

4 Securing outcomes for the Regional Forest Agreement

4.1 INTRODUCTION

The broad objectives of the RFA are to:

- provide certainty in relation to access to forest resources and environment and heritage conservation;
- establish a world class CAR reserve system;
- develop efficient, sustainable and internationally competitive forest-based industries; and
- ensure ecologically sustainable forest management practices.

This chapter seeks to elaborate and develop these major themes, including the more detailed objectives outlined in Chapter 2, and to demonstrate a range of approaches that could be used to achieve these objectives in an RFA.

4.2 CERTAINTY

The 20 year RFA will form the basis for the long-term ecologically sustainable management of the south-west forests, promoting competitive and efficient forest-based industries and protection of environment and heritage values. It will provide long-term certainty for conservation and industry activities and seek to ensure that independent action on the part of either the Commonwealth or the Western Australian governments will not lead to the Agreement being terminated.

Both governments will pursue options for complementary legislation to enhance the certainty of the RFA. The Commonwealth is committed to introducing legislation into the Parliament in 1998. The proposed legislation will include provisions that remove the application of existing Commonwealth legislation to timber harvesting and associated operations in a region subject to an RFA and specify the limited circumstances for termination of an RFA by the Commonwealth.

The Western Australian Government provides security and certainty for public land and resource access for forest based industries through the *Conservation and Land Management Act 1984*, *Mining Act 1978*, *Petroleum Act 1967* and the mineral-based State Agreement Acts. Within the scope of this legislation, new wood supply proposals that arise during the currency of the RFA will not require assessment unless they are beyond the scope of the Agreement.

Where existing legislation and management plans require changes under the RFA to ensure certainty, this will be pursued by both governments

4.3 COMPREHENSIVE, ADEQUATE AND REPRESENTATIVE (CAR) RESERVE SYSTEM

The development of a CAR reserve system will be guided by nationally agreed criteria developed by the Joint Australian and New Zealand Environment and Conservation Council (ANZECC)/Ministerial Council on Forestry, Fisheries and Aquaculture (MCFFA) NFPS Implementation Sub-committee (JANIS). JANIS and the National Forest Policy Statement define comprehensiveness, adequacy and representativeness as:

Comprehensiveness: includes the full range of forest communities recognised by an agreed national scientific classification at appropriate hierarchical levels;

Adequacy: the maintenance of ecological viability and integrity of populations, species and communities;

Representativeness: those sample areas of the forest that are selected for inclusion in reserves should reasonably reflect the biotic diversity of the communities).

The JANIS reserve criteria are summarised in Box 1.1. JANIS also includes specific reserve design criteria which are summarised in Box 4.1. The data obtained from the CRA process, the results of which were summarised in the CRA report released on 6 February 1998, will form the basis for any new reserve design.

Box 4.1 JANIS reserve design criteria

Reserve design can influence not only the protection of conservation values but the efficiency and effectiveness of subsequent management for conservation within the reserve. Criteria which should influence reserve design include:

- boundaries should be set in a landscape context with strong ecological integrity, such as catchments.
- large areas are preferable to small areas, though a range of reserve sizes may be appropriate to adequately sample conservation values.
- boundary-area ratios should be minimised and linear areas should be avoided where possible except for riverine systems and corridors identified as having significant value for nature conservation.
- reserves should be developed across the major environmental gradients if feasible, but only if these gradients incorporate key conservation attributes which should be incorporated in the CAR system.
- each reserve should contribute to satisfying as many reserve criteria as possible.
- reserve design should aim to minimise the impact of threatening processes, particularly from adjoining areas.
- reserves should be linked through a variety of mechanisms, wherever practicable, across the landscape.

The JANIS principles state that all reasonable effort should be made to provide for biodiversity and old-growth forest conservation in the dedicated reserve system on public land. Where this is demonstrated not to be possible or practicable. However, other approaches will be required, for example, conservation zones in approved forest management plans and voluntary arrangements such as covenants on private land. The elements of a CAR reserve system include dedicated reserves, informal reserves, values protected by prescription and private land where they meet the principles outlined in JANIS (Section 4.1).

The strategy for conserving biodiversity relies not just on a CAR reserve system, but also on the application of ecologically sustainable forest management across all tenures. In relation to this, specific management actions in the areas of policy, planning, implementation, monitoring and review for the RFA region will be considered by the Commonwealth and Western Australian governments in developing the RFA.

To assist members of the community to participate in and provide input to the RFA process, Commonwealth and Western Australian officials have developed three possible approaches to the development of a CAR reserve system. Within each of these approaches there are a range of outcomes resulting from differing ways of approaching the reserve design. These approaches, outlined in the remainder of this section, seek to protect biodiversity and old-growth forest values through reservation on public land. Other protection mechanisms such as those discussed in the *Assessment of Ecologically Sustainable Forest Management (1997)* report will be considered in the development of the RFA.

4.3.1 Formal reserves

In accordance with the JANIS criteria, the governments have agreed that, in addition to the existing dedicated reserves, reserves proposed in the 1994-2003 Forest Management Plan will, for the purposes of achieving the JANIS conservation targets, also be counted as formal reserves when included in the approaches. These proposed reserves are currently being managed as if they were a dedicated reserve even though most have yet to go through the consultation and approval process prior to being officially gazetted as formal reserves. Gazetted and proposed reserves are shown separately in the benchmark data.

In exploring approaches to the development of a CAR reserve system, and taking into account the CRA environment and heritage data and economic and social considerations, the opportunity has been taken to increase reserve design flexibility through a limited revision of new reserves proposed in the 1994-2003 Forest Management Plan. This revision has taken the form of some exchanges of areas containing ecosystems that are already well represented in the current reserve system for alternative areas which will increase the reservation of ecosystems and old-growth that are underrepresented in relation to the JANIS targets, with reduced resource impacts.

4.3.2 Informal reserves

Western Australia's current informal reserve system, identified in the 1994-2003 Forest Management Plan, was designed to protect a range of values, including nature conservation, water and aesthetic values.

Informal reserves are protected areas within State forest designated in the Forest Management Plan and consist of:

- river and stream reserves - reserves varying in width from 60 m to 400 m depending on stream order;
- travel route reserves - reserves 400 m wide on Level 1 travel routes (including the Bibbulmun Track) and 200 m wide on Level 2 travel routes;
- diverse ecotype zones - reserves around rock outcrops, wetlands, heath, sedge, herb and woodland communities.

The total area of informal reserves designated in the 1994-2003 Forest Management Plan within the RFA region is 314,900 hectares.

In this paper the following informal reserves have been accredited towards achieving the JANIS conservation criteria, in addition to the existing dedicated and proposed reserves:

- 5th order and higher stream reserves;
- 4th order stream reserves;*
- those informal reserves and adjoining areas of land that were accredited by the Commonwealth Scientific Advisory Group for the Deferred Forest Agreement, on the basis that the RFA would contain a clause specifying that the Western Australian Government will redesignate said adjoining areas of land as informal reserves;
- diverse ecotype zones of an area equal to or greater than 40 hectares; and
- the Bibbulmun Track travel route reserve (400 metres wide).

*These informal reserves were accredited on the basis that the width of these reserves would be increased from 150 metres to 200 metres. This would be achieved through changes to the 1994-2003 Forest Management Plan.

Accreditation of these reserves was on the basis that:

- they are established in approved management plans and are managed accordingly;
- there is an opportunity for public comment on changes to reserve boundaries;
- they are able to be accurately identified on maps; and
- they are of an area and design sufficient to maintain the values they seek to protect.

The total area of informal reserves accredited in this paper is 170,800 hectares, including 113,900 hectares in diverse ecotype zones. This includes 3,530 hectares of State forest which have been accredited towards the JANIS targets but which are not informal reserves under the Forest Management Plan. The area of non-accredited informal reserves is 147,600 hectares.

4.3.3 Reserve design and natural resources

In the development of the RFA the governments will, in seeking to protect environment and heritage values, seek to minimise the impacts on resources (timber, minerals, water, etc) using the data compiled under the CRA process. Data layers showing areas of importance for timber values, mineral values, dam sites and other commodities will be considered in conjunction with the environment and heritage data layers. Consideration will also need to be given to the relevant legislative requirements pertaining to mining leases and other tenements.

State Agreement Act leases

WA has entered into agreements with several mining companies holding leases within the RFA Region - Alcoa Australia, Worsley Alumina, Griffin Coal and Wesfarmers Coal. These agreements have been given legal force through the enactment of individual State Agreement Acts. The Acts impose legally binding obligations between the companies and the State and guarantee the companies access to specified mineral resources within their leases. Proposals by the State for conservation reserves to be established within these leases have therefore been progressed, and only can progress, with the agreement of the respective companies.

In recognition of the importance of conserving viable areas representative of the forest ecosystems within their leases, State Agreement Act companies have, in the past, agreed to some areas within their leases becoming conservation reserves or to the excision of areas from their leases for conservation purposes. The primary mechanisms for achieving this reservation have been through the Conservation Through Reserves (System 6) process and CALM's forest management planning processes. Agreement Act companies are actively participating in the RFA with a view to contributing to JANIS outcomes.

An important consideration for the companies in the design of reserves within their leases is the availability of access to all mineral deposits within the lease. In order to ensure ongoing access it will be necessary to avoid creating a barrier between current mining infrastructure and future mining activity beyond any reserves created in the RFA. These factors will be considered, along with the JANIS reserve design criteria, in the development of the RFA. Access routes would need to be carefully selected to minimise environmental impacts, as has been the case under previous reserve design processes.

Other mineral and petroleum tenements

In other approved mineral and petroleum tenements, or where applications are under consideration, there is an obligation on governments not to change the statutory property rights of the tenement holders without consultation. New reserves in these areas have the potential to conflict with these rights. Consequently, where the creation of new reserves in these tenements is unavoidable because it would lead to significant limitations in achieving the JANIS criteria, discussions will be held with affected companies to ensure that any changes to their statutory property rights will only proceed with their agreement. Governments aim to reduce uncertainty over access to mineral resources as part of the RFA.

4.3.4 Economic analysis

At this stage in the RFA process only indicative economic impacts are available. As such, the impacts shown against the approaches in this paper should be viewed as a general guide. Detailed economic analysis for the development of the final RFA will be undertaken during the public consultation period and a description of the model to be used is provided at Appendix 2.

There was a need, however, to provide initial indicative measures of the possible impact of the various reserve approaches in terms of forgone wood production. Therefore for each approach estimates were made of the annual gross value of production of timber and wood products based on the estimated annual sustainable log yield for that approach. These estimates were then measured against the estimated annual gross value of production in the absence of any changes to conservation reserves.

The gross value of production estimates are based on existing log recovery rates and assumed splits between rough sawn and dressed timber for jarrah and karri and existing product recovery rates for woodchips and conversion rates from jarrah to charcoal production. These estimates are short-term indicators and assume a continuation of existing milling practices and market outlets.

Timber industry employment impacts

Broad estimates of the possible employment impacts in the timber sector that may arise from the RFA were developed to assist in the indicative economic analysis. More detailed analysis will be undertaken during the RFA development phase. The timing of any employment impacts is uncertain and will depend on when changes in contract volumes are passed onto mills, and how each sector would react to any variation in log volumes.

Industry employment

The impacts on direct private sector employment of that portion of the timber industry dependent on logs sourced from public native forests were calculated as follows. The industry was defined as covering employment from the forest to the point of first of sale of the wood. Four industry groupings were chosen: logging and haulage; sawmilling, resawing and dressing; woodchipping and charcoal manufacturing. Estimates were made of the current number of people directly employed in each of these categories. It was estimated that there were 2,440 employed in these categories which were dependent on hardwood log supply from Crown land.

Relationships were then established for the average volume of logs handled per employee for each category, based on the number of employees per category. Using estimates of the possible loss of log resource from each approach, employment losses were calculated for each of the employee categories.

The relationships developed assume that there is straight line association between log volumes and the number employed. In practice, the relationship can be quite uneven. For example, a sawmill may maintain employee numbers at a given level in the face of variable log flow, by adjusting shift lengths or overtime provisions. However, once log throughput declines below some critical level, individual operations may cease

altogether.

The RFA impacts on employment will be in addition to the underlying adjustments which may occur in some sectors of the industry. For example, existing log supply projections indicate that the long-term supply of first and second grade jarrah logs will decline from current levels of 490,000 cubic metres to 300,000 cubic metres per annum due in part to the creation of reserves in the Forest Management Plan in response to the National Forest Policy Statement 1992. Although the introduction of improved milling technology may allow for greater utilisation and recovery from lower grade jarrah logs, a decline in supplies of first and second grade logs of such magnitude would be expected to lead to some significant adjustment in the jarrah sawmilling sector of the industry.

The estimated industry impacts against the approaches in this paper are shown in Appendices 7, 8 and 9.

Public Sector employment

The Western Australian Government has indicated that CALM operates under a net appropriation budget. In addition, hardwood timber production activity within CALM operates within a semi-autonomous Business Unit.

Additions to the reserve system arising from the RFA may result in a reduction in CALM's royalty revenue from the native forest sector. Such reductions may potentially result in CALM employment loss.

Subject to budgetary and policy decisions, the Western Australian Government has estimated that the potential public sector employment impacts are as follows:

Box 4.2 Public sector employment

Direct public sector employment impact of the approaches in Section 4.4 *			
Benchmark	Approach A	Approach B	Approach C
0 to -8 [#]	-81 to -69	-62 to -25	-3

* These estimates are indicative only and have been derived by dividing potential royalty revenue impacts used to meet staff costs by the average wage, salary and associated operating costs of all CALM employees. There has been no job-specific analysis of potential impacts. Based on these figures the likely indirect impacts from CALM employment impacts could be in the range of 0 to -10 (benchmark), -97 to -83 (approach A), -74 to -30 (approach B) and -4 (approach C).

The increase in width of fourth order stream reserves by 50 metres to 200 metres for accreditation purposes results in a decrease in the area of forest available for timber production and hence in a decrease in CALM employment of -8.

Indirect employment impacts

Employment changes in one sector can be expected to have flow-on effects in other sectors. These sectors can include those which service the affected sector, such as fuel suppliers; those which use the output from the affected sector, such as furniture

makers using sawn timber; and other sectors, such as the commerce, health and education sectors which provide services to industry employees. The indirect employment losses are not confined to the State boundary.

One method of measuring employment changes is through the use of input-output employment multipliers. An average multiplier of 2.2 was used, based on the input-output employment multipliers relevant to the timber industry sectors of the Western Australian economy (Clements and Qiang 1995). The resultant estimate is that for every 10 jobs directly lost because of reserve changes, an additional 12 jobs could be lost outside the industry.

Detailed economic analysis - next steps

The detailed economic analysis will examine changes in the economic costs and benefits associated with known and potential mineral resources, forest use patterns, wood production and other economic activities (see Chapter 10 of the CRA report). For the timber industry analysis, broader economy-wide effects will be measured through changes in state output and employment.

For the timber production sector, the economic assessments will be used to provide information on the economic costs and benefits of varying forest use and industry development (see Appendix 2). A computer model has been developed to simulate the interactions between regional timber resources, wood-based forest industries and final product markets. Two important measures used to assess the economic impacts for the timber sector are the value of production and employment opportunities. In order to estimate what impacts the RFA may have on the value of production and employment prospects in this sector, it is first necessary to establish a baseline of how the industry would develop in the absence of an RFA (see Appendix 3). Any potential RFA impacts are then analysed against this baseline.

This baseline is not necessarily a continuation of the existing industry structure and production - the structure of the industry can alter in response to changes in wood resource quality and availability, market opportunities and relative competitiveness of industries within the sector. To assist in establishing this baseline, a consultant was engaged to develop a feasible industry development plan for the native forest timber sector over the life of the RFA (see Section 4.6.1). This development plan also took into account the projected availability of plantation timber over the RFA period, examining markets where native and plantation timbers compete, such as structural timbers, and those where they can complement, such as in the production of panel products. Therefore, in developing the baseline, the profitability and employment opportunities in utilising both native forest and plantation timbers were taken into account.

Any direct economic impacts in the timber and wood products sectors will have linkages to other sectors of the economy, at the regional, state and national levels. To assess these effects a general equilibrium model is to be used to measure the flow-on effects of changes in output or income from timber-based industries to other sectors of the state or national economy. Spillover effects from one sector of the economy to another are captured through wage and price adjustments resulting from one sector's expansion or contraction in response to a policy change. The Centre of Policy Studies

at Monash University was commissioned to provide a computable general equilibrium model of the Australian economy, capable of measuring state level impacts. The model, which is based on the Centre's existing MONASH-MRF model requires the direct timber industry sector impacts to be entered to simulate the subsequent flow-on effects to other sectors at both the state and national levels.

4.3.5 Social analysis

The social analysis has focussed mainly on the potential impacts of the RFA on the native forest based timber industry as this industry sector is likely to feel any effects of the RFA directly and more immediately. Indicative social impacts available from preliminary (Phase 1) social analysis assessment are presented in this paper. More detailed social analysis will be undertaken during the public consultation period.

The native forest based timber industry is a significant employer in the RFA region. Towns such as Manjimup, Pemberton, Nannup, Greenbushes, Northcliffe and Yarloop have a strong association with the industry. In the past 40 years, the timber industry has undergone significant modernisation, increasing centralisation of economic activity and, consequently, has changed in size and structure. In addition, increasing emphasis is being placed on value adding and manufacturing and, thereby, providing greater job skilling opportunities. A major industry issue is the requirement to manage a changing resource, primarily an increasing reliance on timber from native regrowth forests. Many timber industry representatives contend that any further changes would compound the challenges already faced.

Timber industry adjustments are still occurring. Due to recent major mill or shift closures towns including Walpole, Nannup, Northcliffe and Jarrahdale have undergone, or are undergoing, a period of adjustment and some uncertainty. Nannup and Northcliffe do, however, continue to have a significant timber industry presence and many Northcliffe residents now commute to the mill in Pemberton.

From an historical perspective, the last 40 years have seen numerous mill centres in the lower south-west either reduce greatly in size or cease to exist. Since 1961, the Northcliffe urban centre has gone from a population of well over 500 (ABS, 1961) to 239 currently; Nannup had nearly 400 more residents in 1961 than the current population of 521 and Yarloop's population has decreased by about 150 (ABS, 1996) over the same period. However, it should also be noted that these three towns have experienced modest population growth or minimal decline over the last 15 years. Other trends within this period show that the population in coastal towns (eg Denmark, Busselton, Margaret River) has more than doubled, while in the core RFA shires (eg Manjimup, Bridgetown-Greenbushes) the population has not grown substantially.

Mill closures and the downward trend in native forest-based timber industry employment have occurred over a reasonably long period and have been accompanied by consolidation of activities in larger centres such as Manjimup, where new investment in drying and processing of timber has occurred. This information can help to separate possible impacts stemming from the RFA from other events that are likely to occur, given current trends or no change. These events also highlight the

potential for impacts to be cumulative, particularly in smaller communities such as Northcliffe and Nannup, and attention needs to be given to the interrelated effects of events in a region over time, as the combination of these is likely to be higher than those considered separately. A community that has experienced a succession of impacts may possess a different adaptive capacity compared with one that has remained relatively undisturbed.

Today, the region is dominated by several major centres that act as focal points for economic and employment activity (eg Collie, Manjimup, Bridgetown). Coupled with timber industry adjustment and increasing economic diversity (eg mining, tourism, manufacturing, viticulture), many regional economies are less dependent on the timber industry. Key factors in adapting to these changes have been a community’s ability to diversify and manage change.

It is also noteworthy that many existing towns - Denmark, Balingup, Bridgetown and Northcliffe to name a few - have all suffered economic and social hardships over the course of this century. Their endurance has depended upon the ability to broaden economic bases.

However, some towns still remain largely dependent on the timber industry for employment (eg Nannup, Manjimup). Other towns, including Collie and Greenbushes have an historical mix of timber and mining industry employment and there is a trend of increasing employment in the tourism industry in towns such as Pemberton.

Sawmill industry employees profile

An analysis of sawmill worker survey data conducted by Environment and Behaviour Consultants in 1997 for the RFA indicates that these families tend to consist of young to middle-age couples who are likely to have primary school aged children. Reliance on community infrastructure services such as education, health and recreation is therefore apparent. As such, changes in a town’s population or employment levels have the potential to affect - to varying degrees - the level of provision of these and other services. These data also show the strength of workers attachment to rural communities and type of employment. This is demonstrated by the length of employment and residence in a particular community. Industry and place attachment are influential in the decision to remain in a community as is the perception of greater opportunity for re-employment.

Some of the more notable characteristics of sawmill industry workers within the RFA region are shown in Box 4.3.

Box 4.3 Sawmill industry employees profile

Indicator	Results
Age	Average age of 39 years
Gender	86% male
Marital status	59% married
Family size	Average of 2.9 persons
Home ownership	31% owned, 34% rented and 35% paying off a mortgage
Length of employment in current business	Average of 10.5 years
Length of employment in the industry	Average of 14 years

Employment relocation (no. of moves)	16% moved for employment, average of 2 moves
Partner's employment status	63% of partners currently employed
Length of residence in the area	Average of 19 years

Interviews, survey data and previous case studies suggest that any loss of timber or other industry employment does not automatically signify a corresponding loss of local population.

Community sensitivity and community consultation

The RFA social assessment investigated the resources a community has at its disposal and its degree of sensitivity to respond to change. From previous research (CRA Report 1998) more than 20 indicators were identified and analysed for each of 44 towns in the South-West Forest Region. The indicators were combined to form a Community Sensitivity Index (CSI). Using 1991 and 1996 ABS Census data, measures for the CSI include: distance from major centres, ratio of dependents, occupancy rates, median age and median family income. Also included are the percentage of a town's population employed in agriculture/timber production, bought homes, housing authority rentals and occupied dwellings.

The research indicated that those communities most sensitive to change exhibit many of the following characteristics:

- small populations;
- limited economic diversity;
- limited population growth;
- low mobility;
- low levels of home ownership;
- limited service provision;
- lower median income;
- a high percentage employed in the timber industry.

The CSI compares the sensitivity of each town against the other towns in the region and provides a score between zero and one, with one indicating towns with a higher sensitivity to change. Initial data analysis indicated that towns fall into four categories, ranging from those with a high sensitivity to change to those with a low sensitivity to change. Results are shown in Appendix 4.

As the CSI diagram shows, Manjimup, Deanmill, Greenbushes, Northcliffe, Pemberton and Yarloop appear as first order towns with relatively high sensitivity to change. Although a relatively large town, Manjimup has had strong historical links with the timber industry since it was established in 1912 and continues to be identified as a timber and service town. It is the centre for a number of forest-related industries, including a large timber processing centre, a woodchip mill, smaller sawmills and several harvesting and haulage contractors and engineering services. Most Manjimup businesses rely heavily on the forest industry sector.

Another first order town is Northcliffe with an urban centre population of 239 and an unemployment rate around 22%. Approximately 38% of Northcliffe's workforce is employed in the timber industry. While the town's population has risen from below 200 in 1981 to the present level, Northcliffe is experiencing some uncertainty over its future.

Bridgetown has been identified as a second order town. It has been in a state of

growth since the 1970s and has a diverse industry base, including logging contractors, sawmilling, livestock grazing, horticulture, tourism and tree farming. Timber industry employment accounts for approximately 10% of the workforce.

Summary

Broad conclusions can be drawn about the RFA region. Post impact analysis work suggests that towns adjacent to a major regional centre are likely to grow with that centre. The future of other towns is less certain.

As a general assessment, changes related to the timber industry and traditional timber towns are indicative of a host of changes being experienced by rural communities across Western Australia and many other parts of Australia. Business closures, loss of social infrastructure, comparatively high youth and average unemployment and uncertainty are common elements of such change. Uncertainty, particularly in communities with high dependence on forest-based industries, clearly has the potential to affect community cohesion and vitality negatively.

While this is the case, mining has the major economic presence of any industry in the region and has contributed to stability in towns such as Collie, Waroona, Yarloop, Dwellingup, Boddington and Jarrahdale. Forest-based tourism is also growing. Timber, however, remains an important industry of numerous RFA towns.

It is unlikely that the native forest-based timber industry will provide any additional employment in milling and forest management. Given incentives, including business investment, and the influence of strategic policy direction, however, employment growth (and related skilling and retraining) is likely in the value adding and manufacturing sectors (CRA Report, 1998).

Social assessment Phase 2 - The next step

Phase 2 of the social assessment process will be undertaken following the release of this consultation paper. This phase outlined in Appendix 5 will gather quantitative and qualitative information concerning the possible regional and local effects from the RFA. In particular, Phase 2 will inform the RFA decision-making process in relation to:

- the social and economic implications of these actions at regional and local levels;
- the nature and extent of effects and responses anticipated by local and regional businesses, service providers and community service groups; and
- local and regional community feedback about the RFA.

Social systems within townships are complex, interrelated and often cumulative. Effects on one group may have reverberating effects on other groups within that community and on the overall vitality of that township. Further, townships vary considerably in their ability to respond to impacts, whether positive or negative. Impact analyses are likely to be inaccurate if they discount people's values, social dynamics and beliefs about events.

Three approaches will be used to assess local and regional effects, utilising information obtained from:

- industry and community surveys, stakeholder interviews and ABS census data

- collected during Phase 1;
- detailed interviews with key stakeholders from industry, service providers and local, state and federal government agencies; and
- local discussion groups in towns throughout the South-West Forest Region.

1. *Industry and community surveys, stakeholder interviews and Australian Bureau of Statistics data*

During the first phase of the social assessment process, surveys and personal interviews were used to develop a profile of local and regional issues relating to forest use. Additionally, ABS data were used to extract demographic details such as urban centre populations, employment information and labour force characteristics. Information was also obtained from local, state and federal government authorities regarding community infrastructure and services in regional towns. Data derived from the above sources will be used to make local and regional impact projections.

2. *Interviews with key stakeholders from industry, service providers and local, state and federal government agencies*

To reflect more accurately the implications for townships as a result of changes in forest resource access, it is necessary to obtain input from local businesses and organisations. To this end, detailed personal interviews will be held with key people at local and regional levels. This includes those from timber, mining, tourism, local, state and federal authorities, (shire, health, education, social services etc), chambers of commerce, wildflower pickers, apiarists, fine wood manufacturing and Members of Parliament. Interviewees will be selected on the basis that they are able to provide specific information about the most probable effects on their organisation and community in relation to the possible impacts of an RFA.

3. *Local discussion groups*

Using information extracted from social profiles and industry surveys, local discussion groups will be held in Manjimup, Pemberton, Yarloop, Northcliffe, Collie, Nannup, Bridgetown (including Greenbushes) and Walpole (including Denmark).

Local discussion groups will comprise a mix of key people associated with each of the above towns and include local government, shire councillors, local businesses proprietors, tourist bureaux, chambers of commerce, mill managers, hospital boards, school principals, telecentre coordinators, service clubs (Apex, Lions etc) and community service groups (eg bush fire brigades, CWA). Group participants will comment on the desk top analysis and the perceived positive and negative outcomes of the RFA at local town level.

Phase 2 information will be collected and prepared by the Forest Community Co-ordinators who will present a social assessment report to the Steering Committee for consideration in the development of the RFA.

4.4 POSSIBLE APPROACHES TO A COMPREHENSIVE, ADEQUATE AND REPRESENTATIVE RESERVE SYSTEM

To assist members of the community to participate in, and provide input into the RFA process, Commonwealth and Western Australian government officials have developed three possible approaches to the development of a CAR reserve system, for convenience named approaches A, B and C. The approaches are not designed to predetermine the likely outcomes of the RFA but, rather, are intended to promote discussion and feedback to the two governments on the development of a balanced RFA that addresses the needs of the community, industry and governments. There are many other approaches that would be equally appropriate. The final RFA may lead to results which are a mixture of the different approaches or which lie outside the ranges explored in this document.

All three approaches have been developed from, and are compared to, a benchmark developed from the Forest Management Plan 1994-2003. In all of the approaches, existing dedicated reserves remain unchanged, but consideration has been given to some revision of the new reserves proposed in the Forest Management Plan 1994-2003, where this could assist in better achieving the objectives of the RFA.

It should be noted that in the Benchmark most ecosystems meet or exceed the 15% biodiversity targets. Additional reservation to meet the target for old-growth will, in some cases, result in the 15% biodiversity target being exceeded for the same ecosystem. Similarly, additional reservation to meet the target for forest ecosystems may, in some cases, result in the 60% target for old-growth being exceeded.

The approaches vary in their relative emphasis on conservation, resource and employment values, with approach A having greater emphasis on conservation values and approach C having the greater emphasis on economic and employment values.

All approaches:

- increase the areas of reservation above the benchmark in relation to the JANIS quantitative targets, with the highest level of reservation in approach A;
- aim to optimise the achievement of the non-quantitative JANIS criteria in reserve choices; and
- aim to minimise adverse impacts on economic and social outcomes.

In summary the approaches can be characterised as follows:

Approach A aims to meet the JANIS quantitative targets and optimise the non-quantitative targets while minimising resource impacts.

Approach B explores the flexibility provisions in the application of the JANIS criteria with lower levels of reservation than approach A.

Approach C aims to enhance social and economic values by increasing sustained timber yield whilst also seeking to enhance protection of environment and heritage values.

Within each of these broad approaches there are many ways of configuring reserves. Variations inherent in reserve choice means a range of outcomes are possible for each approach. Thus, outcomes such as areas reserved and the employment and resource

impacts, are presented as a range.

The contribution of informal reserves which have received up-front accreditation by governments towards the achievement of the JANIS criteria is considered in all of the approaches. A parallel assessment of outcomes in relation to the JANIS criteria when all existing informal reserves are considered is also presented in the benchmark. Private forested land has generally not been considered in the development of these approaches. However, freehold land outside State forests, which is privately owned by Western Australian Government agencies, has been taken into consideration.

4.4.1 Benchmark

In order to provide a baseline against which the three approaches can be compared a benchmark has been established which shows the estimated outcomes of implementing the Forest Management Plan 1994-2003, including the level of reservation in relation to the JANIS targets and resource impacts.

The contribution of informal reserves towards the JANIS targets are shown in two ways in the benchmark tables at Appendix 6:

1. those informal reserves which have received up-front accreditation by governments; and
2. all existing informal reserves.

Comparisons in the approaches text are made against the benchmark (other than for the timber industry indicative impact analysis) where only those informal reserves which have received up-front accreditation by governments contribute towards meeting the JANIS targets. The timber industry indicative impact analysis is compared against the 1994-2003 Forest Management Plan.

The increase in width of fourth order stream reserves by 50 metres to 200 metres, and the inclusion of other additional areas deemed to be informal reserves for accreditation purposes, results in a decrease in the area of forest available for timber production. The benchmark therefore incorporates change against the current situation. These changes, which include an estimated reduction in employment, are outlined in Tables 6.5 and 6.6 at Appendix 6 and in Box 4.2, Section 4.3.4.

Outcomes against Regional Forest Agreement objectives

The benchmark addresses the environment and heritage and social and economic objectives for the RFA in the ways described below - detailed information regarding the benchmark is contained within the tables at Appendix 6.

Environment and heritage objectives

- The benchmark contains a total area of around 896,700 hectares in accredited reserves, comprising 408,700 hectares of gazetted reserves, 319,700 hectares of proposed reserves and 168,300 hectares in informal reserves. The benchmark would contain a total reserve area of 1,040,700 hectares, comprising 408,700 hectares of gazetted reserves, 319,700 hectares of proposed reserves and 312,300 hectares in informal reserves if all informal reserves were included.

- The JANIS biodiversity reservation target of 15% of the pre-1750 distribution would be met or exceeded in accredited reserves for 15 of the 22 forest ecosystems which are not vulnerable, rare or endangered in accredited reserves. The outcome would be 18 out of 22 if all informal reserves were included.
- The JANIS biodiversity reservation level of 100% would not be achieved for the four forest ecosystems which are vulnerable, rare or endangered.
- The level of protection for other forest biodiversity values would include 39% for areas important as centres of disjunct flora; 54% for areas important as centres of relictual flora; 47% for areas important as centres of flora species richness; and 42% for areas important as centres of flora endemism in accredited reserves. The level of protection for other forest biodiversity values would be 43% for areas important as centres of disjunct flora; 58% for areas important as centres of relictual flora; 52% for areas important as centres of flora species richness; and 46% for areas important as centres of flora endemism if all informal reserves were included.
- The existing and proposed reserves in the benchmark would result in the reservation of 183,700 hectares of old-growth forest in accredited reserves or 202,900 hectares if all informal reserves were accredited. The JANIS target of a reservation level of 60% of the extant distribution would be met or exceeded for four of the nine forest ecosystems in which old-growth is not rare or depleted. Shortfalls in accredited reserves would occur for old-growth in the Jarrah Blackwood (28% reserved), Jarrah Mt Lindesay (49% reserved), Jarrah South (53% reserved), Jarrah Yellow Tingle (36% reserved) and Karri Yellow Tingle (40% reserved) forest ecosystems. Shortfalls would occur for old-growth in the Jarrah Blackwood (33% reserved), Jarrah Mt Lindesay (50% reserved), Jarrah South (56% reserved), Jarrah Yellow Tingle (41% reserved) and Karri Yellow Tingle (48% reserved) forest ecosystems if all informal reserves were included.
- For old-growth forest which is rare or depleted, a 100% level of protection of all examples considered viable would be achieved for four out of ten forest ecosystems. Shortfalls occur for old-growth in accredited reserves in the Jarrah Leeuwin (75% reserved), Jarrah North-East (41% reserved), Jarrah North-West (84% reserved), Western Wandoo forest (77% reserved), and Western Wandoo woodland (56% reserved) forest ecosystems. The protection of all examples considered viable would be achieved for five out of ten forest ecosystems if all informal reserves were included. Significant shortfalls occur for old-growth in the Jarrah North-East, Jarrah North-West, Western Wandoo forest, and Western Wandoo woodland forest ecosystems. For rare or depleted old-growth in some forest ecosystems the target is not achievable on public lands, as the remaining old-growth outside reserves exists as small examples. Protection of small viable patches of old-growth may be best achieved through informal reservation or management prescription.
- Overall, the existing and proposed reserves in the benchmark are generally consistent with the JANIS reserve design principles (such as the setting of boundaries within a landscape context with strong ecological integrity; the reservation of larger rather than smaller areas; the development of reserves across environmental gradients; minimising the impact of threatening processes; and the

establishment of links between reserves).

- The reserves in the benchmark would result in a protection level for areas of indicative national estate significance in accredited reserves of more than 90% for contemporary fauna refuges; more than 80% for refugia and centres of relictual flora and disjunct flora; more than 70% for natural landscapes and centres of endemism; more than 60% for aggregations of old-growth forest, flora species richness and wetlands of national significance; and more than 50% for vegetation community diversity. Protection levels for areas of indicative national estate significance would be more than 90% for refugia and contemporary fauna refuges; more than 80% for centres of relictual flora and centres of disjunct flora; more than 70% for centres of flora endemism, flora species richness and natural landscapes; and more than 60% for aggregations of old-growth forest and wetlands of national significance; and more than 50% for vegetation community diversity if all informal reserves were included.

Social and economic objectives

- The area available for timber production in native forest would be some 1,146,700 hectares or some 1,150,000 hectares if the fourth order stream reserves and other areas deemed informal reserves are not varied for accreditation purposes as outlined in Section 4.3.2.
- The level of harvest of first and second grade jarrah and karri sawlogs from State forests would be around 489,000 and 211,000 cubic metres per year, respectively or 490,000 and 214,000 if the fourth order stream reserves and other areas deemed informal reserves are not varied for accreditation purposes as outlined in Section 4.3.2.
- The level of chiplog and charlog harvest would be around 725,300 cubic metres per year or 734,000 cubic metres per year if the fourth order stream reserves are not varied for accreditation purposes as outlined in Section 4.3.2.
- The gross value of wood products at the mill gate would be \$237.9 million per year or \$239.6 million per year if the fourth order stream reserves and other areas deemed informal reserves are not varied for accreditation purposes as outlined in Section 4.3.2.
- Realisation of development opportunities for the extension of existing plants or the establishment of new plants involving a wide range of solid wood, engineered and reconstituted wood products, could be expected.
- Employment opportunities, quality of life, access to social and physical infrastructure and community viability will be maintained for communities with significant dependencies on native forest industries.
- Access to the forest estate for community activities, including Indigenous cultural activities, would be maintained.
- Current opportunities for tourism, apiary, wildflower picking, fuelwood and seed collecting would be maintained.
- The proposed reserves include 51,200 hectares in State Agreement Act areas, 47,300 hectares in mining tenements and leases (these may overlap Agreement

Act leases), 4,000 hectares in areas of identified mineral resources and 163,500 hectares in areas of high and medium mineral potential.

4.4.2 Approach A

Approach A aims to meet the JANIS quantitative targets and optimise the non-quantitative targets while minimising resource impacts.

Under this approach between 165,000 and 187,500 hectares of new reserves would be added to the CAR reserve system. Major additions to the CAR reserve system would be concentrated in the Jarrah Blackwood, Jarrah North East, Jarrah North west and Jarrah South forest ecosystems.

This approach would involve some 29,000 to 32,000 hectares of areas proposed for reservation in the Forest Management Plan remaining as State forest. These areas would be concentrated in the Jarrah North East, Jarrah North West, Western Wandoo forest, Western Wandoo woodland, Jarrah Blackwood and Jarrah South ecosystems.

Outcomes against Regional Forest Agreement objectives

Approach A addresses the social and economic and environment and heritage objectives for the Regional Forest Agreement in the ways described below. The outcomes are shown in terms of only those informal reserves which have received up-front accreditation by governments contributing towards meeting the JANIS targets. An indication is also provided of how this compares against the benchmark. For more detailed information, refer to the tables presented in Appendix 6.

Environment and heritage objectives

- The protection of forest biodiversity would be enhanced through the additional reservation of between 165,000 and 187,500 hectares of new reserves, (with between 29,000 and 32,000 hectares of proposed reserves remaining as State forest, resulting in a net increase against the benchmark of between 145,000 and 155,500 hectares) contributing to a total area of CAR reserves of between 1,000,200 and 1,007,800 hectares.
- The JANIS biodiversity reservation target of 15% of the pre-1750 distribution would be met or exceeded for 21 of the 22 forest ecosystems which are not vulnerable, rare or endangered. The 15% level of CAR reservation would not be met only for the Darling Scarp forest ecosystem, where opportunities for additional reservation on public land are extremely limited, as the areas outside reserves are largely confined to private lands.
- The JANIS biodiversity reservation level would be increased for one of the four forest ecosystems which are rare or endangered (Jarrah Rates Tingle from 78% to 86%). Opportunities for increased reservation of the remaining three rare or endangered forest ecosystems (Bullich and Yate, Jarrah Red Tingle and Karri Rates Tingle) on public lands are extremely limited, as the areas remaining outside reserves are relatively small and are largely confined to private lands.
- The level of protection for other forest biodiversity would be further enhanced by increased CAR reservation of areas important for disjunct flora (from 39% up to 58%), relictual flora (from 54% up to 62%), flora species richness (from 47% up to 62%), or as centres of flora endemism (from 42% up to 60%).

- The protection of old-growth forest would be enhanced through the additional CAR reservation of 49,500 to 51,800 hectares of old-growth. All of the nine forest ecosystems in which old-growth is not rare or depleted would meet or exceed the JANIS reservation level of 60% of the extant distribution.
- The JANIS target for old-growth forest in six of the ten forest ecosystems in which old-growth is rare or depleted would be met as far as is practical and feasible in this approach. The CAR reservation level would be increased for the four remaining ecosystems (Jarrah North East, Jarrah North West, Western Wandoo forest and Western Wandoo woodland).
- The increases to the CAR reserve system in this approach would allow increased opportunities for applying the JANIS reserve design principles.
- The CAR reserves in this approach would result in a protection level for areas of indicative national estate significance of more than 90% for centres of disjunct flora, refugia and centres of relictual flora; up to more than 90% for centres of flora endemism; more than 80% for contemporary fauna refuges, flora species richness and natural landscapes; up to more than 80% for vegetation community diversity; up to 70% or more for aggregations of old-growth forest, and more than 60% for and wetlands of national significance

Social and economic objectives

- The area available for timber production would be some 1,087,100 to 1,090,200 hectares which represents a reduction of up to 66,200 hectares (about a 5% reduction in comparison to the Forest Management Plan 1994-2003).
- The level of harvest of first and second grade jarrah and karri sawlogs from State forests would be 453,400 to 457,700, and 193,500 to 196,800 cubic metres per year, respectively. This represents a reduction of between 49,500 and 57,100 cubic metres per year (between a 7% to 10% reduction in comparison to the current situation).
- The level of chiplog and charlog harvest would be 664,000 to 675,400 cubic metres per year. This represents a reduction of between 58,600 and 70,000 cubic metres per year (between a 7% to 8% reduction in comparison to the current situation).
- The gross value of wood products at the mill gate would be \$219 million to \$222 million per year, representing a reduction of between \$17 million and \$20 million per year, which is between a 7% to 8% reduction in comparison to the benchmark.
- The ability of the native forest timber industry to take up additional development opportunities would be constrained by this approach because of the reduction in timber resources.
- The estimated reduction in employment (see Appendix 7, Table 7.6 and Box 4.2) which could occur under this approach has the potential to impact on a number of communities across the region with significant dependencies on the native forest timber industry and may contribute to a reduction in quality of life, access to social and physical infrastructure and community viability.
- Access to the forest estate for community activities, including Indigenous cultural

activities, would in general be maintained for most activities.

- This approach may reduce the area accessible for the purposes of apiary, wildflower picking, fuelwood and seed collecting.
- The proposed reserves under this approach includes 66,900 to 73,100 hectares in State Agreement Act areas, 73,500 to 83,500 hectares in mining tenements and leases (these may overlap Agreement Act leases), 3,500 to 3,600 hectares in areas of identified mineral resources and 239,700 to 248,100 hectares in areas of high and medium mineral potential. New reserves established under this approach would be in accordance with the arrangements outlined in Section 4.3.3.

4.4.3 Approach B

Approach B explores the flexibility provisions in the application of the JANIS criteria with lower levels of reservation than Approach A.

Under this approach between 122,500 and 127,700 hectares of new reserves would be added to the reserve system. Major additions to the reserve system would be concentrated in the Jarrah Blackwood, Jarrah North East and Jarrah South forest ecosystems.

This approach would involve some 30,000 to 50,000 hectares of areas proposed for reservation in the Forest Management Plan remaining as State forest. These areas would be concentrated in the Jarrah North East, Jarrah North West, Western Wandoo forest, Western Wandoo woodland, Jarrah Blackwood and Jarrah South ecosystems.

Outcomes against Regional Forest Agreement objectives

Approach B addresses the social and economic and environment and heritage objectives for the Regional Forest Agreement in the ways described below and provides a comparison against the benchmark. The outcomes are shown in terms of only those informal reserves which have received up-front accreditation by governments contributing towards meeting the JANIS targets. For more detailed information, refer to the tables presented in Appendix 8.

Environment and heritage objectives

- The protection of forest biodiversity would be enhanced through the additional reservation of between 122,500 and 127,700 hectares of new reserves (with between 30,000 and 50,000 hectares of proposed reserves remaining as State forest, resulting in a net increase against the benchmark of between 92,500 and 77,700 hectares), contributing to a total area of CAR reserves of between 943,600 and 968,100 hectares.
- The JANIS biodiversity reservation target of 15% of the pre-1750 distribution would be met or exceeded for 16 of the 22 forest ecosystems which are not vulnerable, rare or endangered. The 15% level of CAR reservation would not be met for up to six forest ecosystems. In some of these, such as the Darling Scarp forest ecosystem, opportunities for additional reservation on public land are extremely limited, as the areas outside reserves are largely confined to private

lands.

- The JANIS biodiversity reservation level would be increased for one of the four forest ecosystems which are rare or endangered (Jarrah Rates Tingle from 78% up to 86%). Opportunities for increased reservation of the remaining three rare or endangered forest ecosystems (Bullich and Yate, Jarrah Red Tingle and Karri Rates Tingle) on public lands are extremely limited as the areas remaining outside reserves are relatively small and largely confined to private lands.
- The level of protection for other forest biodiversity would be further enhanced by increased CAR reservation of areas important for disjunct flora (up to 46%), relictual flora (between 60% and 61%), flora species richness (between 59% and 61%), or as centres of flora endemism (between 49% and 51%).
- The protection of old-growth forest would be enhanced through the additional CAR reservation of 32,600 to 36,100 hectares of old-growth. Four of the nine forest ecosystems in which old-growth is not rare or depleted would meet or exceed the JANIS reservation level of 60% of the extant distribution.
- The JANIS target for old-growth forest in six out of the ten forest ecosystems in which old-growth is rare or depleted would be met as far as is practical and feasible. The reservation level would be increased for Jarrah Leeuwin, Jarrah North West, Jarrah Yellow Tingle, Western Wandoo forest and Western Wandoo woodland. For old-growth in the Jarrah North East, Western Wandoo forest and Western Wandoo woodland forest ecosystems, the 100% level of reservation is not feasible.
- The increases to the reserve system in this approach would allow for opportunities to apply the JANIS reserve design principles.
- The CAR reserves in this approach would result in a protection level for areas of indicative national estate significance of more than 90% for refugia and centres of disjunct flora or relictual flora, and up to 90% or more for contemporary fauna refuges; more than 80% for centres of flora endemism, flora species richness and natural landscapes; more than 70% for vegetation community diversity and, more than 60% for aggregations of old-growth forest and wetlands of national significance.

Social and economic objectives

- The area available for timber production would be some 1,123,100 to 1,123,200 hectares which represents a reduction of between 30,300 to 30,200 hectares (about a 2% reduction in comparison to the current situation).
- The level of harvest of first and second grade jarrah and karri sawlogs from State forests would be between 466,100 to 478,000, and 197,300 to 207,700 cubic metres per year, respectively. This represents a reduction of between 18,200 and 40,600 cubic metres per year (about a 3% to 8% reduction in comparison to the current situation).
- The level of chiplog and charlog harvest would be between 677,000 to 712,000 cubic metres per year. This represents a reduction of between 22,000 and 57,000 cubic metres per year (about a 3% to 6% reduction in comparison to the current situation).
- The gross value of wood products at the mill gate would be \$224,800,000 to

\$233,200,000 pa, about a 3% to 6% reduction in comparison to the benchmark.

- This approach could limit opportunities for development in the native forest timber industry due to a reduction in timber resources.
- The estimated reduction in employment (see Appendix 8, Table 8.6 and Box 4.2) which could occur under this approach has the potential to impact on a number of communities across the region with significant dependencies on the native forest timber industry and may contribute to a reduction in quality of life, access to social and physical infrastructure and community viability.
- Access to the forest estate for community activities, including Indigenous cultural activities, would in general be maintained for most activities.
- This approach may reduce the area accessible for the purposes of apiary, wildflower picking, fuelwood and seed collecting.
- The proposed under this approach includes between 55,800 to 58,800 hectares in State Agreement Act areas, between 66,600 to 76,700 hectares in mining tenements and leases (these may overlap Agreement Act leases), between 3,500 to 3,600 hectares in areas of identified mineral resources and between 204,400 to 217, 100 hectares in areas of high and medium mineral potential. New reserves established under this approach would be in accordance with the arrangements outlined in Section 4.3.3.

4.4.4 Approach C

Approach C aims to enhance social and economic values by increasing sustained timber yield whilst also seeking to enhance protection of environment and heritage values. A variation of this approach is reported at the end of this section which provides a further enhancement of the resource outcomes.

Under this approach between 43,500 and 57,400 hectares of new reserves would be added to the reserve system. The main additions to the reserve system would be concentrated in the Jarrah Leeuwin, Jarrah North East, Jarrah South, Western Wandoo forest and Western Wandoo woodland forest ecosystems.

This approach would involve some 35,500 to 50,400 hectares of areas proposed for reservation in the Forest Management Plan remaining as State forest. These areas would be concentrated in the Jarrah North East, Jarrah North West, Western Wandoo forest, Western Wandoo woodland, Jarrah Blackwood, Jarrah South, Jarrah Unicup and Jarrah Sandy Basins ecosystems.

Outcomes against Regional Forest Agreement objectives

Approach C addresses the social and economic and environment and heritage objectives for the Regional Forest Agreement in the ways described below and provides a comparison against the benchmark. The outcomes are shown in terms of only those informal reserves which have received up-front accreditation by governments contributing towards meeting the JANIS targets. For more detailed information refer to the tables presented in Appendix .

Environment and heritage objectives

- The protection of forest biodiversity would be enhanced through the reservation of between 43,500 and 57,400 hectares of new CAR reserves (with between 35,500 and 50,400 hectares of proposed reserves remaining as State forest, resulting in a net increase against the benchmark of between 7,000 and 8,000 hectares), contributing to a total area of CAR reserves of between 905,700 to 911,200 hectares.
- The JANIS biodiversity reservation target of 15% of the pre-1750 distribution would be met or exceeded for 16 of the 22 forest ecosystems which are not vulnerable, rare or endangered. In the remaining four ecosystems opportunities for additional CAR reservation on public land are extremely limited as the areas outside reserves are largely confined to private lands.
- The JANIS reservation target of 100% would not be achieved for the four forest ecosystems which are rare or endangered (Bullich and Yate, Jarrah Rates Tingle, Jarrah Red Tingle and Karri Rates Tingle). Opportunities for increased reservation of three of the rare or endangered forest ecosystems (Bullich and Yate, Jarrah Rates Tingle, Jarrah Red Tingle and Karri Rates Tingle) on public lands are extremely limited as the areas remaining outside reserves are relatively small largely confined to private lands.
- The level of protection for other forest biodiversity would be further enhanced by increased CAR reservation of areas important for disjunct flora (between 41% and 42%), relictual flora (between 54% and 55%), flora species richness (between 52% and 53%), or as centres of flora endemism (between 46% and 47%).
- The JANIS reservation level of 60% of the extant distribution for old-growth would be met or exceeded for four of the ten forest ecosystems in which old-growth is not rare or depleted (Jarrah Unicup, Jarrah Woodland, Karri Red Tingle and Jarrah Mount Lindesay).
- The JANIS target for old-growth forest in five of the ten forest ecosystems in which old-growth is rare or depleted would be met as far as is practical and feasible in this approach without more detailed reserve design. For old-growth in the Jarrah North East, Western Wandoo forest and Western Wandoo woodland forest ecosystems, the 100% level of protection in CAR reserves is not feasible.
- The smaller area of new reserves in this approach may allow for fewer opportunities to apply the JANIS reserve design principles.
- The CAR reserves in this approach would result in a protection level for areas of indicative national estate significance of up to more than 90% for contemporary fauna refuges and refugia; more than 80% for centres of disjunct flora or relictual flora; up to more than 80% for centres of endemism; more than 70% for flora species richness, vegetation community diversity and natural landscapes; more than 60% for wetlands of national significance; and up to more than 60% for aggregations of old-growth forest.

Social and economic objectives

- The area available for timber production would be some 1,170,000 to 1,175,800 hectares which represents an increase of between 16,600 to 22,500 hectares (about a 2% increase in comparison to the current situation).

- The level of harvest of first and second grade jarrah and karri sawlogs from State forests would be 496,300 and 211,100 to 211,200 cubic metres per year, respectively representing an increase of between 3,400 to 3,500 cubic metres per year (up to a 2% increase in comparison to the current situation).
- The level of chiplog and charlog harvest would be 725,800 to 725,900 cubic metres per year representing a reduction of between 8,100 to 8,200 cubic metres per year (similar to the current situation).
- The gross value of wood products at the mill gate would be \$240,000,000 representing an increase of up to \$400,000 per year.
- This approach has the potential to provide for continuing development opportunities for the timber industry through an increase in sustained timber yield.
- The increase in sustained yield resulting from this approach is estimated to increase employment opportunities (see Appendix 9, Table 9.6 and Box 4.2). This would contribute to the quality of life and viability of local communities. This approach may enhance the quality of life and viability of local communities by increasing employment opportunities associated with projected industry developments. This would have a positive effect on the continued availability of community services and social and physical infrastructure in regional areas.
- Access to the forest estate for community activities, including Indigenous cultural activities, would in general be maintained for most activities.
- Current access to forest areas for the purposes of apiary, wildflower picking, fuelwood and seed collecting would be maintained.
- The CAR reserve system under this approach includes between 41,800 to 42,300 hectares in State Agreement Act areas, between 147,400 to 52,900 hectares in mining tenements and leases (these may overlap Agreement Act leases), 3,500 hectares in areas of identified mineral resources and between 181,500 to 184,000 hectares in areas of high and medium mineral potential. New reserves established under this approach would be in accordance with the arrangements outlined in Section 4.3.3.

Alternative approach C

The accreditation of fourth order stream reserves towards the JANIS targets is based on an increase in width from 150 metres to 200 metres and the inclusion of other additional areas deemed to be informal reserves (see Section 4.3.2), has a consequent loss of area available for timber harvesting. An alternative means of increasing timber yield under this approach would be not to proceed with these extensions to informal reserves. This would result in an increase over the existing approach C outcomes of approximately f:

- 3,300 hectares being retained for timber harvesting;
- 4,100 cubic metres per annum in the level of harvest of first and second grade jarrah and karri sawlogs;
- 8,700 cubic metres per annum in chiplog and charlog harvest; and
- \$1.7 million in the gross value of wood products at the mill gate.

Employment impacts are shown at (see Appendix 9, Table 9.6 and Box 4.2). As this would result in the fourth order stream reserves no longer being accredited towards the JANIS targets in this paper, there would, however, be a consequent reduction in the level of reservation achieved for the range of forest ecosystems, old-growth and other environment and heritage values.

4.4.5 Comparison

A comparison of the major features of the approaches presented and the benchmark is presented in Box 4.4.

4.5 ECOLOGICALLY SUSTAINABLE FOREST MANAGEMENT

The need for ecologically sustainable forest management is recognised in the NFPS. It is specifically emphasised in the national goals relating to conservation, wood production and industry development, private native forests, tourism and other economic and social opportunities and public awareness, education and involvement.

The Commonwealth and Western Australian governments agreed to assess jointly the performance of the Western Australia's forest management systems and processes in achieving the objectives of ecologically sustainable forest management. An independent panel of experts was convened to carry out this task and its recommendations are at Appendix 10. Further details may be obtained from the report *Assessment of Ecologically Sustainable Forest Management in the South-West Forest Region of Western Australia report* (Independent Expert Advisory Group 1997).

The recommendations of this group will be assessed by the Commonwealth and Western Australian governments in the development of the RFA. Both governments recognise the importance of ecologically sustainable forest management

4.6 INDUSTRY DEVELOPMENT

In accordance with the objectives of the NFPS, a desired outcome for the RFA is the development of efficient, sustainable and internationally competitive forest-based industries.

4.6.1 Timber

An objective of the RFA is to promote timber industry development options based on a sustainable native and plantation timber resource. Western Australia's timber industry has undergone major structural adjustment over the past decade to enhance its competitiveness through improvements in silvicultural and harvesting practices, conversion technologies and the establishment of hardwood and softwood plantations.

A key factor influencing the future development of the native forest timber industry will be improved certainty in the continuity of log supply from a sustainably managed

Box 4.4 Summary of benchmark and approaches

		Benchmark	Approach A	Approach B	Approach C*
Reserved land area	New	319,700	165,000 to 187,500	122,500 to 127,700	43,500 to 57,400
	Total (hectares)	896,700	1,000,200 to 1,007,800	943,600 to 968,100	905,700 to 911,200
Ecosystems meeting or exceeding biodiversity targets	(number of ecosystems)	15	21	16	16
Ecosystems less than biodiversity targets	(number of ecosystems)	11	5	10	10
Old growth ecosystems meeting or exceeding target	(number of ecosystems)	8	15	10	9
Old growth ecosystems less than target	(number of ecosystems)	11	4	9	10
Reservation of flora values	Disjuncture	39	39-58	46-46	41-42
	Relictual	54	54-62	60-61	54-55
	Richness	47	47-62	59-61	52-53
	Endemism (%)	42	42-60	49-51	46-47
Reservation of National Estate indicative areas	Refugia	88	92-93	90-92	89-91
	Disjunct flora	82	94-96	92-93	83-85
	Relictual flora	85	94-95	91-93	85-87
	Flora				
	endemism	72	87-93	82-83	78-81
	Fauna refuges	92	89-89	89-92	89-92
	Wetlands	65	66-66	65-66	65-66
	Old-growth	61	70-73	67-68	59-62
	Veg diversity	57	76-82	74-75	75-75
	Flora richness	69	88-88	81-83	76-77
Variation in Sustained yield	Natural landscapes (%)	77	84-84	82-82	78-79
	Jarrah	-1,300	-36,600 to -32,300	-23,900 to -12,000	6,300 to 6,300
	Karri (%)	-2,900	-20,500 to -17,200	-16,700 to -6,300	-2,900 to -2,800
Mineral Potential score > 90	(hectares)	148,700	211,800 to 219,000	181,200 to 181,500	167,700 to 168,100
Identified mineral resources	(hectares)	4,000	3,500 to 3,600	3,500 to 3,600	3,500 to 3,500
State Agreement Acts Mining Act Tenements	(hectares)	51,200	66,900 to 73,100	55,800 to 58,800	41,800 to 42,300
		47,300	73,500 to 83,500	66,600 to 76,700	47,400 to 52,900

* NOTE: An alternative approach to achieving the aims of approach C results in increases in timber yields, wood value and employment (see above - 'alternative approach C').

Employment impacts are outlined in Appendices 6 (Table 6.6), 7 (Table 7.6), 8 (Table 8.6) and 9 (Table 9.6) and in Box 4.2..

resource. These factors and opportunities are outlined in the BIS Shrapnel Forestry Group (1997) report.

BIS Shrapnel Forestry Group identified a range of possible industry expansion and investment opportunities. A summary of potential industry developments to 2020, prepared by the BIS Shrapnel Forestry Group is at Appendix 3. The commencement and viability of projects will be influenced by such factors as the security of supply of native forest timber into the future through the RFA process, government and community commitment to the commercial development of the native forest timber industry, international competitiveness, research and development of growing, product development and marketing and commercial considerations such as potential returns to shareholders.

Currently, the native forest timber industry is experiencing a major change towards value adding away from structural timber. Approximately 45% of sawn timber has undergone value adding in some form, the majority of this being jarrah. In some jarrah sawmills more than 80% of the sawn output is directed into value added products. The woodchip industry is currently based largely on native forest timber logs, although rapid expansion of plantation hardwood chip exports is forecast. Reconstituted panels are at present based almost exclusively on softwood mill and forest residues, but provide an opportunity for utilisation of some native forest timber as low cost supplementary fibre.

BIS Shrapnel identified potential for the industry to develop a veneer-based sector by 2010, generating \$133 million per annum and 360 jobs (see Appendix 3). Eighty five percent of sawn timber could be further processed, increasing turnover by about \$25 million per annum. Output of appearance grade timber may also provide the opportunity for considerable downstream processing. There is potential to utilise jarrah residues to produce activated carbon, generating \$60 million per annum in turnover and the manufacture of high grade charcoal. Reconstituted panels are at present based almost exclusively on softwood chiplog and sawmill residue but there is the possibility of utilising both native forest timber and plantation hardwood as supplementary fibre in the manufacture of these panels with the potential, after 2005, to expand both medium density fibreboard (MDF) and particleboard operations.

By 2020, turnover from the native sawn timber industry could increase by \$82 million to \$228 million per annum through value adding and forecast real price increases. Direct employment in the native forest timber sawmilling sector is likely to decline somewhat but this could be more than compensated for by increased employment levels in further downstream processing which has the potential to add over \$200 million to the Western Australian economy. There is expected to be increasing employment in the plantation sector, including the milling of softwood sawlogs. There should be sufficient resource to establish both a pulp and paper making facility which could contribute almost \$800 million to the Western Australian economy and directly employ almost 300 people and expand the manufacturing of high grade charcoal. If current planting levels are maintained, there would be sufficient resource for a Bleached Kraft Pulp (BKP) mill to be built before 2010.

Western Australia, which has undergone significant structural adjustment in the timber industry over the past decade, is well placed to capitalise on this shift in emphasis from primarily a native forest-based industry with moderate value adding to an industry reliant on both native forests with high levels of value adding and

hardwood and softwood plantations.

4.6.2 Mining

The mining industry is the largest economic sector in the region and there remains considerable room for expansion of mineral and related operations. One of the aims of the RFA process is to maintain access for mineral exploration and mining, particularly to areas covered by State Agreement Acts, exploration licences and mining leases, and other identified areas of moderate and high mineral potential.

Under prevailing Western Australian Government policies, all areas of the state are open for exploration and consideration for mining. However, exploration companies consider the existence of conservation reserves a disincentive to exploration unless the prospectivity, based on remote sensing techniques, is perceived as particularly high.

The RFA area contains significant mineral resources and potential for locating new mineralisation, both under existing leases and tenements and in areas which are open for future exploration. Mineral and petroleum resources are targeted by industry based on perceived economic opportunities which in turn are influenced by world prices and markets for commodities. Australia has a technologically advanced and mature industrial base for locating and extracting mineral and petroleum resources and generating down-stream value adding processing. Hydrocarbon (natural gas) resources have been identified in the region and research is currently proceeding to determine if they can be extracted.

The mineral and petroleum sector underpins the state economy. As indicated in the CRA report, the mining sector in the RFA region alone generated considerable revenue and employment in both the state and national economies. The industry has been growing strongly for some years and on-going development is likely, given continuing high levels of investment in exploration, mining and mineral processing. In balancing these industry development prospects with the establishment of a CAR reserve system, certainty of access will need to be considered in the development of the RFA to dispel any concerns of sovereign risk.

4.6.3 Tourism

In Western Australia, the tourism industry is a major contributor to the state's economy and is predicted to become the state's fastest growing industry sector during the 1990s and into the next century (Western Australian Tourism Commission 1997). The RFA will provide certainty for predicted tourism investment to take advantage of the region's comparative advantages as both a general tourism location and with respect to nature-based tourism opportunities.

The RFA will provide the context in which future planning for tourism and recreation activities can be developed. A wide range of factors need to be considered when developing planning strategies for tourism development in forested areas, among them the need to ensure tourism development is both sustainable and compatible with other forest uses. While some recreation and tourism activities require broad areas of forest, it is worth noting that most high-use tourism facilities in forests involve site-based or corridor-based activities. Additionally, tourism can and does operate across tenures and through different forest types and age-structures.

The overall number of visitors to the RFA area is estimated to increase from 1.2 million in 1996 to between 1.8 and 1.9 million in 2018 (tourist bureaux figures indicate that this could be as high as 3 million by the year 2018). To support this growth considerable infrastructure development is required in providing facilities such as roads and accommodation and in developing a range of forest-based tourism attractions such as walking tracks, camping areas, picnic sites and information centres which provide an interpretive framework about forest industry activities to tourists and visitors to the area. The scope for the development of tourism attractions such as vineyards, restaurants and adventure experiences within the region is considerable.

Tourism in the region has been growing with an estimated annual growth rate of around 10% over the period 1994-96. With a growth rate of 20% per annum predicted for ecotourism in Western Australia generally, there would seem to be potential for a further increase in forest-based tourism activity in the region.

4.6.4 Other forest products

Future access for beekeeping in conservation reserves will depend in part on the results of on-going research into the impact of the European honeybee on native flora and fauna.

Wildflowers harvested from crown land add value to the industry in the form of product diversity, more so than contributing to the quantity of production. Restricting access to native forests could impact on the industry as it may preclude harvesting of a number of species.

4.7 COMMONWEALTH AND STATE LEGISLATIVE REQUIREMENTS

One of the objectives of the RFA process is to meet Commonwealth and State statutory and policy requirements through the development of the RFA. The satisfactory completion of these requirements is intended to provide for greater certainty of government decision-making in relation to forests during the period the RFA is in place.

Commonwealth statutory requirements exist in relation to environmental protection, the protection of world heritage and national estate values and the protection of endangered species. The Commonwealth also has obligations relating to the protection of native title rights and interests. The relevant Acts are listed in Section 1.2.3.

The range of Western Australian legislation relating to land management in the South-West Forest Region is also listed in Section 1.2.3.

It has been recognised by both governments that the terms of the RFA for Western Australia are to be consistent with the NFPS and other relevant agreements and policies including the National Strategy for Ecologically Sustainable Development

and the Intergovernmental Agreement on the Environment.

4.7.1 Resource management

Security of tenure arrangements exist in mining leases covered by State Agreement Acts, and no new reserve proposals may be developed without the endorsement of those companies that have negotiated such agreements. The provisions of these Acts are of particular note in the development of the RFA for Western Australia.

Other forest-based resources within the region will be considered in addressing ecologically sustainable management in the RFA.

4.7.2 Environmental impacts

The Commonwealth Government's proposal to enter into an RFA with Western Australia will be referred to the Commonwealth Minister for the Environment in accordance with the administrative procedures of the Commonwealth *Environment Protection (Impact of Proposals) Act 1974*. These procedures require the Minister to determine whether preparation and public review of an environmental impact statement or a public environment report are required to satisfy the objectives of the Act. The Minister is required to provide this advice before the RFA is finalised. The public consultation process for the RFA has been designed to be consistent with the requirements of this Act.

Changes to the Forest Management Plan 1994 - 2003 (CALM 1994) made as a result of the RFA may require consideration as a proposal under the Western Australian *Environmental Protection Act 1986*.

4.7.3 The National Estate

In accordance with Section 30 of the Commonwealth *Australian Heritage Commission Act 1975*, the Commonwealth Government's proposal to enter into an RFA with Western Australia will be referred to the Australian Heritage Commission for comment. The Australian Heritage Commission has statutory responsibility for providing advice on proposed actions that might adversely affect National Estate places. In the context of the RFA, the Commission could make provision for delegating preparation of Section 30 advice for National Estate listed places under the Commonwealth *Australian Heritage Commission Act 1975* to an appropriate Western Australian body. The joint assessment of National Estate values in the South-West Forest Region is detailed in the forthcoming National Estate Report.

In relation to its statutory responsibilities for listing places on the Register of the National Estate, the Australian Heritage Commission will take into account the overall assessment of values and the levels of protection for these values embodied in the RFA. It is expected that the RFA will contain a jointly agreed process for delineating places for listing in the Register of the National Estate.

4.7.4 World Heritage

Australia has international obligations under the World Heritage Convention which

include the identification, protection and presentation of places of outstanding universal natural or cultural heritage value. The Commonwealth *World Heritage Properties Conservation Act 1983* provides the legal means by which the Commonwealth is able to protect and conserve the World Heritage places covered by the Act. While the values governments seek to protect for World Heritage are different to those they are seeking to protect under National Estate legislation and the criteria for a CAR reserve system, there will of necessity be some values that are common to all three.

The Commonwealth and the States have developed a methodology for assessing World Heritage in areas covered by an RFA. The methodology is structured in a series of five steps and is based on a thematic approach to assessing areas in terms of the extent to which they have 'outstanding universal value'. An expert panel carried out the first two steps in this methodology and has provided the Steering Committee with advice on themes of outstanding universal value relevant to Western Australia's forests and which require further investigation.

It is important to note that the places identified by the panel cannot be regarded as 'identified properties' under the *World Heritage Properties Conservation Act 1983*. Only places that are identified once all the steps in the methodology have been completed would be considered for World Heritage nomination. Nomination of places for World Heritage listing would be with the agreement of both governments and take into account social and economic considerations.

As part of the RFA, governments will be considering the next steps required in the process to identify places of potential World Heritage significance in the region.

4.7.5 Endangered species

The Commonwealth *Endangered Species Protection Act 1992* has schedules of nationally endangered, vulnerable and presumed extinct native species of flora and fauna, endangered ecological communities and key threatening processes. The Act requires that any effect on scheduled species and communities be taken into account in all Commonwealth actions and decisions. The Act is linked to the Commonwealth *Environment Protection (Impact of Proposals) Act 1974*, such that any action that could threaten with extinction or significantly impede the recovery of a listed species or community may be considered a matter of environmental significance in terms of the latter Act and may require environmental assessment.

The Commonwealth *Endangered Species Protection Act 1992* also requires that recovery plans be prepared for nationally listed species and that threat-abatement plans be prepared for key threatening processes. Many of these species are also listed under state legislation.

The objective of the Western Australian *Wildlife Conservation Act 1950* is the protection of indigenous flora and fauna. The Act allows the Minister for the Environment to declare flora or fauna as protected, including those likely to become extinct, rare, or otherwise in need of special protection. Such species cannot be taken (removed, interfered with, injured or destroyed) without the written consent of the

Minister. Management plans are prepared for declared species. A large number of plans have been prepared for flora species and the writing of plans for fauna is in progress. Endangered species issues will be considered in the development of the RFA (see Sections 3.7.2 and 3.7.3).

4.7.6 Native title

Under the Commonwealth *Native Title Act 1993* the Commonwealth has obligations relating to the protection of native title rights and interests. It is not intended that the RFA will in any way influence any native title claims that may arise. If any government action to implement the Agreement could affect native title, that action will be taken in accordance with the Native Title Act.

4.8 MONITORING, REPORTING AND ACCREDITATION

For the RFA for the South-West Forest Region to satisfy the requirements of clauses 4(c), 4(h) and 22 of the Scoping Agreement, it must include, or provide for, the:

- identification of appropriate performance indicators to measure the RFA outcomes;
- development of monitoring arrangements;
- reporting on those indicators and the performance of the RFA every five years;
- identification of a mechanism for updating the Agreement in the light of significant new information or exceptional circumstances; and
- identification of exceptional circumstances which could influence the RFA outcomes significantly or which would require a reassessment and amendment of the RFA before its due expiry date.

These requirements will be met through action agreed by both governments in the RFA, taking into account the recommendations of the Expert Advisory Group on ecologically sustainable forest management.

4.9 WOODCHIP EXPORT LICENCES

The Commonwealth 1996 Export Control (Wood Chips) Regulations provide that from 1 January 2000, woodchip exports will be permitted only from areas covered by a RFA.

Under amendments to the relevant regulations under the Commonwealth *Export Control Act 1982* no controls under that Act apply to the export of woodchips or unprocessed wood sourced from native forests in a region for which an RFA is in force.