

# **A Review of High Conservation Values in Western Australia's South- West Forests**

**A Report to the Conservation Commission of Western Australia**

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# Acknowledgments

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# Summary

## A Review of High Conservation Values in Western Australia's South-West Forests

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Under the “*Protecting our old-growth forests*” policy, the Government of Western Australia made a commitment to undertake a “rigorous assessment of other high conservation values areas to be included in the reserve system”. All old-growth forest and large areas of high conservation value forest have already been included in the reserve system, under the Government’s policy commitment to “the full protection of all our remaining old-growth and high conservation value forests”. A review of conservation values was to be undertaken to ensure that no areas with high conservation values which can contribute to the comprehensive, adequate and representative (CAR) reserve system have been missed by the Government’s policy.

This report represents the assessment of conservation values (as defined by the Terms of Reference, Appendix One) of 106 forest blocks and four general areas in the South-West of Western Australia (see Appendix Two for list of blocks). 34 of these blocks have been reported on previously in an interim report submitted January 2001. The assessment of these 34 blocks is also included in this report, along with the assessment of the remaining 72 blocks and four general areas, so that the conservation values of all 106 blocks and the four general areas can be reviewed together.

The forest blocks were assessed against four broad categories relating to high conservation value forest, as follows:

- Old-growth forest;
- Biodiversity;
- Wilderness; and
- Areas of special significance in terms of a high level of community attachment.

Greater detail on the criteria for high conservation value forest relating to each of these categories is provided in the Terms of Reference for the study in Appendix One of this report.

The assessment of conservation values is intended to focus on the contribution each nominated area could make to a comprehensive, adequate and representative (CAR) reserve system. The results of this assessment are to be considered by the Government, which will then decide whether the areas identified as having conservation value warrant being considered high conservation value and whether further additions to the reserve system should be made, taking into account social and economic impacts and the most appropriate means of protecting forest values.

The forest blocks were assessed primarily using existing data, supplied by the Department of Conservation and Land Management (CLM). Additional information on community attachment and social values was collected where possible given the time limitations of this study.

### ***Biodiversity Criteria***

The assessment of biodiversity used the JANIS criteria (see Appendix One), for which the primary unit of evaluation is “forest ecosystem”, with a target of 15% of the pre-1750 extent of each ecosystem to be included in the CAR reserve system. This target can be contributed to by both formal and informal reserves<sup>1</sup>. Details of the levels of reservation of forest ecosystems broken into formal and informal reserve categories are provided for each block.

While vegetation complexes (a level of organisation of vegetation below that of forest ecosystems) are not specifically referred to in the JANIS criteria they do provide information in relation to the representativeness criteria which requires, as far as possible, sampling the full range of biological variation with forest ecosystems and the geographic replication and remnants in fragmented landscapes criteria. Details of the levels of reservation of vegetation complexes broken into formal and informal reserve categories are provided for each block. For the other biodiversity criteria which do not have reservation targets set, occurrence of the value is reported for each block.

### ***Community Attachment Criteria (‘Other’ in the Terms of Reference)***

The assessment of community attachment used the value of aesthetic quality as defined for the National Estate assessment carried out as part of the Regional Forest Agreement (RFA) process, as well as information from various publications on the South-West forests, submissions made by community groups and the WA Forest Alliance to the Conservation Commission, CLM and other government agencies, information gained from forums held as part of the development of the new Forest Management Plan, and the number of letters sent to the Minister for the Environment and Heritage in relation to specific blocks. The presence of the Bibbulmun track was also included as evidence of community attachment, although it is protected by informal and formal reserves along its length. The assessment also included examining Indigenous values. The main source of information for this was the Aboriginal Consultation Project report, prepared for the RFA. Nevertheless, the information presented in this report should not be taken as a comprehensive assessment of Indigenous values.

There was also little capacity to verify the information supplied by various community organisations. Therefore, Ecoscape simply presents the views of the community groups that relate to specific blocks and does not comment on the validity or accuracy of those views.

### ***Old growth Criteria***

The JANIS operational definition of old growth (Old-growth forest is ecologically mature forest where the effects of disturbance are now negligible) was used in this assessment. Consequently, Ecoscape found all areas of old-growth forest in the blocks assessed were either already formally reserved, proposed for formal reservation as a consequence of the Government’s “*Protecting our old-growth forests*” policy or will be protected through the exclusion of timber harvesting operations (i.e. by means other than reservation).

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<sup>1</sup> Formal reserves are: Nature Reserves; National Parks; Conservation Parks; and CLM Act Section 5(1)(g) and 5(1)(h) reserves with a conservation purpose. Informal reserves include buffers along streams, rivers and roads, and diverse ecotype zones.



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## **Wilderness Criteria**

There were no areas of high quality wilderness found in any of the blocks analysed in this assessment.

Section 3 of the report summarises the values identified against these criteria for each of the 106 blocks and four general areas subject to assessment.

## **Conclusions**

The key conclusions from this report are:

- All forest ecosystems represented in the blocks assessed, with the exception of Darling Scarp and Karri South Coast, meet JANIS criteria for CAR reservation level of 15% through a combination of formal and informal reserves. There is little opportunity for significant increases to reservation of the Darling Scarp ecosystem from the public estate, while most of the Karri South Coast ecosystem occurs outside the RFA area and so the figures do not reflect its true reservation status.
- 102 of the forest blocks (including blocks in the four general areas) contained some to many conservation values. The very small parts (c. 10 ha) of Forest Grove, Dwalgan and Swarbrick blocks not reserved have no conservation value because these areas appear to have been cleared and are now planted in exotics or an artifact of the grid system used to store information. Because all of Poorginup block is already reserved there was no area to assess.
- Many of the 102 forest blocks that were identified as having conservation values met at least some component of the biodiversity criteria. Few blocks contained forest ecosystems with <15% reserved, although some did contain forest ecosystems less well reserved. Rather, most blocks contained a number of vegetation complexes less well reserved or other biodiversity values such as flora (e.g. disjunct flora, Declared Rare Flora) and fauna (usually Threatened Fauna) values. This data should be considered in determining the representativeness of current forest ecosystem reservation and in considering the contribution that the forest blocks assessed can make to this factor.
- The increase in the reservation level of forest ecosystems generated by adding the area in any one block containing that ecosystem was very small (usually <1%), i.e. no one block can substantially increase the reservation level of a particular ecosystem.
- Similarly, consideration of the contribution of complexes to representativeness showed the potential increase in reservation level of complexes was also small (mostly <2%), although larger increases are possible (e.g. reserving the 53 ha of the TP complex in Kinkin would increase the reservation of this complex from 2.7% to 8.1%, an increase of 5.4%). Some blocks contain vegetation complexes that currently have no areas formally reserved. For example, all areas of the PM2 complex reserved are in informal

reserves. There are 577 ha of this complex in Yarpup, which could contribute 15.4% to the reservation level of the PM2 complex (increasing it from 8.8% to 24.2%).

- Again, the increase in reservation level of areas with other biodiversity values tends to be small, e.g. the increase in areas with high biophysical naturalness is generally <0.1%. However, the increase in the formal protection of Declared Rare Flora was as high as 50% for some species, if one additional population in one block is formally reserved. It should be noted that Declared Rare Flora can be reserved by mechanisms other than reservation and do have buffer zones around them during timber harvesting and other operations. Some blocks are also notable for containing a large amount of other biodiversity values. For example, in Chester there are over 2,000 ha of areas with relictual flora, high flora species richness and flora endemism.
- Information was provided to suggest that 90 of the 102 blocks identified as having conservation value had values that meet the 'Other' criteria in the Terms of Reference (Appendix One, termed Social Values and Community Attachment throughout this report). Of these, Dalgarpup and the Greater Kingston blocks (Kingston, Walcott, Mersea, Dudijup, Warrup, Corbal, Dwalgan and Winnejup) clearly had the most significant level of information provided in relation to community attachment. In these blocks, members of the local community have undertaken a number of activities which demonstrates their attachment. However, not all of these blocks would contribute much to the CAR reserve system in terms of their biodiversity values. For the remaining blocks community attachment and social values ranged from inclusion by conservation groups on lists of recommended blocks for reserving (based on their biodiversity values as argued by such groups), local community use, the presence of the Bibbulmun track to containing areas of high aesthetic value. The Bibbulmun track is already protected, with informal buffer reserves within multiple use areas or because it runs through reservations. Adding the area with high aesthetic value in any one block to the reserve system would increase the reservation level of this value by a very small amount (usually <1%).
- The assessment of Aboriginal Heritage values for the forest blocks was severely limited by the time allowed for the study, the lack of information readily available and the focus on identifying specific areas of values. Therefore, the information presented in this report on this value should in no way be taken to represent a thorough investigation of the Aboriginal Heritage values present in the forest blocks. It should be noted that there is statutory protection of these values.
- Summing the total area of each conservation value for all the forest blocks it was present in demonstrates that, for some values, the possible increase in reservation if all areas containing a particular value are reserved could be substantial. For example, if all areas of the Jarrah North West ecosystem in the 32 forest blocks this ecosystem was present in are reserved, the reservation level of this ecosystem would increase by 11.4% (from 19.3% to 30.7%). Similarly, if all areas with a high probability of flora species richness where present were reserved, the reservation level of this value would increase by 16.9% (from 75% to 92%). Other factors relating to reserve design would also need to be considered for example boundary/area ratios.

- The reservation levels of some ecosystems, vegetation complexes, areas with flora values (e.g. disjunct flora) and areas with high aesthetic value could be increased substantially by the inclusion of areas currently held as Crown land or as freehold private property; more so than by reserving areas with these values in forest blocks included in this assessment.
- Conservation on private land, using Stewardship Agreements or mechanisms under the Land for Wildlife scheme, should be encouraged because of the noted presence of areas with conservation value on private land. That the inclusion of these lands to the reserve system may provide an additional income to landholders may provide additional motivation.
- Some of the additions to the reserve system proposed by Wafa in 1998 and since can only be made by altering definitions, criteria and targets contained in the Terms of Reference for this study. For example, Wafa's proposals would require a change to the view taken of informal reserves, the boundary which defines reservation targets (currently the RFA boundary) and the definition of old growth forest. These are decisions for Government.
- Government should consider whether to amend Section 5 of the *CALM Act 1984* to recognise that 'informal' reserves in State forest are managed for conservation and to designate these as a conservation category within State forest. This may help change the perception held by conservation groups that informal reserves have no protection.

### **Old growth Forests**

Using the NFPS and JANIS operational definition of old growth, this assessment found no remaining areas of old growth forest within the study region that were not already reserved.

### **Wilderness**

Using the definition of wilderness used in the CRA (Commonwealth and Western Australian RFA Steering Committee, 1998), there were no areas of wilderness identified in the study region.

### **Sensitivity to Disturbance**

Assessing the sensitivity of forest ecosystems and vegetation complexes was possible only in general terms because of the complexity of this topic and the time constraints on this study. Information on the sensitivity of Declared Rare Flora and Threatened Fauna indicates some species are sensitive to the effects of timber harvesting, prescribed burning and *Phytophthora*. The debate over whether there is sufficient data to assess the impacts of logging and prescribed burning on Threatened Fauna and the likelihood that there are some species within a few flora and fauna groups (e.g. fungi, aquatic invertebrates) as yet undiscovered in the South-West, indicates that caution in interpreting the information presented is required.

Ecoscope would also like to emphasise:

- The Terms of Reference were set by the Conservation Commission, the definitions to be used (for example for old growth), the criteria (for example the JANIS criteria) and

the targets to be met (for example 15% or 100% of the estimated pre-1750 area). However, data on the proportions of reserves contributed from formal and informal sources is provided to allow consideration of relative status of reservation as discussed in Section 1.1 of the report.

- This was a desk-top study. No additional biological data could be collected in the time available for the study.
- CLM's role was to provide data requested and explain data that may have been unclear. CLM did not have any role in the evaluation, assessment and writing of the report.
- Data for areas to be assessed were provided to Ecoscape on a forest block basis.
- If the government decides that forest blocks are to be added to reserves on the basis of "Community attachment", they should do so in a transparent way rather than by altering existing definitions for criteria or target levels. Any change to definitions at this stage of the process will have ramifications elsewhere.
- The Terms of Reference did not require Ecoscape to address the consequences of any potential addition to the reserve system that the Government may decide on. Any implications of a reserve addition on sustainable timber yield, employment or other economic and social factors are beyond the scope of this report.

# 1.0 Introduction

## A Review of High Conservation Values in Western Australia's South-West Forests

Under the “*Protecting our old-growth forests*” policy, the Government of Western Australia made a commitment to undertake a “rigorous assessment of other high conservation values areas to be included in the reserve system”. All old-growth forest and large areas of high conservation value forest have already been included in the reserve system, under the Government’s policy commitment to “the full protection of all our remaining old-growth and high conservation value forests”. A review of conservation values was to be undertaken to ensure that no areas with high conservation values which can contribute to the comprehensive, adequate and representative (CAR) reserve system have been missed by the Government’s policy.

This report represents the assessment of the conservation values of 106 forest blocks and four general areas in the South-West of Western Australia (Figure 1; Appendix Two). The four general areas are:

- Remaining Wandoo around Mundaring (i.e. all Wandoo not in blocks in the Mundaring area which were included in this assessment);
- Areas west of Margaret River and east of Sues Rd. The following blocks were considered to fall within this area: Bramley, Chapman, Forest Grove, Molloy, Mowen, Treeton and Witchcliffe. These blocks were assessed individually;
- Little Quinninup Brook system; and
- Links between Shannon National Park and Mt Frankland National Park. The following blocks were considered to form this link: Burnside and Mossop. Both blocks were assessed individually.

34 of these blocks were included on the Indicative Harvest Plans for 2002 (Figure 1). These blocks were assessed and reported on in an interim report in January 2001, but the assessment of the 34 Harvest Plan blocks is also included in this report so that the conservation values of all 106 blocks and the four general areas can be reviewed together. The assessment of conservation values for the remaining 72 forest blocks and four general areas is reported here for the first time (Figure 1). This report also includes a discussion of the sensitivity to disturbance of some conservation values and other issues that have arisen during the assessment process.

The assessment of conservation values only occurred on lands vested in the Conservation Commission and focuses on the part of each block that is not within the existing or proposed reserve system (formal and informal). Areas that are currently proposed for reservation (at the time of this report), were treated as reserved. While the boundaries of the proposed reserves are not yet formalised, the most up-to-date information was used in this assessment and any subsequent boundary changes are likely to only have a small effect on the information presented in this report. Nevertheless, information on the presence of some values (e.g. Declared Rare Flora) in existing and proposed reserves within a block was included, as well as any information on community attachment.

## 1.1 Reserve Tenure

All lands managed for conservation, as well as State forest and timber reserves are vested in the Conservation Commission and are currently managed by the Department of Conservation and Land Management (CLM) on behalf of the Commission.

New reserves are created by the Department of Land Administration (DOLA) under the Land Administration Act. Section 16 of the *Mining Act 1978* requires that DOLA consult with Local Government Authorities and the Department of Minerals and Petroleum Resources before designating an area reserved. The rights to explore and mine are granted either through the Mining Act, Petroleum Act or by State Agreement Acts and mining rights can not be revoked as a consequence of changes in Government policy. The creation of any new reserves that may constrain mining can only occur with the agreement of the mining company involved. Therefore, some areas may have fewer reserves than expected because of the constraints placed on reserve design by mining leases and State Agreement Acts.

### **Formal Reserves**

Section 5 of the *CALM Act 1984* defines the ten types of tenure (for example National Park, Nature Reserve, State forest) used to classify land that is vested in the Conservation Commission. These classifications constrain the management of these areas by CLM (Section 33 and 33A) and set the objectives for management plans (Section 56).

Formal reserves are those reserves with the following tenures: Nature Reserves; National Parks; Conservation Parks; and *CALM Act 1984* Section 5(1)(g) and 5(1)(h) reserves with a conservation purpose.

Currently there are proposals to add to the formal reserve system, namely:

- Reserves proposed in the Government's "*Protecting our old-growth forests*" policy, not yet gazetted;
- Reserves proposed in the 1998 Regional Forest Agreement not yet gazetted;
- Reserves proposed in the 1994-2003 Forest Management Plan not yet gazetted; and
- Reserves proposed in the 1987 Regional Forest Management Plan not yet gazetted.

The tenure and purpose of State forest, National Parks, Conservation Parks and A class Nature Reserves can be changed only with the approval of both Houses of Parliament (Sections 9 and 17 of the *CALM Act 1984*). Any change to other reserves (e.g. removal from the reserve system) requires only Ministerial approval. (Section 17 of the *CALM Act 1984*).

### **Informal Reserves**

Informal reserves were established under the 1994-2003 Forest Management Plan and are protected areas within State forest (Commonwealth and Western Australian RFA Steering Committee, 1998a). Informal reserves consist of:

- River and stream reserves – vary in width from 60 m to 400 m (total width) depending on stream order;
- Travel route reserves – 400 m wide (total) on Level 1 travel routes (including the Bibbulmun Track, in some CLM managed lands formal reserves protect the Bibbulmun Track) and 200 m wide (total) on Level 2 travel routes; and

- Diverse ecotype zones – reserves around rock outcrops, wetlands, heath, sedge, herb and woodland communities.

Informal reserves are protected from timber harvesting by Ministerial conditions as part of an Environmental Protection Authority approval process for harvesting operations. Because informal reserves were created through a public process involving a management plan assessed by the Environmental Protection Authority they can only be altered through a public Section 46 review under the EP Act. Thus they have both security of tenure (Parliament for State forest) and of purpose (EPAct) and any change to their status will require both a public review process and Ministerial approval. Management activities in these areas are audited by the Conservation Commission.

The WA Forest Alliance and other community members argue that informal reserves have a 'lesser' status and are not truly protected and therefore, informal reserves should not count towards the total area reserved. This argument is based on the personal experiences of members of these groups who claim to have witnessed timber harvesting in informal reserves. As already discussed, these areas are intended to have the same security of tenure and purpose as National Parks, Conservation Parks and A class Nature Reserves. In fact, informal reserves have greater security than Nature Reserves, other than A class, as the boundaries of these reserves can be amended by Ministerial decision, without recourse to Parliament or to a public process. In contrast, changes to informal reserves requires a public process. Similarly, the Minister for the Environment has powers of concurrence with respect to mining within informal reserves in State forest, but only powers of recommendation in relation to mining proposals on Nature Reserves other than A class.

The "informal" title given to these reserves does imply a lesser status and could be changed. A better title may be to designate these areas as "conservation reserves in State forest" or something similar and to give them appropriate recognition as conservation reserves within State forest under Section 5 of the *CALM Act 1984*.

## 1.2 Assessment Criteria

The forest blocks were assessed against four broad categories relating to high conservation value forest, as follows:

- Old-growth forest;
- Biodiversity;
- Wilderness; and
- Areas of special significance in terms of a high level of community attachment.

Greater detail on the criteria for high conservation value forest relating to each of these categories is provided in the Terms of Reference for the study in Appendix One of this report.

The assessment of conservation values is intended to focus on the contribution each area with identified high conservation value could make to a comprehensive, adequate and representative (CAR) reserve system. The results of this assessment are to be considered by the Government, which will then decide whether the areas identified has having conservation value warrant being considered high conservation value and whether further

additions to the reserve system should be made, taking into account social and economic impacts and the most appropriate means of protecting forest values. To provide the Government with a context for informing these decisions, Ecoscape and the Conservation Commission agreed that this assessment should present information on all the ecosystems and complexes (as major components of the biodiversity criteria) present in each block, with their current reservation level and the contribution that reserving the area of each ecosystem or complex within each block could make to the CAR reserve system.

### 1.3 CAR Reserve System

The National Forest Policy Statement (NFPS) (Commonwealth of Australia, 1992) was an agreement by Commonwealth, State and Territory governments on broad goals for the management of Australia's forests. An important component of the NFPS was to commit to the development of a CAR reserve system, which included protection of old-growth forest and forested wilderness for their very high aesthetic, cultural and nature conservation values. The CAR reserve system, in conjunction with complementary management of adjoining unreserved forest areas, was deemed to be the most effective way of meeting the objectives of biodiversity conservation for forests, which were to:

- Maintain ecological processes and dynamics of forest ecosystems in their landscape context;
- Maintain viable examples of forest ecosystems throughout their natural ranges;
- Maintain viable populations of native forest species throughout their natural ranges; and
- Maintain the genetic diversity of native forest species (Joint ANZECC/MCFFA NFPS Implementation Sub-committee (JANIS), 1997).

The principle of *comprehensiveness* is to ensure that the reserve system samples the full range of forest communities. Forest ecosystems and vegetation types are often used as indicators of biodiversity in order to plan a CAR system. *Adequacy* refers to ensuring a level of reservation adequate to protect the viability and integrity of populations, species and communities. Although difficult to define accurately what level of reservation is adequate, the probability of protecting viability and integrity increases with increasing areas of forest systems reserved and appropriately managed. Another important component of adequacy relates to replication. Replication of reserves provides a level of insurance against the loss of forest values due to random localised disturbances. An adequate reserve system must also ensure that ecological and evolutionary processes can occur at a spatial scale, so that corridors and linkages between reserved areas and surrounding land uses should be considered. *Representativeness* within the reserve system ensures that the diversity within each forest ecosystem is sampled, so that the areas selected for reservation should reflect the biodiversity of each community (JANIS, 1997).

The CAR reserve system comprises both public and private lands reserved specifically for conservation. Legislation or other appropriate methods secure the tenure of the reserved areas. The categories of land reserved under the CAR system on public lands include dedicated (or formal) reserves, some informal reserves, and values protected by prescription (such as habitat for rare flora or other threatened species). In the South-West forest region, informal reserves that contribute to the CAR reserve system are:

- Stream reserves of a width equal to or greater than 150 metres;



- Those informal reserves and adjoining areas of land that were accredited by the Commonwealth Scientific Advisory Group for the Deferred Forest Agreement;
- Diverse ecotype zones of an area equal to or greater than 40 hectares;
- 400 m wide travel route reserves in the area containing the Karri Yellow Tingle ecosystem;
- The Bibbulmun Track travel route reserve (400 m wide).

Other informal reserves not counted as part of the CAR reserve system are:

- Stream reserves of a width less than 150 metres;
- Diverse ecotype zones of an area less than 40 hectares unless adjoining other parts of the CAR reserve system; and
- Travel route reserves other than the 400 m wide travel route reserves in the area containing the Karri Yellow Tingle ecosystem.

For a dedicated reserve (such as National Parks and Nature Reserves) to contribute effectively to the CAR system, it should have security of tenure (requiring an Act of Parliament or Ministerial decision to revoke the reserve) and purpose and appropriate management in place. Informal reserves are used when it is not possible or practicable to include conservation values within dedicated reserves, in which case the areas to be protected are reserved under secure tenure, purpose or management arrangements (JANIS, 1997).

The CAR reserve system should preferentially be based on public lands. It may be necessary to include private land within the CAR system where this land contributes to the comprehensiveness and replication of forest ecosystems, and to protect the needs of rare or threatened species or ecosystems on private land. Options for including private land in the CAR reserve system include purchase of priority areas and using mechanisms to ensure protection of values, such as covenants on titles.

## 1.4 Comprehensive Regional Assessment

A Comprehensive Regional Assessment (CRA) was undertaken in the South-West forest region of Western Australia. The CRA provided the basis for negotiating the Regional Forest Agreement (RFA) for the region, which defined the commitments made by Commonwealth and State Government to forest conservation, forest use and forest-associated industries, intended to operate for 20 years (Commonwealth and Western Australian RFA Steering Committee, 1998b). The area assessed as part of the CRA is referred to as the Regional Forest Agreement or RFA area.

Much of the data used for the assessment of conservation values in this report was gathered during the CRA process. The CRA provided an assessment of economic, social, natural and heritage values for the RFA area. Of relevance to this report are the assessments of biodiversity, old growth forest, wilderness and National Estate values (including cultural and heritage values) undertaken for the CRA (Commonwealth and Western Australian RFA Steering Committee, 1998, b, c and d). Some of the data used for the CRA has since been updated and was used in the assessment detailed in this report, such as the locations of rare and threatened flora.

## 1.5 Study Area

The South-West RFA region extends from Gingin in the north-west to Denmark in the south, an area of 4.25 million hectares (Figure 1; Commonwealth and Western Australian RFA Steering Committee, 1998b). The western boundary lies along the base of the Darling scarp, excluding the Swan Coastal Plain, and the eastern boundary forms a line between Northam and Rocky Gully. Public land consists of c. 2.5 million ha of the region, of which c. 1.1 million ha (44%) are formally reserved and c. 225,000 ha (9%) are informally reserved, meaning a total of c. 1.3 million ha (53%) of the RFA area is reserved (Conservation Commission of Western Australia, 2002).

A combination of landform, soils and rainfall generally determine vegetation patterns in the South-West region (Commonwealth and Western Australian RFA Steering Committee, 1998b). For example, Jarrah-Marri forests dominate the lateritic soils in the northern part of the region and areas where annual rainfall ranges from 900 mm to 1100 mm in the south. Karri forests are dominant in the extreme south-west of the region where rainfall is >1100 mm per annum. Within the broad range of Karri forest, it tends to occur on younger soils and lower slopes, whereas Jarrah or Jarrah-Marri forest will occur on higher slopes and ridges and less fertile soils. In the north-east of the region, Wandoo forest and woodland occur on clay soils where annual rainfall is below 900 mm (Christensen, 1992).

The South-West has long been recognised as a region of high biological diversity in general, a consequence of the wide range of soil types and interaction between soils, topography and climate in the region. The region also contains Gondwanan relicts and has a high level of endemism. However, the region is not universally high in species richness, one component of biodiversity. Areas of high plant species richness tend to occur more on dry, infertile soils where non-forest communities, such as heathlands and rocky outcrops, dominate.

## 1.6 Limitations of this Report

In preparing the report on the assessment of conservation values for the 106 forest blocks and four general areas, the consultant team has endeavoured to undertake the study in a thorough, objective and comprehensive manner. However limitations on the study included:

- A short timeframe to complete the assessment and report – nine working weeks from project inception and six working weeks from receipt of first data to first draft. Several reports which were commissioned for the RFA and therefore were used in this assessment had similarly short timeframes, further compounding this limitation in our study;
- Difficulties in contacting relevant people, particularly to research community attachment and particularly to research Aboriginal Heritage values;
- Difficulties in comprehensively verifying the data used in this assessment; and
- Lack of data on various elements of biodiversity, for example invertebrates and fungi.

**Figure 1: Location of blocks to be assessed for high conservation value in the South-West region and existing reserve tenure of the of the region.**

(MAP PROVIDED SEPERATELY TO REPORT)