EXECUTIVE SUMMARY

INTRODUCTION

The National Forest Policy Statement, agreed to by State and Territory governments, provides a framework for a long term solution to the debate over competing forest uses, through the development of regional forest agreements (RFAs). RFAs are intended to secure the ecologically sustainable management of forests, the development of an efficient and internationally competitive timber industry, the establishment and management of a comprehensive, adequate and representative reserve system and complementary off-reserve management.

The Statement also provided for a process for developing joint comprehensive regional assessments (CRAs) of the natural, cultural, social and economic values of Australia's forests, as a basis for the development of an RFA.

In January 1997 the Prime Minister and Premier of Queensland signed a Scoping Agreement setting out arrangements for developing the South-East Queensland Forest Region RFA and for the CRA. The major stages in the RFA process are: project planning; filling of data gaps and developing agreed methodologies for a CRA; integration of the emerging data and development of planning options; the release of an options paper and agreement to the RFA.

The detailed information required to negotiate the RFA will be drawn from a CRA process that involved more than 30 separate studies and projects aimed at documenting and assessing the range of forest values within the region.

This report outlines the methods and findings of the environment and heritage, social and economic, and other relevant projects specifically undertaken for the CRA process.

SOUTH-EAST QUEENSLAND REGION

The region covers approximately 6.1 million hectares in the south eastern corner of the State and includes the Blackdown Tableland as an isolated outlier. About 4.3 million hectares are privately owned, and 1.8 million hectares are State owned.

The region is the fastest growing in Australia, with the population of about 2.4 million concentrated mostly in the greater metropolitan areas around the Greater Brisbane – Gold Coast – Sunshine Coast corner.

About 55 per cent of the vegetation cover has been cleared. Estimates of the forested area in the region (including plantations) vary between 2.71 million and 3.03 million hectares. Native forest distribution includes about 689 000 hectares in State forest, 358 000 hectares in national park and 1 191 000 hectares in freehold. Approximately 159 440 hectares of plantations are in State forest and 15 770 are in freehold.

The range of forest-related industries is wide and includes, amongst others, timber harvesting and processing, recreation and tourism, grazing, bee keeping and mining.

ENVIRONMENT AND HERITAGE PROJECTS

South-East Queensland is an area of great biological diversity. The region contains the northern limit of many wet sclerophyll forest species. It is also a prime area for subtropical rainforest types, some of which extend well inland under relatively low rainfall regimes. Drier parts of the region contain extensive areas of savanna woodlands of ironbark and bloodwood and dry sclerophyll forests of spotted gum. In addition, South-East Queensland's geography, comprising broad alluvial valleys, coastal sand masses and rugged volcanic mountain ranges, provide a wide variety of ecosystems for species diversity. South-East Queensland is also a major area for migratory avian species and has rich amphibian and reptilian fauna.

The region is rich in evidence of Indigenous and European and other settler activity and this is reflected in the range of places of cultural heritage importance.

The environment and heritage comprehensive regional assessments were conducted to assist with the determination of key values (including biodiversity, old growth and wilderness) and appropriate areas for a CAR reserve system in

the region, and to account for the respective Commonwealth and Queensland statutory obligations relating to endangered rare and threatened species and National Estate.

Biodiversity

A number of projects addressed biodiversity through the mapping of regional ecosystems, survey and analysis of flora and fauna, assessment of threatening processes on priority species and a genetic diversity study.

Existing vegetation of the entire South-East Queensland region was mapped at a scale of 1:100 000, identifying 170 vegetation communities, including 32 forest, 71 woodland, 10 open woodland, 37 rainforest and vine thicket and 20 non-forest ecosystems in South-East Queensland. Mapping was also developed to represent a pre-1750 coverage utilising a range of data sources, including aerial photographic interpretation and estimating the changes in the landscape over the last 200 years.

These maps were then combined with a geology/landform layer and a regional ecosystem (RE) layer developed which identified 142 different REs. Mapping was also underpinned by 2500 secondary and tertiary level detailed sites based on 0.1 ha plots, and thousands of quaternary sites for ground truthing purposes. The identified REs covered 52 types of eucalyptus forest, 31 eucalyptus woodlands, 20 non-eucalyptus forests and woodland, 26 rainforest and vine thicket and 13 non-forest REs. A pre-clearing extent for each ecosystem has been estimated using a GIS to give a picture of ecosystems depleted and fragmented by clearing or under threat from agents such as frequent fire, grazing, or lack of regeneration.

The project estimated that by 1995 there had been a net loss of 3.423 million hectares (56 per cent) of the natural vegetation coverage of the region with a further 26 300 ha cleared between 1995 and 1997.

As a result of these projects, 10 REs have been assessed as endangered and 43 as vulnerable. Seventeen of these are also considered to be naturally rare, either constituting less than 1000 ha in total, or due to depletion (<1000 ha remaining).

Existing conservation reserves include samples of 118 of the 142 REs but a large number of these samples are small areas only and are not replicated to any extent. There is a low level of conservation reserves in the forested core of the region. Maiala National Park, Conondale National Park, Mt Walsh National Park, Goodnight Scrub National Park, Kroombit Tops National Park and Castle Tower National Park are the only conservation reserves >1000 hectares in the ranges between Brisbane and Gladstone.

Regional ecosystems that are poorly or unrepresented in reserves in South-East Queensland include forests and woodlands associated with better quality agricultural lands and a number of the dry and moist hardwood forests.

Two flora projects collated information on a number of species listed as rare or threatened under the Queensland *Nature Conservation Act 1992*.

One project, *A Survey of Threatened Species*, focused on the distribution, population attributes, ecology and threatening processes of vascular plant species at risk in South-East Queensland. A number of species were selected on the basis of lack of sightings of the species and visibility in the field at the time of searching. Searches for 10 species were conducted while outlines were prepared for a further 22, describing morphology, distinguishing features and conservation status.

The second project, *Flora Data Analysis*, looked at areas of high species richness, endemism, edge of range and other spatial information relating to rare and threatened species. The project utilised the flora databases of the Queensland Herbarium and other data sets in its investigation. Areas with high species richness include the scenic rim in the south east and State forests and national parks in the coastal lowlands (eg. Noosa National Park, Mapleton State Forest), Mt Walsh National Park and Boompa State Forest in the central region, and Kroombit Tops in the north west. High rates of clearing, resulting in low remnant vegetation values, have reduced species richness in some parts of the region.

A total of 273 taxa were identified as regional endemics. In particular, endemism is a feature of the rainforests throughout the region. Additionally, 556 taxa are at their northern range of their limits while 355 are at their southern range. Fraser Island and the adjacent mainland are important for species at the edge of their range.

Thirty-three taxa in South-East Queensland are classed as endangered, 76 as vulnerable and 152 as rare. The report indicates a coincidence between species richness and rare species in a number of areas including the scenic rim national parks, the coastal environments around Noosa/Great Sandy, around Mt Walsh National Park and Boompa State Forest. One hundred and thirty five taxa have disjunct populations in South-East Queensland, many of which are only found again in far north Queensland.

The fauna habitat assessment comprised several projects, the first consisting of:

- compilation of a database detailing the distribution of freshwater and terrestrial vertebrates and selected invertebrate species in South-East Queensland
- identification of significant gaps (taxonomic, spatial and environmental) in the data set.

The project identified a need to conduct systematic fauna survey work to address taxonomic, spatial and environmental gaps in the historical data set.

A total of 36 amphibian species, 92 reptile species, 296 diurnal bird species, 10 nocturnal bird species, 19 small terrestrial mammal species, 11 macropod species, three predator species (two introduced), four introduced ungulate species, 10 arboreal mammal species, five megachiropteran bat species and 27 microchiropteran bat species were recorded. A number of records obtained during the survey were regionally significant, including extensions to the previously known range of priority species such as the collared delma *Delma torquata*, Nangur skink *Nangur spinosa*, and eastern pebble-mound mouse *Pseudomys patrius*.

The second stage of the fauna habitat assessment process aimed to identify areas of medium and high habitat quality for priority fauna species. An environmental GIS database was established for the interpolation of fauna survey results and expert knowledge throughout South-East Queensland. If data were adequate, various statistical models were used (GLM – Generalised Linear Model & GAM – Generalised Additive Model) employing both systematic and incidental or opportunistic site data. If site data or subsequent statistical models were inadequate, then species habitat maps were based on expert knowledge. Where expert models could not be built owing to lack of knowledge and data, species were removed from the habitat mapping process.

Final maps, depicting the distribution of medium and high quality habitat, were produced after digital adjustment and refinement of habitat models based on expert input.

The final stage of the fauna assessment process in the region aimed to analyse the information collected to determine faunal species patterns across the landscape, to identify species rich places and to identify what species/assemblages were poorly represented in the reserve system.

In terms of comprehensiveness, 90 per cent of the 544 species examined were found in at least one national park. However, the analyses indicated major deficiencies in the representativeness of the existing conservation reserve system (representativeness is one of the three criteria to assess the conservation reserve system). In addition, project work was not able to directly assess adequacy of the current reserve system. Fauna associated with dry forest types (mixed, spotted gum and ironbark forest types), Sydney blue gum wet forest and dry rainforest were identified as poorly represented in the current reserve system.

Old Growth

Old growth forest is defined as 'ecologically mature forest where the effects of disturbance are now negligible'. However, for the most extensive forest ecosystems in South-East Queensland – the mixed age or dry eucalypt forests – this definition neither adequately described the ecological processes of the dry forests nor adequately captured the impacts of disturbances on such forests. For the purposes of the Queensland RFA, the definition was modified to include the concept of 'ecological integrity'. A dry forest ecosystem which has been lightly logged but is ungrazed and not subject to repeated low intensity fire is considered to have moderate 'ecological integrity' and, hence, likely to be old growth.

The methods used to identify old growth include intensive air photo interpretation (API), field research, disturbance information collection and validation. To suit the complexity of the sub tropical forests of Queensland the approach to identify old growth incorporated both crown form and other indicators of disturbance, with varying emphases and thresholds depending on the nature of the forest ecosystem and the disturbance environment. API provided the primary data layer for this work

Disturbances identified as likely to impact on the condition of eucalypt-dominated forests were logging and silviculture, grazing and treatment, fire (controlled and wild), clearing and agriculture.

Of the 3 545 237 hectares defined as forest in the region by this project, 1 307 950 hectares (approx 43 per cent) were assessed for old growth characteristics. Forested areas not assessed were mainly plantations or non-eucalypt natural forest. Of the total area of forest in the region, only 97 201 hectares (2.7 per cent of the total forested area), was identified as 'old growth' (Class 1), with a further 204 325 hectares (5.8 per cent) identified as 'likely old growth' (Class 2).

Of the combined Class 1 and Class 2 total of 301 526 hectares, about 40 per cent is found within conservation reserves. About 16 per cent is in State forests and the remaining 44 per cent occurs across a range of tenures including freehold.

Wilderness

The assessment of wilderness is based on the methodology developed by the National Wilderness Inventory (NWI) and implemented in previous CRAs in other States. In accordance with JANIS criteria the identification of wilderness does not take into account land tenure or current reservation status. The NWI is a computer-based mapping system that presents wilderness as being part of a continuum of remote and natural conditions that vary from essentially undisturbed at one end of the continuum to urban at the other end.

The delineation of wilderness areas is guided by the JANIS report and general principles of conservation reserve boundary identification. Generally, wilderness areas should be greater than 8000 hectares in size.

Ten areas were identified as meeting JANIS wilderness criteria: Fraser Island north; Kroombit Tops; Cooloola East; Blackdown Tableland; Bania (upper Burnett River); Mts Huntley, Roberts; Pine Creek; Mt Molangul (Many Peaks Range); Lamington Plateau; and Mt Barney.

The project also investigated the occurrence of other classes of natural areas including 'remote and natural areas', 'natural landscapes' and 'undisturbed catchments'. Areas that could qualify as sufficiently remote and natural to support restoration include: North Many Peaks, South Many Peaks, Cooloola West and Maroom. Areas identified as natural landscapes include Blackdown Tableland, Fraser Island, Cooloola, the Bunya Mountains, the Main Range and Mt Barney.

The National Estate

The Register of the National Estate is a register of places across Australia that have National Estate heritage value defined by the *Australian Heritage Commission Act 1975* as 'those places, being components of the natural environment of Australia or the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the present community'. National Estate values may relate to cultural or natural places and may be significant to the national, regional or local community. The identification and assessment of National Estate places is guided by the National Estate criteria that can be found in Appendix D.

The objectives of the National Estate study for the South-East Queensland CRA were:

• to identify indicative National Estate values across the region and assess their representation in the nature conservation reserve system and other protective land tenures
• to identify those areas in the region which may be considered for listing in the Register of the National Estate
• to provide management guidelines on the protection and maintenance of National Estate values in a regional context.

National Estate natural values that have been assessed in South-East Queensland are: ecosystem richness and rarity, old growth, natural history places, wilderness, natural landscapes, undisturbed catchments, geoheritage, refuges and places of flora succession. Fauna and flora species values including richness, rarity, endemism, phylogenetic distinction and disjunction have also been assessed.

National Estate flora and fauna values have been identified using the outputs of the respective biodiversity projects. A series of maps was produced showing the distribution of the species values. These layers have been put to stakeholder workshops for comment and thresholded. Individual National Estate values were then combined into a layer that will be available for contextual purposes during the RFA development.

Results of the old growth and wilderness assessment projects are reported separately.

National Estate cultural values that have been assessed include both non-Indigenous and Indigenous cultural heritage places and values.

Information about non-Indigenous cultural places and values has been obtained from a number of existing databases as well as from local communities and community heritage workshops. Once the information was collated, expert workshops were conducted to identify those sites or values that had National Estate significance, ie. the best expressions of those values or thresholding. As a result, a number of places of natural history and non-Indigenous cultural heritage have been identified. The geoheritage assessment identified 59 sites as being above the assessment

threshold and so potentially of National Estate significance. These sites occurred across a range of tenures. The natural history places assessment identified 163 places as above the assessment threshold. Most (62 per cent) were located in State forests. The non-Indigenous cultural heritage places and values project identified 89 places above the historic value threshold, 22 places above the social value threshold and 53 places above the aesthetic value threshold. In total, places of non-Indigenous cultural heritage value were located in approximate equal proportion across the conservation estate, State forests, other reserves and private land.

Indigenous heritage places and values are being treated differently. Representatives from the three land councils of the region have formed a management team and are conducting a data audit of existing records both at the State and Commonwealth level. Because of cultural sensitivities and time and resource implications, it is not possible to identify all Indigenous cultural heritage places and values. Rather, the focus is on developing management guidelines that include consultation mechanisms, protocols and conservation principles that can be placed into the land management systems. These guidelines can be triggered to ensure that relevant Aboriginal community members are involved in identifying their heritage when a proposal that may affect such places and values is made in the region's forests.

World Heritage

Under the World Heritage Convention, Australia has an obligation to identify and assess World Heritage values.

A thematic approach has been adopted for the RFA process. An expert panel was convened to develop themes of outstanding natural and cultural value relevant to Australia, and to then identify places in forested areas that warrant further investigation for their potential World Heritage value in the context of these themes. The expert panel considered that a number of sites in Queensland warranted further investigation for their potential World Heritage value including the Bunya Mountains and Cooloola National Parks as extensions to existing World Heritage Areas. Areas of eucalypt forest across the region could contribute to a potential nomination focused on *Eucalyptus* evolution and diversity. Work continues on this possible nomination.

SOCIAL AND ECONOMIC PROJECTS

The region supports a variety of forest-based and related industries including timber production and processing, tourism and recreation, mining, apiculture, grazing and flora collection. Forest-based industries are responsible for significant employment in many parts of the region.

South-East Queensland is the major timber producing region of Queensland, providing around 75 per cent of the total Queensland sawlog production. Currently, around 1 million m^3 of softwood plantation sawlog and 338 000 m^3 of native forest sawlog is harvested from the forests of South-East Queensland annually. Publicly owned plantations supply the majority of the plantation sawlog harvest while private native forests supply about 62 per cent of the South-East Queensland native forest sawlog harvest.

The objective of the social and economic assessments was to measure the current social and economic significance of the range of native forest and plantation-based industries in South-East Queensland. The assessments also provided data for the evaluation of economic opportunities for various timber industry development scenarios, including increased reliance on plantation sourced timber.

Social/Community

Four assessment projects were undertaken covering regional social demographic data, identifying and defining issues, profiling stakeholder interests and identifying timber-resource-dependant communities.

The *Post-Impact Studies Analysis* aimed at understanding the social costs and benefits of imposed change and how these changes might best be managed and mitigated. An analysis of previous logging impacts and post-impact analysis across the case study areas of Fraser Island, the Wet Tropics World Heritage area in north Queensland and the Northwest Forest in Oregon, North America was a key part of the study.

The project generated a list of issues regarding the RFA which provide a framework for successful mitigation and change management strategies for South-East Queensland, including:

- mitigation strategies should be responsive and appropriate to the local environment and community
- governments to involve the local community and groups in development of mitigation strategies, and provide resources

- ongoing monitoring and management of strategies at the local level
- mitigation strategies to focus on capacity building, be broad based and integrated (including existing development programs at all levels)
- development of a structural adjustment program, to be applied at the local level, by governments, social and economic technical professionals and the community
- any structural adjustment program should ensure that non-organised or non-represented groups and individuals affected by RFA decisions are considered
- establishment of cross-sectoral local implementation teams to work with affected communities on the implementation and monitoring of strategies.

The *Regional Social Profile* study encompassed examination of a range of demographic indicators and service delivery capacity across the region as well as a survey of 2000 respondents on the social values associated with forests. The study found evidence of a gradual population growth in coming years, with major growth around coastal areas. The northern inland area of South-East Queensland was likely to undergo a decline in population.

Indicators showed a marked difference across the region with western shires demonstrating lower levels of education, income, youth population and 'socio-economic index for area values'. The western shires have a higher proportion of aged people and higher levels of employment in agriculture, forestry and labouring. The eastern and coastal shires have the higher rates of service delivery while the north western shires have the lowest rate.

Public concerns regarding forest management was highest in the north coast sector and lowest in Esk, Kingaroy and Builyan areas. This concern was generally higher in the 20–29 year age group and in those households not dependent on timber resource. These latter households were also more likely to have relatively higher levels of recognition of the intrinsic values of the forests (the non-use values such as aesthetic and conservation values) while households with forest industry employees were more likely to put greater store in the extrinsic value of forests (eg. the production and economic values).

The *Social Case Study Areas* project researched 12 case study areas (Gympie, Conondale, Linville, Cooroy, Builyan, Many Peaks, Wondai, Dingo, Beaudesert, Woodford, Maryborough, Brooweena and Eudlo). Through workshops, data collection and analysis and community consultation, the project provided a profile of the socio-demographics and service delivery capacity of the towns as well as an assessment of the potential responses of local communities to changes in forest use and management.

The general characteristics of the socio-demographic profile include a sharp separation between youthful, or ageing population, little ethnic diversity in the population, low post-secondary school attendance and high proportions in the low income categories.

Town and community visions varied, with some towns looking forward to and encouraging population growth while others preferred to retain a rural lifestyle. The towns of Woodford, Conondale and Gympie indicated that the historical connection to timber industries was integral to the community vision. These town visions included a commitment to sustainable farm forestry, revegetation of logged areas and softwood plantations. The Wondai, Beaudesert and Linville town visions recognised the protection of forests for scenic and environmental reasons, with Wondai, Beaudesert and Gympie interested in encouraging forest-based tourism and recreation.

Community workshops recognised the importance of the timber industry to the local economy. Workshop participants generally were concerned about job losses in the forestry sector and flow-on impacts on the town's economy. The community visions held by the participants included a sustainable timber industry, farm forestry and plantations, balanced with protection of the environment and biodiversity.

A fourth study prepared a resource, forest industry and employee catchment analysis for the region, identifying towns and communities reliant on forest industry activities, and establishing the relationships between forest resources and dependant communities. Information was obtained from timber processing businesses, contractors and employees, apiarists, graziers and other forest users with term leases.

Some 17 Town Resource Clusters (TRCs) were identified where a direct relationship could be established between the Crown sawmill allocation zone and the towns and communities dependant on that resource. Potentially, these TRCs would bear the impact of any change in Crown hardwood resource allocation. It is proposed that these TRCs represent the primary geographic area for the management of social change and community impacts.

Two studies dealing with Indigenous issues, covering an examination of Indigenous community issues and the potential impact of changes in forest use on such communities are also being undertaken but have yet to be finalised. These will use desktop studies of literature as well as socio-demographic data and a number of community meetings.

Timber

A number of studies were aimed at describing the timber resource (sawlogs and other wood products), its management, economic significance, potential, use and sustainabilty. Methodologies included the use of vegetation community mapping, industry surveys, examination of harvesting data over the last century, and assessment and use of the Department of Primary Industries – Forestry (DPI–F) database and yield estimation system.

The timber resource of South-East Queensland comprises an estimated 751 000 hectares of merchantable timber (native hardwood, softwood and plantation timber). About 65 per cent of this productive estate is on Crown land. Currently, the total regional annual sawlog harvest is around 1 365 000 m³, of which about 1 million m³ (about 73 per cent of the SEQ total) is plantation sourced (primarily State plantations). Native forest sawlog production is dominated by the harvest from private forests which provide about 62 per cent of the current annual native forest sawlog harvest in South-East Queensland.

Crown native forests

The forest inventory project reports an estimated 911 000 hectares of native forest in South-East Queensland on tenures where the government retains the timber rights (mostly State forests, timber reserves and some leasehold lands). Of this area, only about 338 000 hectares is classed as productive forest available for wood production. The total standing volume of sawlog on this area is estimated at 3.9 million m³. Additionally, there are significant volumes of other wood products, including an estimated 16.3 million lineal metres of poles.

The growth rate across this estate is low by Australian standards. Around 35 per cent of this estate has a mean annual increment (MAI) of less than 0.1 m³/ha/year. Wet/moist blackbutt forests and wet sclerophyll forests, which tend to be the most wood productive forests, occur on only about eight per cent of the area but contain about 21 per cent of the total standing sawlog volume.

Allocations of Crown sawlog have been made from 14 allocation zones within or partially within the South-East Queensland region. Availability of Crown resource has declined by over 50 per cent in the past 20 years with 109 000 m³ of sawlog available for harvest in 1998 from the 14 zones. Yield calculations indicate that further reductions will be necessary, including:

- reductions of about 23 per cent on average across the region, and over 40 per cent in some zones, resulting from updated yield calculations
- possible reductions to account for ESFM practices that are being progressively implemented.

These reductions do not include an allowance for any decrease in the productive estate associated with the establishment of a CAR reserve system.

The reductions in sawlog availability are accompanied by a decline in the proportion of blackbutt, a preferred species. The project also noted a predicted continuing decline in the proportion of merchantable trees in many stands and concluded that the silviculture applied should be reviewed if the wood productivity of these forests is to be maintained.

While sawlog production is the major product for which Crown native forests are managed, other wood products, including poles, girders, landscape material, posts, railway sleepers and piles are also harvested. Maryborough, Kilcoy–Woodford, North Coast and Gympie allocation zones have the greatest potential supply of these 'other wood products'. Estimates of the annual availability of these products were made, usually as a proportion of the calculated available sawlog volume. Thus, a reduction in the availability of sawlogs will reduce the other wood products' estimated availability.

Estimated annual harvestable quantity, based on the current sawlog harvest, included around 21 000 m³ of landscape and associated timbers and around 155 000 lineal metres of poles, piles and other round timbers.

Crown native forest yield calculation system

The *Appraisal and Accreditation of Wood-yield Methods* project reviewed the growth model, data and sustainable yield calculations used by DPI–Forestry to calculate wood yields for public forest. This study described and assessed the system and provided a basis for accreditation of methods and yield predictions.

The major purpose of the DPI–Forestry system is to estimate the long term even flow sustainable yield used to establish the annual allocations of sawlogs from Crown resources to mills from the 14 sawmill allocation zones wholly or partly in South-East Queensland. This entails the projection of wood production for about 100 years into the future, with adjustments for harvesting in that period and then examining the trends across a number of indicators

to reach a 'steady state' condition. The system devised by DPI–Forestry comprises three databases – the Area Information System, the Native Forest Inventory and the Native Forest Permanent Plot System – and various derived models. The simulation model, 'sked', incorporates these and other related predictive functions, providing a means of simulating future growth and removals under various levels of harvest to determine the level of sustainable harvest.

The study found the analytical system is unique, well conceptualised and includes models based on a very large database but that shortcomings in data quality caused problems for accurate estimation of yield. For example, comparing predicted and harvested volumes, an average overestimation of 14 per cent was identified. Items that have been identified for further analysis include:

- alternative methods for estimating net areas and merchantable volumes
- modifications to the yield simulator to include financial and other non-wood measures
- addressing ecologically sustainable forest management (ESFM) concerns
- modifications to the allocation zone basis of yield estimation.

Private native forests

The private native forests were studied to assess the extent of this estate and to understand the availability of the resource.

Under the assumptions used in the project (eg. assumed slope constraints), the total area of private forest was estimated to be 1.36 million hectares. The majority of this estate carried volumes of less than the assumed commercial viability limit of 2 m^3/hectare. Excluding rainforests, for which the information was unreliable, only an estimated 217 000 hectares of privately owned native forests in South-East Queensland carried volumes above this commercial limit. Estimates of the timber volume in these commercial timber stands ranged between 1.3 and 2.2 million m^3, with an estimated annual sustainable harvest of around 45 000 m^3 of sawlog. The harvest in 1995/96, however, was around 210 000 m^3.

Additionally, private forests are being cleared at a rate estimated at between 0.3 per cent and 0.8 per cent of the estate each year. The largest area of clearing occurs in the moist dry and woodland type forests (60 per cent and 25 per cent of the private forest resource respectively).

While recognising the limitations of the volume predictions, the current levels of harvesting and clearing appear to be unsustainable in the long term. A survey of private forest owners provided little quantitative data on management intent.

Challenges for a more sustainable and productive private native timber resource include providing better information to land holders on silviculture techniques, economics and marketing, and ensuring greater certainty about future government decisions regarding harvesting rights.

Crown softwood plantations

The publicly owned plantation estate in South-East Queensland consists of about 150 000 hectares of softwood plantations and 1200 hectares of hardwood plantations. Exotic pines of the *Pinus* genus make up the bulk of the estate (about 70 per cent), with about 47 477 hectares planted to slash pine, 33 370 hectares planted to Caribbean pine and nearly 20 000 hectares to the genetically improved slash/Caribaea hybrid. Hoop pine, a native softwood, is planted over 43 000 hectares.

About one third of the total estate has been planted in the last 15 years and is not yet making a significant contribution to production. As the plantation estate matures, and with improving silvicultural practices and genetics, the average annual sawlog availability from Crown plantations in South-East Queensland is predicted to increase by around 30 per cent from the current level of around 990 000 m^3 to about 1.3 million m^3 by year 2006 and then be maintained at that level until at least 2020. The *Pinus* plantations will provide the majority of this increased production.

With a focus on sawlog production, and subsequent changing thinning regimes, pulpwood availability will decrease over time. Current average annual pulpwood availability is around 533 000 m^3. This will progressively fall to around 270 000 m^3 by 2016.

Broadacre clearing of native forests for the establishment of Crown plantations does not occur. All current softwood plantation establishment occurs as second rotation plantings.

Crown hardwood plantations

The Crown hardwood estate in South-East Queensland covers only 1243 ha, (less than one per cent of the total South-East Queensland Crown plantation estate), and has been established mainly around the Gympie–Maryborough area. The plantations are managed for the production of sawlogs. The size of the estate does not allow calculation of 'average yields', however, the standing merchantable volume is around 91 000 m^3. Sixty five percent of this volume is sawlog. The four main species planted are Gympie messmate, grey ironbark, rose gum and blackbutt. The majority of these plantations were established more than 30 years ago. Recent plantings, totalling about 200 hectares in the past five years, have focused on Gympie messmate and spotted gum.

A hardwood plantation research and development strategy is being implemented by the Queensland Departments of Primary Industries and Natural Resources.

Private plantations

There are only three private plantations of a commercial scale in South-East Queensland. Slash pine is the species planted, with the total area approximating 12 450 hectares. The majority of this private plantation estate (some 11 450 hectares) has been established close to Brisbane and these plantations are currently being cleared prior to subdivision for residential development. These plantation areas are expected to disappear over the next 10 years.

An unknown number of minor plantings (less than 10 hectares each) occur throughout the region but are unlikely to contribute significantly to the regional timber industry.

Wood processing industries

CRA projects provided an overview of the wood and wood products industry in Queensland and the regulatory and policy environment in which it operates. The industry in South-East Queensland was described in this context.

The forests of South-East Queensland are the focus of the timber industry in Queensland, contributing around 75 per cent of the total public and private native and plantation sawlog volume processed in Queensland during 1996/97. Based on all timber sources including imports, the timber and timber processing industries in South-East Queensland provided in total about 8420 jobs.

There are about 125 primary processors holding sawmill licenses, 98 processing mainly hardwood timbers and 27 processing softwoods. Some 47 of these were surveyed to provide an overview of the resource flows, processing costs, employment and other economic data. The findings of this survey highlighted the contrast between the hardwood and softwood processing sectors.

This business dependency study identified 41 timber processing businesses with access to Crown hardwood allocations and these were located in 35 towns. Total employment in these processing businesses amounts to an estimated 821 employees, with a further estimated 164 people employed by harvesting and transport contractors to these businesses. On average, the timber processors drew around 55 per cent of their sawlog intake from private lands, 45 per cent from Crown lands. Native forest timber processing, harvesting and transport processing generated an estimated $24.5 million in employee annual income and $18.6 million in annual household expenditure which was distributed through local communities and towns within the RFA region. When the high levels of local expenditure by forest industries within the region are considered along with the high levels of local household expenditure by forest industry employees, forest industries provided an important and significant contribution to local and regional economies within South-East Queensland.

The native hardwood sawlog harvest in South-East Queensland has been gradually declining for the past 20 years. Native forest sawlog processors in the region tend to be small, each utilising only a small portion of the resource harvested and usually operating well below capacity. Some 50 per cent of the mills process five per cent of the regional hardwood harvest of just over 400 000 m^3 (sawlogs and other timbers). Sawmill recovery rates averaged around 40 per cent with a limited market for sawmill residues. Estimates of employment in the hardwood sawmills of South-East Queensland range between 765 and 872 with additional employment in some other than sawlog processors (eg. hardboard production). Unseasoned timber, used in construction, framing, fencing and boards, accounted for more than 90 per cent of the sawmills' output. Gross value of production for 1995/96 was about $69 million.

By contrast, the softwood sector has been expanding over the past two decades. It is much larger than the hardwood sector, processing 1 500 000 m^3 of softwood logs (sawlog and pulp logs) through 27 mills during 1995/96, employing an estimated 1100 people and with a gross value of production of around $207 million. Wood-based panel (WBP) accounted for more than 40 per cent of the final softwood product.

Assessment of Timber Development Possibilities

The RFA outcomes are critical to the identification of industry development options. Possible options for industry development are outlined in the *Review of Value-adding Opportunities* report, and opportunities for increasing productivity of native and plantation resource are outlined in the *Forest Resource Enhancement Opportunities* report.

The *Forest Resource Enhancement Opportunities* report found that management of native forests for wood production has tended to rely on the two silviculture techniques of selection logging and/or post logging silviculture treatment. Rules governing tree selection and tree marking are based on 1960s prescriptions. An examination of more than 130 studies and papers relevant to silviculture in the region found that almost all of the research had been devoted to softwood plantations, particularly of exotic species, with few reports dealing with native forests or hardwood plantations. These results appear to suggest that, in native forests, harvesting, thinning and burning practices aimed at removing non-productive stems, reducing competition and promoting regeneration, have the potential to increase the productive capacity of the forests. There are unresolved economic/marketing issues associated with this silvicultural approach and there may also be significant adverse effects. These may include the alteration of:

- the forest structure and age distribution
- the proportions of various flora species
- the distribution, species composition and frequency of understorey species.

These effects may be reduced by a number of forest management practices. Further studies would be needed to develop additional silviculture techniques for native forests and plantations. Any such techniques must be consistent with ecologically sustainable forest management principles.

Studies on silviculture in softwood plantations covered a wide range of aspects and the techniques used by DPI–F, for nursery practice, site preparation, weed control, fertilising, thinning and residue management, together with the use of genetically superior stock, appear to have been effective in enhancing softwood production.

For native forests, the report recommended that priority should be given to research covering harvesting and thinning regimes and their financial viability, and post harvesting burning techniques in terms of frequency and intensity to maximise regeneration.

Priorities for hardwood plantations research cover almost the whole range of silviculture techniques, including silviculture systems, the economics of such practices, nutrition, site preparation, spacing and thinning, pest and disease control.

This review suggests that forest management strategies should include a continuing commitment both to long term ecological studies and to maintaining the flexibility to improve the current silviculture practices as more scientific information becomes available.

The *Review of Value-adding Opportunities* study aimed to project the potential development of a technically feasible and world-competitive wood and wood products industry in the region to 2020. The project methodology included an examination of the evolution of timber markets to date, and assessment of the availability of wood resources, and profiled the harvesting and transportation industry associated with the timber industry in order to identify value-adding, transformation and expansion opportunities.

The analysis highlighted the need for significant change in all sectors, with the most significant changes being required for native hardwoods where the total sawlog availability from public and private lands is expected to drop from 294 000 m^3, to an estimated 125 000 m^3 in 2010 (not including impacts of ESFM provisions). This reduction is principally due to a predicted reduction in the harvest from private native forests from current harvest levels of around 210 000 m^3 to the predicted sustainable harvest of 45 000 m^3. The primary change in the softwood sector is due to the maturing of the forest estate and a subsequent increase in sawlog and decrease in pulpwood availability.

The study found that the hardwood industry is based on the production of green structural timber. While there will continue to be a market for these products, there should be a move towards dried and dressed products, including flooring, decking, paneling and mouldings and furniture. Exotic softwoods will continue to take market share for framing from unseasoned hardwood framing. For the plantation grown native softwoods, there are opportunities to take greater advantage of the inherent characteristics of this timber.

Market opportunities for all these value added products exist in Asia as they are cost-competitive, but overseas markets will need development through product definition and niche marketing.

The study showed the increasing importance of the plantation softwood industries, both sawn wood and wood panels and predicted expansion of the existing industry to take up increasing volumes and maintain world scale processing facilities.

For MDF and particleboard there is strong competition, and there needs to be more concentration on high quality, value-added products. There are opportunities for new plywood and laminated veneer lumber (LVL) manufacture based on the exotic and native softwood plantation resource.

While pulp and paper market opportunities exist, the quality, quantity and variability of the current South-East Queensland timber resource probably prevents industry development in this area.

Although overall it is likely that the hardwood sector of the industry will decline further in the next millennium, this loss to industry may be ameliorated if Queensland can generate the public and private support necessary to contribute to the objectives set forth by the *Plantations for Australia 2020 Vision* report.

Plantation land capability

Consistent with the RFA intent of identifying the region's forestry potential, an assessment was made of the commercial plantation land capability of the South-East Queensland region. The study considered preferred species, current land use, site characteristics, rainfall and soil characteristics. Five species or species groupings, selected on the basis of their potential commercial viability and capacity to grow well in plantation situations, were studied – hoop pine (a native softwood), an exotic pine hybrid (*Pinus* species) and three grouping of native hardwoods, including western white gum, spotted gum, blackbutt, Gympie messmate and rose gum.

Cleared land capable of growing each target species was identified and assigned to an expected productivity class. Some 2.72 million ha of cleared land in the region met plantation slope, lot size and other operational constraints. Of this area, 84 per cent was predicted to be in the medium to high land capability class for one or more of the species. Maps identifying the areas of each predicted capability class are presented in the project report.

The study highlighted the lack of accurate soil information for large areas of the region that limited the precision of the land capability estimates. Additionally, the study did not consider issues such as land availability, location of markets or ownership.

Tourism and recreation

The recreation and tourism report found that recreation and tourism opportunities exist on all forested land in South-East Queensland. Passive recreation activities such as camping, bushwalking, scenic driving and picnicking account for more than 95 per cent of the forest recreation use, with the remainder made up of more active recreation activities such as horse riding, four-wheel driving, motorcycling and abseiling.

There are 224 State forests and 143 national parks in the South-East Queensland region. An estimated 7.6 million visitor days are spent in these forests each year (5.8 million in parks, 1.8 million in State forests). An estimated one million of these visitor days are made by tourists to the South-East Queensland region, the remainder are made by residents. Some 84 commercial tour operators cater for nearly 350 000 visitor days per year to both national parks and State forests. Visitation tends to be concentrated, with the most popular national parks (Noosa, Springbrook, Lamington, Fraser Island and Cooloola) accounting for around 55 per cent of the national park visitation. The most popular State forests include State forests in Brisbane Forest Park, at Daisy Hill and Bunyaville.

The forests provide an important economic base for the region with expenditure by visitors estimated as $190 million in 1997, with an estimated $79 million of this being attributed to tourists and $111 million to South-East Queensland residents. The takings of the commercial tour sector, operating mainly in national parks, were estimated to be about $29 million per annum, providing employment for 768 people.

With a projected growth in population in the region, and anticipated growth in visitor and tourism numbers, the demand for forest-based tourism and recreation is likely to grow considerably. This growth is estimated to be a 36 per cent increase by 2011 and 57 per cent by 2021. The net economic benefits of tourism and recreation for all forests were estimated at between $70 and $112 million per year.

Future issues revolve around the need to provide recreation areas of appropriate quality and quantity, and in reasonable proximity to population centres to ensure sustainable use of forested areas.

Mineral and extractive industries

The assessment of the current and potential mineral and extractive resources and industries found there were 19 active centres of mining operations in forested areas of the region, including heavy minerals and coal, and smaller mines for gold and industrial minerals. These centres produced minerals worth $199.2 million in 1996/97, paid royalties of $6.02 million and employed 586 people. Most of the production value is generated by the two largest mines, the sand mining operations on North Stradbroke Island and the coal mine at Tarong. Some 147 mining leases cover 0.65 per cent of forested areas. In 1995–96 there was a committed expenditure on exploration tenures of $4.1 million and an estimated employment of 41 persons.

Areas assessed as having high to medium mineral potential are as follows:

- Agnes Waters–Middle Island–Hummock Hill Island, with reserves of heavy mineral material exceed 2.4Mt.
- Mt Rawdon gold deposit, south east of Mt Perry, has a resource of 22mt of ore with a potential income of $40 million pa
- Spring Mountain, south east of Ipswich, has potential for an underground coal mine producing 2mt per year
- Ban Ban zinc deposit, south of Biggenden
- Goodicum ilmenite, east of Monto – 112mt of ilmenite potentially providing $45m pa in full production
- Norton Gold deposit, Calliope Shire – 120,000t with an average grade of 6 grammes per ton of gold.

Grazing

The significance of State forests and timber reserves to the grazing industry in South-East Queensland was examined and the economic significance of the industry to the region estimated. The stock carrying capacity across the region was estimated through workshops, expert advice and examination of forest canopy, density, topography and rainfall mapped data. The highest carrying capacity areas were in the 950-1450 mm per annum rainfall zone, where capacity was up to four hectares per head. Creek flats were also highly productive and ridge slopes across all rainfall zones.

Based on the estimated stock numbers (43 000) the annual operating profit from grazing cattle (at $33 per head) for 1996/97 was estimated at $1.4 million.

The forest resource was found to be an integral part of beef cattle management in the region, providing a significant element of flexibility in terms of stock rotation that would otherwise not exist. Potential deleterious effects of forest grazing on the ecology of the forest, and the need for further research into grazing impacts, were identified.

Apiculture

Apiculture is another significant enterprise with some dependency on forested areas. Using methodology similar to that used in the grazing study, it was estimated that State forests and timber reserves account for more than 40 per cent of the honey (between 1700 and 2370 tonnes) and 17 per cent of the queen bee production in South-East Queensland. Forests of the Imbil district, south west of Gympie, were found to be particularly popular with apiarists, having on average, more than 70 per cent of the available apiary sites booked on an annual basis. The Net Present Value of potential honey and beeswax production from State forests and other reserves in South-East Queensland over the next 20 years was estimated as $14.8 million.

Flora collection and export

An industry with strong growth predictions, and reliant on Crown forests, is that of native cut flowers and foliage collection and export. In South-East Queensland the industry is currently largely reliant on access to Crown forests. However, nationally, the industry is increasingly moving from bush harvesting to cultivation. On Crown lands, operations are restricted to specified areas. Of the 29 currently available harvest sites on State forest and timber reserves, 11 are in native forest areas, 15 in plantations and three include both forest types.

One operator dominates the industry in South-East Queensland. The estimated industry turnover for 1997/98 is around $3 m with estimated employment, on a yearly average, in excess of 50 people. Indications are that the industry turnover could treble by 2005/06, with a doubling of employment.

Water production

The major objective of the *Water Resources and Management* project was to describe the role, and sensitivities to forest uses, of water yield and quality from forested catchments of the region. Overall the project covered two major subjects; water resources (quality and quantity) and the impact on these resources by forest uses and management practices.

Key findings included acknowledgment that the region's water resources are under increasing pressure from urbanisation and more intensive agricultural practices. While there is insufficient research to gauge the impacts of current forest practices, the region's forests are acknowledged as producing good quality water. Operational management of forests for quality water has developed based on observation and experience. Recently established paired catchment studies in native forests and plantations will supplement this adaptive learning framework. Priorities for further research have been identified.

The next stage in the RFA

The next stage in the RFA process, where all CRA data is integrated, will provide governments with the information required to develop an option, or a number of options, concerning long term use and sustainable management of the region's forests. This will culminate in the preparation of an RFA options report, which will be released for public comment through a range of mechanisms, including public workshops.

Following consideration of comments received from the public and community groups, the Queensland and Commonwealth Governments will commence final negotiations, leading to the signing of the RFA.