priority Four — Rare Taxa (4): Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.

The Priority Flora list is also reviewed annually and distributed within CLM and to other government agencies, groups and individuals. CLM's Wildlife Branch is responsible for the preparation of the list and the administration of the statutory requirements of the Act with respect to Declared Rare Flora. As this list changes annually any reference to taxa on the 'Declared Rare Flora and Priority Flora List' should be referenced.

A Threatened Ecological Community is a naturally occurring assemblage or group of plants and/or animals that occurs in a particular type of habitat and is subject to processes that threaten to destroy or significantly modify it across much of its range. Threatened Ecological Communities are categorised as presumed totally destroyed, critically endangered, endangered or vulnerable. As with Declared Rare Flora, CLM maintains a priority list of communities not fully assessed, or near threatened (some recently removed from the Threatened Ecological Community list but to be monitored for change of circumstances) and with these communities are to be managed conservatively.

A number of ecological communities in the region have been identified and assessed by English and Blyth (1997) as being naturally rare in occurrence, depleted by European land use or vulnerable to continuing threatening processes. The significance of these ecological communities may be related to both flora and fauna components.

Occurrence

Locations of Declared Rare Flora are scattered throughout the region, with concentrations east and north-east of Perth; between Busselton and Augusta; and from Lake Muir through Mt Frankland and east to Mt Lindesay.

Threatened Ecological Communities occur mainly on the Swan Coastal Plain between Gingin in the north to Busselton in the south, in the Whicher Ranger, lower Blackwood River and Scott River Plains, national parks between Northcliffe and Walpole, north of Denmark and near York.

Reservation

For Declared Rare Flora, 66% of taxa are represented in the conservation reserve system and 29% of populations occur in the conservation reserve system. Seventy-six per cent of Threatened Ecological Communities occur in the conservation reserve system.

Protection

Declared Rare Flora and Threatened Ecological Communities will have recovery plans or interim recovery plans prepared for them and where flora management plans are prepared for an administrative region of the Department they will include Priority Flora in addition to Declared Rare Flora. The implementation of these plans is considered an appropriate and adequate mechanism to protect these taxa. Systems are in place to improve knowledge and accommodate new understandings of communities and individual taxa in relation to conservation status, life histories and threats.

Where populations or communities are known to be present or likely to be present, operations likely to impact on a site are tailored to protect the site, i.e. mitigation of potential threat, be it from inappropriate fire regimes, impacts of timber harvesting (direct or indirect), roading or drainage works.

Where a desktop analysis indicates a species or community has some likelihood to be present (based on habitat, landform, soils, species distribution), a risk assessment is undertaken of the potential impact of the activity, and based on that assessment, a survey may be undertaken or the operations tailored to protect the site.

The protection of Declared Rare Flora and Threatened Ecological Communities in State forest could be improved through implementation of a number of the proposed strategies in the Draft Forest Management Plan, as listed above in the section on areas of high flora species richness. **It is recommended that these strategies be included in the proposed Forest Management Plan that the Conservation Commission submits to the Minister for the Environment**.

Protection of Threatened Ecological Communities and Declared Rare Flora could be improved through:

- specific triggers to check the occurrence of these values in planning checklists for timber harvesting, prescribed fire, roading and other disturbance activities; and
- specific requirements to exclude locations of these values from areas subject to timber harvesting.

It is recommended that planning checklists be revised to include specific triggers and requirements to exclude the location of Declared Rare Flora and Threatened Ecological Communities from timber harvesting.

Enactment of the proposed Biodiversity Conservation Act (Government of Western Australia 2002) would support greater protection of Threatened Ecological Communities and Declared Rare Flora through stronger legislative backing.

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Table 1: Taxa that are considered to be locally endemic and that have a conservation status of Declared Rare Flora or Priority Flora.

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Acacia aphylla	Sand, loam, clay loam. Granite outcrops, hills.	R [2, 3, 5]	
Acacia browniana var. *glaucescens*	arrah-Wandoo woodland. Lateritic gravelly soils.	2 [2]	
Acacia chapmanii subsp. *australis* ms	Sandy clay or gravel, grey sand. Plains, swampy areas.	2	Not in forest.
Acacia cummingiana	Grey or yellow sand, lateritic gravel. Sandplains, lateritic breakaways.	3 [2]	
Acacia cuneifolia ms	Sand, clay or loam over granite. Granite outcrops & hills, rocky watercourses.	4 [2]	
Acacia drummondii subsp. *affinis*	Lateritic gravelly soils.	3 [2]	
Acacia flagelliformis	Sandy soils. Winter-wet areas.	4	
Acacia horridula	Gravelly soils over granite, sand. Rocky hillsides	3 [2]	
Acacia inops	Black peaty sand, clay. Swamps, creeks.	3 [4]	
Acacia insolita subsp. efoliolata ms	Sandy & gravelly soils. Lateritic hills & ridges.	3	
Acacia lasiocarpa var. *bracteolata long peduncle variant (*GJ Keighery 5026*)*	Swampy areas, winter wet lowlands.	1	Not in forest.
*Acacia lateriticola glabrous variant (*BR Maslin 6765)	Lateritic soils.	3 [4]	
Acacia pulchella var. *reflexa acuminate bracteole variant (*RJ Cumming 882*)*	Sandy loam or sandy clay over laterite. Woodland.	3 [2]	
Acacia semitrullata	White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	3 [4]	
Acacia subracemosa	Red or yellow sand over limestone.	2 [4]	
Acacia tayloriana	Grey or yellow/orange sandy soils, lateritic gravel, clay loam. Winter-wet areas.	4	
Acacia volubilis	Gravelly sand, sandy clay.	R	Not in forest.
Actinotus whicherae ms	White sand pockets over laterite in forest.	2[4]	*A. whicheranus.*
Adenanthos detmoldii	Grey or black peaty sand, wet. Swamps, roadsides.	4	
Adenanthos pamela x	Grey sand, laterite. Damp flats, roadsides.	4	Not in forest.

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Alexgeorgea ganopoda	Peaty sand. Seasonally-wet areas.	2	Not in forest.
Andersonia annelsii ms	Low quartzite ridges, granite outcrops.	2	Not in forest.
Andersonia hammersleyana ms	Granitic sand, gravelly clay loam. Granite outcrops, slopes. Adjacent to river.	2	Not in forest.
Andersonia macronema	= *Andersonia virolens*...Grey sand over laterite or granite.	2 [9]	= *A. virolens* ms.
*Andersonia sp.Collis Rd (*G.Wardell-Johnson GWJ5A)	= Andersonia redolens. Jarrah woodland, deep sand adjacent to swamp, lateritic sandy gravel.	1	= A. *redolens.* Not in forest.
Andersonia sp.*Ironstone (*B.J.Keighery & N.Gibson 227)	White sand or red-brown loam over ironstone. Seasonally wet flats.	1[4]	*A. ferricola.*
*Andersonia sp.Mitchell River (*B.G.Hammersley 925*)*	Grey sand over laterite or granite. Usually on creeklines and in wet areas.	1	Not in forest.
Anigozanthos bicolor subsp*. exstans*	White sand, sandy clay loam.	3 [2]	
Anigozanthos humilis subsp*. chrysanthus*	Grey or yellow sand.	R	Not in forest.
Anthocercis gracilis	Sandy or loamy soils. Granite outcrops.	R [2, 5]	
Anthocercis sylvicola	Sand. Usually below granite, moist sites.	2	Not in forest.
Aotus carinata	Sandy soils. Seasonally wet flats.	4	Not in forest.
Astartea sp.*Mt Johnston (*A.R.Annels 5645*)*	Shallow soils. Granite outcrops.	3	Not in forest.
Astartea sp.*Scott River (*D.Backshall 88233*)*	Grey sand. Seasonally wet flats.	4	Not in forest.
Asterolasia grandiflora	Lateritic soils, clay over granite. Breakaways, hills. ??Disjunct Distr 200 km septn….York/Katanning.	4 [2]	
Asterolasia nivea	Sand or clay with lateritic gravel, saline loam. Breakaway, slopes.	R [2, 3, 5]	
Astroloma foliosum	Gravelly lateritic soils, loam over granite.	2 [2]	
Astroloma sp.*Nannup (*R.D.Royce 3978*)*	Sandy & gravelly lateritic soils.	4 [2]	
*Baeckea sp.Chittering (*R.J.Cranfield 1983*)*	Jarrah/Wandoo open woodland. Lateritic gravel.	1 [2]	
Baeckea sp.*Darling Range (*R.J.Cranfield 1673)	Marri, jarrah open woodland, gravel over laterite.	4 [2]	
Banksia meisneri subsp*. ascendens*	White or grey sand. Swampy flats.	4	
Billardiera sp.*Walpole (*A.R.Annels 277*)*	Grey sand, sandy soils, gravelly soils. Granite hills & outcrops.	3 [9]	

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Boronia capitata subsp. *gracilis*	White/grey or black sand. Winter-wet swamps, hillslopes.	2 [2, 4]	
Boronia exilis	Seasonally wet heath.	R [4, 6]	
Boronia humifusa ms	Gravelly clay loam over laterite. Jarrah-marri open forest.	1 [4]	
Boronia virgata	Peaty sand or clay. Swampy or waterlogged places.	3	Not in forest.
Borya longiscapa	Granite.	2	Not in forest.
Bossiaea modesta	Soils derived from granite. Damp areas close to stream.	2 [2]	
Brachysema modestum	Grey sand or clay loam over ironstone. Margins of swamp.	R [4, 5]	
Brachysema papilio ms	Sandy clay over ironstone. Winter-wet flats.	R [4, 6]	
Caladenia busselliana ms	Sandy loam. Winter-wet swamps.	R [4]	
Caladenia caesarea subsp. *maritima* ms	Loam, granite. Rock outcrops.	R	Not in forest.
Caladenia christineae ms	Sand, clayey loam, laterite. Margins of winter-wet flats, swamps, & freshwater lakes.	R [4, 5, 9]	
Caladenia evanescens ms	Sand in coastal dunes.	1	Not in forest.
Caladenia interjacens ms	Coastal dunes.	4	Not in forest.
Caladenia rubrichila ms	= Caladenia erythrochila ; Well-drained lateritic soils under scattered jarrah.	2 [9]	= *C. erythrochila.*
Caladenia starteorum ms	Clay loam. Winter-wet swamps.	2	Not in forest.
Caladenia subdita	Lateritic sand. (*C. luteola*).	2 [9]	*C. luteola*.
Caladenia uliginosa subsp. *patulens ms*	Clay loam and gravel. Well drained soils amongst dense shrubs.	1 [4]	
Caladenia viridescens	Marri and Agonis flexuosa woodland, over low heath and open herbs. Dark grey sand over granite.	R	Not in forest.
Caladenia winfieldii ms	Creek line, swamp.	R [6, 9]	
Calothamnus pachystachyus	Lateritic soils, often gravelly. Ridges, road verges.	4 [2]	
Calothamnus pallidifolius	Lateritic soils. Hillsides.	3	
Calothamnus rupestris	Gravelly skeletal soils. Granite outcrops & rocks, hillsides.	4 [2]	

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Calothamnus sp.*Mt Lindesay (*B.G.Hammersley 439*)*	Granitic gritty soils. Slopes.	2	Not in forest.
Calothamnus sp.*Scott River (*R.D.Royce 84*)*	Sand. Wet depressions.	2	Not in forest.
Calymperastrum latifolium	Granite - on *Macrozamia.*	2 [9]	
Calytrix breviseta subsp*. breviseta*	Sandy clay. Swampy flats.	R	Not in forest.
Calytrix oncophylla	Stony loam. Lateritic breakaways.	2 [2]	
Calytrix simplex subsp*. simplex*	Jarrah woodland (Saddleback).	1 [2]	
Calytrix sylvana	Lateritic soils, sand. Sandplains, ridges.	4 [2]	
Chamaexeros longicaulis	Grey or white sand, sandy clay with lateritic gravel. Walpole.	2	Not in forest.
Chamelaucium erythrochlorum	Gravelly lateritic soils, clay.	4	
Chamelaucium floriferum subsp*. diffusum* ms	Grey sand or shallow loam. Granite hills & outcrops.	2	Not in forest.
Chamelaucium floriferum subsp*. floriferum* ms	Sandy soils. Coastal dunes & limestone, granite outcrops.	3	Not in forest.
Chamelaucium forrestii subsp*. forrestii* ms	Shallow soils. Rocky crevices, granite outcrops.	2	Not in forest.
Chamelaucium roycei	Sandy clay, clay, lateritic soils. Winter-wet flats, swamps, stream banks.	R	Not in forest.
Chamelaucium sp*. Gingin (*N Marchant s.n. 4.11.88*) [aff. pauciflorum]*	Low woodland, on sands.	R	Not in forest.
Chordifex jacksonii ms	Sand, loamy sand. Seasonally inundated swamps.	2 [9]	= *Restio jacksonii* ms.
Conospermum caeruleum subsp*. contortum*	On ironstone plain.	1 [4]	
Conospermum densiflorum subsp*. unicephalatum*	Clay soils. Low-lying areas.	R [2]	
Conospermum paniculatum	Sandy or clayey soils. Swampy areas, plains, slopes.	3	
Conospermum undulatum	Sands on Swan coastal plain.	R	Not in forest.
Cryptandra arbutiflora var*. pygmaea*	Sand on granite and sand at margins of swamp.	1 [9]	
Cryptandra congesta	Granite.	2	Not in forest.
Cyanicula ixioides subsp*. ixioides ms*	Laterite, gravel.	4 [2]	
Dampiera heteroptera	Sandy soils. Swampy areas.	3	
Darwinia apiculata	Open Low Woodland and heaths on laterite and	R [2, 3, 5]	

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
	gravel.		
Darwinia ferricola	Peaty sand over ironstone.	R [4, 5]	
Darwinia pimelioides	Loam, sandy loam. Granite outcrops.	4 [2]	
Darwinia sp.*Williamson (*G.J.Keighery 12717*)*	Wet skeletal clay. Ironstone flats.	R [4, 6]	
Darwinia thymoides subsp*. St Ronans* (J.J.Alford & G.J.Keighery 64*)*	Hilltop, exposed granite site.	4	= *Darwinia thymoides* subsp. *bella* [2]ms.
Daviesia elongata subsp*. elongata*	*Eucalyptus* and *Banksia* woodland mainly on sandy soils of the coastal plain.	R [4]	
Deyeuxia inaequalis	Loamy soils in Tall forest.	1 [9]	
Diplolaena andrewsii	Loam, clay. Granite outcrops & hillsides.	2 [2]	
Drepanocladus aduncas	Limestone pools and wet limestone outcrops.	2	Not in forest.
Drosera fimbriata	White sand, granite.	4	Not in forest.
Dryandra aurantia	White/grey sand. Seasonally waterlogged plains.	R [2]	
Dryandra echinata	Gravel, sandy soils over laterite.	3 [2]	
Dryandra mucronulata subsp*. retrorsa*	Clay or clay loam. Flats, rocky hills.	R	Albany / Katanning.
Dryandra nivea subsp*. Morangup* (M Pieroni 94/2)	Dry-wet laterite with loam-clay-gravel.	2 [2]	
Dryandra nivea subsp*. uliginosa*	Sandy clay, gravel.	R [4]	
Dryandra serra	Gravel, sand or clay loam over laterite. Hillslopes.	4 [8, 9]	
Dryandra squarrosa subsp*. argillacea*	White/grey sand, gravelly clay or loam. Winter-wet flats, clay flats.	R [4]	
Epiblema grandiflorum var*. cyaneum ms*	Winter-wet swamps.	R	Not in forest.
Eremaea asterocarpa subsp*. brachyclada*	Laterite and sand. Base of Darling Scarp.	1	
Eremaea blackwelliana	White sand. Sandy depressions, gentle hillside.	4 [2]	
Eriochilus scaber subsp*. orbifolia* ms	Grey sand. Coastal dunes.	1	Not in forest.
*Eryngium sp.Lake Muir (*E.Wittwer 2293*)*	Black peaty silty soils. Winter-wet swamps.	1	Not in forest.
Eucalyptus brevistylis	Sandy loam, sand. N of Walpole.	3	Not in forest.
Eucalyptus goniantha subsp*. goniantha*	Sand, sandy clay, often over weathered granite & laterite. Coastal areas.	4	Albany area to Denmark - conservation and other lands, not in forest.
Eucalyptus graniticola ms	Exposed granite slopes.	R	

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Eucalyptus lane-poolei var. *Whicher (*S.D.Hopper 6316*)*	= *Eucalyptus relicta*… Creek banks.	1 [4]	= *E. relictua.*
Eucalyptus phylacis	Laterite, loam over granite. Coastal areas.	R	Not in forest.
Eucalyptus virginae ms	Lower slopes near watercourses, edge of rock outcrops, gently sloping sites.	2	Not in forest.
Gastrolobium tomentosum	Gravelly loam or clay. Hills, roadverges.	4	Not in forest - in agricultural zone.
*Genus sp.Shannon (*P.G.Wilson 1237B*)*	*Brachyscias verecundus* - Winter wet flats. Red-brown clay over ironstone	1	*Brachyscias verecundus.* Not in forest.
Goodenia arthrotricha	Gravel. Granite rocks, slopes.	2 [2]	
Goodenia katabudjar ms	Sandy gravel. Upland areas of open wandoo woodland.	1 [9]	
Grevillea brachystylis subsp*. australis*	Sand, sandy clay. Swampy situations, stream banks.	R	Not in forest.
Grevillea brachystylis subsp*. brachystylis*	Black sand, sandy clay. Swampy situations.	3	Not in forest.
Grevillea candolleana	Laterite, lateritic loam. Hillsides. Flats.	2 [2, 4]	
Grevillea corrugata	Woodland with *Eucalyptus rudis*, gravelly loam.	1 [2]	
Grevillea crowleyae	Gravel.	2	Herbarium records indicate also considered to have disjunct distribution.
Grevillea curviloba subsp*. curviloba*	Grey sand. Winter-wet heath.	R	Not in forest.
Grevillea elongata	Gravelly clay, sandy clay, sand. Swamps, creek banks.	R [4]	
Grevillea fuscolutea	Granite.	2	Not in forest.
Grevillea manglesii subsp*. ornithopoda*	Riverine and swamp community types.	2 [2]	
Grevillea mccutcheonii	Shallow soils over laterite, clay. Seasonally inundated sites.	R	Not in forest.
Grevillea papillosa	Brown or peaty sand, sandy clay, loam. Seasonally-wet areas, swamps.	3	Not in forest.
Grevillea pimeleoides	Gravelly soils over granite. Rocky hillsides.	4 [2]	
Grevillea prominens	Gravelly loam. Along creeklines.	3 [4]	
Grevillea rara	ateritic loam. Creeklines.	R [4]	
Grevillea ripicola	Granite on river margins.	4	
Grevillea sp.*Scott River (*G.J.Keighery 4070*)*	Red sandy clay over ironstone. Winter wet flats.	2	*Grevillea manglesioides* subsp. *ferricola*.

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
			Not in forest.
Hemiandra australis ms	Grey sand. Sand dunes.	2	Not in forest.
Hibbertia miniata	Lateritic gravelly soils.	4 [2]	
Hydrocotyle hamelinensis ms	Now should include in Disjunct - C. Naturaliste and Rottnest. Lakeside flats. Low open heath.	2 [2, 4]	
Hydrocotyle striata	Clay borders of a spring.	1	
Isopogon formosus subsp. *dasylepis*	Sand, sandy clay, gravelly sandy soils over laterite. Often swampy areas.	3 [4]	
Isopogon latifolius	Stony sandy soils on sandstone, quartzite or schistose rocks. Rocky slopes & summits of hills.	3	
Jacksonia sp.Collie(C.J.Koch 177*)*	Dry grey sand, ironstone. Slight hillslopes, ridges.	R[4]	=J.velveta ms ?
Johnsonia inconspicua		3 [2]	
Kennedia macrophylla	Loam, sand, granitic soils. Interdunal depressions.	R	Not in forest.
Lambertia echinata subsp. *occidentalis*	Winter wet sand over ironstone.	R [4, 6]	
Lambertia rariflora subsp. *lutea*	Grey sand, laterite. Margins of swamps and banks of rivers.	3 [9]	
Lambertia rariflora subsp. *rariflora*	Lateritic or clayey soils. Creeksides.	4	
Lasiopetalum bracteatum	Sandy clay, clay, lateritic gravel. Along drainage lines, creeks, gullies, granite outcrops.	4 [2]	
Lasiopetalum cordifolium subsp. *acuminatum* ms	Sand, sandy or gravelly loam. Granite outcrops, slopes, lateritic ridges.	3	Not in forest.
Lasiopetalum pterocarpum ms	Riverbank over granite.	R [2, 6]	
Laxmannia sp.*Little Lindesay (*B.G.Hammersley 1615*)*	Granite.	2	= *Laxmannia grandiflora* subsp *brendae.* Not in forest.
Leptomeria dielsiana	Presumed extinct. Scott River - probably a wet habitat.	X [4]	Unlikely to occur in forest.
Leptomeria furtiva ms	Grey or black peaty sand. Winter-wet flats.	2 [4]	
Lomandra ordii	Grey or black sand. Along river banks.	3 [9]	
Loxocarya magna	Sand, loam, clay, ironstone. Seasonally inundated or damp habitats.	3	Not in forest. Disjunct?
Lysinema lasianthum	Swamps, seasonally wet areas.	4 [8, 9]	

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Meeboldina crassipes ms	rey/white or red/brown sand, peat. In permanently inundated habitats.	3 [9]	
Melaleuca incana subsp. *Gingilup (*N.Gibson & M.Lyons 593)	Red-grey sand, sandy clay over ironstone. Seasonally wet flats.	2	Not in forest.
Meziella trifida	Sandy clay. Winter-wet flats.	R [4, 5, 9]	
Microtis globula	Peaty soils. Winter-wet swamps.	R	Not in forest.
Nemcia cordata ms	Sandy clay with laterite.	1 [4]	*N. whicherensis*.
Nemcia sparsa ms	Steep gullies, breakaway country.	1 [2]	
Neofuscelia subbarbatica	No known population extant.	1	
Parsonsia diaphanophleba	Alluvial soils. Along rivers.	4 [2]	
Petrophile latericola ms	Red lateritic clay. Winter-wet flats.	R [4, 6]	
Pimelea ciliata subsp. *longituba*	Grey sand over clay, loam. Moist sites.	3	Leeuwin Naturaliste - NPs, other lands, not State forest.
Pimelea cracens subsp. *glabra*	Clay. Flats.	2 [9]	
Pimelea rara	Lateritic soils.	4 [2]	
Pultenaea pauciflora	Sandy & clay lateritic soils. Undulating country.	R [2, 5]	
Pultenaea pinifolia	Loam or clay. Floodplains, swampy areas.	3 [4, 9]	
Pultenaea skinneri	Sandy or clayey soils. Winter-wet depressions.	4	
Restio isomorphus	Disjunct not local endemic…Sandy soils, grey sand, wet ironstone. Swamps, seasonally wet flats.	2	= *Cordifex isomorphus*.
Rhacocarpus webbianus	Granite.	R	Not in forest.
*Rulingia sp.Trigwell Bridge (*R.Smith s.n. 20.6.89*)*	Laterite.	R	Not in forest.
Schoenus indutus	Edges swamp, black sand over clay.	1	Scott River, not in forest.
Schoenus sp. *Waroona (*GJ Keighery 12235*)*	Clay or sandy clay. Winter-wet flats.	3	Not in forest.
Schoenus sp.*Bullsbrook (*J.J.Alford 915*)*	Grey peaty sand. Low-lying flats.	2	Not in forest.
*Schoenus sp.Jindong (*R.D.Royce 2485*)*	Stream banks.	1 [4]	
Selliera radicans	Saline mud. Estuarine areas.	1	Not in forest, also a disjunct taxon.
Sollya drummondii	Sand over laterite or granite. River banks, slopes.	4	Not in forest.
Sphaerolobium rostratum	Sandy soils and clayey sand. Creeklines, seasonally	3 [9]	

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
	wet swamps.		
Sphagnum molliculum	now S. nova-zealandicum? - swamp and seasonal indundated areas.	2 [9]	
Sphenotoma drummondii	Granite outcrops and hills.	R	Not in forest.
Sphenotoma sp.*Stirling Range* (P.G.Wilson 4235)	Skeletal soils over granite or quartzite. Rocky slopes & plateaus, gullies.	3	Not in forest.
Spirogardnera rubescens	Laterite, sand over laterite, loam. N and NE of Perth.	R [2, 3, 5]	
Spyridium riparium	Sandy or gravelly soils over laterite. River banks, slopes.	2	Not in forest.
Stenanthemum intropubens ms	Heath.	1 [2]	
Stirlingia divaricatissima	Yellow sand or sandy loam. Wet depressions.	3	Not in forest.
Stylidium barleei	White or grey sand.	3 [4]	
Stylidium cymiferum	Now local endemic, not disjunct. Lateritic soils.	1	
Stylidium marradongense ms	Lateritic soils. Open jarrah forest.	3 [2]	
Stylidium semaphorum ms	Lateritic gravelly soils. Hill summit.	2 [2]	
Stylidium sp.*Boulder Rock (*A.H.Burbidge 2536)	On granite soils beside rock.	2 [2]	
Synaphea decumbens	Sand over laterite. In Jarrah Forest.	1	Not in forest.
Synaphea grandis	Laterite.	3 [2]	
Synaphea incurva	Gravelly loam, sandy soils.	1	Albany area to Denmark - on conservation and other lands, not State forest.
Synaphea intricata	Sand, peaty sand. Flats, swampy areas.	3 [9]	
Synaphea macrophylla	Jarrah/Marri forest. In gravelly loam.	1 [4]	
Synaphea nexosa	clay-loam. Winter-wet flats.	1	
Synaphea odocoileops	Brown-orange loam & sandy clay, granite. Swamps, winter-wet areas.	1 [2]	
Synaphea otiostigma	Clayey laterite, gravelly loam, sand.	3 [4]	
Synaphea panhesya	Gravelly loam & sandy gravel.	1 [2]	
Synaphea petiolaris subsp. *simplex*	Sandy soils. Flats, winter-wet areas.	2 [4]	

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Synaphea stenoloba	Sandy or sandy clay soils. Winter-wet flats, granite.	R [2, 4]	
Tegicornia uniflora	Clay, sandy clay, loam. Salt lakes & creeks.	4	Albany; conservation and other lands, not State forest.
Tetratheca parvifolia	Open Jarrah forest.	3 [4]	
Tetratheca sp. *Granite (*S.Patrick SP1224*)*	Loams, sands and clay over granite. Creek beds and adjacent areas.	3 [2]	
Thomasia quercifolia	On sandy limestone soil.	2	Not in forest.
Thomasia solanacea	Iluvium, sand over limestone, rocky loam. Coastal areas.	3	Albany area to Denmark; on cons and other lands, not in forest.
Thysanotus formosus	Clayey sand, sandy loam. In situations often inundated in winter.	1 [4]	
Thysanotus isantherus	Granite.	3 [8]	
Trichocline sp. *Treeton (*BJ Keighery & N Gibson 564)	Sand over limestone, sandy clay over ironstone. Seasonally wet flats.	2 [4]	
Trymalium urceolare	Loamy & clayey soils, often with lateritic gravel.	2 [2]	
Verreauxia verreauxii	White/grey or yellow sand. Flats.	4 [2]	
Verticordia apecta	Granite.	R	Not in forest.
Verticordia attenuata	White or grey sand. Winter-wet depressions.	3 [4]	
Verticordia citrella	Gravelly loam or sand. Low-lying damp areas, swamps.	2 [2]	
Verticordia densiflora var. *pedunculata*	Grey/yellow sand, sandy loam. Winter-wet low-lying areas.	R [4]	Unlikely to occur in forest.
Verticordia endlicheriana var. *angustifolia*	Sandy clay. Granite outcrops.	2	Not in forest.
Verticordia fimbrilepis subsp. *australis*	Shallow sand, clay loam. Granite outcrops.	R	Not in forest.
Verticordia plumosa var. *pleiobotrya*	Clay, sandy loam. Seasonally inundated swamps, road verges.	R	Not in forest.
Verticordia plumosa var. *vassensis*	White/grey sand. Winter-wet flats.	R [4]	
Verticordia serrata var. *linearis*	White sand, gravel. Open woodland.	3 [2]	
Verticordia serrata var. *Udumung* (D.Hunter & B.Yarran 941006*)*	No data available.	2 [2]	
Wurmbea calcicola	Limestone clifftop.	R	Not in forest.

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Wurmbea sp.*Cranbrook (*A.R.Annels 3819*)*	Swamps, areas subject to inundation.	2	Not in forest.
Xanthoparmelia darlingensis	No known population extant.	1 [2]	
Xanthosia sp.*Warren* (A.R.Annels 1265*)*	X.eichlerii - Grey sand over granite, sandy loam. Granite outcrops, jarrah/marri woodland.	3 [9]	= *X. eichleri*.
Xyris maxima	Black peaty sand. Drainage flats.	2	

[1] Conservation status is as described on pages 27 and 28:

R is Declared Rare Flora - Extant Taxa;
X is Declared Rare Flora - Presumed Extinct;
1 is Priority One - Poorly Known Taxa;
2 is Priority Two - Poorly Known Taxa;
3 is Priority Three - Poorly Known Taxa; and
4 is Priority Four - Rare Taxa.

[2] Draft Swan Region Flora Management Plan (in preparation)
[3] Declared Rare Flora and other plants in need of special protection in the Northern Forest Region. Kelly et al. 1990.
[4] Declared rare and poorly known flora in the Central Forest Region. Williams et al. 2001.
[5] Conservation statements for threatened flora within the Regional Forest Agreement Region for Western Australia. Atkins 1998.
[6] Interim Recovery Plan.
[7] Declared Rare Flora and other plants in need of special protection in the metro area. Kelly et al. 1993.
[8] Declared rare and poorly known flora in the Albany District. Robinson and Coates 1995.
[9] Draft Warren Region Flora Management Plan (in preparation)

Table 2: Taxa that are considered to be locally endemic, that have a conservation status of Declared Rare Flora or Priority Flora, that occur in forest and have no document to guide their management (from Table 1).

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Acacia flagelliformis	Sandy soils. Winter-wet areas.	4	
Acacia insolita subsp. efoliolata ms	Sandy & gravelly soils. Lateritic hills & ridges.	3	
Acacia tayloriana	Grey or yellow/orange sandy soils, lateritic gravel, clay loam. Winter-wet areas.	4	
Adenanthos detmoldii	Grey or black peaty sand, wet. Swamps, roadsides.	4	
Banksia meisneri subsp. *ascendens*	White or grey sand. Swampy flats.	4	
Calothamnus pallidifolius	Lateritic soils. Hillsides.	3	
Chamelaucium erythrochlorum	Gravelly lateritic soils, clay.	4	
Conospermum paniculatum	Sandy or clayey soils. Swampy areas, plains, slopes.	3	
Dampiera heteroptera	Sandy soils. Swampy areas.	3	
Dryandra mucronulata subsp. *retrorsa*	Clay or clay loam. Flats, rocky hills.	R	Albany / Katanning.
Eremaea asterocarpa subsp. *brachyclada*	Laterite and sand. Base of Darling Scarp	1	
Eucalyptus graniticola ms	Exposed granite slopes.	R	
Grevillea crowleyae	Gravel.	2	Herbarium records indicate also considered to have disjunct distribution.
Grevillea ripicola	Granite on river margins.	4	
Hydrocotyle striata	Clay borders of a spring.	1	
Isopogon latifolius	Stony sandy soils on sandstone, quartzite or schistose rocks. Rocky slopes & summits of hills.	3	
Lambertia rariflora subsp. *rariflora*	Lateritic or clayey soils. Creeksides.	4	
Neofuscelia subbarbatica	No known population extant.	1	
Pultenaea skinneri	Sandy or clayey soils. Winter-wet depressions.	4	
Restio isomorphus	Disjunct not local endemic…Sandy soils, grey sand, wet ironstone. Swamps, seasonally wet flats.	2	= *Cordifex isomorphus.*
Stylidium cymiferum	Now Local Endemic, not disjunct. Lateritic soils.	1	
Synaphea nexosa	Clay-loam. Winter-wet flats.	1	

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Xyris maxima	Black peaty sand. Drainage flats.	2	

[1] Conservation status is as described on pages 27 and 28:
R is Declared Rare Flora - Extant Taxa;
X is Declared Rare Flora - Presumed Extinct;
1 is Priority One - Poorly Known Taxa;
2 is Priority Two - Poorly Known Taxa;
3 is Priority Three - Poorly Known Taxa; and
4 is Priority Four - Rare Taxa.

Table 3: Taxa that are considered to be locally endemic, which are not Declared Rare Flora or Priority Flora, and that do not occur within State forest

Taxon Name	Habitat Attributes	Conservation Status	Comments
Adenanthos apiculatus	Sand, sandy loam, gravel.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Adenanthos barbiger subsp. *intermedius* ms	Sandy clay, sand, laterite. Jarrah forest.		Blackwood Plateau /S Swan Coastal Plain - not currently considered threatened.
Anigozanthos preissii	Grey sand.		Albany area to Denmark/Walpole - not currently considered threatened; conservation and other lands, not State forest.
Astartea sp.*big bracteoles* (A.R.Annels 995)	Sandy soils. Valley floor. Swamps.		Restricted N Walpole - Denbarker; not currently considered threatened; conservation and other lands, not State forest.
Boronia juncea subsp. *laniflora* ms	Peaty sand or clay. Seasonally swampy areas.		Albany to Walpole - not currently considered threatened; conservation and other lands, not State forest.
Bossiaea aquifolium subsp. *laidlawiana*	Karri and Jarrah forest - Nannup to Lake Muir		Tall forest of Manjimup Pemberton Nannup area - common within range - not at risk.
Caladenia citrina ms	Granite, gravel, loam, sand. Gravelly or granitic soils in jarrah/marri forest.		Leeuwin Nat - not currently considered threatened; conservation and other lands, not State forest.
Caladenia longicauda subsp. *merrittii* ms	Grey or yellow sand, loam. Jarrah forest.		Blackwood Plateau - not currently considered threatened.
Caladenia meridionalis	Sand. Consolidated sand dunes.		Windy Harbour to Quarrum - dunes; not currently considered threatened; conservation and other lands, not State forest.
Calytrix similis	Sand over laterite. Flats.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Chordifex amblycoleus	Sand, clay. Swamps, seasonally wet flats.		Leeuwin Naturaliste to Windy Harbour; coastal swamp; not considered threatened; conservation and other lands, not State forest.
Conospermum caeruleum subsp. *debile*	Sandy soils. Swampy areas.		Scott River & Busselton - not currently considered threatened; conservation and other lands, not State forest.
Conospermum caeruleum subsp. *marginatum*	Grey peaty sand. Low winter-wet areas.		Blackwood Plateau /S Swan Coastal Plain - not currently considered threatened.
Conothamnus neglectus	Sandy loamy soils, gravelly areas, sandy		Albany area to Denmark - not currently considered

Taxon Name	Habitat Attributes	Conservation Status	Comments
	clay. Swampy plains, flats.		threatened; conservation and other lands, not State forest.
Corymbia ficifolia	White/grey sand or sandy loam, often with gravel. Hillslopes. (Should be in Disjunct set as well).		Albany area to Walpole - not currently considered threatened; conservation and other lands, not State forest.
Dryandra blechnifolia	Sandy & loamy soils, rocky soils.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Eremaea purpurea	White, grey or yellow/brown sand, moist depressions.		North from Perth & record near York - not considered threatened.
Eucalyptus guilfoylei	Gravelly loam. Slopes & ridges. N & E of Walpole.		Denmark/Walpole - not currently considered threatened; conservation and other lands, not State forest.
Eucalyptus jacksonii	Loam. Hillslopes, gullies. N & E of Walpole.		Denmark/Walpole - not currently considered threatened; conservation and other lands, not State forest.
Gonocarpus hexandrus subsp. *hexandrus*	Wet swampy flats.		South Coast Donnelly to Albany - not currently considered threatened; conservation and other lands, not State forest.
Grevillea depauperata	Laterite, gravel, clay loam, grey sand over laterite.	*	Restricted around Denmark - was listed; not considered under threat - conservation and other lands, not State forest.
Hemigenia barbata	Sandy clay, lateritic gravelly soils.		N and NE of Perth - not currently considered threatened - reserved and non State forest lands.
Hibbertia depressa	Sandy soils, lateritic soils. Swampy & coastal areas, slopes.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Hodgsoniola junciformis	Grey-black sand. Swamps.		Blackwood Plateau /S Swan Coastal Plain - not currently considered threatened.
Hydrocotyle pilifera var. *pilifera*	??? ID problems		Swan Coastal plain (doubtful records for Albany and Augusta) - not currently considered threatened.
Hypolaena caespitosa ms	Grey sand, lateritic gravel. Swampy areas.		ID's to resolve - not currently considered threatened; conservation and other lands, not State forest.
Johnsonia teretifolia	White-grey or black peaty sand. Scree slopes, swamps.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Kunzea ciliata	Loamy sand. Granite slopes, gneiss outcrops.		Leeuwin Naturaliste / lower B/wood - not currently considered threatened; conservation and other lands, not State forest.
Kunzea ericifolia subsp. *ericifolia*	Peaty or grey/black sand, sandy soils.		Albany area to Denmark/Walpole - not currently considered

Taxon Name	Habitat Attributes	Conservation Status	Comments
	Seasonally wet swamps, moist situations.		threatened; conservation and other lands, not State forest.
Lambertia echinata var*. citrina* ms	Sandy clay, gravel, laterite.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Leptomeria ericoides	Sandy soils.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Leucopogon gracilis	Sandy soils, granitic gravel. Coastal sandhills, flats, hillslopes.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Lysinema fimbriatum	Stony & sandy soils. Winter-wet areas, slopes, rocky grounds.		Albany area to Denmark/Walpole - not currently considered threatened; conservation and other lands, not State forest.
Melaleuca camptoclada	Gravelly sand, clay loam.		Albany; conservation and other lands, not State forest.
Melaleuca croxfordiae	+ *M. croxfordiae*.. Sand, sometimes with granite. Coastal heath, granite slopes.		Albany area to Denmark/Walpole - not currently considered threatened; conservation and other lands, not State forest.
Microtis familiaris	Peaty soils. Winter-wet swamps.		Albany to Walpole - not currently considered threatened; conservation and other lands, not State forest.
Pultenaea brachytropis	=*P. brachytropis*…. ???		Blackwood Plateau /S Swan Coastal Plain - not currently considered threatened.
Stylidium lowrieanum	Sandy soils. Coastal limestone.		Leeuwin Naturaliste - not currently considered threatened; conservation and other lands, not State forest.
Stylidium pritzelianum	Sand over granite, lateritic soils. Damp areas.		Denmark area to Walpole/Shannon - not currently considered threatened; conservation and other lands, not State forest.
Synaphea polymorpha	White or peaty sand, sandy clay, laterite. Hillslopes, swamps.		Albany area to Denmark - not currently considered threatened; conservation and other lands, not State forest.
Trymalium venustum	Sandy soils, often over laterite or with lateritic gravel.	*	Restricted around Denmark - was listed; not considered under threat - conservation and other lands, not State forest.
Xyris indivisa	Wet forest and swamps.		Bow River to Donnelly River, coastal and swamp - not threatened - conservation and other lands, not State forest.
Xyris roycei	Moist grey sand.		Scott River and Windy Harbour area - Conservation and other estate - not State forest - Not considered threatened.

*** Previously listed as a Declared Rare Flora or Priority Flora**

Table 4: Taxa that are considered to be locally endemic, that are not Declared Rare Flora or Priority Flora, that do not occur within State forest, and that it is recommended should have their conservation status reviewed.

Taxon Name	Habitat Attributes	Conservation Status	Comments
Andersonia geniculata (A. sp.Beardmore Rd)	Grey sand over clay or black peat. Swamps, lower slopes.	?	Nth of Walpole, very restricted - conservation lands; "abundant" but should be considered for listing as a priority taxa. (Pc, climate change, fire).
Banksia meisneri subsp. *ascendens*	White or grey sand. Swampy flats.	*?	Blackwood Plateau /S Swan Coastal Plain - not currently considered threatened.
Caladenia nivalis	Sand, loam, granite. Coastal granite outcrops.	?	Extremely restricted - Cape Naturaliste - not currently considered threatened; conservation and other lands, not State forest.
Conostylis teretifolia subsp. *planescens*	Yellow/grey sand, sandy loam.	?	Swan Coastal Plain and Dandaragan plateau - extremely restricted - review of conservation status is required.
Drosera silvicola	Open jarrah forest. In laterite gravel soils.	?	North Banister - extremely restricted - review of status warranted - not in State forest.
Drosera stelliflora	In laterite soils, sometimes with sand.	?	Leeuwin Nat/S Swan Coastal Plain - not currently considered threatened; conservation and other lands, not State forest.
Drosera walyunga	Sandy clay with lateritic gravel.	?	Very restricted - review of status warranted - not in State forest.
Gastrolobium truncatum	Clay. Winter-wet flats.	?	East of forest, mostly agric, some cons lands - needs review of status and threat (salt).
Hakea sp.*Walyunga* (L.Penn s.n.)	Lateritic ridge.	*?	Was Priority 2. Extremely restricted.
Hypolaena grandiuscula	= H. grandiuscula: Grey sands. Lower slopes, valley floor.	?	Extremely restricted - Bow River - Walpole; review of conservation status is required.; conservation estate and other lands, not State forest.
Isopogon buxifolius var. *buxifolius*	Grey sand. Swampy areas.	?	Albany to Denmark very restricted - not currently listed; mostly on other lands, not cons est. Should be considered for listing as a priority taxa.
Lepidosperma obtusum	Lateritic sand.	?	Clackline - York area, very restricted but not in State forest.

Taxon Name	Habitat Attributes	Conservation Status	Comments
Nemcia congesta ms	Avon Valley. Brown gravelly clay over granite. Ridges.	*?	Extremely restricted (Avon Valley NP) - deleted from list recently (Should be considered for listing as a priority taxa for long term monitoring).
Schoenus sp.*Mt Barker* (G.J.Keighery 9679)	Low lying flats, brown sandy clay - lateritic pebbles over clay and loam over granite	#?	Mt Barker - Stirlings; To be added to priority list.
Thomasia glutinosa var. *glutinosa*	Lateritic & granitic soils.	*?	NE of Perth - not currently considered threatened; conservation and other lands, not State forest.
Thysanotus scaber	Laterite, granite.	*?	NE of Perth - not currently considered threatened; conservation and other lands, not State forest.
Xyris inaequalis	Swamps.	?	Margaret River area + Walpole(?) - few records - status should be reviewed - Conservation lands, not State forest.

Should be considered for addition to the Declared Rare Flora or Priority Flora list
? **Based on Herbarium records, a review of Conservation status seems required**
* **Previously listed as a Declared Rare Flora or Priority Flora**

Table 5: Taxa that are considered to be locally endemic, that are not Declared Rare Flora or Priority Flora, that occur within State forest, and are considered not to be at risk of decline because of a combination of factors including prevalence/dominance of the taxa within its range, the habitat types within which it occurs are informal reserves within State forest, and life history attributes.

Taxon Name	Habitat Attributes	Conservation Status	Comments
Astartea sp. *Gingalup* (N.Gibson & M.Lyons 119)	Lateritic gravel, red clay over ironstone. Swampy drainage lines, seasonally inundated areas.		Most populations on reserves and other land, few on State forest - not considered threatened.
Bossiaea webbii	Sand, loam, clay loam.		Albany - Walpole, mostly in Reserve, some in State forest; common within range, not considered threatened.
Brachysema melanopetalum	Swampy depressions, banks of watercourses, swamps.		Manjimup to Walpole - not currently considered threatened.
Caladenia infundibularis	Sand, loam, gravel.		Restricted Leeuwin Naturaliste /Blackwood Plateau; not currently considered threatened.
Daviesia microphylla	Sandy soils. Flats, sandplains.	*	Was Priority 4. N Jarrah /Wandoo mostly within Wandoo NP.
Eucalyptus laeliae	Sandy clay, sandy loam. Granite outcrops & hills.		Northern Jarrah E & SE of Perth; currently considered secure within its range.
Grevillea bronwenae	Grey sand over laterite, lateritic loam. Hillslopes.		Blackwood Plateau /S Swan CP - not currently considered threatened.
Grevillea manglesii subsp. *manglesii*	Gravelly loam, sandy loam on granite, clay. Roadsides, granite outcrops.		Darling Ranges E and SE Perth - not currently considered threatened.
Grevillea manglesioides	Yellow sand, sandy clay, sandy loam, ironstone. Swamps, winter-wet flats, creeklines.		Blackwood Plateau/ S Swan Coastal Plain/ Leeuwin-Naturaliste; not currently considered threatened.
Grevillea monticola	Gravelly soils (loam, sand) over laterite, granite. Hills, granite outcrops.		Eastern Jarrah/Wandoo - not currently considered threatened.
Hakea cristata	Usually associated with granite and laterite moisture gaining sites and creeklines.		Darling Range E and NE of Perth - not currently considered threatened; cons and other lands, some State forest.
Hakea petiolaris subsp. *petiolaris*	Granite outcrops.		Darling Ranges E and SE Perth - not currently considered threatened.
Hibbertia ovata	Lateritic soils.		Northern Jarrah E & SE of Perth; currently considered common and secure within its range.

Taxon Name	Habitat Attributes	Conservation Status	Comments
Pimelea brevistyla subsp. *brevistyla*	Lateritic soils (sand, clay).		Darling scarp adjacent to Perth - not currently considered threatened.
Xyris laxiflora	Wet areas.		Restricted to Lower Blackwood / Scott River; not currently considered threatened.

*** Previously listed as a Priority Flora**

Table 6: Taxa that are considered to be locally endemic, that are not Declared Rare Flora or Priority Flora, that occur within State forest, and and could be impacted by disturbance activities.

Taxon Name	Habitat Attributes	Conservation Status	Comments
Dasypogon hookeri	Grey or black sand, sandy gravel, sandy clay, often wet.		Blackwood plateau - not currently considered threatened – apparently common in range but low recruitment rates possibly make the species vulnerable to extensive disturbance.
Dryandra praemorsa var. *praemorsa*	Laterite, clay, granite.	*	Was Priority 3. Restricted to N Jarrah…. . Populations outside Wandoo NP should be monitored.
Dryandra praemorsa var. *splendens*	Loam, sand, lateritic gravel.	?*	Was Priority 3. N Jarrah / Wandoo forest. Extremely restricted distribution; single forest block. To P4??? . Populations outside Wandoo NP should be monitored.
Grevillea scabra	Laterite.	*	Was Priority 2. Very restricted, N jarrah and off estate. Populations outside Wandoo NP should be monitored.
Lepyrodia porterae ms	Red clay over ironstone, sand, peat. Swamps, depressions.	?	Scott River - southern Blackwood Plateau – a wet ironstone community species vulnerable to changes in hydrology.
Nemcia alternifolia ms	Gravelly sand or loam. Undulating low rises.	*	Was Priority 1 - Very restricted - N Jarrah forest…. Populations outside Wandoo NP should be monitored.
Nemcia cyanophylla ms	Gravelly loam. Low rises. Gravelly loam. Low rises.	?*	Was Priority 1 - now off list - very restricted distribution. Populations outside Wandoo NP should be monitored ???P4.
Nemcia epacridoides	Loam, gravel, laterite. Granitic hills.	*	Was Priority 2. Very restricted…N jarrah and off estate. Populations outside Wandoo NP should be monitored.
Stenanthemum nanum	Laterite, gravelly clay on granite.	*	Was Priority 1. Northern Jarrah main forest belt…Should be ongoing monitored in areas subject to operations.
Synaphea damopsis	Lateritic gravels.	*	Was Priority 3. Restricted to N Jarrah…Margaret R pops doubtful…. Populations outside Wandoo NP should be monitored.
Synaphea whicherensis	Gravelly lateritic soils, white/grey sand. Winter-wet depressions, flats.	*	Was Priority 3. Restricted to B/Wood Plateau and S Swan Coastal Plain. Populations outside conservation parks should be monitored.
Thelymitra dedmaniarum	Granite.	?*	At RFA the understanding of the taxa was such that it was DRF. However, the DRF taxon was another closely related species. This species though is extremely restricted to northern Jarrah / Wandoo. Should be considered for listing as a priority taxa. Populations outside Wandoo National Park should be monitored.

? **Based on Herbarium records, a review of Conservation status seems required**
*** Previously listed as a Declared Rare Flora or Priority Flora**

Table 7: Potential threats and management requirements for taxa that are considered to be locally endemic, that are not Declared Rare Flora or Priority Flora, that occur within State forest, and could be impacted by disturbance activities.

Taxon Name	Potential Threats	Management Requirements
Dasypogon hookeri	Apparently common in range but low recruitment rates possibly make the species vulnerable to extensive disturbance.	Planning checklists for disturbance activities should be revised to specifically identify the need to address the following requirements for known populations that occur in State forest areas that may be impacted by disturbance activities: • The taxa should be approached and managed as for a Priority 4 taxon, where they are taken into account during planning, activities are designed to minimise impact on the population and monotoring of the population is undertaken; and • Advice should also be sought from the Regional Ecologist, Regional Nature Conservation Leader, Principal Botanist or other relevant expertise, so that the latest knowledge for each taxon and the impacts of disturbance activities are considered.
Dryandra praemorsa var. *praemorsa*	A restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable.	
Dryandra praemorsa var. *splendens*	An extremely restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable.	
Grevillea scabra	A very restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable.	
Lepyrodia porterae ms	An extremely restricted species of the wet ironstones vulnerable to changed hydrology	
Nemcia alternifolia ms	A very restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable.	
Nemcia cyanophylla ms	A very restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable.	
Nemcia epacridoides	A very restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable.	
Stenanthemum nanum	A restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable. Known predominantly from main forest belt.	
Synaphea damopsis	A restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable. Known predominantly from the main forest belt.	

Taxon Name	Potential Threats	Management Requirements
Synaphea whicherensis	A restricted species previously listed as a priority taxon. Loss of populations that contributed to its removal from the priority list is undesirable. Vulnerable to changes in hydrology.	
Thelymitra dedmaniarum	An extremely restricted species previously listed as a Declared Rare Flora. Loss of populations that contributed to its removal from the list is undesirable.	

Table 8: Taxa that were considered in the Comprehensive Regional Assessment to have a disjunct distribution and are no longer considered to have a disjunct distribution.

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Caladenia chapmanii			No longer disjunct.
Convolvulus erubescens	Convolvulus angustissimus - Damp depressions, floodplains, drainage lines, slopes.		= *C.angustissimus*; distribution E and W of main forest belt - not disjunct.
Eutaxia cuneata			Redets in herbarium remove disjuncture.
Hakea petiolaris	Loam. Granite outcrops.		No longer considered to have a disjunct distribution.
Isoetes drummondii	Swampy areas subject to winter flooding and dryness in summer.		Additions to collections post RFA indicate disjuncture no longer exists.
Isolepis fluitans	Clay, mud. In water, creek edges, swamps, claypans.		No longer have a disjunct distribution. New post-RFA records have updated distribution.
Laxmannia arida			No longer recognized for SW.
Lepidosperma drummondii	Lateritic, yellow, peaty or black sand, red clay, red sandy loam. Granite outcrops, dunes, hills.		A couple of recent collections have removed disjuncture (post RFA).
Logania micrantha	Deep sand, gravelly sandy soils over laterite. Sandplains, hills, swamp edges.		Distribution appears to no longer be disjunct - was an attribute of land clearing and collecting.
Myriocephalus pygmaeus			No longer present in region.
Nemcia crenulata			No longer present in region.
Pleurosorus rutifolius	Rock crevices, particularly where rock overhangs, granite outcrops.		Restricted habitat results in scattered distribution - would not now consider disjunct in WA.
Schoenus minutulus	(York population) On upland breakaway, sandy clay over rocky clay.		A scattered distribution Geraldton to Albany-Esperance; Arthur River collection (98) removed disjuncture.
Sporobolus mitchellii			No longer recognized for SW.
Stenanthemum emarginatum	Clay, sandy clay, gravelly sand. Creek edges, slopes.		Not disjunct.
Stylidium beaugleholei	Shallow seasonal swamps.		Redets have removed disjunctedness.
Stylidium cymiferum	Now Local Endemic, not disjunct. Lateritic soils.	1	Not disjunct.
Stylidium pilosum			No longer recorded for the region.

[1] Conservation status is as described on pages 27 and 28:

R is Declared Rare Flora - Extant Taxa;
X is Declared Rare Flora - Presumed Extinct;
1 is Priority One — Poorly Known Taxa;
2 is Priority Two — Poorly Known Taxa;
3 is Priority Three — Poorly Known Taxa; and
4 is Priority Four — Rare Taxa.

Table 9: Taxa that are considered to have a disjunct distribution and that have a conservation status of Declared Rare Flora or Priority Flora.

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Aotus cordifolia	Peaty soils. Swamps. (Recent collections reduce disjunctedness.)	3 [2, 4]	
Apodasmia ceramophila ms	Flats, wetlands.	2 [4, 9]	= *Leptocarpus ceramophilus* ms.
Asplenium obtusatum	Steep valleys, pockets in granite gneiss.	R [8, 9]	Not in forest.
Austrofestuca littoralis	Sand. Littoral sand & foredunes.	1	(was *A. pubinervis*) - Not in forest.
Banksia verticillata	Granite outcrops and hills.	R	Not in forest.
Boronia anceps ms	Seasonally swampy heaths.	3 [4]	S Swan Coastal Plain to Scott River / Walpole (this latter population - Boggy Lake - not relocated… doubtful).
Calothamnus graniticus subsp. *leptophyllus*	No longer disjunct.	4 [2]	
Calytrix pulchella	Grey or white sand over laterite. Ridges, flats.	3 [4]	
Calytrix simplex subsp. *simplex*	Jarrah woodland (Saddleback).	1 [2]	
Carex tereticaulis	Black peaty sand.	1 [2, 4, 9]	
Chordifex isomorphus	Sandy soils, grey sand, wet ironstone. Swamps, seasonally wet flats.	2	= *Chordifex serialis* ms; Scott River - Busselton / Albany. Not in forest.
Chorizema ulotropis	White sand with gravel. Dwellingup population not recorded for habitat.	4 [2]	
Conospermum quadripetalum	Sandy clay, grey sand. Flats behind coastal hills.	2 [4]	
Drosera binata	Black peat. Winter-wet swamps.	2	Not in forest.
Dryandra mimica	Banksia woodlands, heaths, white or grey sand over laterite, sandy loam.	R [2, 4, 5, 7]	
Dryandra sessilis var. *cordata*	White/grey sand. Coastal limestone.	2	Not in forest.
Gonocarpus trichostachyus	Sandy soils. (In region associated with granite above Denmark River).	3	Not in forest.
Grevillea althoferorum	Grey sand with gravel. Low open heath.	R	Swan Coastal Plain, Perth / Eneabba - not in forest.

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Grevillea crowleyae	Gravel.	2	Herbarium records indicate also considered to be locally endemic.
Grevillea ripicola		4	No longer fits criteria of disjunct - redets removed disjuncture. Probably endemic with southern populations now removed.
Hakea tuberculata	Shallow red loam over ironstone. Winter-wet flats.	3 [4]	
Hybanthus volubilis	Clay or sandy clay. River banks.	2 [4, 9]	
Lambertia multiflora var. *darlingensis*	Sandy clay or grey/brown sand over granite, lateritic gravel.	3 [2, 4]	
Lambertia orbifolia	Sandy loam, sand, gravel. Banksia woodlands, heaths, riverbanks.	R [4, 5]	Not in forest.
Leucopogon glaucifolius	Flats, sand dunes, swamps.	3 [2]	
Melaleuca micromera	Gravelly sandy loam or clay. (Perup NR - single plant??)	3	Not in forest.
Mitreola minima	Grey sand. Peaty swampy areas.	2 [4, 9]	
Pentapogon quadrifidus var. *quadrifidus*	Clay. Open winter wet flat in forest.	1 [9]	
Pultenaea pinifolia	Loam or clay. Floodplains, swampy areas.	3 [4, 9]	
Reedia spathacea	Peaty sand. Swamps, river edges.	4 [9]	
Rorippa dictyosperma	Granitic slopes.	2	Not in forest.
Schizaea rupestris	Gullies, creek banks, shaded moist rock faces.	2	Not in forest.
Schoenus fluitans	Freshwater swamps.	2	Not in forest.
Selliera radicans	Saline mud. Estuarine areas.	1	Not in forest. Also local endemic taxon.
Sowerbaea multicaulis	Gravels and sands elsewhere, type not recorded for SW (possibly miss ID).	4	RFA record -type loc near Northam, not in main forest belt - disjunction likely to be caused by land clearing in Wheatbelt.
Sphenotoma drummondii	Granite outcrops and hills.	R	Not in forest.
Sphenotoma sp.*Stirling Range* (P.G.Wilson 4235)	Skeletal soils over granite or quartzite. Rocky slopes & plateaus, gullies.	3	Not in forest.
Stylidium articulatum	Granite hills.	2 [8]	Albany / Perth.
Stylidium rhipidium	Flats, wetlands.	3 [2]	Unlikely to be in forest.

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Stylidium tylosum	Watershed run-off areas from granite outcrops.	1[4]	Moodiarup / Albany.
Tricoryne arenicola ms	Grey or yellow sand, laterite. Heath, shrubland and open woodland in N and E of region.	2	Scattered in Eastern Wandoo through to Geraldton/Kalbarri.
Xanthoparmelia hypoleia		3 [4]	

[1] Conservation status is as described on pages 27 and 28:
R is Declared Rare Flora - Extant Taxa;
X is Declared Rare Flora - Presumed Extinct;
1 is Priority One — Poorly Known Taxa;
2 is Priority Two — Poorly Known Taxa;
3 is Priority Three — Poorly Known Taxa; and
4 is Priority Four — Rare Taxa.

[2] Draft Swan Region Flora Management Plan (in preparation)
[3] Declared Rare Flora and other plants in need of special protection in the Northern Forest Region. Kelly et al. 1990.
[4] Declared rare and poorly known flora in the Central Forest Region. Williams et al. 2001.
[5] Conservation statements for threatened flora within the Regional Forest Agreement Region for Western Australia. Atkins 1998.
[6] Interim Recovery Plan.
[7] Declared Rare Flora and other plants in need of special protection in the metro area. Kelly et al. 1993.
[8] Declared rare and poorly known flora in the Albany District. Robinson and Coates 1995.
[9] Draft Warren Region Flora Management Plan (in preparation)

Table 10: Taxa that are considered to to have a disjunct distribution, that have a conservation status of Declared Rare Flora or Priority Flora, that occur in forest and have no document to guide their management (from Table 9).

Taxon Name	Habitat Attributes	Conservation Status[1]	Comments
Grevillea crowleyae	Gravel.	2	Herbarium records indicate also considered to be locally endemic.
Tricoryne arenicola ms	Grey or yellow sand, laterite. Heath, shrubland and open woodland in N and E of region.	2	Scattered in Eastern Wandoo through to Geraldton/Kalbarri.

[1] Conservation status is as described on pages 27 and 28:

R is Declared Rare Flora - Extant Taxa;
X is Declared Rare Flora - Presumed Extinct;
1 is Priority One — Poorly Known Taxa;
2 is Priority Two — Poorly Known Taxa;
3 is Priority Three — Poorly Known Taxa; and
4 is Priority Four — Rare Taxa.

Table 11: Taxa that are considered to have a disjunct distribution, which are not Declared Rare Flora or Priority Flora, and that do not occur in State forest.

Taxon Name	Habitat Attributes	Conservation Status	Comments
Aotus genistoides	Normally mountain peaks in Stirlings - Denmark pop in swamp - probably miss identification.		Denmark townsite population disjunct from Stirlings populations - not in forest. (Denmark population is possibly a garden escape).
Aristida ramosa	Various - now presumed an alien = weed, not native to the area	*	Was Priority 1, now accepted as an alien in WA.
Asplenium trichomanes	Shady, wet sites, near waterfalls, limestone outcrops		Leeuwin Naturaliste / Albany - not in forest.
Azolla filiculoides	Still, fresh water swamps and backwaters.		Swan Coastal Plain / Albany - not in forest.
Brachysema celsianum	Banks or beds of watercourses, granite rocks.		Non forest taxon straddling the forest belt - Swan Coastal Plain and Darling Scarp / Albany hinterland.
Chorizandra multiarticulata	Sandy clay. Swamps.	*	Was Priority 3 taxon - populations scattered Swan Coastal Plain to Ravensthorpe, not in main forest belt (WAHerb).
Conothamnus trinervis	Sandy lateritic soils. In Perth area associated with the Darling Scarp.		Forrestfield / Eneabba - not in forest.
Cyclosorus interruptus	Near swamps, creeks		Northern Swan Coastal Plain disjunct to the tropics (Kimberley) - not in forest.
Drosera ramellosa	Granite outcrops, margins of swamps, usually in moss beds.		Bipolar distribution: West Distr Albany - Geraldton but excluding forest belt / eastern distribution at Esperance.
Eucalyptus jucunda	White, yellow or red sand. Sandplains. N limit of region.		Doubtful record for RFA area N of Perth - not in forest.
Fimbristylis velata	Black sand. Swamps, creek edges, along watercourses.		Swan Coastal Plain, Perth - Bunbury / Scott River. Not in forest.
Glossostigma diandrum	Winter-wet depressions, rock holes, claypans.		? as to disjunct, record for RFA was Swan CP, not forest.
Glossostigma drummondii	Granite rock pools, claypans, swamps, winter-wet depressions.		Doubtful as to disjunct. Records for RFA was Swan Coastal Plain / Denmark and Eastern wandoo. Occurs in non-forest communities surrounded by forest.
Hakea candolleana	Low lying depression, grey sandy clay. Swamps.		RFA records Swan Coastal Plain in Perth metro area.
Halgania cyanea var.	Sandplains, sandhills, Boggy Lake a real out of		Arid Zone species - Boggy Lake (Walpole) collection or

Taxon Name	Habitat Attributes	Conservation Status	Comments
latisepala ms	range collection… ID???		identification questionable, not in forest.
Lepidosperma carphoides	White, grey, gravelly or lateritic sand. Sandplains, creeks.		Bipolar; Swan Coastal Plain / South Coast and hinterland + 1 collection Lake Muir area - not in forest.
Leucopogon cymbiformis	Sandplains, wet flats, foothills. (In region, C. Naturaliste)		Distribution is Perth to Albany east of forest with a record for Leeuwin Nat - not in forest.
Leucopogon elegans	Winter-wet areas, sandplains, coastal areas. (In region, Cape Naturaliste area).		Albany and a record for Leeuwin Naturaliste - not in forest.
Levenhookia pauciflora	Sand over sandstone or granite. Flats, granitic rises.		Esperance / Albany / Scott River / Capel / Watheroo. Not in forest.
Lilaeopsis polyantha	Sandy mud. Lake margins.		SW populations disjunct to East Coast - conservation lands (Lake Muir) and Wheatbelt - not in forest.
Lomandra hastilis	Coastal dunes in Warren.		Known populations in RFA region in conservation estate (D'Ent NP), not in State forest.
Myoporum caprarioides	Seasonally wet flats, swamps, sand dunes, limestone ridges, coastal areas.		Bipolar; Swan Coastal Plain and South Coastal Plain (+Lake Muir) - not in main forest belt - ? Two taxa?
Olearia strigosa	Sandy loam. Open forest.		Swan CP / Esperance ??? Not in forest.
Pithocarpa achilleoides	River flats, swamps in Busselton and Harvey area.		= *Pithocarpa pulchella* var. *pulchella*; probably not disjunct - Swan Coastal Plain and N jarrah / Albany record is questionable.
Platytheca juniperina	Stony sandy soils over quartzite. Upper slopes.		Denmark / Stirlings / Ravensthorpe. Not in forest.
Pleurosorus subglandulosus	Amongst boulders, under rock overhangs.		Darling Scarp associated with granite - national disjuncture - not in forests.
Schoenus subaphyllus	Doubtful location data (Murray River WA - 1839, F. Mueller).		Arid zone taxon with a single old record (F.Mueller 1839) for Murray River - very doubtful.
Stenanthemum pumilum	Sandy soils, gravel, rocky sandy loam. Flats.	*	Was Priority 3 - additions to WAHerb since RFA have removed "Rareness" and Disjuncture.
Thomasia macrocarpa	Granite or laterite slopes bordering creeks, hills.		Perth foothills and Scarp / Leeuwin Naturaliste. Not in forest.
Utricularia australis	Shallow pools, lakes.		Doubtful as to disjunct. records for RFA was South coastal (Yeagerup) and Lake Muir … conservation lands, not in forest.
Xanthorrhoea acanthostachya	Darling escarpment soils and sands of coastal plain.		Darling Scarp and Swan Coastal Plain (disjunct to Jurien).

*** Previously listed as a Declared Rare Flora or Priority Flora**

Table 12: Taxa that are considered to have a disjunct distribution, that are not Declared Rare Flora or Priority Flora, that do not occur within State forest, and that should have their conservation status reviewed.

Taxon Name	Habitat Attributes	Conservation Status	Comments
Chamelaucium hamatum ms	Grey or yellow sand, often over granite. Floodplains.	?	Walyunga NP / Arthur River / Watheroo.
Hemigenia obovata	White or black wet sand. Flats.	?	Not in forests - also taxonomic problem group, disjuncture may be attribute of identification problem.

? **Based on Herbarium records, a review of Conservation status seems required**

Table 13: Taxa that are considered to have a disjunct distribution, that are not Declared Rare Flora or Priority Flora, that occur within State forest, and that are considered not to be at risk of decline because of a combination of factors including prevalence/dominance of the taxa within its range, the habitat types within which it occurs are informal reserves within State forest, and life history attributes.

Taxon Name	Habitat Attributes	Conservation Status	Comments
Eriochilus pulchellus ms	Granite outcrops.	*	Granites of the Warren Bioregion / Granites 'near' Esperance.
Isoetes australis	Rock pools on granitic outcrops.		Perth and inland / Northcliffe area associated with mainly with gnammas.
Isolepis oldfieldiana	Swamps, winter-wet depressions.		Swan Coastal Plain with a disjuncture to "Perup River" (1948 collection) - location unknown.
Juncus aridicola	Creeks, rivers, lakes, swamps, granite outcrops.		Blackwood River population may be a miss identification.
Marsilea mutica	In pools or watercourses, or in mud on creek banks.		SW populations well seperated from main distribution. ? Rare fern in SW… may not be genetically significant?
Metzgeria decipiens	Tall forests on *Trymalium floribunda* stems.	*	Was Priority 3 – WA / East Coast disjuncture – now part of a Priority listed community for assessment and monitoring.
Schoenoplectus pungens	Emergent aquatic perennial, mud.	? for WA	East of Manjimup and near Bunbury with other records in Eastern Australia and overseas.
Sphaerolobium racemulosum	Swampy areas, river flats, slopes.		Bipolar; Leeuwin Naturaliste, Scott River, Blackwood River / Ravensthorpe.
Stylidium corymbosum	Swampy flats, rocky sites.		Single record for Blackwood Plateau (McCorkhill) / Albany and South Coast east of Albany.
Stylidium roseo-alatum	Winter-wet depressions, swamps, creek beds.		Doubtful Disjunct - Manjimup population isolated from Swan Coastal Plain and Northern Jarrah.

*** Previously listed as a Declared Rare Flora or Priority Flora**

? **Based on Herbarium records, a review of Conservation status seems required**

Table 14: Taxa that are considered to have disjunct distributions, that are not Declared Rare Flora or Priority Flora, which occur within State forest, and could be impacted by disturbance activities.

Taxon Name	Habitat Attributes	Comments
Caladenia heberleana	Sand, clayey loam, gravel.	Manjimup / Albany / Esperance – protect known populations from local extinction.
Cheiranthera preissiana var. *planifolia*	Loam. Swamps, near granite boulders, streams.	Bipolar; Leeuwin Naturaliste, Mullalyup, Dwellingup / Nornalup, Denmark -protect State forest populations from local loss.
Lepidosperma persecans	Swamps.	Bipolar; Donnelly River / Albany-Stirlings only 1 recent collection (94) – protect known population(s) – species to be refered for priority listing.
Leucopogon striatus	Sandy soils.	4 clusters of records - probably represents multiple restricted / rare - known populations should be protected from local loss.
Marianthus tenuis (=Billardiera parviflora var. *guttata)*	Lateritic sand.	3 nodes (Alb, Leeuwin Nat, and Serpentine) + a couple of other forest records – known populations should be protected from local loss.
Orthrosanthus multiflorus	Tall forests with heath understorey (possibly miss identification).	Mooralup, Lowden and Strickland colls may be miss-IDs - other pops Stirlings and E of Esperance – resolve ID's and protect populations from local loss.
Patersonia maxwellii	SW - winter wet swamps or open wandoo.	Esperance and main forest belt (+ Yelverton) - few collections - need assessment and taxonomy work – highly likely at risk from Pc. – known populations should be protected from local loss.
Scaevola auriculata	Granite outcrops & hills.	Manjimup-Pemb / Porongarups – possibly represents two relatively rare taxa – resolve taxonomy – protect State forest populations from local loss.

Table 15: Potential threats and management requirements for taxa that are considered to have disjunct distributions, that are not Declared Rare Flora or Priority Flora, that occur within State forest, and could be impacted by disturbance activities.

Taxon Name	Potential Threats	Management requirements
Caladenia heberleana	Winter and early spring fire.	
Cheiranthera preissiana var. *planifolia*	Changed hydrology.	
Lepidosperma persecans	Changed hydrology.	
Leucopogon striatus	Pc dieback.	Planning checklists for disturbance activities should be revised to specifically identify the need to address the following requirements for known populations that occur in State forest areas that may be impacted by disturbance activities: • The taxa should be approached and managed as for a Priority 3 taxon, where they are taken into account during planning, activities are designed to ensure that local extinction does not occur and monitoring of the population is undertaken; and • Advice should also be sought from the Regional Ecologist, Regional Nature Conservation Leader, Principal Botanist or other relevant expertise, so that the latest knowledge for each taxon and the impacts of disturbance activities are considered. For *Orthrosanthus multiflorus* and *Scaevola auriculata* there is a need to resolve taxonomy. For *Lepidosperma persecans* the species should be considered for priority listing.
Marianthus tenuis (=Billardiera parviflora var. *guttata)*	Unknown.	
Orthrosanthus multiflorus	Unknown.	
Patersonia maxwellii	Changed hydrology and Pc dieback.	
Scaevola auriculata	Unknown.	

Table 16: Taxa considered to be relictual because they are monotypic taxa.

Taxon Name	Habitat Attributes
Acidonia microcarpa	White, grey or black peaty sand, sandy clay. Swamp edges, creek beds, lake margins.
Actites megalocarpa	Calcareous sand, sand over granite. Coastal dunes, cliffs, winter-wet plains.
Agrostocrinum scabrum	Slopes, around lakes and streams, ridges.
Azolla filiculoides	Still, fresh water swamps and backwaters.
Baxteria australis	Grey or black sand. Margins of swamps.
Blancoa canescens	White, grey or yellow/red sand over laterite. Mostly Perth coastal and northern sandplains.
Callistachys lanceolata	In damp areas: along watercourses, swamps.
Cephalotus follicularis	Around swamps & along streams.
Chorilaena quercifolia	Rocky coast & hillsides, granite & limestone rocks. Karri forest on deep loams and gravels.
Cosmelia rubra	Sandy peaty soils. Swampy areas.
Cymbonotus preissianus	Outside region - N of Albany.
Diaspasis filifolia	Sandy or clayey soils. Bogs & seasonally wet areas.
Diplopogon setaceus	Wet grey sand. Swamps.
Epiblema grandiflorum var*. cyaneum ms*	Winter-wet swamps.
Epiblema grandiflorum var*. grandiflorum*	White or black sand, peaty loam. Swamps.
Eremosyne pectinata	Sand, clay, loam. Swamps, hillsides, granite outcrops.
Euchilopsis linearis	White, grey or peaty sand. Swampy places.
Genus sp.*Shannon* (P.G.Wilson 1237B*)*	= *Brachyscias verecundus* - Winter wet flats. Red-brown clay over ironstone (outside area).
Gilberta tenuifolia	Sand, gravel, granite, laterite. Eastern woodlands.
Hodgsoniola junciformis	Grey-black sand. Swamps.
Homalosciadium homalocarpum	Often in winter-wet depressions, granite outcrops.
Homalospermum firmum	White, grey, yellow or black peaty sand, loam. Winter-wet depressions, swamps.
Jansonia formosa	Sandy soils. River banks.
Kingia australis	Sand, sandy loam, clayey loam. Swamps, heaths and jarrah forest.
Leporella fimbriata	Sand, laterite, sandy clay.
Leptinella drummondii	Clay loam, mud. Along rivers.
Leptoceras menziesii	Sand, peaty or granitic loam, clay. Winter-wet areas, granite outcrops, creek margins.

Taxon Name	Habitat Attributes
Macropidia fuliginosa	White sand, lateritic gravel, laterite. Sandplains north of Perth.
Melanostachya ustulata ms	Swamps and other wet or seasonally wet sites.
Meziella trifida	Sandy clay. Winter-wet flats.
Needhamiella pumilio	Sandy soils. Often in wet depressions, costal areas.
Nuytsia floribunda	White, grey or yellow sand.
Phylloglossum drummondii	Grey to black sands or brown loam over granite. Coastal plain and granitic outcrops.
Praecoxanthus aphyllus	White or grey sand. Sandhills, low swampy areas.
Quinetia urvillei	Moist sandy soils. Granite outcrops & hills.
Reedia spathacea	Peaty sand. Swamps, river edges.
Spartochloa scirpoidea	Lateritic sand, clay, granite, rarely quartzite. Granite outcrops.
Spiculaea ciliata	Shallow soils. Granite outcrops.
Spirogardnera rubescens	Laterite, sand over laterite, loam. N and NE of Perth.
Stenopa ramosissima ms	= *Stenotalis ramosissima* - Sand, peat, ironstone. Seasonally inundated swamps & wet heath.
Taraxis grossa ms	Sand, peat. Swamps and along stream banks.
Tegicornia uniflora	Clay, sandy clay, loam. Salt lakes & creeks.
Tyrbastes glaucescens	Swamps and along stream banks.
Viminaria juncea	Near lakes & swamps, river banks, winter-wet depressions.

Table 17: Taxa considered to be relictual as a result of their taxanomic or evolutionary position.

Taxon Name	Habitat Attributes
Actinostrobus acuminatus	Yellow, white or grey sand. Undulating slopes. Usually associated with wetlands, moist areas.
Actinostrobus pyramidalis	Grey, white or brown sandy loam or clayey sand. Moist, low-lying areas.
Adiantum aethiopicum	Damp clay banks or among rocks in sclerophyll forests.
Anogramma leptophylla	Protected rock crevices, or open banks among mosses and liverworts, near streams.
Anthocercis sylvicola	Sand. Usually below granite, moist sites.
Asplenium aethiopicum	In rock crevices of rocky outcrops, and occasionally on rotting logs and a dendrophyte on casuarinas.
Asplenium flabellifolium	Rocky crevices, on tree trunks in wet forest, granite rock.
Asplenium trichomanes	Shady, wet sites, near waterfalls, limestone outcrops.
Azolla filiculoides	Still, fresh water swamps and backwaters.
Blancoa canescens	White, grey or yellow/red sand over laterite. Mostly Perth coastal and northern sandplains.
Callitris canescens	Breakaways, rock outcrops, slopes around salt lakes.
Callitris glaucophylla	Walls of sandstone gorges, granite outcrops, sandplains, salt lake dunes.
Callitris roei	White, yellow or grey-brown sand, red sandy clay, loam over clay. Flat to sloping ground.
Chamaexeros longicaulis	Grey or white sand, sandy clay with lateritic gravel. Walpole.
Cheilanthes austrotenuifolia	Exposed rocky areas, granitic outcrops.
Cheilanthes distans	Rock crevices.
Cheilanthes lasiophylla	On rocky slopes and in rock crevices.
Cyclosorus interruptus	Near swamps, creeks.
Eucalyptus brevistylis	Sandy loam, sand. N of Walpole.
Eucalyptus guilfoylei	Gravelly loam. Slopes & ridges. N & E of Walpole.
Eucalyptus jacksonii	Loam. Hillslopes, gullies. N & E of Walpole.
Isoetes australis	Rock pools on granitic outcrops.
Isoetes drummondii	Swampy areas subject to winter flooding and dryness in summer.
Lindsaea linearis	Shaded situations in jarrah forest, in moist depressions, granite rocks.
Lycopodiella serpentina	Black peaty soil, granite. Swamps.
Macrozamia fraseri	Lateritic sands and sands on the coastal planin north-east of Perth.

Taxon Name	Habitat Attributes
Macrozamia riedlei	Lateritic soils. Karri and Jarrah forests.
Marsilea mutica	In pools or watercourses, or in mud on creek banks.
Melanostachya ustulata ms	Swamps and other wet or seasonally wet sites.
Ophioglossum gramineum	Clay, heavy loam, yellow-brown or red sand, granite. Damp soil, floodplain.
Ophioglossum lusitanicum	Shallow soil pockets subject to flooding, amongst rocks or along streambanks.
Phylloglossum drummondii	Grey to black sands or brown loam over granite. Coastal plain and granitic outcrops.
Pilularia novae-hollandiae	Among grasses in soft mud at the edges of swamps and pools, or in shallow water.
Pleurosorus rutifolius	Rock crevices, particularly where rock overhangs, granite outcrops.
Pleurosorus subglandulosus	Amongst boulders, under rock overhangs.
Podocarpus drouynianus	Lower slopes or lowlands, near creeks. Karri and Jarrah forest.
Pteridium esculentum	Moist sandy soils, along creeks in eucalypt forest.
Pteris vittata	Peaty sand. Rocky gorges of rivers, along banks of streams.
Reedia spathacea	Peaty sand. Swamps, river edges.
Schizaea fistulosa	Black, sandy peat. In wet moss mounds, among sedges and rushes on edges of swamps.
Schizaea rupestris	Gullies, creek banks, shaded moist rock faces.
Selaginella gracillima	White to grey or black sand, peat over sand, granite. Moist shaded places, often near creeks.
Sphaeropteris cooperi	Exotic weed (= *Cyathea cooperi*).
Stenopa ramosissima ms	Stenotalis ramosissima - Sand, peat, ironstone. Seasonally inundated swamps & wet heath.
Taraxis grossa ms	Sand, peat. Swamps and along stream banks.
Tyrbastes glaucescens ms	Swamps and along stream banks.