ASSESSMENT OF SYSTEMS AND PROCESSES FOR *ECOLOGICALLY SUSTAINABLE FOREST MANAGEMENT* IN SOUTH EAST QUEENSLAND

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This report has been prepared for the SEQ RFA Steering Committee.

This is consistent with the principle that all information related to the Comprehensive Regional Assessment process will be made publicly available

Disclaimer

This project has been jointly funded by the Queensland and Commonwealth Governments. The work undertaken within this project has been managed by the joint Queensland / Commonwealth RFA Steering Committee and overseen by the ESFM Technical Committee.
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FOREWORD

This is the report of the Expert Panel's review of the forest management systems and processes in place in South Eastern Queensland (SEQ) in terms of their ability to achieve Ecologically Sustainable Forest Management (ESFM).

To achieve ESFM, forest management systems need to balance social, economic and culturally beneficial uses of forests, within ecological constraints, while maintaining options for the future. An elaborated set of principles for ESFM articulated by the Steering Committee of the Queensland Regional Forest Agreement process provided the criteria for the Expert Panel's assessment.

The Expert Panel evaluated the legislative and policy commitment to ESFM and the planning, implementation, monitoring and review processes that apply across all land tenures including Protected Areas, the State forests, crown land and freehold land in the region.

The Expert Panel consisted of eight members covering the ecological, socio-economic and forest management expertise required for the task and were informed by two Working Groups on the key issues of Private Lands and Cultural Heritage. The Expert Panel also considered submissions from stakeholders, and interviewed stakeholders and forest managers as part of its task.

Given the limited time and other resources available to the Expert Panel, the report identifies the key issues for forest management in the region to achieve ESFM. Recommendations focus on critical improvements needed in the systems and processes.

The Expert Panel did not evaluate SEQ forest management systems and processes in the context of the forest scenarios proposed in the joint Commonwealth and Queensland directions report.

This report has been completed prior to the release of the Directions Report.

EXECUTIVE SUMMARY

South East Queensland (SEQ) covers approximately 6.1 million hectares and includes the Blackdown Tableland as an isolated outlier. Estimates of the forested area in the region (including plantations) vary between 2.71 million hectares and 3.03 million hectares. Native forest distribution includes about 689 000 hectares in State forests, 358 000 hectares in National Parks and 1 191 000 hectares on freehold land. Approximately 159 440 hectares of plantations are in State forest and 15 770 are in freehold" (CRA/RFA, 1999). These forests provide substantial environmental, economic, social and cultural benefits for people of the region and beyond. Managing the forests so they continue to produce these benefits in the long term within ecological constraints, the goal of ecologically sustainable forest management, represents a major challenge and requires commitment by all land owners and managers.

The Expert Panels assessment focused on the ability of management systems and processes to deliver ESFM, and not on evaluating the outcomes of current forest management. Whilst the report focuses on areas where cost-effective improvement is necessary, we also wish to emphasise that much has been achieved. Agencies managing state lands have many progressive programs and commendable achievements. There is the foundation of rational conservation and multiple use planning systems based on innovative bioregional survey and analysis, species management programs, forest inventory and application of codes of practice for forest use. Current processes for ensuring ESFM on private forests are poorly developed.

Overall, the systems and processes for delivery of the new and challenging requirements of ESFM in SEQ need significant development. The Expert Panel recognises that the development of appropriate processes for ESFM will take considerable time and will require a substantial increase in resourcing. In some cases, it will also require a substantial change in community attitudes. It is appropriate to recognise that ESFM must be based upon a principle of continuing improvement and that appropriate time-frames and resources must be agreed upon to ensure the delivery of acceptable outcomes in the long term

The Expert Panel recommends a wide ranging set of reforms including improvements in the legislation and policy commitment, improved mechanisms for public participation, better ways of establishing the balance between environmental, economic and social values, and more explicit processes for monitoring outcomes and improving forest management over time. These changes apply not only to management of state owned forests and protected areas, but more importantly to forest management on freehold land in the region.

The issues, which the Expert Panel considered to be the most significant for delivery of ESFM, are discussed in the body of this report. Suggestions for improving current management practices are in the form of a series of recommendations distributed throughout the body of the report. These recommendations have been synthesized into 19 key recommendations that appear below. They are cross-referenced to the relevant sections of the report and other recommendations contained therein.

1 Legislative Reform

In Queensland, existing forest management acts do not provide an adequate basis of support for ESFM. Nor does the combined legislation meet the cross-tenure needs of ESFM. The legislation needs to specify ESFM principles and objectives and provide clear guidance to their achievement in planning and implementation. Particular weaknesses in the current system are the archaic *Forestry Act 1959* and the absence of any statutory or policy basis for regulating tree clearing and forestry activities on private land. Relevant sections in the text include 2.1, 2.4, 3.5.1, 3.5.4, 3.5.5, 3.5.6, 3.6, 3.5.6 3.6, 4.1, 4.2.1, 5.2.3, 5.2.4 and 6.3.

> **The Expert Panel recommends enactment of new natural resource management legislation focused on integrated resource management and/or modernisation of the *Forestry Act 1959*.**

2 Institutional Arrangements and Resources

Existing institutional arrangements may lead to duplication and overlap of functions. There are also deficiencies in the integration of planning for ESFM values across all tenures. In particular, there is a need to clarify the institutional arrangements and resources needed for recreation, cultural heritage, commercial use, forest planning including yield scheduling, management of activities such as fire control and road maintenance, independent monitoring and reporting, and the role of Government in regulation of ESFM on freehold land. Greater recognition of the role of Local Government as a land managing agency is required. Relevant sections in the text include 1.2.3., 2.2., 2.4., 3.4., 3.5., 4.1., 4.3., 4.6., 6.2 and 6.3.

> **The Expert Panel recommends that the State recognise that it has a public obligation to provide resources for the assessment and inventory of ESFM values on all land, including freehold land, and to promote the sustainable management of these values**.
>
> **The Expert Panel recommends a review to clarify the fundamental roles and responsibilities of DNR, DPIF and DEPA**.

Delivering ESFM will involve additional resource commitment by Governments. Some of the most important include management planning and data collection for Protected Areas, management planning for public forests, support for private forestry, research and development, information management, support for cultural heritage, assessment and inventory of ESFM values, and development and implementation of adequate survey and monitoring programs. In decisions about the allocation of resources, and the level of resources, care should be taken to allow for the changing roles of different agencies.

> **The Expert Panel recommends reassessment of funding priorities and funding levels to reflect the changes necessary to achieve ESFM.**

3 Land Clearing

Continuing land clearing on freehold land (for agricultural and urban development) represents the greatest threat to the maintenance of ESFM values within SEQ. The single most substantial need for ESFM in SEQ is for an adequate process to regulate clearing of freehold land. Relevant sections in the text include 3.5.4 and 3.5.6.

> **The Expert Panel recommends the implementation of systems and processes to regulate clearing on freehold land, so that ESFM may be delivered over the total forest estate.**

4 Forest Planning and Management on Freehold (private) Lands

There are no processes to support the proper planning of forestry activities, or for the implementation of codes of practice, or the monitoring of outcomes on freehold land. The lack of a State-wide approach to the regulation and support of forestry activities on freehold land is a serious deficiency for ESFM in SEQ. Relevant sections in the text include 2.2, 3.5.5, 3.5.6, 4.1, 5.2.2 and 5.2.3.

> **The Expert Panel recommends that for freehold land there should be a mandatory code of forest practice, a blend of public and self regulatory processes. The code should make provision for: the preparation of forest plans; monitoring of compliance; harvest security; recognition of a landowner's duty of care; and arrangements for protecting values above the duty of care through a range of options including voluntary measures, statutory covenants, mandatory protection and land purchase**.

5 Public Involvement in Planning and Policy Development

Natural resource management systems fail when public confidence in those systems is eroded or when those systems do not meet changing public expectations. The Expert Panel believes that mechanisms are needed to involve the public at several levels of planning and policy development. Relevant sections in the text include 1.2.3, 1.2.4, 2.3, 3.5.2 and 5.2.4.

The Expert Panel recommends that:

1. **A Forest Management Advisory Council be established to provide general guidance on strategic policy to the Ministers responsible for Primary Industries, Natural Resources and Environment portfolios.**
2. **Approaches used to involve diverse stakeholders in plan and policy making at different scales be reviewed.**
3. **Forest land management agencies develop and maintain regional and sub-regional citizen committees and indigenous land management committee during planning and to provide on-going comment on forest management.**

6 Regional Planning and Allocation

ESFM entails recognition of the multiple uses and values of all the forests across the SEQ region. A significant proportion of the forest is in public tenure, although it is managed by several agencies. There are competing demands for access and use of these forests and resolving these competing demands is a major issue for planners. For some uses in SEQ (e.g. recreation, biodiversity protection) this can only be done by starting with the regional context. Currently, regional cross tenure planning and forest use allocation processes are poorly developed, although these will be crucial for achieving ESFM. Relevant sections in the text include 1.2.3, 3.1, 3.2, 3.3, 3.4, 4.5 and 5.2.4.

The Expert Panel recommends that regional strategies be developed for each of the major forest values such as biodiversity, recreation, timber and non timber uses, water yields and quality. Systems and processes need to be developed to improve co-operation between agencies in the collection and analysis of data for planning, procedures for evaluation of alternatives for allocation, and effective linkages made to public participation processes, including the proposed Forest Management Advisory Council.

7 Management Plans for Protected Areas

There is a need for state-wide and regional policies and plans that identify goals of Protected Areas. There is a lack of data on which to base management decisions and few resources are devoted to identifying and filling information gaps. Strategies for new land acquisitions are well targeted but under resourced. Relevant sections in the text include 2.4, 3.5.1, 5.2.2 and 5.2.3.

The Expert Panel recommends accelerated development of management plans for Protected Areas, supported by appropriate funding and development of strategies, including resources for extending the protected area network.

8 Management Plans for State forests

Future planning for management of State forest will utilise the MUMPS system. This newly developed system has been trialled and completion of a planning manual is expected within twelve months. Forest area planning will require some revision of boundaries to reflect recent changes in institutional arrangements and to best capture the interests of stakeholders in specific forest areas. MUMPS involves extensive public consultation and this is considered as essential. Relevant sections in the text include 3.5.2, 4.1, 4.4 and 4.5.

The Expert Panel recommends that a statutory basis be provided for the MUMPS system that includes Ministerial approval of plans. These plans should include ESFM objectives and targets coupled with a reporting requirement on performance.

9 Recreation

Catering for growing demand for outdoor recreation and managing the environmental impacts of recreation is a significant management issue for forested lands in SEQ. Relevant sections in the text include 2.4, 4.1 and 4.2.1.

> **The Expert Panel recommends that a coordinated research and data management facility for outdoor recreation be established to provide the information required for regional scale analysis; and that a cross-government planning facility be developed to develop regional perspective on the supply and management of recreational opportunities across all tenures.**

10 Cultural Heritage

There is a lack of systems for cultural heritage management. To facilitate detailed consideration of cultural heritage issues, a working group was formed and proposes a work program to remedy these problems. The Expert Panel has examined the proposed work program and made a series of recommendations to ensure that cultural heritage is protected and managed as part of ESFM. Relevant sections in the text include 1.2.3, 4.1 and 6.3.

> **The Expert Panel recommends changes to heritage legislation including both indigenous and non-indigenous legislation, that provide (i) a definition of cultural heritage which is inclusive of all values relating to place, particularly social and spiritual values, and (ii) effective provisions for protection, declaration of significant places, emergency procedures and dispute resolution. The Expert Panel also recommends systematic reform of administrative and operational aspects of cultural heritage management based on a whole-of-government approach.**

11 Native Title

The complex, slow and adversarial legislative and bureaucratic machinery devised to respond to claimant and non-claimant native title determination applications is an important source of uncertainty and delay to forest management and planning decisions. Relevant sections in the text include 3.1, 3.6 and 6.3.

> **The Expert Panel recommends a regional effort to develop an Indigenous Land Use Agreement under the *Native Title Act 1993* for the settlement of these issues. The Expert Panel believes that a *process agreement* should be pursued; this would be concerned with guiding future management activities and decisions that might affect native title and other indigenous interests and provide a process for working through the issues**.

12 Managing Wood Flow

Wood flow prediction is a key element in multiple use forest management planning in public forest management. While yield prediction systems for plantation forests are well established, those predictions from native forests are more difficult. The Queensland system (SKED) incorporates estimation of forest areas, measurement of forest condition and a system for simulation of forest growth and potential yields. Systems such as SKED are based on measurements of past forest growth and harvesting practice, and cannot provide reliable estimates of forest yield where there are substantial changes to silviculture or environmental protection measures. For these reasons, forest yield is managed on an adaptive basis, with allocations being made for short periods. To assure sustainability, this must be coupled with adequate monitoring of forest condition and yield indicators to allow readjustment of the allocation in subsequent periods. Relevant sections in the text include 3.5.2, 3.5.6, 4.4 and 4.5.

The Expert Panel recommends that the system be improved by development of a GIS basis for estimating harvesting area. The yield simulation tools should be improved through on-going research and development. Timber harvest levels should be established in the MUMPS forest area planning process. Sustainable harvesting indicators need to be monitored adequately and results published during the period of the plan, allocation levels reviewed at the completion of a planning period, and adjustments made to accommodate differences between estimates and realised change in forest growing condition and harvest yield. Timber allocation should be included. Allocation of cutting levels should only be made over periods 5-10 years because of uncertainties in forest stocking levels and growth."

13 Managing Risks

Monitoring systems must reliably detect serious or irreversible environmental impacts on ESFM values if ESFM is to be delivered. Simple, but seldom employed, methods exist to (a) calculate the chance that such impacts have been missed and (b) estimate the sampling effort required to be confident about detecting such impacts. Estimating the size of impacts and the uncertainties of the estimations is crucial. Making these calculations would allow planners and the public to better assess the risks associated with management decisions, and would increase confidence in the process among stakeholders. These methods should be couched within the broader context of formal risk assessment, and they demand minimum data standards. The methods provide a concrete procedure for implementing the precautionary principle.

Operationally this means: putting in place a formal process for hazard identification and risk assessment; agreeing on a set of management goals supported by relevant indicators; setting acceptable critical thresholds for change in these indicators; specifying standards for data acquisition and management; agreeing on levels of reliability for reporting impacts; adopting methods for estimating the chances of detecting, and failing to detect, changes, and implementing steps to reverse detected serious impacts. These steps require public participation, and should be supported by routine, transparent publication of protocols and outcomes. Environmental survey, research and development and application of Codes of Practice are also important approaches to identifying and managing risk. The Expert Panel made a set of recommendations summarised as follows. Relevant sections in the text include 1.2.3, 1.2.4, 2.4, 3.5.3, 4.1, 4.2, 4.3, 5.2.3, 5.2.5 and 5.2.6.

The Expert Panel recommends that agencies report regularly (every two or three years) on the sustainability of forest management activities using reliable and transparent mechanisms. The monitoring system supporting delivery of ESFM should take into account and report on the chances that undetected impacts have occurred. This system should be embedded within a formal risk assessment and risk management framework. This process is common to all recommendations that mandate monitoring.

14 Flexible Silviculture to Deliver ESFM

Within the context of agreed regional ESFM goals, participatory planning processes that consider the contributions of all tenures, should be used to define the management objectives and ESFM targets for specific areas of forest, and the silvicultural options for achieving these. Where such processes identify specific forest areas where wood production is accorded a high priority, silvicultural practices could be modified to enhance wood production. In these circumstances silvicultural regimes can be developed e.g. regimes that encompass flexibility in the number and spatial distribution of habitat trees (Schedule 6 of the Code of Practice for Native Forest Timber Production) to deliver a range of conservation and wood production outcomes on a particular area of forest. Relevant sections in the text include 4.1, 4.4 and 4.5.

The Expert Panel recommends that where harvesting intensity is increased to facilitate wood production, there should be no negative impact on agreed site level conservation targets or other environmental values. Flexibility is also needed at those locations where

it is agreed that biodiversity conservation is of high value as there may be a need to enhance the number and spacing of habitat trees.

15 Management of Biodiversity

A substantial amount of the region's forests has been cleared or ecologically degraded. Less than 3% of forests are classified as old growth (Queensland and Commonwealth Governments, 1999). The threat from land clearance is ongoing and potential threats from grazing, fire and timber harvesting are largely not quantified. The information base to support planning is poor. Relevant sections in the text include 1.2.3, 2.2, 2.4, 3.5.1, 4.1, 4.4 and 5.2.

The Expert Panel recommends that within the context of an RFA, there is a need to develop state and regional strategies that clearly define the objectives for biodiversity management, protect and encourage the recovery of old growth, identify, monitor and protect priority forests on private land, and deal with the impacts of grazing through risk minimization and tactical research. Priority should be given to establishing a dedicated reserve system based on comprehensiveness, adequacy and representativeness, necessarily complemented by management outside Protected Areas that protects and restores important habitats and populations. The *Nature Conservation Act 1992* should be amended to require management plans for rare species, threatened species, threatened ecosystems, and threatening processes. These actions should be underpinned by setting and reporting performance criteria.

16 Impacts of Grazing and Fire

A considerable proportion of the forests under State and private control supports cattle grazing. Interactions between grazing impacts and fire management activities may pose significant threats to all ESFM values unless managed conservatively. There are no management prescriptions or Codes of Practice that regulate the effects of grazing on threatened species or ecosystems. There are no explicit audit requirements or guidelines for assessing compliance. Relevant sections in the text include 2.4 and 5.2.6.

The Expert Panel recommends implementing impact studies and monitoring programs to determine the effects of cattle grazing on individual species, and on the structure and function of ecosystems; developing management plans for threatened species that account for the effects of grazing; and completing and implementing a Code of Practice for grazing. If the benign nature of current grazing practices cannot be demonstrated within 5 years, grazing intensity on public lands should be significantly reduced until such time that ecological sustainability can be demonstrated.

17 Socio-Economic Impact Management

The Expert Panel recognises that in balancing the various environmental, social, economic, and cultural values of forests in order to achieve ESFM in SEQ, the RFA process will involve both consideration of possible tenure changes for public forested land, and changes to forest management systems and uses.

In turn, this may result in substantial if localised social and economic impacts on some communities. These issues have been addressed (including through the recently released CRA Social Assessment Report and the development of the Commonwealth-State Forest Industry Development Assistance Programme), and will be further examined in the forthcoming Directions Report. However there is a need for continued scrutiny of any impacts. Relevant sections in the text include 4.2.1, 6.1 and 6.2.

The Expert Panel recommends a mechanism be established to continue to identify and monitor the social and economic impacts of changes in resource use and to implement strategies designed to manage these impacts over the life of the RFA. One means of

achieving this would be to have this as part of the terms of reference of the Forest Management Advisory Council.

18 Forest role in the Global Carbon Cycle

The greenhouse issue and the role of forests in the carbon cycle will influence the future management of forests and the timber industry. It is of particular concern for Queensland because of the high rate of tree clearing and per capita CO2 emission. There are opportunities for positive environmental, social and economic outcomes. Emission trading could result in increased investment in plantations. There are carbon opportunity costs associated with different forest management scenarios. The amount of carbon stored in a forest depends on how it is managed. The State Government has endorsed the National Greenhouse Strategy. A Greenhouse Task Force has been established and is currently developing policy options. The RFA is at risk of locking forests into management scenarios that clash with evolving greenhouse policy, with consequent significant costs. Relevant section in the text is 5.1.

The Expert Panel recommends that the carbon consequences of forest management scenarios be evaluated, and that Queensland Government planning and policy options anticipate these emerging policy responses.

1 INTRODUCTION and METHOD

1.1 Purpose of this Report

This report presents an independent Expert Panel assessment of current forest management systems and processes across all land tenures in SEQ in terms of their ability to achieve Ecologically Sustainable Forest Management (ESFM). (See Terms of Reference in Appendix 1)

The report is to guide State and Commonwealth Governments in the Regional Forest Agreement process on improvements needed in existing forest management systems and processes to achieve ESFM.. See appendix 2 for a list of all abbreviations used.

1.2 What is Ecologically Sustainable Forest Management (ESFM)?

1.2.1 Definitions of ESFM Provided by Government and the RFA Process

The National Forest Policy Statement (NFPS) (Commonwealth of Australia, 1992) provides the framework for assessing ecologically sustainable forest management in Australia:

'The Commonwealth-State regional agreement resulting from the [comprehensive regional] assessment will also cover guidelines for all aspects of ESFM of the forests in question, taking into account the existing regulatory framework in the States and building on forest management strategies and practices. In this respect, the guidelines will cover, for example, management for sustainable yield, the application and reporting of codes of practice, and the protection of rare and endangered species and national estate values. They may also specify the levels and types of disturbance that are acceptable for a particular forest so as not to adversely affect national estate and other conservation values of that forest'. (Commonwealth of Australia, 1992a, p.25)

The Expert Panel was instructed by the Steering Committee of the Queensland Regional Forest Agreement process to use as its assessment criteria those in the document "Elaboration of the Steering Committee endorsed Goals/Objectives Guiding Principles and Strategy to Achieve ESFM". (within the Terms of Reference, Appendix 1) The Goals and Objectives of ESFM as defined in this document are:

"ESFM should:

a) be achieved across all land tenures;
b) maintain, or where necessary, enhance ecological and evolutionary processes within forests;
c) maintain, or where necessary, enhance the biological diversity of forests, from genes to landscapes, and,
d) optimise the net social, economic and cultural heritage benefits derived from a mixture of forest uses within ecological constraints, whilst maintaining options for the future"

The guiding principles are:

Principle 1 -
The maintenance, protection or, where appropriate enhancement of the following:

- Biodiversity to ensure the viability and integrity of all elements
- The productive capacity and sustainability of forest ecosystems
- Forest ecosystem health and vitality
- Soil and water resources
- Forest contribution to global carbon cycles
- Long-term multiple social and economic benefits to meet the needs of societies
- Natural and cultural heritage values.

Principle 2 –
Where appropriate the use of the precautionary principle for the prevention of environmental degradation (IGAE 1992).

Principle 3 -
Prevention or mitigation of impacts, both on-site and off-site, of forest management practices, which are, or may be deleterious.

Principle 4 - Indigenous cultural heritage.

1.2.2 The Expert Panel's Interpretation of ESFM Used in this Assessment

The Expert Panel appreciates that stakeholders may hold differing understanding of ESFM and expectations about the kinds of questions

that the Expert Panel should address. For example, three key stakeholder issues are:

- Trade-offs between competing values-are all ESFM values equal or is there a hierarchy of values (i.e. do some values taking precedent over others?)
- Resource security for the timber industry-can an 'annual allowable cut' be specified for a 20-40 year period (e.g. 83,000m^3 per year for 20 years)?
- Biodiversity conservation-how much of the existing biodiversity should be protected?

The Expert Panel's terms of reference required that it assess systems and processes for ESFM. We have interpreted this to mean that we are to make recommendations to ensure that systems and processes were in place so that ESFM could be delivered. In this context, the recommendations do not include specifying targets for ESFM values such as how big the reserve system should be, how much wood should be logged.

The Expert Panel believes that an underlying concern is how to 'operationalise' the concept of ESFM.

Ecologically Sustainable Forest Management represents a new way of thinking about and implementing forest management. Traditionally forest managers were concerned with ensuring a sustainable supply of wood. The idea then developed that wood supply should be constrained by considering other 'non-wood values' such as biodiversity, recreation or water quality. However neither of these is a suitable conceptual basis for ESFM. Rather, ESFM demands adoption of an Ecosystem Management approach which recognises that what is being managed is an ecological system not a human engineered system.

ESFM also draws heavily upon ideas that have emerged in the field of Ecological Economics. It is rooted in the idea that the natural environment encompasses the economy-so that the economy is seen as an open system within the global ecosystem (the Ecosphere). The fact that the human economy nests within the Biosphere means that Earth's ecosystems provide services that we must have and cannot do without, and that all economic activity is 'enabled' by the natural environment (Prugh 1995). This concept is illustrated in figure 1.

Bodiversity is of value for two fundamental reasons. First, Australian society has decided that it greatly values the existence of forest-dependent plants, animals and microorganisms. This is a culturally based value. However in addition, By is valued because this same biodiversity constitutes the very structure of the forest ecosystem and is the source of its resilience and regeneration. The term resilience refers to the capacity of an ecosystem to absorb and recover from external perturbations. Biodiversity conservation is therefore the cornerstone of ecosystem management.

The prime directive of ecosystem management is that economic activity must operate within the ecological constraints of the forest ecosystem. This has two implications. First, forest products cannot be extracted at a rate that exceeds the rate at which they can regenerate. Second, forest ecosystems cannot be disturbed in a way that exceeds their resilience. A major problem is that the limits of resilience for forest ecosystems are only poorly understood. This means there is uncertainty as to how much and what kind of external perturbations a system can tolerate before it is significantly ecologically degraded. This uncertainty is a major reason why forest management must make use of the precautionary principle.

Unfortunately, the ecological integrity of the forest ecosystems in relation to the demands of Ecosystem Management has yet to be determined. Until this occurs, it is not possible to deliver a reliable answer to questions such as 'how much wood' and 'how much biodiversity'. Ecosystem limits are uncertain and management systems must be adaptive and consider the risks involved in using forest resources.

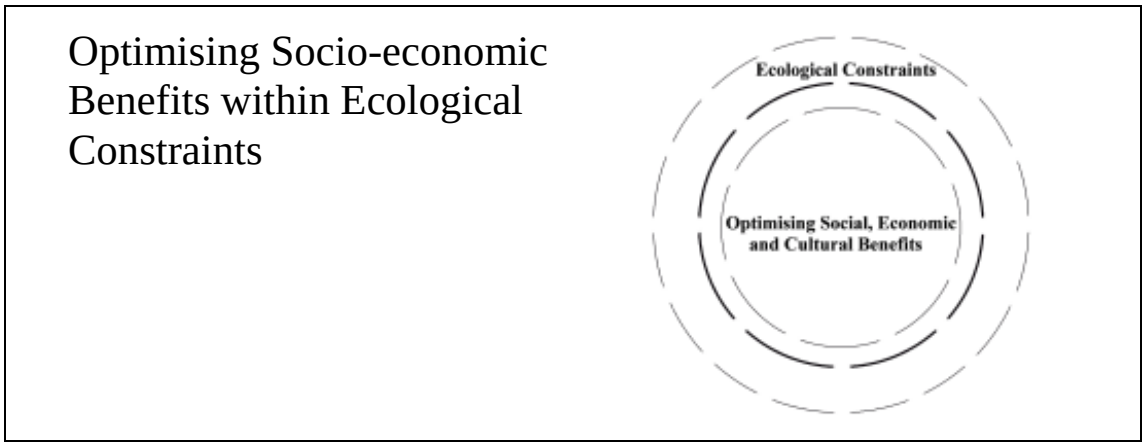

Figure 1: Alternative Modes of Ecosystem Management

Unfortunately in SEQ, as elsewhere in Australia, we do not have a 'clean slate' from which to implement ecosystem management. About 40% of Australia's forest cover have been cleared in the last 200 years. Of the remainder, regrowth from past logging covers about 60%. Forests have also been subjected to alteration arising from management activities such as silvicultural treatments, rates of extraction, fire regimes and grazing and from impacts such as posts and weeds. This legacy of previous management sets the context for current attempts to achieve ESFM through ecosystem management.

There are two implications. First, it is highly likely that certain forest ecosystems with SEQ are degraded and in need of ecological restoration in order to allow their characteristic structures and system resilience to be renewed. Second, the design and implementation of systems and processes established for ESFM and subsequent management targets (in relation to outcomes such as 'how much biodiversity or 'how much wood) must be informed and guided by the current state of the forest ecosystems in the region.

In light of the preceeding discussion, it is incumbent on this Expert Panel to provide advice on systems and mechanisms that, if implemented, will provide the best possible chance of achieving ESFM within the near future. In that spirit, the Expert Panel has made every effort to make recommendations that are cost-effective and achievable. It is not possible, given the magnitude and complexity of the task, to identify all contingencies, nor to make recommendations that depend on the ecological integrity of the forest and its ability to rehabilitate when these factors are unknown. However it is clear that achieving the goal of ESFM in SEQ will require some readjustment of social priorities, community expectations and the status quo of forest management and regulation on all tenures, and will require a flexible approach to the use of forests in the future.

Table 1 Approaches to the ESFM Principles in the Assessment

Principle 1 The maintenance, protection or, where appropriate enhancement of ESFM values.	The Expert Panel systematically assessed forest management systems' ability to achieve these outcomes.
Principle 2 Where appropriate the use of the precautionary principle (IGAE 1992) for the prevention of environmental degradation.	The Expert Panel's interpretation and approach to using the concepts inherent in the precautionary principle are discussed below.
Principle 3 Prevention or mitigation of impacts, both on-site and off-site, of forest management practices, which are, or may be deleterious.	The Expert Panel considered this principle to be at the core of forest management goals and actions and used it as a major criterion in assessing management systems. It does not report separately on this principle.
Principle 4 Indigenous cultural heritage.	A working group of Commonwealth and State officials, and including an Expert Panel member, considered this Principle in depth. The Expert Panel used the working group report as a prime source of information in reaching its conclusions on this principle.

1.2.3 Interpreting the Precautionary Principle

Commonwealth and State Governments have made much of the precautionary principle as one of the key principles of ecologically sustainable forest management. It has appeared in a number of broad policy statements, in particular, the National Strategy for Ecologically Sustainable Development (1992, p 8) and the National Strategy for the Conservation of Australia's Biological Diversity (1995, p 5). It also appears in the Intergovernmental Agreement on the Environment (IGAE) (para. 3.5.1) and the National Forest Policy Statement.

The precautionary principle is one of the principles that can assist in the achievement of ecologically sustainable development. It is defined as follows:

> If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Better information will reduce the need to apply the precautionary principle. This provides a major incentive for research, survey and monitoring to provide such information. The precautionary principle has particular relevance:

- where surveys for identification of threatened species, populations and communities affected by activities have been inadequate;
- where scientific knowledge limits our ability to predict the magnitude and importance of impacts;
- when setting minimum targets for reservation and retention to ensure long term viability.
- when setting codes of practice to ameliorate poorly known impacts.

There is still a considerable amount of discussion about the meaning of the precautionary principle and how it may be put it into operation. In applying the precautionary principle there is a need to evaluate potential threats, including the probability of an event and the magnitude of its consequences

A risk-weighted judgement is required of the possible cost of management action that precipitates serious or irreversible environmental damage. The precautionary

principle should be considered alongside social and economic considerations. A key issue is whether or not the precautionary principal is always evoked. Where it is applied, there will usually be a choice in the means employed to prevent environmental harm. This decision will consider a range of relevant information, e.g. economic values.

Consequently there are two levels of decision making. The first is whether the precautionary principle will always be invoked, and secondly if it is, then how will the trade off between ESFM values be achieved.

Questions which arise include:

- How should decision makers deal with proposed activities where there is no scientific evidence of likely impact (e.g., the effect of fire on a particular species of plant).
- Under what circumstances, if any, should a particular proposal be delayed while more scientific research is carried out?
- If the precautionary principle is read as requiring that more research should be carried out before a decision is made, does it have anything to say about how that research should be carried out e.g. the number and timing of surveys?

A satisfactory application of the precautionary principle requires that the following elements of an adaptive forest management system be operational and effective:

- public participation to expose and resolve differing perspectives on risk;
- production of management plans that define environmental targets monitoring protocols and evaluation procedures.
- open processes of reporting environmental outcomes, and for review and improvement of plans and practices. The adequacy of monitoring programs must be addressed explicitly.

Currently, only some elements of an adaptive management system are in place in SEQ. As discussed in this report, significant further developments are required. There are, however, several precautionary practices in place e.g.:

- protection of habitats of rare and poorly known species in reserves or retained areas where development is prohibited.
- conducting uncertainty analysis during the preparation of species management profiles and their prescriptions.

The most appropriate way of implementing the precautionary principle at the operations level is through comprehensive bioregional planning, together with adequate survey, auditing and conservation evaluation.

Recommendation:
The DNR in consultation with other relevant government agencies should prepare guidelines for the application of the precautionary principle to policy development and planning processes aimed at delivering ecologically sustainable forest management in SEQ.

1.2.4 The Importance of Scale Issues and Trade-offs amongst Forest Values

It is clear that there is no simple or precise operational definition of ESFM principles. The Expanded Principles (Appendix 1) address the components of ecologically sustainable forest management (or forest values) seen as important to society. However, the relative weighting given to the values, and the quantity of each desired will vary locally, and thus must relate to agreed management goals for particular forests. Emphasis will vary from conservation, through multiple use, to intensive wood production (for example plantation forestry).

Forest values vary in both space (for example with environmental conditions) and time (for example, during forest succession after disturbance and as forests age). This is true for both protected natural forests and those that are managed for timber production. It follows that not all parts of the forest can contribute equally to all forest values, and that any patch might well make different contributions at different points in time. Management plans must reflect these aspects of forest life and address ESFM at appropriate scales. For example, soil and water values need to be protected at the site level by local engineering measures, while others (e.g. home range and population targets of large vertebrates) must be considered at the whole forest scale. Wood production goals will also be set at larger scales, with some patches of forest making no contribution and others making a large contribution. This is effectively a zoning of forest use to meet agreed objectives. Any such initiative should be set in a broader context of strategic planning for ESFM goals that include vegetation structural and other ecological goals.

Clearly, it is unrealistic to expect particular patches of forest to provide the same level of all forest values when they are managed for different purposes. The community must decide what levels and mix of environmental, social and economic values provide an acceptable balance for ecologically sustainable forest management. However the Expert Panel stresses that setting targets for ecologically sustainable forest management should not be based solely on stakeholder consensus, because this can fail to adequately consider the scientific requirements for maintaining some values (for example, viability of species populations, sustainable wood supply). The selected mix of values must consider some loss of habitat on the one hand, and potential wood production on the other. A key issue is that of irreversible change (for example, species extinction, severe soil erosion). Where this is judged to be a significant threat, a highly precautionary approach to forest management must be adopted as implied by the Ecosystem Management approach outlined – 1.2.2.

1.3 Defining Systems and Processes

ISO14000 provides a framework for defining and evaluating forest management systems and processes. The components of such a system are:

1) The commitment and policy framework (including legislation).
2) Planning.
3) Implementation.
4) Measurement and monitoring.
5) Compliance systems and auditing.
6) Review and improvement

In the Stage 1 assessment the Expert Panel reports on each of these systems and components for each of the land tenures. This Stage 2 report uses these components as a guide only in conducting and presenting its assessment.

1.4 Assessment Methods and Processes

The assessment of ESFM in Queensland was carried out in two stages.

Stage 1 Assessment

In the first stage an Expert Panel provided an independent assessment of whether the forest planning processes and management systems for delivery of ESFM in the SEQ RFA region were sufficient to proceed to a full CRAIF review. That Expert Panel consisted of Professor Geoff McDonald (Chair), Dr Steven Cork, Dr Bob McCormack, Mr Graham Wilkinson, and Professor Douglas Fisher. The Stage 1 assessment was undertaken mainly as a desktop exercise assessing the overview documentation on forest management systems and processes (Background report) in September and October of 1998.

The Expert Panel reached conclusions and recommendations on each of the main tenures i.e. Protected Areas, State forests, other crown land and freehold land. While the Expert Panel identified significant deficiencies in forest management systems on freehold land, overall they considered that there are sufficient systems in place warranting a full assessment in Stage 2.

Subsequently, the RFA Steering Committee endorsed progression to a Stage 2 (CRAIF review) assessment and in recognition of the identified deficiencies established working groups on private property and cultural heritage issues.

Stage 2 Assessment

This report contains the results of the Stage 2 assessment and should be read in conjunction with the Stage 1 assessment and other documents to obtain a comprehensive picture of forest management systems and processes across all tenures. Associated documents are the “Background to Assessment of Queensland’s Ecologically sustainable Forest Management Systems and Processes (DNR, 1998) and the Stage One report by the Expert Panel.

The Expert Panel for the Stage 2 assessment comprised:

Professor Geoff McDonald (Chair), The University of Queensland

Assoc. Professor Mark Burgman, The University of Melbourne

Dr Steven Cork, CSIRO, Wildlife and Ecology

Dr Marcus Lane, Royal Melbourne Institute of Technology

Dr Brendan Mackey, The Australian National University

Dr Robert McCormack, CSIRO Forestry and Forest Products

Dr John Raison, CSIRO, Forestry and Forest Products

Mr Graham Wilkinson, Forest Practices Board Tasmania

In addition two working groups examining private land and cultural heritage issues for ESFM supported the Expert Panel. These working groups reported directly to the Steering Committee, though their work was to inform the reconstituted Expert Panel. An Expert Panel member was a member of each working group.

As part of Stage 2, the Expert Panel met as a group and worked individually as required, from January to March 1999. They reviewed a number of documents (Appendix 3) and received oral and written submissions from a wide range of stakeholders and departmental officers.

The Expert Panel incorporated findings of a report evaluating environmental management systems provided by Mr Stan Rodgers, AVTEQ Consulting Services.

2 LEGISLATION and ADMINISTRATION

2.1 Legislative Reform

Most of SEQ is in the forest biome and potentially all environmental, resources and economic development legislation and policy applies to forested lands. For ESFM forest management, legislation must:

- have goals based on principles for ESFM consistent with the purposes of the legislation;
- provide clear guidance to the achievement of the goals in the instruments and plans created under the legislation;
- set out appropriate processes for preparing these instruments and plans including public involvement and adequate information;
- specify requirements for the implementation, sanctions, monitoring and review of the management system.

There also must be a holistic perspective on ESFM–"Balancing social, economic and cultural heritage benefits within ecological constraints while maintaining options for the future." This goal of ESFM needs to be a fundamental plank in legislation applying to natural forest resources. Once legislated the objective needs to be operationalised through the planing and monitoring framework of the whole ESFM system.

Four acts are paramount in managing forested lands. These are the *Nature Conservation Act 1992*, *Environmental Protection Act 1994*, *Forestry Act 1959* and the *Integrated Planning Act 1997*

The *Nature Conservation Act 1992* provides for the protection and management of Protected Areas and for the protection of Queensland flora and fauna. The *Environmental Protection Act 1994* defines and makes it an offence to cause significant levels of environmental damage. The *Forestry Act 1959* provides for the declaration and management of State forests and lists and regulates the taking of forest products. *The Integrated Planning Act 1997* sets out the framework for statutory local planning and establishes a regional planning process through the Integrated Development Assessment System (IDAS), IPA co ordinates development assessment and approvals across government.

The Expert Panel is not satisfied that these acts considered individually are meeting ESFM principles within the purpose of each act. In various parts of this report, weaknesses of specific legislation are set out (e.g. section 5.2.3 for recommendations with respect to the *Nature Conservation Act 1994*).

In particular, the Expert Panel notes that taken collectively the whole set of legislation does not provide an adequate foundation for ESFM. The greatest weakness in the current system is the absence of any transparent and accountable means by which the multiple social values of forests can be achieved within the ecological constraints.

A particular weakness is the *Forestry Act 1959* which amongst other things lacks a commitment to ESFM under the objects of the Act. The *Forestry Act 1959* was due to be replaced in the early 1990s by the Natural Resources Management Act, drafted to amalgamate nine natural resources acts in whole or in part. The Natural Resources Management Bill (NRM) was not passed through parliament. The purposes of the Bill were to:

- Protect the sustainable productive capacity of natural resources while allowing for their sound economic development.
- Ensure the impact of natural resource use is consistent with ESD principles.
- Ensure fair access to and allocation of resources.

The Bill applied across all tenures and incorporated new policies for natural resource management. In respect to forest resources it was proposed to:

- Apply to State forests to provide a clearer multiple use management mandate.
- Ensure management planning requirements for State forests.
- Ensure public participation in planning.

Not having the NRM legislation has caused a significant imbalance and a vacuum in the planning and management of natural resources across crown and private lands.

Recommendations:

1. The current legislation dealing with natural resource management needs to be reviewed from a standpoint of providing a coherent and interconnected framework.
2. In view of the abandonment of the integrated Natural Resources Management Bill, all of the natural resource legislation requires updating to account for ESFM principles, to improve its functionality, and to ensure regular review.
1. The *Forestry Act 1959* needs to be revised to provide for a commitment to ESFM, and should also provide guidance on the optimal processes to achieve the multiple goals of ESFM.
2. Further, a specific requirement concerning the content (i.e. a process for the creation and review) of management plans for each State forest within a specified period of time is needed within the *Forestry Act 1959*. There should be a clear statutory commitment within the primary legislation relating to forest management for the issue of codes of practice, management plans, and monitoring standards. The legislation should provide for public input into the development of these, and for regular review and improvement.

3. Consideration should be given to providing a statutory base for the regulation of private forestry *Forestry Act 1959*.

2.2 Institutional Arrangements

The Expert Panel recognises that the institutional arrangements within Government are relatively new and still in a process of change. It is therefore too early to determine whether they will deliver effective and efficient processes for all components of ESFM. However, at this early stage, there appears to be a number of deficiencies with respect to the integration of planning for ESFM values across all tenures.

The integration of harvest planning with other values is constrained by current arrangements in which yield scheduling and operational management of timber production is undertaken by DPIF, yet strategic planning and management for other forest uses is undertaken by DNR. Current arrangements between DNR and DPIF for undertaking and paying for activities such as fire management and road maintenance are somewhat ambiguous. Monitoring programs are carried out by DPIF and DNR, and care should be taken to avoid overlap. At the same time, there is a need for an "independent" audit of the processes used by both organisations. The current arrangements between DPIF, DNR and EPA do not appear to facilitate the integration of inventories for ESFM values, particularly on freehold land.

The average unit management expenditure ($/ha) on Protected Areas is very low by national standards.

Recommendations:

1. There is a need to review and clarify the fundamental roles and responsibilities of DNR, DPIF and DEPA. In particular, there is a need to clarify the institutional arrangements for the optimum delivery of those functions that relate to:
   - commercial activities;
   - forest planning, including yield scheduling;
   - management of activities such as fire control, road maintenance, cultural heritage and recreation;
   - independent monitoring and reporting, including clarification of the role of each agency in processes such as EMS.

2. The State should review the resource levels provided for the management of public forests. In particular, there needs to be recognition of the costs involved in the management of Protected Areas for ESFM.

2. A clarification of departmental responsibilities and resources must also address the role of Government with respect to the inventory and management of ESFM values on freehold land.

4. Formal mechanisms should be developed to facilitate co-ordination and integration of activities such as fire control and biodiversity management across State Government agencies and Local Government. Care should be taken to co-ordinate resource distribution with the changing roles of different agencies.

2.3 Public Involvement in planning and policy development

Public involvement has an important role in natural resource planning. Natural resource management systems fail when public confidence in those systems is eroded or when those systems fail to meet changing public expectations. The development of plans of management and forest policies in Queensland generally provides for public review and comment. Consideration should, however, be given to the development of a forum for on-going public involvement in forest policy at a strategic level. Since forest managers in Queensland are currently managing forests for multiple uses, they must make decisions as to how land and resources are allocated among competing uses. Since this is the most contentious dimension of forest policy, a mechanism for on-going public input is needed.

There is also a need for the results of monitoring, i.e. the performance of the management system in terms of ESFM, to be made public to ensure that both forest policy and management is transparent.

Involving the public in planning and policy-development is a complex task that requires cognisance of issues such as, among other factors, representivity and political power. There are also particular needs and issues associated with involving indigenous people in planning that also need to be recognised. In addition, opportunities for stakeholder participation may need to be provided for at State, regional and local levels.

Recommendations:

1. It is recommended that the Queensland Government establish a broadly based Forest Management Advisory Council advise Ministers responsible for the Primary Industries, Natural Resources and Environment portfolios. On strategic forest policy.
2. Planning agencies should consider the utility of developing and maintaining sub-regional citizen committees for plan formation and to provide on-going advice on forest management.
3. All regional strategies should be subject to a mandatory public review period to enable interested parties to comment on and inform their development.
4. The results of comprehensive monitoring programs should be published on a regular basis.
5. The DNR should convene an inter-agency committee to review the approaches used by the Queensland Government to involve diverse stakeholders in policy and planning.

2.4 Co-ordination, Resourcing, and Prioritising of Research and Development

Research and development is essential to the review and improvement of forest management. The most important contribution research can make to ESFM is to improve the quality of the planning, management prescriptions (especially their local application), monitoring methods, and environmental standards that are used for evaluating the effects of management on forest values.

Management prescriptions can be improved via site-specific research (case studies) that examines the effects of various forest management options in a number of representative forest environments. The results are then extrapolated to the wider forest estate using some form of environmental stratification (e.g. forest type, soil type). This approach suffers from a major limitation; namely that generally results are extrapolated from a few experimental sites to broad areas having vastly different environmental conditions. Often there is no explicit basis for how results are applied to the forest at large. It is clearly desirable to supplement site-specific research with monitoring of outcomes.

Much forest management practice involves the development of detailed decision criteria and prescriptions based on advanced scientific and technical knowledge. Whilst significant new information will be generated within Queensland forest management agencies, strong mechanisms are needed to ensure that external advice is routinely sought to capture new findings and to fill any gaps.

External peer review is an important process for minimising risk. The forest management agencies should ensure that the scientific basis of those parts of the management system that generate greatest risk to ESFM is subject to peer review. Peer review is very important in

the areas of management where there are contrary scientific interpretations or scientific knowledge is advancing rapidly. The scientific basis for management prescriptions should be made available to the public in a timely manner.

For research and development programs to effectively contribute to ESFM the following linked processes are required: broad and transparent mechanisms for defining research priorities; successful execution of the research; and capture of new findings to improve planning and management practices. The following processes are important:

- Assessment of information deficiencies (including the risks of adverse effects) during the development of strategic land-use plans.
- Identification of the key research needs in relation to ESFM in specific forest environments.
- Risk assessment to assess the consequences of not undertaking particular components of research.
- Prioritising research needs in relation to one another and securing resourcing.
- Setting targets for individual research projects in relation to what is needed to minimise the risk from lack of knowledge.
- Setting secondary processes in place to ensure adequate performance (including communication) by the research programmes.
- Ensuring plans and prescriptions are underpinned by scientific knowledge, and that these are regularly reviewed.

The processes by which research priorities (including the balance between tactical and longer-term research) are developed within agencies are not well documented. Better documentation would improve later evaluation of results and the revision of priorities. There is also not a clear process for achieving co-ordination between the agencies conducting forest research. The development of a strategic plan for research and development would address all of these components. The plan should have clear links to agency policy. The process for allocating funding to research is important and should be based on an analysis of the threats to ESFM and the contribution of research to reducing these threats.

There needs to be a formal process to ensure that research activities are oriented towards solving management problems that are relevant to those responsible for delivering ESFM. The State research effort should also include a component of research sourced and focused independently of the managing agencies. That is, the majority of the research effort should address the needs of managers in DPIF, DNR, and EPA, through a purchaser-provider model. In addition, to ensure continuation of long-term research (e.g., long-term reference areas) and research that synthesises objectives across regulators and tenures (e.g., research into grazing impacts), a balance of research priorities should be set by independent scientific advice and public input. A Scientific Advisory Committee could provide advice on the long-term and cross-tenure research goals necessary to ensure ESFM.

Given the various responsibilities and priorities established in the past, the Expert Panel identified research areas which have been inadequately addressed. These include the development of reliable monitoring systems and methods, measurement and reporting of non-wood values, and the impacts of grazing and recreation on biodiversity and other ESFM values. The cost-effective methods for monitoring include the linked areas of indicators, monitoring methods, performance evaluation and reporting (see section 4.2). Research and development is essential to developing and testing improved monitoring systems, and should be given high priority as part of the RFA.

Currently, management plans for threatened, vulnerable and rare species (see Section 5) are not mandatory under the *Nature Conservation Act 1992*. Listing of rare or threatened flora and fauna occurs under the *Nature Conservation Act 1992*, through the existing Scientific Advisory Committee (see Appendix 7). Agencies develop their own priorities for research on threatened species and threatening processes. Submissions to the Scientific Advisory Committee are received from the DEPA, which includes the Queensland Herbarium, other Government agencies and the public. Typically government agencies apply the IUCN criteria to all proposals before submission. The Committee makes formal recommendations that usually are then gazetted under the *Nature Conservation Act 1992*. The process of listing a threatened species via the Scientific Advisory Committee may take 12 months or more. There is no formal mandate for the composition or role of

this Committee. Its role could encompass scientific advice on a broad range of biodiversity issues across tenures and agency responsibilities, particularly if the composition of the Committee was broadly based and scientifically sound, from the perspectives of scientific disciplines, agencies and stakeholders.

Recommendations:

1. Research and development co-ordination should be improved via a formal and transparent process involving all relevant research providers. In the short-term this might be achieved via an inter-departmental committee that is independently chaired to oversee priority determination, resource allocation and assessment of effectiveness.
2. Formal processes should be developed to facilitate the use of new scientific information for policy development, planning and improved field practices. External input and peer reviews are essential to risk mitigation and public acceptance.
3. A new Biodiversity Scientific Advisory Committee should be established. The Committee members should be broadly representative of relevant scientific disciplines and have high professional standing. The Nature Conservation Act should be revised to provide the Committee with statutory support, and government policy mechanisms should be developed to take the advice of the Committee into account in management planning and in setting research priorities. The Committee could advise on listing threatened species, threatening processes and threatened communities, and on priorities for acquisition and management of protected areas.
4. Research needs to be strengthened generally, but particularly in the areas of: monitoring systems, quantifying non-wood values, grazing and fire impacts and recreational planning.

3 PLANNING and ALLOCATION

ESFM entails recognition of the multiple uses and values of forests. Forest planning therefore needs to give expression to these diverse uses and values and, most importantly, to allocate forests among these different and sometimes competing uses. Ecologically sustainable forest management as it is defined in the context of the RFA process, assumes that all uses and values are of equal importance. This is a complex and highly contested task requiring:

- Comprehensive information about the full range of social values and uses, including information about its ecological, social, cultural and economic value to different groups;
- A region and cross tenure perspective;
- An ongoing, contingent planning process that is capable of responding to changes in social values and expectation as well as changes to the physical resource;
- A process for allocation of land resources among diverse and sometimes competing uses and values in a manner, which is both transparent and accountable to the public.

A large number of processes and initiatives have been or are in use within SEQ in this area, but further development and a greater degree of integration are necessary to assure ESFM. A series of interlinked recommendations are made, based on strengthening a three-tiered hierarchy for planning and managing the use of forests. The three tiers are:

- Regional and across tenures, strategic plans and strategies (medium to long term e.g. 5-20 years).
- District (sub-regional) strategic tenure and land unit specific (medium term 5-10 years).
- Site or activity specific operational plans (0-2 years).

The current system is most strongly developed in the second and third tiers where activities are substantially within agency. The Expert Panel has identified the absence of a well-developed regional, inter-agency planning and allocation capacity as a critical deficiency in current systems. A regional, cross tenure perspective is fundamental to catering for and managing diverse uses across tenures and is essential to provide the context for effective planning at the district level.

3.1 Regional cross tenure strategies, plans and allocation mechanisms.

Forest management is an adaptive process, because of changes to the physical resource, changes in community expectation and changes in knowledge of natural system. The RFA is expected to introduce significant changes in resource allocation and cross tenure management, but ongoing changes require the development of processes that consider future allocation balances and possible tenure changes to meet ESFM goals. This process needs to be replicable, transparent and rational, and requires effective community consultative processes such as may be provided by FMAC, and establishment of a cross-agency capability for evaluation and allocative decisions. These processes require significant development.

Since Local Governments acquire and manage lands, including forested areas, for recreation and conservation purposes, it is important that (i) Local Government collaborates in regional planning activities and (ii)management of Local Government lands reflects ESFM principles and values.

Major forest values and processes for which cross tenure strategies and planning are critical include:

- Biodiversity (also see Sections 5.2)
- recreation;
- wood-flow;
- non-wood products (e.g. apiary, foliage);
- water quantity and quality; and
- fire.

Co-ordinated strategy development and target setting are particularly important where several agencies and tenures have been assigned roles under state policies for the supply of particular forest-derived outputs or services. In these cases, it is vital that effective cross-tenure planning addresses targets. Effective strategic planning within tenure can only be done once these are completed.

Other regional cross-tenure processes need to be addressed, such as the development of an Indigenous Land Use Agreement (also see section 3.6)

Recommendations:

1. Regional cross-tenure strategies and plans should be developed for each major forest value and process and approved at ministerial level. These must provide for public participation, and might usefully be managed by reference to the FMAC. There is a need to complete these strategies or plans in the near term (e.g. 2 years). Performance against strategies should be reviewed and updated on a periodic basis (e.g. 5 - 7 years).

3.2 Information Systems to Support Planning

There are issues related to the adequacy of current data collection, analysis and storage procedures. Regional, cross-tenure databases need to be developed and maintained for use by all land management agencies in the region. Some areas of particular concern include recreation, biodiversity, eco-tourism and non-wood utilisation of forested areas. For each of the uses data should include:

- An inventory of utilisation sites in terms of location, size, landscape class, environmental quality, tenure and management arrangements;
- User numbers across tenures over time, and yield, where appropriate (e.g. honey);
- Types of activities in different locations;
- User satisfaction.

In some cases this might require an expansion of data collection and analysis capabilities.

Recommendations:

Databases available to support regional and tenure planning need improvement, particularly those supporting biodiversity, recreation and eco-tourism management and non-wood utilisation. Processes for co-ordination of data collection and data sharing need to be streamlined, and commitment must be made to ensure ongoing maintenance of data collection activities.

3.3 Catchment Management and Regional Resource Management

The integrated management of land and water in Queensland is addressed through the Integrated Catchment Policy (1991) and the emerging system of regional resource management strategies promoted through DNR's community resource management program. A substantial source of funding for these programs is the Natural Heritage Trust. There is no legislative basis for integrated resource management in Queensland to compare with the NSW Total Catchment Act or the Victorian Catchment Management Act and little statutory guidance for forest management on steep lands, riparian zones and other key forest landscapes.

While considerable progress has been achieved in some catchments and in some regions, the depth, coverage, and effectiveness of the Queensland integrated resource management system is very patchy (See also discussion on NRM legislation). Specifically, there are no regional resource management plans for the SEQ region and only a minority of river basins covered by Integrated Catchment Management (ICM) plans.

The consequence is that at this time there is no statutory or policy framework to guide landholder and local resource management plans with respect to water, vegetation and land management. There is no set of priorities for on-ground works, plantation establishment or vegetation management.

Recommendation:

1. The regional resource management and integrated catchment management strategies prepared under the DNR's community resource management program be strengthened by having a statutory basis and co-ordinated with the regional planning process under the *Integrated Planing Act 1997* and other resource management legislation.

3.4 Recreation

SEQ has been experiencing prolonged population and economic growth. It remains one of the fastest growing urban areas in Australia. Accompanying this process of population growth and urbanisation is an increasing demand for outdoor recreation opportunities (DNR & Department of Emergency Services 1998). It is estimated that 5.1 million people visited SEQ reserves last year (CRA/RFA 1997). The recreational opportunities in the region are important both for the local population and also for tourists visiting the region. Much of the demand for outdoor recreation is focused on public lands, including naturally forested lands.

There are diverse demands for outdoor recreation. Public forested lands in the region are used for, *inter.alia* bushwalking, horse riding, four-wheel driving, picnicking, and pursuits such as orienteering, rock climbing and mountain biking. Anecdotal evidence suggests that user conflict is increasing as demand and competition for appropriate settings becomes more intense. One recent analysis has suggested that less than 7% of SEQ provides natural or partly natural landscapes for recreation (Batt, 1998) In addition, it is suggested that processes of recreation succession, resulting from the environmental impacts of recreational use and/or from management decisions, have further limited the quality and diversity of outdoor recreational settings in SEQ (Batt 1998). Stakeholders interviewed by the Expert Panel reported increasing concern over user conflict and regulation of recreation possibilities by land managers. There is concern that tenure or management changes resulting from the RFA process may further restrict access to forested areas for recreation purposes.

The magnitude and distribution of outdoor recreation on private lands is not well understood. Examples of outdoor recreation include–commercial off-road vehicle parks or venues, commercial camping areas, and commercial horse trail riding operations.

Stakeholders and some agency personnel interviewed by the Expert Panel reported an increase in the environmental impacts of recreation (see also Batt 1998).

Government responsibilities for outdoor recreation management can be summarised as thus:

- Queensland National Parks and Wildlife Service manages recreation occurring on National Parks, Conservation Parks, World Heritage Areas and other Protected Areas as defined in the *Nature Conservation Act 1992*.
- Queensland Department of Natural Resources manages recreation within State Forests.
- Brisbane Forest Park Authority manages recreation within the Brisbane Forest Park.
- Local Governments manage recreation on lands they control and acquire land for this purpose.

In addition, the Queensland Department of Tourism, Sport and Racing includes the Sport and Recreation Division that has a limited role in outdoor recreation.

There are problems with recreation planning in forests. Paramount among these is the absence of a *shared* inventory and database on outdoor recreation. Effective planning for and management of outdoor recreation, particularly in an environment of increasing demand and shrinking supply, requires comprehensive information and knowledge of stakeholder aspirations and concerns. In addition, the absence of a cross-government, regional planning perspective limits the effectiveness of recreation planning and management at smaller scales.

Recommendations:

1. A co-ordinated research and data management facility for outdoor recreation should be established to provide the information required for regional scale analysis. State Government agencies and Local Government should collaborate in the development of this facility and share existing data. The data base should (i) use standard data fields; (ii) develop an inventory of recreation sites in terms of location, size, landscape class, environmental quality, tenure and management arrangements; (iii) include visitor numbers across tenures over time for a range of recreational activities; and (iv) include data on visitor satisfaction.
2. A cross-government planning facility needs to be established to develop regional perspective on the supply and management of recreational opportunities across all tenures (see Recommendations on regional planning).
3. Queensland Government agencies should actively seek the involvement of Local Government in the development of the database described above and in regional planning activities.
4. Consideration should be given to increasing funds to the acquisition of properties deemed to have strategic importance/potential for recreation such as the ROSS systems.
5. That the Queensland Government's Eco-Tourism Strategy undergoes independent evaluation followed by policy responses to improve the efficacy of the strategy.

3.5 Tenure Specific Planning

3.5.1 Management Planning for Protected Areas

The success of a network of conservation areas depends on the identification and protection of areas that best achieve the goals of comprehensiveness, adequacy and representativeness. Rates of vegetation clearance in Queensland are such that this should be the priority for conservation in the short-term. The RFA is likely to complete an analysis that examines the comprehensiveness, adequacy and representativeness of Queensland's protected area network. This work should provide a platform for the development of a strategic plan for establishing and improving the reserve network. Some of this work is already in hand in State Government agencies, and should continue with full support and adequate resources.

There is a significant number of protected area management plans to be written. Only nineteen plans had been completed for SEQ by the end of 1998, and a further three were in draft form. State Government expenditure on management of Protected Areas is relatively low by Australian standards (expenditure on a per-ha basis is roughly 1/3 of the Australian average). DEPA intends to complete 12 plans per year for the next 5 years to complete the task.

A number of the Protected Area plans being developed under the NCA do not sufficiently report the baseline data on which they are based and appear not to address the trade-offs involved in allocating park lands to different uses. Some plans are better described as statements of management intent and provide little effective guidance to how an individual park should be managed, given (i) diverse uses, (ii) the regional context and (iii) the values of the park itself.

There is a lack of data upon which to base management decisions, and little time is devoted to monitoring and enhancing biodiversity values. There is no centralised strategic plan (at State or regional level) for biological survey or monitoring, no audit protocols for biodiversity status, and no reporting mechanisms for performance in managing Protected Areas for biodiversity. In particular there is no explicit feedback mechanism between recreational activity pressures, revenue generation, biodiversity conservation needs, and resource allocation.

The planning hierarchy for Protected Areas in Queensland involves: (1) the statutory requirements as set out in the NCA; (2) a (*Draft*) Protected Areas Planning Manual; (3) Management Plans for individual Protected Areas. In view of the fact that transparent and accountable planning procedures are a central tenet of ESFM, the Expert Panel suggests that Protected Areas Planning Manual should be formally adopted by DEPA following a review that includes independent experts in relevant areas. In addition, the Expert Panel notes that there is no guidance for park managers beyond the management prescriptions contained in management plans. The Expert Panel believes that there is a need for a Code of Practice for Protected Area management that provides detailed land management guidance to protected area managers in areas such as biodiversity conservation, recreation and visitor management, and cultural heritage management.

Conflicts arise as a consequence of land use adjacent to National Parks, especially when these uses are particularly detrimental to the values of that park. These effects are the result of things such as cattle grazing, domestic pig incursion, arson, and water quality impairment. In addition, priorities for management and resource allocation do not always reflect the biodiversity values in parks where these values are the primary motivation for the protected area. In such cases independent formal advice would provide policy support and motivation for management activities.

Recommendations:

1. Legislative guidance on the role of parks for competing uses such as biodiversity conservation and recreation opportunity provision should be provided.
2. The Protected Area Planning Manual should be formally adopted following review.
3. A Code of Practice for Protected Area Management should be developed to provide detailed land management guidance to protected area managers in areas such as biodiversity conservation, recreation and visitor management and cultural heritage.
4. A funding base to support the development and implementation of plans for all Protected Areas needs to be established.
5. Protected Area management plans need to be comprehensive; they should be informed

by regional strategies for biodiversity and recreation, provide adequate descriptions of the baseline environment, elucidate the trade-offs in allocative decisions and provide detailed management guidance. Monitoring results should be provided on an annual or biennial basis (see Section 3.5.2. and Section 4.2), and reporting of monitoring results should be done transparently (see Section 4.2.1)

6. Management plans for all Protected Areas should be completed within 5 years.
7. Management plans should be reviewed at regular intervals (8-10 years).
8. The recommended Biodiversity Scientific Advisory Committee should be used to advise DEPA with respect to management priorities for each National Park and Conservation Park, and resource allocation to support biodiversity conservation initiatives (see Section 2.5 on Co-ordination, Resourcing, & Prioritising of Research and Development, and Section 5.2.2 on Biodiversity Management Outside Protected Areas).

3.5.2 Planning on State forests

The Multiple-Use Management Planning System (MUMPS) that has been developed by DNR and is being promoted for use across Queensland is not fully developed and needs to be fully implemented for all State forests.

MUMPS is crucial to allocation between multiple uses on State forests. A number of issues need further development. Reconsideration of planning unit boundaries to reflect the balance of interests in ESFM values should be considered. These appear to be based largely on DNR district boundaries. Current wood flow calculations appear to be based on different, historical allocation zones. Other forest uses (e.g. recreation) may have other natural planning boundaries. A third consideration in setting boundaries is the need for effective involvement of relevant stakeholders. This may depend on proximity to population centres.

MUMPS forest area plans should have a statutory basis as a public document with ministerial signoff (see also 2.1). These plans should incorporate performance targets for important uses and/or areas of impact or change, and identify responsibilities for monitoring against these targets and for annual or biennial reporting.

Public involvement is critical to the credibility and effectiveness of MUMPS as a planning technique. In addition to direct involvement in plan preparation, consideration needs to be given to establishing longer-term communication with stakeholders and community.

MUMPS planning is conducted within the context of regional cross-tenure planning strategies and targets, and some of the data needed for forest area planning will be available from the major information systems supporting regional planning. Other planning data will need to be assembled and analysed by DNR from a forest area basis. Some key data and supporting systems are currently held and managed by other agencies (e.g. SKED and wood flow predictions undertaken by DPIF). There is potential for inter-agency difficulties in the operation, support and development of a key planning system component such as SKED and associated inventory programs, which function to support planning, and these institutional arrangements may require review.

The economic dimensions of wood flow and other ESFM uses need to be covered at the MUMPS level. See also recommendations within section 6.

The most important steps of the MUMPS process involve the resolution of multiple claims to the use or protection of resources and values for the planning region. Major re-allocation decisions will be a part of the RFA, and to a significant extent these pre-empt some allocation aspects of the proposed MUMPS planning process. There are also concerns by stakeholders that once finalised, these RFA decisions relating to usage rights should be fixed for an agreed period. This raises two important issues for ESFM, the role of MUMPS, and the frequency of plan revision.

MUMPS (or equivalent sub regional, tenure specific strategic planning process) is an essential component of an ESFM system to be implemented following the RFA. While the RFA will constrain some aspects of resource allocation at the district level, completion of a full round of MUMPS planning is required in the short term. The RFA will likely require significant forest usage re-allocations, but it is unlikely to be sufficiently prescriptive at the sub-regional or district level to provide a clear basis for management. MUMPS plans also need to be developed to provide essential

targets and yardsticks for subsequent evaluation of ESFM performance.

Implementation of an effective, detailed planning process is even more important in the longer term because both underlying forest condition and society's demands change through time, leading to a requirement to revisit these allocation decisions on a periodic basis. ESFM requires response to change, hence the development of effective complementary regional and sub region (district) level planning structures must be completed and fully implemented. The timing of major revisions to MUMPS plans is influenced by a number of factors. Some circumstances favour shorter planning intervals, such as rapid rate or extent of change in forest condition or user demands, or where there is significant improvement in knowledge of the resources under management. Factors favouring longer planning intervals include high costs associated with plan revision, and the potential dislocation of secure supply or access for resource users.

The extent to which resources and usage rights are fully allocated also influences the plan re-evaluation period. Uncertainty in resource availability over time is a common feature of multiple use natural resource management, requiring close attention to condition monitoring (see Sections 4.2 and 4.4) and adaptive change. Conservative levels of resource allocation can be used to provide a greater buffer for incremental management change within the planning period where it is considered important that allocation levels not change for long periods (e.g. log supply)

Planning periods of 8 – 10 years are commonly used in forestry. Since considerable changes in the extent and nature of forest use in SEQ are either already in place (implementing Codes) or expected (RFA allocation), monitoring and inventory results will be particularly important to an adaptive plan revision within 10 years.

Recommendations:

1. The conceptual and methodological development of MUMPS should be finalised forthwith and a planning manual completed.
2. Forest area planning (MUMPS) should be given a statutory basis including an approval process by the relevant Minister.
3. Planning unit boundaries currently based largely on DNR district boundaries should be re evaluated
4. Management plans should be developed for all forest areas in the region within 5 years.
5. Resource usage levels (wood, water, recreation) should be set at conservative levels, if they are expected to remain unchanged for long periods, because of uncertain knowledge of future availabilities or usage impacts (see also section 4.4)
6. Plans should include resource supply, allocation or usage levels and performance indicators that permit effective monitoring of ESFM performance. Monitoring results should be reported on an annual or biennial basis.
7. Management plans should be reviewed at regular intervals (8-10 years).
8. Ongoing research and development is required in the evolving area of multiple use planning to capture quantitative and qualitative measures of value and to develop better methods for allocation between competing values.

3.5.3 Management of Other Crown Lands

Under S.16 of the *Land Act*, prior to granting unallocated State land in fee simple, as a lease or in trust, the Chief Executive must evaluate land suitability and use this assessment to ensure the most appropriate tenure for the land (S. 16(1)). In making the allocative decision, the Chief Executive must take into account State, regional and local planning policies. A lack of resources and staff are responsible for the patchy application of this requirement. While the Expert Panel recognises that these lands constitute a proportionally small area of the entire SEQ region, a more consistent land evaluation effort may reveal that individual parcels of land have strategic importance for achieving ESFM.

Compliance monitoring of the extent to which land managers meet lease conditions is important to achieving ESFM on these lands. It is apparent that an increase in resources is required to ensure adequate compliance monitoring.

Recommendations:

1. Land suitability evaluations as required under the *Land Act 1994* should be undertaken as a matter of routine; the Expert Panel accepts that an increase in staff and resources may be required to achieve this.

2. In making allocative decisions under the *Land Act 1994*, the Chief Executive should consider ESFM as well as other State and Local policies.
3. Land suitability assessments carried out under the auspices of the *Land Act 1994* should inform the development of the regional multiple-use evaluation and strategy (as described above).
4. The setting of management conditions for the grant or renewal of a lease should take into account ESFM principles.
5. Routine compliance monitoring of lease conditions in relation to ESFM is not currently undertaken. Effective monitoring is essential and will require additional resources.

3.5.4 Land Clearing Freehold (private) Lands

ESFM, by definition, can not be constrained to specific tenures, to the exclusion of others. Continuing large-scale land clearing on freehold land represents the major threat to the maintenance of biodiversity within SEQ, due to the loss of rare, threatened and endangered species and forest ecosystems that are not contained within existing Protected Areas or State forests. Vegetation clearing is not classified as a development activity and therefore does not require approval under IPA.

The lack of an adequate process to regulate land clearing on freehold land is the single most substantial deficiency in the systems and processes for ESFM in SEQ. ESFM can not be delivered across the existing total forest estate within SEQ unless suitable systems and processes are implemented to regulate land clearing on freehold land.

Recommendations:

1. Vegetation clearance must be subject to regulatory processes for the purposes of ESFM. An appropriate legislative framework should be introduced as a priority.

3.5.5 Regulation of forestry on freehold land

Forestry requires approval as a development activity only where it involves a change in land use. However, once forestry has been approved as a development, future forestry activities are exempt from further requirements under the IPA. As a result, there are inadequate processes for the proper planning of forestry activities, implementation of codes of practice and monitoring of outcomes on freehold land. This means that there is no measure of the impacts of forestry activities on any ESFM values, including even basic values such as the protection of soil and water.

The lack of a State-wide approach to the ongoing regulation of forestry activities on freehold land is a serious deficiency for ESFM in SEQ.

Recommendations:

1. Forestry activities must be subject to regulatory processes for the purposes of ESFM. An appropriate legislative framework should be introduced as a priority.
2. The State should investigate the option of amending the IPA or introducing separate legislation to provide for the adoption of a uniform State-wide code for forestry that regulates development and ongoing activities and is able to be monitored for compliance.
3. Implementation of the code should be mandatory across all tenures.
4. The code should make provision for the preparation of forest plans, desirably at two levels: at the property level and at the operational level (e.g. harvesting unit scale). As a minimum, plans need to be prepared and approved at the operational level. A property-based management plan is the most appropriate way to demonstrate the planning processes used for ESFM (see section 4.1).
5. The State should develop a model for the delivery of the Code on private land. The model should define the roles and responsibilities of both the private and public sectors. The Expert Panel acknowledges that the introduction of ESFM processes will require a change in current attitudes with respect to the public regulation of freehold land. It will therefore be necessary to adopt a cautious approach, based on continuing improvement through education and fostering good attitudes and knowledge about the contribution of freehold land to ESFM. The regulatory system must be simple and low cost, yet still provide for adequate environmental protection. The system should be delivered under an appropriate blend of self-regulatory and public regulatory processes. For example:

- the private sector could prepare the plans and provide certification of compliance with the Code, through accredited officers under a self-regulatory mechanism; and
- the public sector could foster the achievement of good standards through mechanisms for training and education, backed up by independent monitoring and legal enforcement.

6. Compliance with the Code should be encouraged through incentives, rather than penalties, wherever possible. The State should investigate the feasibility of creating marketing advantages through systems of certification for production from sustainably managed properties.
7. The State should ensure that the legislative/policy framework provides security of harvest rights for forests established for wood production and managed on private land. This should be achieved as part of an overall package for ensuring compliance with a statewide code. The code should specify those provisions that are retrospective and those that are prospective–this needs to be determined through consultation with stakeholders.
8. The role of the public sector should be delivered by a single agency that has clear statutory responsibilities and dedicated resources for the encouragement and regulation of ESFM on private land.

3.5.6 Land clearing and forestry activities on freehold land

Recommendations:

1. The State should recognise that it has a public obligation to provide resources for the assessment and inventory of ESFM values on freehold land. This knowledge must be subject to continuing update and modification on the basis of new information. Resources and systems for managing and updating the information base are an essential prerequisite for the delivery of ESFM.
2. The State should facilitate a process for the prediction of wood yields from freehold land. The process should take account of the requirements for sustainability and the need to provide information on future yields for the purposes of industry and marketing development.
3. The legislative/policy framework for the regulation of land clearing and forestry activities needs to define the thresholds (or minimum requirements) for a landholder's "duty of care" with respect to ESFM. For example, under the Tasmanian system the thresholds are defined as including all of the minimum requirements for the protection of soil and water values within the Code of Practice, plus a defined contribution to the protection of other values, such as biodiversity. This contribution is defined as a percentage of the land area of a property. The thresholds should recognise that there may be different standards between freehold and public land. The cost of protecting values under the thresholds for a duty of care should be borne by the landholder. Protection of values above the thresholds for a duty of care should be recognised as a community benefit, and be subject to appropriate recognition of the rights forgone. The State should develop a range of options for dealing with the protection of values above the duty of care. These options should include voluntary measures, statutory covenants, mandatory protection and land purchase. (see section 5.2.2).

3.6 Native Title and Indigenous Interests

The complex, slow and adversarial legislative and bureaucratic machinery devised to respond to claimant and non-claimant native title determination applications has important impacts for land and resource use in the region. The lack of certainty that arises as a result of the slow process of settlement has impacts on land and resource managers, including forestry on public lands, leasehold land users and National Park managers. The lack of clarity and certainty in tenure arrangements may also be an impediment to new investment in forestry, and in other commercial uses of forests. In addition, the lack of formal recognition of indigenous interests in land has been identified as an impediment to the systemic involvement of Aboriginal people in biodiversity conservation (Gillespie and Cooke 1997). Finally, Aboriginal communities in the region have native title rights that they wish to give expression to and protect from inadvertent extinguishment or impairment.

In this context, the Expert Panel believes that a regional effort to achieve a comprehensive settlement of indigenous land claims, or to

develop a *process* agreement under the *Native Title Act 1993* for settlement of these issues, is an appropriate step. The *Native Title Act 1993* provides for three forms of indigenous land use agreement; body corporate agreements, area agreements and process agreements. It is area and process agreements that are potentially applicable in the RFA context. An area agreement could simultaneously provide a settlement of all land claims in the region and a framework for indigenous involvement in land and resource management and economic development. A process agreement would be concerned with guiding future management activities and decisions that might affect native title and other indigenous interests and provide a process for working through the issues.

The Expert Panel further notes the explicit support of a number of non-government stakeholders in the region, including the Queensland Timber Board and the Rainforest Conservation Society, for pursuing an ILUA. It also notes that the Eden Management Area Heads of Agreement, negotiated as part of the RFA process for southeast NSW, represented an attempt to comprehensively settle indigenous land claims and provide for community development and participation in resource management.

The Government has an important role in providing a forum for the negotiation of a binding regional agreement that accomplishes a number of objectives important to industry, Government and indigenous peoples. Government agencies with statutory responsibilities for land management will need to be involved in the development of such an agreement given the role they will inevitably play in implementation. These processes should include an indigenous people's employment strategy ensuring involvement of indigenous people in all aspects of ESFM including social and cultural heritage evaluation, biodiversity monitoring and assessment, fire management and planning. The Queensland Government has an existing legislative and policy approach for the indigenous joint-management of National Parks. *The Aboriginal Land Act 1991* and the *Torres Strait Island Land Act 1991* provide for indigenous claim and joint-management of Queensland National Parks. The *Nature Conservation Act 1992* is complementary in this respect.

It is also clear that native title survives the dedication of a National Park and is therefore claimable.

The Government's approach to joint-management of National Parks appears *ad hoc* and the Expert Panel notes that the Government has recently initiated a review of policy in this area.

The benefits of joint management can be summarised as providing for:

- Indigenous involvement in conservation and biodiversity conservation;
- Provision of economic opportunities;
- Satisfying indigenous aspirations for recognition of their rights in land; and
- Provide a tenure specific basis for indigenous involvement in cultural heritage protection and management.

Recommendations:

1. The Queensland Government should enter into discussions with Native Title Representative Bodies, and other relevant stakeholders, to develop an ILUA as provided for under the Native Title Act. The Expert Panel recommends that the Government pursue the development of a process agreement under the Native Title Act (i.e. an agreement concerned with procedural matters for future acts).

2. The Expert Panel recommends development of employment and participation strategies to ensure the involvement of indigenous people in the delivery of ESFM.

3. That the Government should adopt and consistently apply a policy that enables indigenous joint management of National Parks.

4 OPERATIONAL SYSTEMS

4.1 Codes of Practice

There is no legal commitment for codes of practice within the primary legislation for forest management (the *Forestry Act 1959* and the *Nature Conservation Act 1992*). DNR has a strong policy commitment to deliver the intent of the National Forest Policy Statement with respect to codes of practice. Codes have been developed for timber production from plantations and from native forests. These codes are enforceable on State forest and leasehold, through the mechanism of sales agreements. The codes are voluntary on private land.

The *Environmental Protection Act 1994* provides that codes may be accredited, and that such accreditation provides a defence against any alleged breach of the Act. The *Integrated Planning Act 1997* requires compliance with a nominated code for activities that are deemed to be "assessable" developments. Land clearing, and "continuing-use" forestry activities are not assessable developments under IPA.

4.1.1 Code of Practice for Native Forest Timber Production

The Code of Practice for Native Forest Timber Production is written specifically for timber harvesting operations on public land controlled by DNR/DPIF, and is not applicable to private forests. The core document (Part 1) of the Code is structured on the basis of the EMS components of ISO14001. This structure is useful in terms of documenting institutional responsibilities and processes. Part 1 also contains most of the principles relevant to the planning and supervision of operations. The Schedules (Part 2 of the Code) contain specifications in relation to a number of key activities. Some activities such as silviculture are dealt with by reference to other operational guidelines and policies. These guidelines and policies are not comprehensive and there is no system for reviewing, updating and formally linking them to the Code. This lack of comprehensive cover means that some key issues may not be formally addressed by the Code system. For example, neither the Code nor any "supporting" documents deal with stocking standards for forests (i.e. nominated stocking after harvest, including provision for the evaluation of retained stocking and regeneration success, whether from existing advance growth or new recruitment).

The Code's format is appropriate at the level of forest planners and managers within DNR and DPIF. The format and content is less appropriate for field operators. This deficiency has been recognised by DNR, who have produced a Field Guide on the Code. However, the audience for the Field Guide is not clear. The Guide contains a mixture of planning and operational guidelines and the overall document is not user-friendly, in terms of layout and lack of diagrams etc.

4.1.2 Draft Code of Practice Plantations for Wood Production

The draft Code of Practice Plantations for Wood Production is written as a common code for all tenures. Implementation of the Code will be mandatory on public lands and voluntary on private lands. The draft Code contains comprehensive principles and guidelines for the planning of forest practices in plantations. The format and content of the draft Code is less appropriate as a field guide for forest operators.

4.1.3 Other Codes

A number of other Codes have been proposed and are in varying stages of consideration or preparation:

- Code of Practice for the Harvesting of General Forest Products.
- Code of Practice for Extractive Industries.
- Code of Practice for Fire Management.
- Code of Practice for Forest Based Recreation.
- Code of Practice for Grazing on Forest Reserves.

Recommendations:

1. There should be a clear statutory commitment within the primary legislation relating to forest management for the issue of codes of practice. The legislation

should provide for public input into the development of the codes, the involvement of key stakeholders, and for regular external review and improvement of the codes.

2. The Code of Practice for Native Forest Timber Production should be reviewed to address the management of forests on both public and private land. It would be desirable for the Code to be re-written as a common document for both public and private land. Separate documents will be required if the standards and processes to be applied differ markedly between the public and private sectors. Key principles and standards should be documented within these codes, including standards that relate to forest stocking and structure. Supporting documentation should be formally linked to the codes in a transparent manner.
3. The codes should be re-formatted to ensure that they are appropriate for a wider audience, including private land owners and forest operators.
4. The codes should specifically cover ESFM values such as:
   - Soils and water.
   - Biodiversity.
   - Cultural heritage.
   - Landscape.
   - Geomorphology/geoheritage.
   - Forest regeneration and stocking standards.
5. The State should develop standards and mechanisms for implementation, compliance monitoring and legal enforcement of the Codes on all tenures.
   - 5.1. For public land, the *Forestry Act 1959* should be amended to provide a legal basis for the implementation and enforcement of the Codes other than through sales agreements.
   - 5.2. For private land, consideration should be given to the amendment of the IPA or the introduction of other legislation to allow for the adoption of uniform State-wide Codes for forest use that regulate ongoing activities and are able to be monitored for compliance. The Codes should cover continuing forest activities and not be limited to prospective changes in land use.
   - 5.3. The codes should provide for streamlined processes (see comments under Freehold land).
6. The Codes should also require the preparation of site specific plans across all tenures. Comprehensive provisions for planning on State forest are contained in the Code of Practice for Native Forest Timber Production and, to a lesser extent, in the Code of Practice Plantations for Wood Production. On private land, the plans should ideally be prepared at two levels: at the management unit or property scale, and at the operational or harvesting unit scale. The operational plan should be a minimum requirement across all tenures and forest types.
7. The Codes that deal with extractive industries, fire management and forest based recreation, grazing, other forest products should be completed in consultation with representatives from all tenures and stakeholder groups to ensure that appropriate standards can be applied for each tenure.
8. Codes of Practice for mining operations should be developed.
9. Legal and institutional support for compliance with the Codes through incentives and penalties or bonds. For example, bonds could be required, providing an incentive to comply with codes of practice, for production of wood and non-wood values.

Refer to section 3.5.5 for further recommendations relevant to the Codes of Practice.

4.2 Monitoring

4.2.1 Monitoring of the Impact of Forest Management on ESFM Values

In this report, monitoring refers to the process of measuring biological, physical and social variables that reflect the goals of ESFM. That is, it is the process of measuring the effects and outcomes of forest management practices, rather than the process of measuring compliance with protocols. The latter activity is the realm of Environmental Management Systems and Codes of Practice.

Effective monitoring programs are essential for the continuous improvement of forest management. In common with forest management elsewhere, monitoring in SEQ is poorly developed and ignores reliability to detect important impacts. That is, standard monitoring methods do not take into account the chance of *failing to detect* important environmental and social impacts. This general failing must be addressed if ESFM is to be delivered.

The EPA conducts some social research that focuses on community perceptions of the effectiveness of the conservation program and seeks to facilitate public understanding of and involvement in research and monitoring. However, the monitoring programs of forest management agencies in Queensland (e.g. DNR) emphasise environmental conditions (i.e. biophysical matters) and largely fail to monitor social, economic or cultural heritage objectives. This could be rectified by progressively adopting relevant Montreal Process Criteria and Indicators.

Recommendations:

1. Legal and policy initiatives are required for the development and implementation of monitoring and associated standards for all the ESFM values. These standards should be sufficient to detect meaningful change with adequate reliability (see Appendix 4 for definitions and background).

2. Management plans should specify the complete details of monitoring objectives, sampling protocols, biodiversity targets, evaluation procedures, time lines and reporting procedures designed to improve forest management and inform the public.

3. A set of cost-effective indicators should be developed and tested to facilitate the detection of changes in ESFM values. These need to be reviewed and improved on an ongoing basis.

4. In all forested areas, the value of all wood and non-wood products, including recreation, employment, tourism and intangible benefits, should be tracked for all forest uses, together with biophysical values. More generally, all agencies involved directly in forest management need to implement monitoring programs that account for all dimensions of ecologically sustainable forest management. A set of indicators, consistent with Montreal Process Criteria and Indicators, should be progressively developed and a program to monitor these indicators implemented.

4.2.2 Monitoring Design and Reporting of Findings

Forest managers need reliable information and they must be able to demonstrate in a timely, transparent and rigorous scientific fashion that they can detect serious or irreversible environmental impacts. Monitoring, auditing, and survey must reliably (statistically) detect any such impacts if ESFM is to be delivered. In current monitoring and auditing programs, low statistical power means there is an unknown (but potentially high) chance of concluding there is no impact or violation when there is one. Simple, but seldom employed, statistical methods exist to calculate the chance that an effect has been missed or to estimate the sampling effort required to be confident about detecting an effect. Making such calculations would allow planners to better assess the risk associated with management decisions, and would increase confidence in the process among stakeholders. These methods should be couched within the broader context of formal risk assessment.

Operationally, this means: putting in place a formal, tiered process for hazard identification and risk assessment; agreeing on a set of management goals supported by relevant indicators; setting acceptable critical thresholds for change in these indicators, levels of reliability for reporting impacts; the adoption of rules and methods for estimating the chances of detecting, and failing to detect, changes, and implementing steps to reverse detected serious impacts. These steps require public participation, and should be supported by routine, transparent publication of protocols and outcomes.

Recommendations:

1. Departments responsible for ESFM should submit public reports on the sustainability of forest management, taking account of all ESFM values across all tenures. Interpretations of sustainability should relate to objectives and methods (indicators, monitoring methods, targets) specified in forest

management plans and reporting could be part of the regular (two or three yearly) reporting recommended elsewhere (see sections. 3.5.1 and 3.5.2)

2. All statements about sustainability must be supported by a rigorous and transparent scientific demonstration from agencies that:
   (a) monitoring systems are very likely to detect any serious or irreversible environmental impacts (reflected in critical thresholds for agreed indicators); and
   (b) no such impacts were observed.
3. If serious impacts are detected, the report should include details of strategies to prevent future damage and to recover lost values.
4. Data and calculations upon which sustainability reporting is based should be made publicly available according to due process that considers respect for indigenous rights, risk to protected values, responsible use, and meeting the costs of providing the data.

The reports must include details of these systems and of the calculations that demonstrate that if there were serious impacts, the agencies would very probably have detected them.

4.3 Monitoring of Forest Health - the Biosecurity System

DPI has developed a multi-layer risk minimisation system for dealing with threats from biological organisms (pests and diseases) from outside Australia, outside Queensland and within Queensland (F.R. Wylie, March 1999). DPI take responsibility for the general implementation of this system but not in Protected Areas or Native Forests. DNR is in the process of allocating resources for implementation in Native Forests, but it appears that resourcing will be minimal. DEPA should be encouraged to fund implementation in Protected Areas.

Recommendations:

1. DNR and DEPA should commit resources to support implementation of the Biosecurity System in Native Forests and Protected Areas. DPI, DNR and DEPA should formally assess the level of resourcing required to keep risks from undetected outbreaks of pests and diseases within defined and acceptable limits and commit adequate resources for this purpose.

4.4 Predicting and Regulating Wood Flows from Native forests

Wood-flow prediction is a key element of multiple use allocation for State forest and ESFM. The current SEQ system is based on an area information system for recording forest areas (in blocks of homogenous type), an ongoing forest inventory program, and a growth and harvest simulator (SKED). The structure and performance of the system was evaluated for the CRA by Turner (Report SE 1.2). He noted that at the time of his evaluation ESFM considerations were not effectively incorporated into yield estimation. These are in part important problems that apply more generally to forest yield prediction systems and particularly to those modelling selective harvesting of natural forests. These must be recognised and accommodated for the achievement of ESFM.

One very important problem relates to estimation of the (net) harvestable area. The on-ground extent of the harvestable area depends partly on the capability of logging technologies on differing terrain, and partly on rules such as those in Codes of Practice, and on their interpretation by forest planners, field staff and operators. Both result in exclusion of areas, but exact delineation of these areas to survey accuracy is impractical, and planning systems must rely on experience and estimation. However, modern developments in GPS offer scope for improvement in field mapping and these could usefully be further explored in SEQ. Some harvest area restrictions can be modelled to a useful degree in GIS, although inaccuracies in some map layers, particularly drainage and contours are a source of error. Lack of access to these technologies is a current weakness of the Queensland system. It must be noted, however, that logging technology, Codes of Practice and the relative economics of timber extraction all change through time, and current area loss estimates will be inaccurate over the long planning periods used in forestry.

A second set of problems relates to prediction of growth. The current system relies on forest growth plots drawn from the general forest area. Some sources of impact on forest growth may not be well captured by this approach.

The first includes the impact of the infrequent destructive agents, such as high intensity fire or cyclone which are difficult to capture in forest growth measurements and thus to model. The second difficulty in growth estimation comes from changes in silvicultural practice through time. Selective removal of preferred timber species, leading to their decline in the stand species mix, and changes in the general intensity of logging, and particularly the pattern of mature tree retention can lead to reductions in timber yield (although not total forest growth). Where appropriate, active silvicultural intervention (thinning, spacing) can be used to favour preferred timber species and enhance timber yields. Systems of growth prediction based on long term forest growth plots have a lesser ability to predict the consequences of silviculture where the intended future patterns or intensities of removal is significantly different from past patterns. These difficulties are overcome in part by silvicultural research that investigates the impact on forest stand structure and forest growth of varying practices. This research would lead to modifications to the growth and harvesting functions in the SKED system.

Uncertainties such as these mean that forest growth and harvest simulators (such as SKED) provide useful but not complete tools for setting wood supply level as a component of ESFM. Several additional steps are needed. First, the potential yields suggested by inventory and SKED need to be adjusted to the best estimates of the net area factors and any modifications to growth factors as described above and due recognition given to likely sources of error and probable variance in achieved removals. In some cases these require explicit professional judgement and should involve a precautionary approach. In the second stage, potential wood supply level must be weighed against other competing values in the multiple-use planning context. Other complementary tools and/or analyses are needed to model stocks and flows of other forest use values as input to the multiple use planning processes.

For these reasons, forests need to be managed in an adaptive manner. The assurance of sustainability (in log removal) depends most importantly on effective monitoring of both forest condition (inventory) and of forest harvesting (log size and yields per hectare). Adaptive management approaches to cutting level (over a 5 - 10 year interval) can be employed effectively in forestry because of the long rotation lengths and comparatively slow changes in forest growth and condition. Differences between growth and yield forecasts and expected harvest must be captured by monitoring and yield analyses to provide the direct signals of system stability.

Public confidence and system transparency are important aspects of ESFM. In the context of yield regulation, these require the development and publication of effective indicators (e.g. estimated standing volumes, volumes removed and log dimension, areas cut, yields per hectare for different types of forest), that can be used to assess forest condition and trends. These indicators should be published periodically (e.g. 2 - 5 years) and reviewed critically in relation to levels and targets set in strategic forest management plans. This is a weakness of the current system.

SKED appears to provide a basis for the development of prediction systems for other important attributes of forest condition and change (e.g. selected habitat characteristics, carbon storage) important to ESFM. These developments require ongoing research and development, and completion of the development of the spatial (GIS) underpinning. The current institutional funding and support arrangements may require review. The growth and yield system is managed by the DPIF which has commercial objectives, while the proposed developments, and the supporting inventory which would be required, might be seen to have a high public good rather than commercial component.

Recommendations:

1. Allocation of cutting levels should only be made over 5 – 10 year periods because of uncertainty in forest stocking levels and growth. These must be integrated into the MUMPS process.
2. Sustainable harvesting indicators should be developed (e.g. removals per hectare, size of stems removed) for the important wood production forest types in each sub-region or zone to complement allowable cut determinations and provide a benchmark for system monitoring. Targets for these should be incorporated into the sub-regional strategic forest plan (i.e. Forest Plans under MUMPS), performance against these should be monitored as a routine operational activity and results routinely reported.
3. The GIS capability to support forest yield planning needs urgent development, particularly in relation to estimation of net harvest area. A GIS coverage's for Sub-

unit Identifier (SUID) boundaries is needed and a capability to model major sources of harvesting restriction such as the impacts of watercourse buffers and slope exclusion needs to be available to planners. This is an urgent requirement to allow effective development of allowable cut estimates.

4. The SKED system and related inventory needs to be supported by ongoing research and development to improve its predictions of timber yield, particularly in relation to the impact of changing silviculture on models for forest growth and harvesting. A greater focus on measurement of post harvest stand conditions may be required.
5. SKED should be further developed to include a predictive capability for a range of forest characteristics including habitat, estimates of carbon storage, and to refine the predictions of growth based on site and climatic factors.

4.5 Silviculture to Achieve Specific Management Objectives

Within the context of regional cross-tenure plans that set strategic goals for ESFM values, participatory planning (MUMPS) may identify some forest zones where priority can be accorded to a particular value e.g. wood production or biodiversity, and where adaptation of silvicultural systems can enhance management outcomes. Such zoning requires adequate information on forest condition (environmental values and wood production potential) and the development of strategies to meet local and regional targets for specific values such as biodiversity, old growth restoration, and wood production. This is not to imply that the off-reserve contributions of harvested forests to biodiversity can be ignored but acknowledges that not all areas of forest need make equal contribution to agreed biodiversity targets.

Silviculture is a tool that can be used flexibly to deliver specific management objectives. For example, a uniform approach to the retention of habitat trees is not necessarily appropriate because:

- it ignores the variation in forest type and condition throughout SEQ; and
- it may deliver an outcome that is sub-optimal on some sites. For example, a fixed rate of tree retention may be too low for protecting biodiversity on sites where this is a management priority, and restrict wood production on sites where it is given a higher management priority.

Recommendations:

A landscape approach to zoning the forest for different management objectives is recommended. These zones should identify the objectives and priorities for management. The zoning approach should be based on integrated planning across all tenures, recognising the different contribution that particular forest areas may make to specific values, such as biodiversity, grazing and wood production. Until comprehensive local forest planning is in place, guidelines in the Code of Practice for Native Forest Timber Production should continue to be followed.

Appropriate silvicultural regimes should be developed and used to achieve management objectives within each zone. This may involve modifying the standard approach to the retention of habitat trees (within Schedule 6 of the Code of Practice for Native Forest Timber Production) to make provision for different management objectives.

Flexibility in the number and spatial distribution of habitat trees may be used to increase wood production in selected parts (zones) of the forest where this does not negatively impact on achieving agreed site-level conservation targets, or other environmental values. Similarly, zones within the forest may be identified where conservation values could be enhanced by increasing the number of habitat trees.

4.6 Implementation of Environmental Management Systems

Three agencies have roles in managing forest systems on public land in SEQ (DEPA, DNR and DPIF). Processes to develop comprehensive formal Environmental Management Systems (EMS) have been commenced in each agency. These developments were reviewed as part the of ESFM Expert Panel enquiry by Mr Stan Rogers, AVTEQ. While the respective EMS's deal principally with environmental matters, and thus comprise only a part of the agencies broader management systems, their completion offers considerable advantages.

One major benefit will be a clarification of roles and responsibilities between agencies, which are currently complex. This should permit a further simplification of arrangements, for example in relation to the Code of Practice for Native Forest Timber Production. The achievement of external certification of an EMS by DPIF should provide DNR with an opportunity to reduce its emphasis on in-field inspection to the level required to assure themselves that the DPIF systems are functioning properly (audit rather than compliance checking). This should permit a greater emphasis by DNR on monitoring of environmental outcomes and evaluation of the efficacy of the Codes.

Development processes for EMS were assessed as well developed in DPIF. Completion of EMS's by DNR and DEPA, at least for those parts of the organisation that deal with forests (including reserves) and their management will also provide a number of other benefits. It will assist in identifying common functions and needs, provide clear identification, for example, of training, procedural documentation and monitoring needs, and provide transparency in the separation of regulatory activity from implementation and management (see section 5.2.5).

Recommendations:

1. Agencies responsible for the management of public forests should complete the implementation of their ISO14000 EMS's in relation to forest management.
2. External certification is desirable.

5 ENVIRONMENTAL ISSUES

5.1 Global Carbon

The role of forests and plantations in the carbon cycle is a major issue that will influence the future management of forests and the wood industry. It is important not to underestimate the significance of the carbon issue to Queensland. There will be strong pressures to reduce emissions of carbon associated with land clearing. Also, there are major resource developments planned for Queensland that will have large carbon dioxide CO^2 emissions that will somehow have to be offset.

It seems highly likely that emission trading will be a reality. This could produce very positive social, economic and environmental outcomes for Queensland if the issue is handled correctly. In particular, there is the potential to exploit emission trading through investment (especially foreign investment) in plantations. If this eventuates then such forests will have a new market value.

Globally, the long term average reservoir of carbon stored in native forest ecosystems represents about 75% of the total terrestrial carbon store. This reservoir plays a critical role in regulating atmospheric carbon concentrations. However current international protocols have not been established that allow for this reservoir to be incorporated into emission trading schemes. Nonetheless, it is enlightening to value this reservoir by using the possible market value of carbon when traded under the proposed emission schemes. This may be in the range of $2.00-$20.00/tonne. Valuing native forest ecosystems in this way provides an index of the carbon opportunity costs involved in different forest management scenarios. 'Back-of-envelope' calculations indicate there are about 693 million tonnes of carbon in the forests of SEQ. At $20.00/tonne this yields a potential carbon opportunity cost index of 14 billion dollars, of which 2.2 billion dollars is sequestered in the productive areas of state forests.

Logging can affect the long term average (steady state) carbon store of forests by (a) removing very large trees (where most of the biomass carbon is stored in a forest) and (b) potentially disturbing the top layers of the soil (depending on silvicultural practices) where most of the soil carbon is stored leading to oxidisation and release into the atmosphere. Given that (despite the Kyoto agreement) the concentration of CO^2 in the atmosphere will increase for some time yet, it is likely that emission targets will become tougher in the decades ahead. In which case Governments, if they wish to maintain industrial activity based on fossil fuel, may be forced to implement specific land use controls in order to increase the State's annual carbon sequestration rate.

The Queensland State Government response has been to (i) endorse the national strategy and (ii) establish a Greenhouse Taskforce. The Taskforce is supported by a range of sub-committees and a Greenhouse Stakeholder Consultative Committee. State Cabinet has established a Ministerial Council to oversee the development and provision of high level strategic advice on all matters relating to the greenhouse issue. The Council will oversee the development of the Queensland Greenhouse Response Strategy. Policy options are currently being developed for consideration by the various sub-committees.

Because of the significance of the greenhouse issue to the future economic development of the State, all land use in all sectors will potentially be affected. In developing an RFA, care must be taken not to lock forest management into a pattern that turns out to be inconsistent with State, Federal and International policy on greenhouse.

Recommendations:

1. An adequate basis for predicting the carbon consequences of alternative forest management scenarios must be developed. This must include methods for considering carbon change at landscape scales and evaluating the economic implications of carbon in forests for the wood market (see Appendix 5).
2. The RFA options must anticipate emerging Commonwealth and state global carbon policy responses.

5.2 Biodiversity

5.2.1 General

Biodiversity refers to the diversity across the region of forest ecosystems, biological communities, species and genes. The Elaborated Principles for ESFM in SEQ (see Appendix 1) specify that economic and social benefits are constrained by the goals of biodiversity conservation. Many of the ecosystems, vegetation types and habitats in SEQ are degraded or substantially altered. It is of grave concern that only 2.7% of old growth and 5.8% of potential old growth remains (EH2.1). Old growth forests represent the mature end of the forest ecosystem spectrum and contain structural elements that are rarely found, or are absent, in younger forests. Some elements of biodiversity are dependent or primarily represented in forests that have old-growth attributes.

Recommendations:

1. Biodiversity objectives must be clearly defined in a regional, tenure-wide strategy.
2. As a matter of urgency, develop and implement a Structural and Old Growth Recovery Strategy. It should include processes to:
   - identify all remaining old growth and undisturbed catchments;
   - set priorities for reservation;
   - set structural goals in a landscape context for each forest ecosystem with the aim of restoring the structural composition of the forests to more closely resemble natural dynamic equilibrium conditions;
   - determine targets for area of old growth for each forest ecosystem; and
   - develop and implement ecological restoration plans to achieve these targets.
3. Develop and implement a strategy to involve indigenous people in biodiversity management ensuring the utilisation of traditional knowledge.

5.2.2 Biodiversity Management Outside Protected Areas

The conservation of biodiversity requires the establishment of a reserve system that represents the full range of genetic, species, and ecosystem diversity, complimented by off-reserve management to provide adequate habitat to maintain viable populations. The importance of management outside protected areas depends on how close the protected area network comes to fulfilling the requirements for comprehensiveness, adequacy, and representativeness and on the intensity of activities outside protected areas. However, it is unlikely that any reserve system will be fully adequate or representative because (a) the substantial amount of the region's forests that has been cleared or ecologically degraded; and (b) the information base about the distribution, abundance and ecology of the vast majority of the biota of SEQ is inadequate. There are two consequences of these considerations. First, outside protected areas management is a higher risk option for many elements of biodiversity so that where possible biodiversity should be conserved through reservation. On reserves, priorities for management must be clearly specified. Second, actions are needed to minimise risk outside protected areas, in particular to reduce the impact of threatening processes associated with land clearing and the loss of habitat such as habitat trees. Given this, great caution must be used in considering intensification of wood production off-reserve. In addition, improved codes of practice are needed to reduce off-reserve risk to biodiversity.

Recommendations:

1. Priority to achieving biodiversity objectives should be through a dedicated reserve system, recognising that this can only be part of an effective strategy.
2. Beyond the CRA process, the new Biodiversity Scientific Advisory Committee should be used to advise on priorities for reservation or protection of those forests on freehold land containing biodiversity values that are most depleted and most at risk, recognising that land clearing is the most important threatening process on this tenure (see Section 2.4 on Co ordination, Resourcing and Prioritising of Research and Development, Section 3.5.1 on Management Planning for Protected Areas and Section 3.5.2 on Planning on State Forests).
3. Use a range of methods, for example statutory covenants, to protect forests on freehold lands that are identified as facing the greatest threats.

5.2.3 Species, Ecosystems and Processes

Current legislation recognises rare species, which may be naturally rare in the landscape and under little imminent threat. It would be more useful instead to recognise Rare Species as those not currently classified as threatened, that factors affecting their abundance and distribution are such that they may become threatened in the near future. This may include species that have low numbers or restricted geographical ranges (and that are therefore at risk from stochastic events), as well as species that are more abundant but are subject to threatening processes. This classification would provide a vehicle for pro-active species management, to prevent species entering a threatened category.

Species occur in various combinations (assemblages/ecosystems) depending on the mix of habitats. Some such assemblages have aesthetic and evolutionary significance and can be threatened if processes that maintain the habitat cease to operate or are altered. These may be termed threatened communities, ecosystems or assemblages. Classifications of assemblages of ecological and evolutionary significance are somewhat arbitrary, but they are one useful surrogate for substantial portions of the biodiversity of the landscape. The SEQ CRA report and the Private Lands Working Group Report use a classification of regional ecosystems developed in EH1.2B. This report identifies 142 regional ecosystems in SEQ, of which 10 are considered endangered and 30 are considered vulnerable under the JANIS criteria. A total of 30 of these ecosystems have 5% or less of their original extent in Protected Areas or State forests. In south-east Queensland, the work by EH1.2B, Peter Young in Sattler and Williams (in press) and the Queensland Herbarium provide a basis for the further identification of species assemblages at a level that can be recognised and is feasible to assess and manage.

Threatening processes are those that pose a significant threat to the survival of a range of flora and fauna, usually within a specific region or ecosystem. For example, in other states, threatening processes include the loss of hollow-bearing trees in harvested forests (see Appendix 6). The identification and management of threatened ecosystems, rare species, and threatening processes are recognised elsewhere as effective tools for setting goals and priorities for biodiversity conservation. The system would be improved by a mechanism for fast-tracking applications for listing under the *Nature Conservation Act 1992*.

Monitoring biodiversity values for ESFM will require the dedication of permanent reference areas. These areas should remain as free as possible of human disturbance and be used as benchmarks for monitoring ESFM outcomes for biodiversity, particularly in areas of high conservation significance.

Much of the rationalisation for the recommendations below may be found in Appendices 7 & 8. They take into account current policies, systems and protocols in the responsible agencies, and endeavour to provide improvements that are cost-effective and pragmatic.

Recommendations:

1. Develop and implement cross-tenure recovery/conservation plans for all Threatened Species as an urgent priority.
2. Modify the *Nature Conservation Act 1992* to:
   - redefine Rare Species as those that are near-threatened, and recognise threatened ecosystems and threatening processes
   - provide policy and institutional support to identify and list rare species, threatened ecosystems and threatening processes, and to develop and implement conservation/recovery/abatement plans;
   - provide for fast-tracking of the listing and management of species, ecosystems or processes in special circumstances;
   - provide a mandate for the Scientific Advisory Committee to recommend conservation status for species, ecosystems, and threatening processes, and to advise on the priorities for management of Protected Areas (See Sections 2.4, 3.5.1, 3.5.2);
   - provide greater utility and encourage the preparation of conservation plans by modifying Section 119 to allow either subordinate legislation or policy; and
   - provide for the protection of critical habitat through the details specified in a management plan.
3. Monitor selected species and ecological communities, with a particular focus on threatened species and ecosystems (see also Section 4.2). This should include the establishment of reference areas for each of the species and ecosystems to be

conserved, and reporting against targets for conservation and restoration. The reference areas will need to be sufficiently large to incorporate the full suite of natural disturbance processes that are typical of the community in its natural state.

5.2.4 Survey and monitoring for Biodiversity

There is a need to develop and implement minimum standards for survey and monitoring of biodiversity values on State, leasehold and freehold land. Ideally, public access, timber harvesting, foliage harvesting, grazing, fire management, and the production of other non-wood values should be constrained to levels that are very likely to be compatible with nature conservation. In the absence of an adequate information base for survey, monitoring and planning, the claim that ESFM is being achieved has no demonstrable basis in fact.

Current prescriptions and activities must be regarded as interim. Until adequate survey and monitoring practices are in place, (1) there is a need for initiatives and processes that are very likely to sustain or enhance biodiversity values; and (2) provide incentives to detect and protect against the impacts of human activities. These may include industry bonds such as those applied to the mining industry to ensure site rehabilitation, specifying milestones for the implementation of adequate monitoring programs, public participation in the development of all management plans, and the development of regional-scale adaptive management plans that include explicit contingency plans that anticipate the possibility that there are undetected, important ecological impacts resulting from existing practices. It is important that such interim measures apply to all human uses of forests including timber harvesting, grazing, fire management, recreational uses and foliage harvesting.

Recommendations:

1. Modify the NCA to include a requirement to set performance criteria relevant to ESFM in threatened species and threatened ecosystems conservation/recovery plans, and threatening process abatement plans, and to monitor and report on the preparation, implementation and outcomes of these reports.
2. Modify the legislation to include a requirement to report on the implementation and outcomes of environmental survey and monitoring programs.
3. In consultation with the public, develop and implement minimum standards for survey and monitoring of biodiversity values on all tenures as a basis for adaptive management.
4. Until those standards have been met, set in place interim measures that are very likely to deliver ecologically sustainable forest management. These should include:
    - Specify milestones for the implementation of adequate monitoring programs.
    - Provide for public participation in the development of all management plans.
    - Develop regional-scale adaptive management plans that include explicit contingency plans that anticipate the possibility that there are undetected, important ecological impacts resulting from existing practices.

5.2.5 The conservation of hollow dependent fauna

There are a large number of native fauna that are dependent upon tree hollows for nesting (Australian forests support about 180 species of vertebrate fauna that use hollows in trees). Substantial hollows usually do not form in Eucalypts until around 140-200 years (depending on the tree species and the forest ecosystem type.) Habitat trees are therefore older trees that contain suitable nesting hollows. In order to maintain hollow-dependent fauna in a stand, a certain number, type and spacing of habitat trees must be retained. Furthermore, a certain number of recruitment trees must be left in addition to extant hollow-bearing trees. Also alternatives to high intensity fires must be implemented to protect the remaining habitat stems.

The Code of Practice includes Standard Requirements in Schedule 6 for the retention of habitat trees and addresses the main parameters noted above (number of hollow trees, number of recruitment trees, spacing of trees, type of habitat tree). This is a critically important development to help reduce the off-reserve risk to key biodiversity. However, the values for the parameters given in the Code of

Practice require further evaluation. The information is very important because of likely impacts on the size and viability of populations.

Recommendations:

1. Further research and monitoring is urgently needed to confirm the effectiveness of the prescribed values for the habitat tree parameters. Until the effectiveness of these values has been confirmed, caution must be applied in considering alternative silvicultures which would require reduction in the number of hollow-bearing and recruitment trees specified by the code (see section 4.5).

2. A model should be developed to enable the simulation of the supply of tree hollows at a MUID scale (analogous to modelling the supply of wood). There are some field data available in SEQ about tree hollow development that would enable this analysis to be undertaken (see comments under section 4.3).

5.2.6 Impacts of grazing and fire

A considerable proportion of the forest under State and private control supports cattle grazing. Many of the Species Management Profiles completed to date identify species as sensitive to the effects of grazing. Several stakeholders voiced the opinion that grazing, particularly in grasslands, may be compatible with flora and fauna conservation if properly managed, and that 'excessive' grazing was the source of problems. The long history of grazing and fire management in SEQ forests is no guarantee that serious or irreversible environmental consequences will not result from a continuation of current practices. In other parts of Australia, grazing practices have been associated with the spread of weeds, soil disturbance, compaction, vegetation damage, changes in the structure of plant communities, and changes in habitat characteristics for ground-dwelling species (Hobbs and Hopkins 1990, Morton 1990, Christie 1993, Kirkpatrick 1994, Wilson and Clark 1995, Landsberg et al. 1997)

Despite the potential for grazing and associated fire management practices to precipitate substantial short and long-term impacts on biodiversity values, there are no data in south-east Queensland on the effects of cattle grazing and fire management, or trends in biophysical variables associated with grazing activities (SE4.2 Report on Forest Grazing). There are no management prescriptions of Codes of Practice that govern the effects of grazing on threatened flora or ecosystems. There are no explicit audit requirements for compliance.

Interactions between grazing impacts and fire management activities may pose significant threats to substantial portions of the threatened flora unless managed conservatively. Thus, to achieve ESFM, it is necessary to demonstrate, through the results of specifically designed research and monitoring programs that have sufficient power to detect important environmental changes, that grazing activities and fire management practices are ecologically sustainable.

Recommendations:

1. Implement impact studies and monitoring programs to determine the effects of cattle grazing and fire management on individual species, and on the composition and structure of ecosystems (See Section 4.2.2).
2. Develop management plans for threatened species and threatened communities that account for the effects of grazing and fire management.
3. Explore and report on management options for grazing and fire management with the intention of developing management prescriptions that more closely mimic the dynamics of natural disturbance regimes.
4. Complete and implement a Code of Practice for Grazing (See Section 4.2.3).
5. If the benign nature of current grazing practices cannot be demonstrated within 5 years, grazing intensity on public lands should be reduced significantly until such time that ecological sustainability can be demonstrated.

6 SOCIAL ISSUES

6.1 Socio-Economic Impact Management

The Expert Panel recognises that in balancing the various environmental, social economic, and cultural values of forests in order to achieve ESFM in SEQ, the RFA process will involve both consideration of possible tenure changes for public forested land, and changes to forest management systems. In turn, this may result in substantial if localised social and economic impacts on some communities.

There is therefore a need for a strategy that seeks to manage the continued social and economic consequences of change over the life of the RFA. The Commonwealth and Queensland Governments have developed a Forest Industry Development Assistance Program, which is specified in a Memorandum of Understanding. In addition, the Queensland Government is preparing an industry-restructuring package that will include industry assistance and worker compensation. The package has not yet been approved by Cabinet and is therefore not yet available.

The program needs to be targeted to suit the particular economic, social and familial needs of displaced timber workers. It is suggested that the Growth and Development Package implemented following the Fitzgerald Inquiry into resource use in the Great Sandy Region should be used as a guide (see McGuffog and Western 1993). The program should consist of (i) dislocation assistance to workers; (ii) special employment projects in the region; (iii) worker relocation assistance; (iv) worker training programs and assistance and (v) a business compensation program.

Consideration should also be given to economic impacts on indigenous communities. Since some of the Aboriginal communities in the region are materially impoverished, consideration needs to be given to the mitigation of social impacts arising from major changes in resource use, as well as to ensuring that forest management provides benefits to these communities. In addition, previous efforts at regional-scale socio-economic impact management in Queensland have failed to account for the particularities of indigenous communities in relation to economic issues.

The Social Impact Assessment Unit of the Government should be given responsibility for implementing the impact mitigation strategy and conducting socio-economic analyses for tenure conversions.

Recommendations:

1. Socio-economic impact analyses should be conducted prior to major conversion of tenure to ensure that impact management programs are applied in a targeted manner.
2. A social impact management strategy should be implemented in the region to respond to the impacts of major changes to forest products as a result of governmental decisions to re-allocate the land/resource.
3. The strategy should include (i) dislocation assistance to workers; (ii) special employment projects in the region; (iii) worker relocation assistance; (iv) worker training programs and assistance; and (v) a business compensation program.
4. It should include a component specifically devised to suit the needs of indigenous communities both in terms of mitigating negative impacts and in terms of enhancing existing and potential economic opportunities.

6.2 Institutional Arrangements to Support Sustainable Forest Industry, Employment and Community Benefits

The allocation of timber resources and marketing to support the timber industry and dependent communities to date has been based on administrative arrangements used in part to support existing mills and employment. The implementation of the National Competition Policy from 2000 may limit the capacity of State forest managers to continue this practice although it might pass the Public Benefit Test at least in the short term.

The allocation, pricing and marketing of land and timber resources should have a coherent industry wide policy and program framework.

There are a number of options to examine industry development and provide strategic direction including:

- a new group, the Department of Primary Industries –Forest Industry Development may partially undertake this function
- a Task Force approach involving key players from both the private and public

sector looking at a range of strategies including transparent subsidies, research to inform on industry development and royalty policies.

Recommendations:

1. Create a permanent policy group in Government to oversee optimisation of the socio-economic returns from forest products.
2. Develop pricing and marketing strategies that provide incentives for the improved utilisation of wood and value adding of forest products.

6.3 Cultural Heritage

Stage 1 of the ESFM assessment revealed a lack of systems in relation to cultural heritage management. The elaborated principles to which the Expert Panel is working includes consideration of cultural heritage and, in particular, to indigenous cultural heritage. In order to facilitate detailed consideration of cultural heritage issues, a working group inclusive of State and Commonwealth officers and representatives of indigenous organisations was formed. This working group has prepared a report that identifies the deficiencies in current systems and proposes a work program to remedy these problems. The Working Group's report should be examined along with the recommendations below.

The key issues the Working Group identified are:

- a restrictive definition of indigenous cultural heritage in the *Cultural Record (Landscape Queensland and Queensland Estate) Act 1987*;
- the absence of a whole of Government approach to cultural heritage;
- problems in existing institutional arrangements, particularly in terms of the linkages between the lead agency and land management agencies;
- a shortage of appropriately trained personnel which limits the capacity of land management agencies to manage cultural heritage as an integral component of environmental management;
- the absence of a set of consistent, effective and credible tools to identify, protect and manage cultural heritage;
- insufficient resources for identification and management of cultural heritage;
- insufficient mechanisms to involve stakeholders and owners of traditional knowledge in cultural heritage issues, particularly in relation to indigenous cultural heritage; and
- a lack of monitoring.

The Expert Panel notes that the Working Group has developed a work program to respond to these problems. In reviewing the proposed work program, the Expert Panel has not been able to review all of the detailed recommendations of the Working Group. However, the Expert Panel has sought to identify the major issues canvassed by the Working Group and has identified the following as appropriate responses to the major deficiencies in current arrangements.

Recommendations:

1. The current Queensland Government review of legislation pertaining to indigenous cultural heritage needs to adopt a definition of indigenous cultural heritage which encompasses the spiritual and social meaning of places in addition to the historical/archaeological definition currently used.

2. The Queensland Government should adopt a whole of Government approach to cultural heritage management; ensuring that policy and planning approaches are consistent across Government and across tenures.

3. The Queensland Government should respond to identified problems in institutional arrangements by:
   (i) bolstering the profile and role of the lead agency for cultural heritage or developing an independent statutory authority for cultural heritage
   (ii) clearly identifying the roles and responsibilities of land management agencies in relation to the role of the lead agency; and
   (iii) improve the capability of land management agencies to integrate cultural heritage considerations into their work.

4. Consistent with the work program developed by the Working Group, develop a set of tools for the identification, management and protection of cultural heritage across all tenures, and in particular:
   develop a Protocol for Work Area Clearance to identify cultural heritage and use this process to

identify cultural heritage at the commencement of planning activities and for development on private and public lands;
adopt a consistent approach for surveying non-indigenous cultural heritage in line with the principles of the Burra Charter [1],
develop a Code of Practice for Cultural Heritage Protection and Management (inclusive of indigenous and non-indigenous cultural heritage) to provide advice on processes to be followed in relation to cultural heritage matters;
provide for protection by developing a policy for Heritage Agreements which prescribe management and use of significant areas; and
provide a mechanism to declare areas subject to Heritage Agreements under legislation, thus invoking statutory provisions for protection, sanctions and prosecution.

5. Finalise and implement, as a matter of priority, arrangements under *IPA* for the protection of cultural heritage on private lands.

6. Develop a Complaints Register to enable third party concerns in relation to cultural heritage management to be expressed and investigated by the lead agency.

7. Encourage the voluntary adoption of the Code of Practice for Cultural Heritage Protection and Management on private lands and develop the public's understanding of cultural heritage issues generally by developing a targeted communication strategy.

8. Ensure that land evaluation and the setting of lease conditions under S.16 of the *Land Act 1994* have regard to cultural heritage considerations.

9. Develop, and make publicly available, Government policies and processes for the protection and management of cultural heritage.

10. Provide for an Indigenous Heritage Advisory Group to provide policy advice and guidance to the Minister responsible for cultural heritage (mirroring stakeholder input to non-indigenous cultural heritage).

11. Encourage the Heritage Council to include cultural heritage on forested lands as part of their deliberations.

12. Provide for local indigenous land management committees to facilitate indigenous involvement in cultural heritage issues in forested areas.

13. Provide for routine monitoring of cultural heritage protection.

14. Allocate a proportion of the total research budget of DNR and DEPA to cultural heritage.

In particular, the Expert Panel wishes to stress that an increased management focus on cultural heritage, which is implied by the both the Work Program and the recommendations above, must be accompanied by an increase in resources available to land management agencies for implementation. Cultural heritage protection consistent with ESFM cannot be provided without an increase in resourcing.

[1] The Burra Charter is a document that defines the basic principles and procedures to be followed in the conservation of heritage places.

RECOMMENDATIONS FROM THE TEXT

Precautionary Principle

The DNR in consultation with other relevant government agencies should prepare guidelines for the application of the precautionary principle to policy development and planning processes aimed at delivering ecologically sustainable forest management in SEQ.

LEGISLATION AND ADMINISTRATION

Legislative Reform

- The current legislation dealing with natural resource management needs to be reviewed from a standpoint of providing a coherent and interconnected framework.
- In view of the abandonment of the integrated Natural Resources Management Bill, all of the natural resource legislation requires updating to account for ESFM principles, to improve its functionality, and to ensure regular review.

Forestry Act 1959

- The *Forestry Act 1959* needs to be revised to provide for a commitment to ESFM, and should also provide guidance on the optimal processes to achieve the multiple goals of ESFM.
- Further, a specific requirement concerning the content (i.e. a process for the creation and review) of management plans for each State forest within a specified period of time is needed within the *Forestry Act 1959*. There should be a clear statutory commitment within the primary legislation relating to forest management for the issue of codes of practice, management plans, and monitoring standards. The legislation should provide for public input into the development of these, and for regular review and improvement.
- Consideration should be given to providing a statutory base for the regulation of private forestry *Forestry Act 1959*.

Institutional Arrangements

- There is a need to review and clarify the fundamental roles and responsibilities of DNR, DPIF and DEPA. In particular, there is a need to clarify the institutional arrangements for the optimum delivery of those functions that relate to:
    - commercial activities;
    - forest planning, including yield scheduling;
    - management of activities such as fire control, road maintenance, cultural heritage and recreation;
    - independent monitoring and reporting, including clarification of the role of each agency in processes such as EMS.
    - The State should review the resource levels provided for the management of public forests. In particular, there needs to be recognition of the costs involved in the management of Protected Areas for ESFM.
- A clarification of departmental responsibilities and resources must also address the role of Government with respect to the inventory and management of ESFM values on freehold land.
- Formal mechanisms should be developed to facilitate co-ordination and integration of activities such as fire control and biodiversity management across State Government agencies and Local Government. Care should be taken to co-ordinate resource distribution with the changing roles of different agencies.

Public Involvement in planning and policy development

- It is recommended that the Queensland Government establish a broadly based Forest Management Advisory Council advise Ministers responsible for the Primary Industries, Natural Resources and Environment portfolios. On strategic forest policy.
- Planning agencies should consider the utility of developing and maintaining sub-regional citizen committees for plan formation and to provide on-going advice on forest management.
- All regional strategies should be subject to a mandatory public review period to enable interested parties to comment on and inform their development.
- The results of comprehensive monitoring programs should be published on a regular basis.
- The DNR should convene an inter-agency committee to review the approaches used by the Queensland Government to involve diverse stakeholders in policy and planning.

Co-ordination, Resourcing, and Prioritising of Research and Development

- Research and development co-ordination should be improved via a formal and transparent process involving all relevant research providers. In the short-term this might be achieved via an inter-departmental committee that is independently chaired to oversee priority determination, resource allocation and assessment of effectiveness.
- Formal processes should be developed to facilitate the use of new scientific information for policy development, planning and improved field practices. External input and peer reviews are essential to risk mitigation and public acceptance.
- A new Biodiversity Scientific Advisory Committee should be established. The Committee members should be broadly representative of relevant scientific disciplines and have high professional standing. The Nature Conservation Act should be revised to provide the Committee with statutory support, and government policy mechanisms should be developed to take the advice of the Committee into account in management planning and in setting research priorities. The Committee could advise on listing threatened species, threatening processes and threatened communities, and on priorities for acquisition and management of protected areas.
- Research needs to be strengthened generally, but particularly in the areas of: monitoring systems, quantifying non-wood values, grazing and fire impacts and recreational planning.

PLANNING AND ALLOCATION

Regional cross tenure strategies, plans and allocation mechanisms.

- Regional cross-tenure strategies and plans should be developed for each major forest value and process and approved at ministerial level. These must provide for public participation, and might usefully be managed by reference to the FMAC. There is a need to complete these strategies or plans in the near term (e.g. 2 years). Performance against strategies should be reviewed and updated on a periodic basis (e.g. 5 - 7 years).

Information Systems to Support Planning

Databases available to support regional and tenure planning need improvement, particularly those supporting biodiversity, recreation and eco-tourism management and non-wood utilisation. Processes for co-ordination of data collection and data sharing need to be streamlined, and commitment must be made to ensure ongoing maintenance of data collection activities.

Catchment Management and Regional Resource Management

- The regional resource management and integrated catchment management strategies prepared under the DNR's community resource management program be strengthened by having a statutory basis and co-ordinated with the regional planning process under the *Integrated Planing Act 1997* and other resource management legislation.

Recreation

- A co-ordinated research and data management facility for outdoor recreation should be established to provide the information required for regional scale analysis. State Government agencies and Local Government should collaborate in the development of this facility and share existing data. The data base should (i) use standard data fields; (ii) develop an inventory of recreation sites in terms of location, size, landscape class, environmental quality, tenure and management arrangements; (iii) include visitor numbers across tenures over time for a range of recreational activities; and (iv) include data on visitor satisfaction.
- A cross-government planning facility needs to be established to develop regional perspective on the supply and management of recreational opportunities across all tenures (see Recommendations on regional planning).
- Queensland Government agencies should actively seek the involvement of Local Government in the development of the database described above and in regional planning activities.
- Consideration should be given to increasing funds to the acquisition of properties deemed to have strategic importance/potential for recreation such as the ROSS systems.
- That the Queensland Government's Eco-Tourism Strategy undergo independent evaluation followed by policy responses to improve the efficacy of the strategy.

Management Planning for Protected Areas

- Legislative guidance on the role of parks for competing uses such as biodiversity conservation and recreation opportunity provision should be provided.
- The Protected Area Planning Manual should be formally adopted following review.
- A Code of Practice for Protected Area Management should be developed to provide detailed land management guidance to protected area managers in areas such as biodiversity conservation; recreation and visitor management and cultural heritage.
- A funding base to support the development and implementation of plans for all Protected Areas needs to be established.
- Protected Area management plans need to be comprehensive; they should be informed by regional strategies for biodiversity and recreation, provide adequate descriptions of the baseline environment, elucidate the trade-offs in allocative decisions and provide detailed management guidance. Monitoring results should be provided on an annual or biennial basis (see Section 3.5.2. and Section 4.2), and reporting of monitoring results should be done transparently (see Section 4.2.1)
- Management plans for all Protected Areas should be completed within 5 years.
- Management plans should be reviewed at regular intervals (8-10 years).
- The recommended Biodiversity Scientific Advisory Committee should be used to advise DEPA with respect to management priorities for each National Park and Conservation Park, and resource allocation to support biodiversity conservation initiatives (see Section 2.5 on Co-ordination, Resourcing, & Prioritising of Research and Development, and Section 5.2.2 on Biodiversity Management Outside Protected Areas).

Planning on State forests

- The conceptual and methodological development of MUMPS should be finalised forthwith and a planning manual completed.
- Forest area planning (MUMPS) should be given a statutory basis including an approval processes by the relevant Minister.
- Planning unit boundaries currently based largely on DNR district boundaries should be re evaluated
- Management plans should be developed for all forest areas in the region within 5 years.
- Resource usage levels (wood, water, recreation) should be set at conservative levels, if they are expected to remain unchanged for long periods, because of uncertain knowledge of future availabilities or usage impacts (see section 4.4)

- Plans should include resource supply, allocation or usage levels and performance indicators that permit effective monitoring of ESFM performance. Monitoring results should be reported on an annual or biennial basis.
- Management plans should be reviewed at regular intervals (8-10 years).
- Ongoing research and development is required in the evolving area of multiple use planning to capture quantitative and qualitative measures of value and to develop better methods for allocation between competing values.

Management of Other Crown Lands

- Land suitability evaluations as required under the *Land Act 1994* should be undertaken as a matter of routine; the Expert Panel accepts that an increase in staff and resources may be required to achieve this.
- In making allocative decisions under the *Land Act 1994*, the Chief Executive should consider ESFM as well as other State and Local policies.
- Land suitability assessments carried out under the auspices of the *Land Act 1994* should inform the development of the regional multiple-use evaluation and strategy (as described above).
- The setting of management conditions for the grant or renewal of a lease should take into account ESFM principles.
- Routine compliance monitoring of lease conditions in relation to ESFM is not currently undertaken. Effective monitoring is essential and will require additional resources.

Land Clearing Freehold (private) Lands

- Vegetation clearance must be subject to regulatory processes for the purposes of ESFM. An appropriate legislative framework should be introduced as a priority.

Regulation of forestry on freehold land

- Forestry activities must be subject to regulatory processes for the purposes of ESFM. An appropriate legislative framework should be introduced as a priority.
- The State should investigate the option of amending the IPA or introducing separate legislation to provide for the adoption of a uniform State-wide code for forestry that regulates development and ongoing activities and is able to be monitored for compliance.
- Implementation of the code should be mandatory across all tenures.
- The code should make provision for the preparation of forest plans, desirably at two levels: at the property level; and at the operational level (e.g. harvesting unit scale). As a minimum, plans need to be prepared and approved at the operational level. A property-based management plan is the most appropriate way to demonstrate the planning processes used for ESFM (see section 4.1).
- The State should develop a model for the delivery of the Code on private land. The model should define the roles and responsibilities of both the private and public sectors. The Expert Panel acknowledges that the introduction of ESFM processes will require a change in current attitudes with respect to the public regulation of freehold land. It will therefore be necessary to adopt a cautious approach, based on continuing improvement through education and fostering good attitudes and knowledge about the contribution of freehold land to ESFM. The regulatory system must be simple and low cost, yet still provide for adequate environmental protection. The system should be delivered under an appropriate blend of self-regulatory and public regulatory processes. For example:
- the private sector could prepare the plans and provide certification of compliance with the Code, through accredited officers under a self-regulatory mechanism; and
- the public sector could foster the achievement of good standards through mechanisms for training and education, backed up by independent monitoring and legal enforcement.
- Compliance with the Code should be encouraged through incentives, rather than penalties, wherever possible. The State should investigate the feasibility of creating marketing advantages through systems of certification for production from sustainably managed properties.
- The State should ensure that the legislative/policy framework provides security of harvest rights for forests established for wood production and managed on private land. This should be achieved

as part of an overall package for ensuring compliance with a statewide code. The code should specify those provisions that are retrospective and those that are prospective–this needs to be determined through consultation with stakeholders.

- The role of the public sector should be delivered by a single agency that has clear statutory responsibilities and dedicated resources for the encouragement and regulation of ESFM on private land.

Reforms common to land clearing and forestry activities on freehold land

- The State should recognise that it has a public obligation to provide resources for the assessment and inventory of ESFM values on freehold land. This knowledge must be subject to continuing update and modification on the basis of new information. Resources and systems for managing and updating the information base are an essential prerequisite for the delivery of ESFM.
- The State should facilitate a process for the prediction of wood yields from freehold land. The process should take account of the requirements for sustainability and the need to provide information on future yields for the purposes of industry and marketing development.
- The legislative/policy framework for the regulation of land clearing and forestry activities needs to define the thresholds (or minimum requirements) for a landholder's "duty of care" with respect to ESFM. For example, under the Tasmanian system the thresholds are defined as including all of the minimum requirements for the protection of soil and water values within the Code of Practice, plus a defined contribution to the protection of other values, such as biodiversity. This contribution is defined as a percentage of the land area of a property. The thresholds should recognise that there may be different standards between freehold and public land. The cost of protecting values under the thresholds for a duty of care should be borne by the landholder. Protection of values above the thresholds for a duty of care should be recognised as a community benefit, and be subject to appropriate recognition of the rights forgone. The State should develop a range of options for dealing with the protection of values above the duty of care. These options should include voluntary measures, statutory covenants, mandatory protection and land purchase (see section 5.2.2).

Native Title and Indigenous Interests

- The Queensland Government should enter into discussions with Native Title Representative Bodies, and other relevant stakeholders, to develop an ILUA as provided for under the Native Title Act. The Expert Panel recommends that the Government pursue the development of a process agreement under the Native Title Act (i.e. an agreement concerned with procedural matters for future acts).
- That the Government adopt and consistently apply a policy that enables indigenous joint management of National Parks.

Codes of Practice

- There should be a clear statutory commitment within the primary legislation relating to forest management for the issue of codes of practice. The legislation should provide for public input into the development of the codes, the involvement of key stakeholders, and for regular external review and improvement of the codes.
- The Code of Practice for Native Forest Timber Production should be reviewed to address the management of forests on both public and private land. It would be desirable for the Code to be re-written as a common document for both public and private land. Separate documents will be required if the standards and processes to be applied differ markedly between the public and private sectors. Key principles and standards should be documented within these codes, including standards that relate to forest stocking and structure. Supporting documentation should be formally linked to the codes in a transparent manner.
- The codes should be re-formatted to ensure that they are appropriate for a wider audience, including private land owners and forest operators.
- The codes should specifically cover ESFM values such as:

  - Soils and water.
  - Biodiversity.
  - Cultural heritage.
  - Landscape.
  - Geomorphology/geoheritage.
  - Forest regeneration and stocking standards.
- The State should develop standards and mechanisms for implementation, compliance monitoring and legal enforcement of the Codes on all tenures.
  - For public land, the *Forestry Act 1959* should be amended to provide a legal basis for the implementation and enforcement of the Codes other than through sales agreements.
  - For private land, consideration should be given to the amendment of the IPA or the introduction of other legislation to allow for the adoption of uniform State-wide Codes for forest use that regulate ongoing activities and are able to be monitored for compliance. The Codes should cover continuing forest activities and not be limited to prospective changes in land use.
  - The codes should provide for streamlined processes (see comments under Freehold land).
- The Codes should also require the preparation of site specific plans across all tenures. Comprehensive provisions for planning on State forest are contained in the Code of Practice for Native Forest Timber Production and, to a lesser extent, in the Code of Practice Plantations for Wood Production. On private land, the plans should ideally be prepared at two levels: at the management unit or property scale, and at the operational or harvesting unit scale. The operational plan should be a minimum requirement across all tenures and forest types.
- The Codes that deal with extractive industries, fire management and forest based recreation, grazing, other forest products should be completed in consultation with representatives from all tenures and stakeholder groups to ensure that appropriate standards can be applied for each tenure.
- Codes of Practice for mining operations should be developed.
- Legal and institutional support for compliance with the Codes through incentives and penalties or bonds. For example, bonds could be required, providing an incentive to comply with codes of practice, for production of wood and non-wood values.

Monitoring of the Impact of Forest Management on ESFM Values

- Legal and policy initiatives are required for the development and implementation of monitoring and associated standards for all the ESFM values. These standards should be sufficient to detect meaningful change with adequate reliability (see Appendix 4 for definitions and background).
- Management plans should specify the complete details of monitoring objectives, sampling protocols, biodiversity targets, evaluation procedures, time lines and reporting procedures designed to improve forest management and inform the public.
- A set of cost-effective indicators should be developed and tested to facilitate the detection of changes in ESFM values. These need to be reviewed and improved on an ongoing basis.
- In all forested areas, the value of all wood and non-wood products, including recreation, employment, tourism and intangible benefits, should be tracked for all forest uses, together with biophysical values. More generally, all agencies involved directly in forest management need to implement monitoring programs that account for all dimensions of ecologically sustainable forest management. A set of indicators, consistent with Montreal Process Criteria and Indicators, should be progressively developed and a program to monitor these indicators implemented.

Monitoring Design and Reporting of Findings

- Departments responsible for ESFM should submit public reports on the sustainability of forest management, taking account of all ESFM values across all tenures. Interpretations of sustainability should relate to objectives and methods (indicators, monitoring methods, targets) specified in forest management plans and reporting could be part of the regular (two or three yearly) reporting

recommended elsewhere (see sections. 3.5.1 and 3.5.2)

- All statements about sustainability must be supported by a rigorous and transparent scientific demonstration from agencies that:
  - monitoring systems are very likely to detect any serious or irreversible environmental impacts (reflected in critical thresholds for agreed indicators); and
  - no such impacts were observed.
- If serious impacts are detected, the report should include details of strategies to prevent future damage and to recover lost values.
- Data and calculations upon which sustainability reporting is based should be made publicly available according to due process that considers respect for indigenous rights, risk to protected values, responsible use, and meeting the costs of providing the data.

Monitoring of Forest Health - the Biosecurity System

- DNR and DEPA should commit resources to support implementation of the Biosecurity System in Native Forests and Protected Areas. DPI, DNR and DEPA should formally assess the level of resourcing required to keep risks from undetected outbreaks of pests and diseases within defined and acceptable limits and commit adequate resources for this purpose.

Predicting and Regulating Wood Flows from Native forests

- Allocation of cutting levels should only be made over 5 – 10 year periods because of uncertainty in forest stocking levels and growth These must be integrated into the MUMPS process.
- Sustainable harvesting indicators should be developed (e.g. removals per hectare, size of stems removed) for the important wood production forest types in each sub-region or zone to complement allowable cut determinations and provide a benchmark for system monitoring. Targets for these should be incorporated into the sub-regional strategic forest plan (i.e. Forest Plans under MUMPS), performance against these should be monitored as a routine operational activity and results routinely reported.
- The GIS capability to support forest yield planning needs urgent development, particularly in relation to estimation of net harvest area. A GIS coverage's for Sub-unit Identifier (SUID) boundaries is needed and a capability to model major sources of harvesting restriction such as the impacts of watercourse buffers and slope exclusion needs to be available to planners. This is an urgent requirement to allow effective development of allowable cut estimates.
- The SKED system and related inventory needs to be supported by ongoing research and development to improve its predictions of timber yield, particularly in relation to the impact of changing silviculture on models for forest growth and harvesting. A greater focus on measurement of post harvest stand conditions may be required.
- SKED should be further developed to include a predictive capability for a range of forest characteristics including habitat, estimates of carbon storage, and to refine the predictions of growth based on site and climatic factors.

Silviculture to Achieve Specific Management Objectives

- A landscape approach to zoning the forest for different management objectives is recommended. These zones should identify the objectives and priorities for management. The zoning approach should be based on integrated planning across all tenures, recognising the different contribution that particular forest areas may make to specific values, such as biodiversity, grazing and wood production. Until comprehensive local forest planning is in place, guidelines in the Code of Practice for Native Forest Timber Production should continue to be followed.
- Appropriate silvicultural regimes should be developed and used to achieve management objectives within each zone. This may involve modifying the standard approach to the retention of habitat trees (within Schedule 6 of the Code of Practice for Native Forest Timber Production) to make provision for different management objectives.
- Flexibility in the number and spatial distribution of habitat trees may be used to increase wood production in selected parts (zones) of the forest where this does not negatively impact on achieving agreed site-level conservation targets, or other environmental values. Similarly, zones

within the forest may be identified where conservation values could be enhanced by increasing the number of habitat trees.

Implementation of Environmental Management Systems

- Agencies responsible for the management of public forests should complete the implementation of their ISO14000 EMS's in relation to forest management.
- External certification is desirable.

ENVIRONMENTAL ISSUES

Global Carbon

- An adequate basis for predicting the carbon consequences of alternative forest management scenarios must be developed. This must include methods for considering carbon change at landscape scales and evaluating the economic implications of carbon in forests for the wood market (see Appendix 5).
- The RFA options must anticipate emerging Commonwealth and state global carbon policy responses.

Biodiversity

- Biodiversity objectives must be clearly defined in a regional, tenure-wide strategy.
- As a matter of urgency, develop and implement a Structural and Old Growth Recovery Strategy. It should include processes to:
  - identify all remaining old growth and undisturbed catchments;
  - set priorities for reservation;
  - set structural goals in a landscape context for each forest ecosystem with the aim of restoring the structural composition of the forests to more closely resemble natural dynamic equilibrium conditions;
  - determine targets for area of old growth for each forest ecosystem; and
  - develop and implement ecological restoration plans to achieve these targets.
- Develop and implement a strategy to involve indigenous people in biodiversity management ensuring the utilisation of traditional knowledge.

Biodiversity Management Outside Protected Areas

Priority to achieving biodiversity objectives should be through a dedicated reserve system, recognising that this can only be part of an effective strategy.

Beyond the CRA process, the new Biodiversity Scientific Advisory Committee should be used to advise on priorities for reservation or protection of those forests on freehold land containing biodiversity values that are most depleted and most at risk, recognising that land clearing is the most important threatening process on this tenure (see Section 2.4 on Co ordination, Resourcing and Prioritising of Research and Development, Section 3.5.1 on Management Planning for Protected Areas and Section 3.5.2 on Planning on State Forests).

Use a range of methods, for example statutory covenants, to protect forests on freehold lands that are identified as facing the greatest threats.

Species, Ecosystems and Processes

- Develop and implement cross-tenure recovery/conservation plans for all Threatened Species as an urgent priority.

- Modify the *Nature Conservation Act 1992* to:
  - redefine Rare Species as those that are near-threatened, and recognise threatened ecosystems and threatening processes
  - provide policy and institutional support to identify and list rare species, threatened ecosystems and threatening processes, and to develop and implement conservation/recovery/abatement plans;
  - provide for fast-tracking of the listing and management of species, ecosystems or processes in special circumstances;
  - provide a mandate for the Scientific Advisory Committee to recommend conservation status for species, ecosystems, and threatening processes, and to advise on the priorities for management of Protected Areas (See Sections 2.4, 3.5.1, 3.5.2);
  - provide greater utility and encourage the preparation of conservation plans by modifying Section 119 to allow either subordinate legislation or policy; and
  - provide for the protection of critical habitat through the details specified in a management plan.
- Monitor selected species and ecological communities, with a particular focus on threatened species and ecosystems (see also Section 4.2). This should include the establishment of reference areas for each of the species and ecosystems to be conserved, and reporting against targets for conservation and restoration. The reference areas will need to be sufficiently large to incorporate the full suite of natural disturbance processes that are typical of the community in its natural state.

Survey and monitoring for Biodiversity

Modify the NCA to include a requirement to set performance criteria relevant to ESFM in threatened species and threatened ecosystems conservation/recovery plans, and threatening process abatement plans, and to monitor and report on the preparation, implementation and outcomes of these reports.

Modify the legislation to include a requirement to report on the implementation and outcomes of environmental survey and monitoring programs.

In consultation with the public, develop and implement minimum standards for survey and monitoring of biodiversity values on all tenures as a basis for adaptive management.

Until those standards have been met, set in place interim measures that are very likely to deliver ecologically sustainable forest management. These should include:

- Specify milestones for the implementation of adequate monitoring programs.
- Provide for public participation in the development of all management plans.
- Develop regional-scale adaptive management plans that include explicit contingency plans that anticipate the possibility that there are undetected, important ecological impacts resulting from existing practices.

The conservation of hollow dependent fauna

- Further research and monitoring is urgently needed to confirm the effectiveness of the prescribed values for the habitat tree parameters. Until the effectiveness of these values has been confirmed, caution must be applied in considering alternative silvicultures which would require reduction in the number of hollow-bearing and recruitment trees specified by the code (see section 4.6).
- A model should be developed to enable the simulation of the supply of tree hollows at a MUID scale (analogous to modelling the supply of wood). There are some field data available in SEQ about tree hollow development that would enable this analysis to be undertaken (see comments under section 4.4).

Impacts of grazing and fire

- Implement impact studies and monitoring programs to determine the effects of cattle grazing and fire management on individual species, and on the composition and structure of ecosystems (See Section 4.2.2).

- Develop management plans for threatened species and threatened communities that account for the effects of grazing and fire management.
- Explore and report on management options for grazing and fire management with the intention of developing management prescriptions that more closely mimic the dynamics of natural disturbance regimes.
- Complete and implement a Code of Practice for Grazing (See Section 4.2.3)
- If the benign nature of current grazing practices cannot be demonstrated within 5 years, grazing intensity on public lands should be reduced significantly until such time that ecological sustainability can be demonstrated.

SOCIAL ISSUES

Socio-Economic Impact Management

- Socio-economic impact analyses should be conducted prior to major conversion of tenure to ensure that impact management programs are applied in a targeted manner.
- A social impact management strategy should be implemented in the region to respond to the impacts of major changes to forest products as a result of governmental decisions to re-allocate the land/resource.
- The strategy should include (i) dislocation assistance to workers; (ii) special employment projects in the region; (iii) worker relocation assistance; (iv) worker training programs and assistance; and (v) a business compensation program.
- It should include a component specifically devised to suit the needs of indigenous communities both in terms of mitigating negative impacts and in terms of enhancing existing and potential economic opportunities.

Institutional Arrangements to Support Sustainable Forest Industry, Employment and Community Benefits

- Create a permanent policy group in Government to oversee optimisation of the socio-economic returns from forest products.
- Develop pricing and marketing strategies that provide incentives for the improved utilisation of wood and value adding of forest products.

Cultural Heritage

- The current Queensland Government review of legislation pertaining to indigenous cultural heritage needs to adopt a definition of indigenous cultural heritage which encompasses the spiritual and social meaning of places in addition to the historical/archaeological definition currently used.

- The Queensland Government should adopt a whole of Government approach to cultural heritage management; ensuring that policy and planning approaches are consistent across Government and across tenures.

- The Queensland Government should respond to identified problems in institutional arrangements by:
  - bolstering the profile and role of the lead agency for cultural heritage **or** developing an independent statutory authority for cultural heritage
  - clearly identifying the roles and responsibilities of land management agencies in relation to the role of the lead agency; and
  - improve the capability of land management agencies to integrate cultural heritage considerations into their work.
- Consistent with the work program developed by the Working Group, develop a set of tools for the identification, management and protection of cultural heritage across all tenures, and in particular:
- develop a Protocol for Work Area Clearance to identify cultural heritage and use this process to identify cultural heritage at the commencement of planning activities and for development on private and public lands;

- adopt a consistent approach for surveying non-indigenous cultural heritage in line with the principles of the Burra Charter [2],
- develop a Code of Practice for Cultural Heritage Protection and Management (inclusive of indigenous and non-indigenous cultural heritage) to provide advice on processes to be followed in relation to cultural heritage matters;
- provide for protection by developing a policy for Heritage Agreements which prescribe management and use of significant areas; and
- provide a mechanism to declare areas subject to Heritage Agreements under legislation, thus invoking statutory provisions for protection, sanctions and prosecution.
- Finalise and implement, as a matter of priority, arrangements under *IPA* for the protection of cultural heritage on private lands.
- Develop a Complaints Register to enable third party concerns in relation to cultural heritage management to be expressed and investigated by the lead agency.
- Encourage the voluntary adoption of the Code of Practice for Cultural Heritage Protection and Management on private lands and develop the public's understanding of cultural heritage issues generally by developing a targeted communication strategy.
- Ensure that land evaluation and the setting of lease conditions under S.16 of the *Land Act 1994* have regard to cultural heritage considerations.
- Develop, and make publicly available, Government policies and processes for the protection and management of cultural heritage.
- Provide for an Indigenous Heritage Advisory Group to provide policy advice and guidance to the Minister responsible for cultural heritage (mirroring stakeholder input to non-indigenous cultural heritage).
- Encourage the Heritage Council to include cultural heritage on forested lands as part of their deliberations.
- Provide for local indigenous land management committees to facilitate indigenous involvement in cultural heritage issues in forested areas.
- Provide for routine monitoring of cultural heritage protection.
- Allocate a proportion of the total research budget of DNR and DEPA to cultural heritage.

[2] The Burra Charter is a document that defines the basic principles and procedures to be followed in the conservation of heritage places.

APPENDIX 1 TERMS OF REFERENCE

1. SCOPE OF THE PROJECT

The framework agreed at CRAIF (Attachment 1 to this document) will provide the basis to assess each management system component against assessment criteria for each tenure (e.g. conservation reserves, State forests and administrative reserves) and forest use (e.g. conservation, timber production, plantations, other forest produce, recreation and tourism, water, and mineral resources). The criteria for the assessment of the SEQ RFA region forest planning processes and management systems are provided in the SEQ Goals, Objectives, Principles and Strategies for achieving ESFM principles and their elaboration as agreed by the SEQ RFA Steering Committee (See Attachment 2 to this document).

The project broadly aims to:

- assess the scope, quality, integrity and ability of systems/processes to deliver ESFM for all levels of government, across all land tenures, land uses and components (except those identified by the Steering Committee and listed under 'Task Description' below);
- link management systems and processes to issues identified in other assessments that affect the achievement of ESFM;
- identify systems/processes which are effective in achieving ESFM objectives and any significant gaps, deficiencies, overlaps or duplication in the management and planning systems and controls;
- identify cost-effective options for improvement and actions to address any gaps or deficiencies, including the identification of appropriate performance indicators relating to systems and processes across all tenures.

2. METHODOLOGY

For Stage Two, an independent Expert Advisory Panel will be established for the SEQ RFA region by the Steering Committee. Panel members will be drawn from the schedule of consulting experts previously approved by Steering Committee in consultation with the Chair.

Task Description - Stage Two

The Steering Committee will request the Expert Advisory Panel to commence its formal assessment of all systems and processes with the following exceptions:

- Freehold and Freeholding Leases;
- Cultural Heritage (indigenous and non-indigenous);

These issues were identified by the ESFM Technical committee following the completion of the Stage 1 report, as 'gaps' in the current Queensland Forest Management System. They will be addressed by the establishment of dedicated ESFM Working Groups, which will develop a framework and work program for each issue.

During the Stage Two assessment, the Expert Panel and ESFM Working Groups should regularly exchange information, and keep each other appraised of progress.

The assessment should:

- be structured and reported on against the agreed SEQ principles
- address the scientific basis of standards and prescriptions, and the processes through which they have been developed;
- identify systems/processes which are effective in achieving ESFM objectives, any significant gaps or deficiencies in the management and planning systems and controls and to identify cost-effective options for improvement and actions to address any gaps or deficiencies, including the identification of appropriate performance indicators relating to systems and processes across all tenures.
- take into account the work programs developed by the Working Group on Private Land and the Working Group on Cultural Heritage

The Expert Panel will provide an interim assessment report on issues related to native forest logging on publicly owned lands to the

steering Committee by late February/early March to assist in options development. A final report to the Steering committee is due mid April

Inputs

In undertaking the Stage Two formal assessment of Forest Planning Processes and Management systems for delivery of ESFM, the Expert Advisory Panel should have regard to the following:

- The assessment will be in accordance with the designated ESFM CRAIF framework and examine the effectiveness and scientific underpinning of the SEQ management systems and processes in meeting the agreed SEQ Goals, Objectives, Principles and Strategies for achieving ESFM (including the elaboration of these - Attachment 2 to this document).

- The assessment will be informed by the report "Background to assessment of Queensland's Ecologically Sustainable Forest Management Systems and Processes – Description report" and the Stage 1 Expert Panel Assessment report. In undertaking the Stage Two formal assessment the Expert Panel should take into account the ESFM issues identified by the relevant CRA environment and heritage, and social and economic assessment projects (the relevancy is already established in those project proposals agreed by Steering Committee).

- the work programs developed by the ESFM Working Groups.

- directions provided by the Steering Committee as appropriate and within the framework of the Goals, Objectives, Principles and Strategies as set out in Attachment 2 to this document.

Consultation

The Expert Panel, in undertaking the above processes, should consult with other parties including, forest managers and technical officials, as necessary. The Expert Panel is to consult with the ESFM Technical Committee according with the attached Timelines and Milestones

The Expert Panel is to consult with the ESFM Working Groups to ensure a co-ordinated and an integrated approach to the development of Queensland forest management systems and processes. This may include joint workshops and direct participation on Working Groups.

Secretariat

Secretarial support will be provided to the Expert Panel by one State and one Commonwealth official acting in an independent capacity.

3. CRITICAL PATH

Outcomes/Outputs

- An assessment of the scope, quality, integrity and ability of systems/processes to deliver ESFM for all levels of government, across all land tenures, land uses and components (except those identified by the Steering Committee and listed under 'Task Description'.

- Identification of systems and processes which are effective in achieving ESFM objectives, any significant gaps or deficiencies in the management and planning systems and controls.

- Identification of cost-effective options for improvement and actions to address any gaps or deficiencies, including the identification of appropriate performance indicators relating to systems and processes across all tenures.

Reporting

Apart from the requirement for the interim and final reports to be submitted to Steering Committee by the Expert Advisory Panel following the completion of Stage Two of the assessment, progress reports will be submitted by the project secretariat to Steering Committee each month.

ELABORATION OF THE STEERING COMMITTEE-ENDORSED GOALS/OBJECTIVES, GUIDING PRINCIPLES AND STRATEGY TO ACHIEVE ESFM[3]

Goals/Objectives of ESFM

ESFM should:

a) be achieved across all land tenures;

b) maintain, or where necessary, enhance ecological and evolutionary processes within forests;

c) maintain, or where necessary, enhance the biological diversity of forests, from genes to landscapes; and

d) optimise the net social, economic, and cultural heritage benefits derived from the mixture of forest uses within ecological constraints, whilst maintaining options for the future.

Guiding Principles

To the maximum extent practicable, the management planning for, and management of forests should maintain options for the full suite of forest values for present and future generations, and not adversely impact on any environmental values outside the forest estate. This over-arching principle should be applied at ecologically appropriate regional, landscape and operational scales. Scientifically based targets should be set and indicators of performance defined and monitored. The application of this over-arching principle will require:

Principle 1. The maintenance, protection or, where appropriate, enhancement of the following:

A Biodiversity to ensure the viability and integrity of all elements

- Biological diversity of forests at the ecosystem, species and genetic levels where biological diversity includes natural patterns of ecosystems, species and gene pools in time and space across the landscape;
- Address the requirements of rare and vulnerable species, assist with the recovery of endangered species;
- Maintain populations of all native forest species;
- Maintain the full range of ecological communities at viable and ecologically functional levels over their geographical range;
- Maintain or, where necessary for the viability of wildlife populations, restore structural complexity and the multi-aged characteristics of the forests where these naturally occur;
- Exclude inappropriate human-induced disturbance from high-quality habitat areas;
- Ensure no additional functional gaps in species distribution are created, ie no fragmentation of populations impeding interactions within or among local populations;

[3] These principles to be read in conjunction with the NFPS

- Protect landscape values through the careful planning of operations and the reservation of appropriate remnant patches and corridors of vegetation;

- Ensure a continuity of old-growth characteristics in the landscape to ensure long term viability and integrity of populations of flora and fauna species that are dependent upon, or make major use of, old-growth characteristics.

B The productive capacity and sustainability of forest ecosystems

- Maintain ecological processes within forests (such as the formation of soil, energy flows, the carbon, nutrient and water cycles, and the natural interrelationships among native flora and fauna);

- Maintain or increase the ability of forest ecosystems to produce biomass whether utilised by society or as part of nutrient and energy cycles.

- Ensure the rate of removal of any forest products is consistent with ecologically sustainable levels.

- Ensure the effects of activities/disturbances which threaten forests, forest health or forest values are minimised.

C Forest ecosystem health and vitality

- Reduce or avoid threats from activities or disturbances to forest ecosystems from:
  - ~ introduced diseases, plants and animals;
  - ~ inappropriate regimes of fire;
  - ~ flooding;
  - ~ land clearing; and
  - ~ impacts of urbanisation.

- Promote good environmental practice in relation to pest management.

- Restore and maintain the suite of attributes (ecological condition, species composition and structure) of native forests where forest health and vitality have been degraded.

D Soil and water resources

- Maintain and/or enhance the chemical and biological functions of soils by protecting soils from nutrient losses, exposure, degradation and loss.

- Maintain and/or enhance the physical integrity of soils by protecting soils from erosion, mass movement, instability, and compaction.

- Protect water quality (physical, chemical, biological).

- Maintain at appropriate levels, water yield and flow duration in catchments.

E Forest contribution to global carbon cycles

- Maintain and/or enhance the positive contribution of forests to the global carbon cycle.

F Long-term multiple social and economic benefits to meet THE NEEDS OF SOCIETIES

- Maintain and/or enhance, on an ecologically sustainable basis, the production of wood and wood products, including value adding, investment and resource security.

- Maintain and/or enhance on an ecologically sustainable basis the production of non-wood products, including bee-keeping, grazing, mining, recreation and tourism and reliable water supply.

- Maintain and/or enhance, on an ecologically sustainable basis, the provision of employment and community needs such as economic diversification, investment skills, education, jobs stability, training and indigenous needs.

- Encourage the establishment and use of purpose planted timber resources on existing cleared land to expand social and economic resource on an ecologically sustainable basis.

- Maintain and/or enhance the intangible social benefits which forests provide.

G NATURAL AND CULTURAL HERITAGE VALUES

- Protect social, natural and cultural heritage values and sites, including aesthetic, landscape, historic, cultural, educational, scenic, spiritual and scientific values, including indigenous values and sites.

Principle 2. Where appropriate the use of the precautionary principle (IGAE 1992) for the prevention of environmental degradation.

The incorporation of the precautionary principle into decision making has been endorsed by State and Commonwealth Governments (Commonwealth of Australia 1992 p. 49, IGAE 1992) and is defined as 'where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

- careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- an assessment of the risk-weighted consequences of various options.

Principle 3. Prevention or mitigation of impacts, both on-site and off-site, of forest management practices, which are, or may be deleterious.

Principle 4. Indigenous Cultural Heritage

- Ensure the participation of Indigenous people in all aspects of forested land management and planning to ensure:

  i. existing customary, traditional and Native Title uses of forested lands are maintained and enhanced;

  ii. subsistence, cultural and spiritual needs are met;

  iii. the social and economic viability of Indigenous communities are maintained and enhanced; and

  iv. that processes are in place to resolve any property or land tenure disputes that may arise from the exercise of common law, customary and/or traditional rights to Indigenous people.

- Where appropriate use the precautionary principle to protect Indigenous Cultural Heritage.

APPENDIX 2 LIST OF ABBREVIATIONS USED

AL Act	*Aboriginal Land Act* 1991 (Qld)
AHC Act	*Australian Heritage Commission Act* 1975 (Cth)
AIS	Area Information System
ATSIHP Act	*Aboriginal and Torres Strait Islander Heritage Protection A*ct 1984 (Cth)
BP Act	*Beach Protection Act* 1968 (Qld)
CH Policy	Cultural Heritage Policy
CP Act	*Coastal Protection and Management Act* 1995 (Qld)
CR Act	*Cultural Record (Landscapes Queensland and Queensland Estates) Act* 1987 (Qld)
CRA	Comprehensive Regional Agreements
CRAIF	Comprehensive Regional Assessment Information Forum
DCILGP	Department of Information, Local Government and Planning
DEPA	Department of Environment Protection Agency
DNR	Department of Natural Resources
DPIF	Department of Primary Industries Forestry
DME	Department of Minerals and Energy
DYP	Detailed Yield Plot
EC Act	*Export Control Act* 1982 (Commonwealth legislation)
EMOS	Environmental Management Overview Strategy
EMS	Environmental Management System
EPA	*Environmental Protection Act* 1994 (Commonwealth legislation)
EP(IP)	*Environment Protection Impact and Proposals Act* 1974 (Commonwealth legislation)
EPP (Water)	*Environmental Protection Policy (Water*) 1997 (Qld)
EPReg	*Environmental Protection Regulations* 1998 (Qld)
ESD	Ecologically Sustainable Development
ESFM	Ecologically Sustainable Forest Management
ESP Act	*Endangered Species Protection Act* 1992 (Commonwealth legislation)
EVR	Endangered, Vulnerable and Rare
F Act	*Forestry Act* 1959 (Qld)
FMAC	Forest Management Advisory Council
FRA Act	*Fire and Rescue Authority Act* 1990 (Qld)
GIMP	Generic Incursion Management Plan (draft)
GIS	Geographical Information Systems
GPC Policy	*Greater Planning Certainty Policy* 1991
GPS	Global Positioning System
HM and RM	Harvesting Marketing and Resources Management
ICM	Integrated Catchment Management
IGAE	Intergovernmental Agreement on the Environment
ILUA	Indigenous Land Use Agreement
IMA	Integrated Management Area
IPA	*Integrated Planning Act* 1997 (Qld)
JANIS	Joint Australian and New Zealand Environment and Conservation Council (ANZECC)
L Act	*Land Act* 1994 (Qld)
LG Act	*Local Government Act* 1993 (Qld)
MIG	Montreal Process Implementation Group
MOU	Memorandum of Understanding
MPAZ	Management Priority Area Zoning
MUID	Management Unit Identifier
MUMPS	Multiple Use Management Plans
NCA	*Nature Conservation Act* 1992 (Qld)
NFI	Native Forest Inventory System
NFPP	Native Forest Permanent Plot System
NFPS	*National Forest Policy Statement* 1992
NPWC Act	*National Parks and Wildlife Conservation Act* 1975 (Commonwealth legislation)

NRM	The Natural Resources Management Bill
NTA	*Native Title Act* 1993 (Commonwealth legislation)
PFDO	Private Forest Development Officer
Q Act	*Quarantine Act* 1908 (Commonwealth legislation)
QGP	Queensland Greenhouse Priorities Statement
QH Act	*Queensland Heritage Act* 1992 (Qld)
RAM Act	*Recreational Areas Management Act* 1988 (Qld)
RFA	Regional Forest Agreements
RIT Act	*River Improvement Trust Act* (1940) (Qld)
SC Act	*Soil Conservation Act* 1986 (Qld)
SDPWC Act	*State Development and Public Works Organisation Act* 1971 (Qld)
SEQ	South East Queensland
SKED	DPIF Yield Scheduling System
SL Act	*Sawmills Licensing Act* 1936 (Qld)
SLATS	Statewide Landcover and Trees study
SMA	Special Management Areas
SMP	Species Management Profiles
SMPIS	Species Management Profiles Information System
SOE	State of the Environment Reporting
SPI	Sound Practice Indicators
SS Act	*Soil Survey Act* 1929 (Qld)
SUID	Sub-unit Identifier
TSIL Act	*Torres Strait Islander Land Act* 1991 (Qld)
WHPC	W*orld Heritage Properties Conservation Act* 1983 (Commonwealth legislation)
WP Act	*Wildlife Protection (Regulation of Exports and Imports) Act* 1982 (Commonwealth legislation)
WR Act	*Water Resources Act* 1989 (Qld)

APPENDIX 3 DOCUMENTS AVAILABLE TO THE EXPERT PANEL

Queensland Commitments to ESFM

Legislation

Forestry Act 1959 (1)
Land Act 1994
Environmental Protection Act 1994 (2)
Nature Conservation Act 1992 (3)
Cultural Record (landscapes Queensland and Queensland Estate) Act 1987
Integrated Planning Act 1997 (4)
Local Government Act 1993
City of Brisbane Act 1993
Beach Protection Act 1968
Coastal Protection and Management Act 1995
Queensland Heritage Act 1992
National Environmental Protection Council (Qld) Act 1994
Aboriginal Land Act 1991
Torres Strait Islander Land Act 1991
Recreation Areas Management Act 1998
State Development and Public Works Organisation Act 1971-96
Freedom of Information Act 1992
Judicial Review (JR) Act 1991
Sawmills Licensing Act 1936
Primary Industries Corporation Act 1992
Water Resources Act 1989
Fisheries Act 1994
Fire and Rescue Authority Act 1990
Proposed Natural Resource Management Legislation

Policy

Forest Management in Queensland 1984 (5) – 2 volumes
Queensland Greenhouse Priorities Statement (in prep)
Greater Planning Certainty Policy 1991
Plantations, Forests and Future Directions: Qld Forest Direction Statement 1995
Native Species Plantation Policy Statement 1995
Decade of Landcare Plan (DOLP) 1992
DOLP Priority Actions 1997-2000 (1997)
Integrated Catchment Management Strategy
Client Consultation in DPI: Policy and Guidelines 1994
Client Consultation and Service Strategy Recommendations Paper 1997
DNR Forest Resources Cultural Heritage Policy – dependent on 2 RFA CH projects
Queensland Ecotourism Plan

Environmental Management System (EMS)

DNR Forest Resources Draft EMS 1998 (5)
Environmental Risk Management System Draft Version 2.0 – May 1998
DPIForestry EMS (6)
DEH EMS – Draft document

State-wide Strategic Planning

The State Strategic Plan 1997-2000 (1997)

Regional Planning Strategies under the State Strategic Plan:

- FNQ 2010 Regional Planning Project
- CYPLUS
- EDROC Regional Land Use Strategy
- Central Qld Project
- Gulf Regional Development Plan
- SEQ 2001 Project
- Townsville – Thuringowa Strategy Plan
- Wide Bay 2020 – Regional Planning Project
- WHAM 2015 – Regional Planning Project

Queensland Ecotourism Plan (section 1.3.2)

DNR and DPI Strategic Planning

DNR Resource Management Program Three Year Strategic Plan
Native Forest Yield Regulation System (DPI Forestry) (7)

DEH Strategic Planning

Corporate Plan 1998-2000
Program Strategic Plans
Conservation Program Strategic Plan 1997-1999
Environment Program Strategic Plan 1996-1998
Business Plans
Conservation Program Business Plan 1997-98
Southeastern Region Business Plan 1997-98

Interagency Planning

Strategic Land Management plans (8)

- Conondale Range Strategic Plans

IPA Schemes

Land Classification

DNR and DPI Land Allocation and Zoning

Management Priority Area Zoning
Enhanced MPAZ Project (9)
Special Management Areas (SMA)

- Scientific Areas – Proposal Document
- Feature Protection Areas

Interim Management Areas
Water Allocation and Management Planning (WAMP) and Water Management Planning (WMP)

DEH Land Classes

Management Planning Manual (draft) 1997

Land Classification by Local Governments

Local Government (Planning and Environment) Act

Land Management Planning

DNR and DPI Land Management Planning

Forest Management in Qld (5) – 2 volumes (repeat)
State forest Group and District Management Plans (10)

DEH Land Management Planning

Management Planning Manual (Draft) 1997 (section 2.3.2)
Protected Area Management Plans

On Other Tenures

Natural Resource Assessment Manual – Nature Refuges
Conservation Agreements
Coastal Management Plans

Operational Codes of Practice, Prescriptions, Policies, Guidelines and Permits

DNR and DPI

Codes of Environmental Practice (11)

- Code of Practice for Native Forest Timber Production
- Code of Practice for Native Forest Timber Production Issue Papers
- Code of Practice: Plantations for Wood Production

Harvesting Marketing and Resource Management Manual – 3 volumes
Species Management Information Systems (14a)
The Species Management Profiles (14b) – 2 volumes
The Species Management Database (15c)
DPIF Silvicultural Manuals (Plantations)

- Weed Control
- Exotic Pine and Hoop Pine Plantation Silviculture

Code of Practice – Taking and Use of Protected Plants 1995
Code of Environmental Practice for the Harvesting of Other Forest Products
DPIF Quarry Material Extraction Guidelines 1987
DNR Custodial Policy Management Manual (16)
Code of Practice for Extractive Industries (draft discussion paper)
DNR Land Administration's Fire Management Manual 1995
Joint fire Protection Plans
Memorandum of Understanding 1996
Code of Environmental Practice for Fire Management (discussion paper)
Draft Code of Environmental Practice for Forest Base Recreation
Sound Practice indicator for Visitor Site Management on State forests: Policy and Guidelines Manual (and appendix manual)
Draft Recreation Policies and Guidelines Manual (State forests)
Term leases for Grazing on State forests and Timber Reserves
Policy Advice on Term Leases 1995
Stock Grazing Permits in DPIF Leases and Permits Manual
Grazing Code of Practice
Apiary Permits in DPIF HM&RM Manual – V1
Occupation of State forests in DNR Custodial Policy Management Manual
Broad Scale Tree Clearing Policy for Tree Clearing on Leasehold Lands Administered under the Land Act 1994 (15a)
Local Tree Clearing Guidelines for Leasehold Lands (15b)
Tree clearing on areas administered under the Forestry Act
Permits to collect biological or geological materials from Qld's State forests
DNR Custodial Policy Management Manual (16)
Handbook of Land Planning Guidelines: DNR Resource Management (draft)
Contaminated Forestry Land Policy
Wildlife Regulation Manual

DEH

Protected Area Policy Manual
Wildlife Policy Manual
Fire Management Strategies
Wildfire Response Procedures (Fire Protection Plans)
Sign System Manual
Site Planning Manual
Draft Australian Standard for Walking Tracks
Interpretation Manual
Queensland Heritage Register
RFA Projects

- Protecting Cultural Heritage Values and Places in Forests
- SEQ Indigenous Cultural Heritage Management Guidelines

Nature Conservation Regulation 1994

Local Governments

Conservation Agreements
Vegetation Orders/Tree Protection Orders
Integrated Development Assessment System (IDAS) process
Environmental Impact Assessment and Management for Mining in Queensland 1995

Operational Planning

DNR and DPI

Native Forest Timber Harvesting Plans and Contracts (Generally timber sales on State forest) (13)
Plantation Timber Sales (State forest)
DPIF Quarry Material Extraction Guidelines 1987
Recreation Management State forest Recreation Planning Manual (draft for internal use)
South East Qld Outdoor Recreation Demand Study
Outdoor recreation value assessment process

DEH

Fire planning and reporting system
Erosion prone area plans - Policy Statement: Beach Protection Buffer Zones
Threatened Species Conservation Plans
Threatened Species Recovery Plans
Ecosystem Recovery Plans
WildNet Strategic Plan (draft)
Weed Management Plans
Pest Control Plans
Site Plans
Public Contact Plans
Cultural Heritage Management Plans

IMPLEMENTATION

Queensland's Commitment to Implement ESFM Guiding Principles

DNR and DPIF

Forest Management in Queensland 1984 (5) – 2 volumes
QFRI – Forest Health Surveillance System – Proposal
DNR Land Administration's Fire Management Manual 1995
DPIF Fire Management Manual

DEH

Corporate Plan
Conservation Program Strategic Plan
Conservation Program Business Plan
Southeastern Region Business Plan
Public Contact Plans
Extension Programs
Management Planning Manual (draft)
Regional Plans
Protected Area Management Plans
WildNet
Threatened species and ecosystem recovery plan implementation schedule
Conservation and Management of Protected Plants in Trade
Native Forest Permanent Plots
Local Government Planning Scheme

Macropod Harvest Strategy
Pandanus Dieback Report
Acquisitions Strategy
Greenhouse Gas Unit
Consultation Policy

ROLES AND RESPONSIBILITY

Organisational Structure

Roles and Responsibilities

Memorandum of Understanding between DNR Resource Management and DPI Forestry: Management of State forest and Other State Land 1996
Operational Guidelines for the Management of State forest and other State Land 1997DPIF
Commercialisation Charter 1995

COMMUNICATION AND AGENCY LINKS

Inter-agency Communication

Memorandum of Understanding between DNR Resource Management and DPI Forestry: Management of State forest and Other State Land 1996

MONITORING AND MEASUREMENT

Monitoring Policy

DNR

Draft DNR Forest Environmental Monitoring Policy
DNR Forest Resources Research Policy 1998

DEH

Conservation Research and Monitoring Program Agenda 2000

COMPLIANCE SYSTEMS AND AUDITING [17]

DNR and DPIF

Environmental Operational Review Policy For Native Forest Timber Production
Environmental Operational Review of Native Forest Timber Production Sale areas on Crown Land in Queensland
Queensland forest environmental auditing
Sound Practice Indicators
DNR Custodial Policy Management Manual (16)

DH

Corporate Plan
Strategic Plan, Business Plan, Performance Planning and Review

REVIEW AND IMPROVEMENT

Internal Review

DNR and DPI Internal Review

Enhancing the Native Forest Detailed Yield Plot System: Internal Review 1992
Native Forest Resources Task Force Reports

Timber Allocation Review
Code of Practice Review
Species Management Information System Review

DEH Internal Review

DEH Annual Report 1995-96
Administration of the Nature Conservation Act 1992 (1995-96)
Administration of the Environmental Protection Act 1994 (1995-96)
Environmental Protection Council of Queensland Report

External Reviews

DEH External Review

Environmental Management Systems Review (ERM Mitchell McCotter 1996)
CSIRO Review of the Code of Practice: Plantations for Timber Production
Review of Sustained Yield Management Data for Native Forests Managed by the Queensland Forest Service 1992 (external review by Turner and Ferguson)
Technical Advisory Group for Habitat Tree Retention
Evaluating Management of Protected Areas (UQG)

Research

DPIF Research

Queensland Forest Research Institute Research Review
Forest Health Surveillance System in Qld – Proposal

DNR Research

Research Science Centre: The Forest Wildlife Group in Review (Draft)
Hollows, habitat trees and sustainable forest management in Qld – Working Draft Document 1997

DEH Research

Monitoring impacts of forestry on wildlife

The Expert Panel had all CRA/RFA reports made available to them. These reports can be viewed on the World Wide Web at: http://www.rfa.gov.au/rfa/seq/index.html

APPENDIX 4 MONITORING STANDARDS

Background

The nature of monitoring and compliance is to report on the state of the system in question with a level of reliability that is likely to detect processes or changes considered important. Measures to achieve these goals may be qualitative or quantitative. Thus, any adequate system for monitoring and compliance has four components:

- the attributes measured should reflect the qualities and values deemed important;
- the measurements should be repeatable by independent observers;
- the attributes should be measured sufficiently that both the presence or the absence of important impacts are likely to be detected;
- whenever compliance is reported, the likelihood of detecting non-compliance is also reported.

Monitoring systems are part of a broader risk assessment and management framework. Environmental Management Systems should support processes and systems that facilitate the identification of hazards, assessment of their potential consequences (impacts), qualitative evaluation of their importance and likelihood, and the development of priorities for monitoring that reflect the relative risks posed by the different hazards. All steps in this process should be transparent and involve public consultation. Only after such assessments is it advisable to specify desired monitoring standards.

Reporting and audit requirements include measurement practices that meet specified standards such that they are likely to detect changes deemed to be biologically or socially important. One of the difficulties facing all broad monitoring programs is that they encompass a very broad range of variables. For example, MIG measures may include the extent and fragmentation of forest types, population levels of representative species, the amount of genetic variation within and between populations, areas of regenerated forest, forest areas experiencing changed ecological processes, areas of compacted or eroded forest soils, and the biological diversity of water bodies. The only way to ensure the application of uniformly effective measurement practices across such a broad array of criteria is to establish reliability standards. The utility of field surveys, monitoring designs and code of practice protocols can be measured by error rates, statistical power and detectable-effect size.

Standard monitoring methods must take into account and report on the chance of *failing to detect* important environmental and social impacts. This feature is a critical part of both monitoring and compliance (EMS and Code of Practice). Any management systems that omit these features cannot deliver ESFM.

The choice of a range of indicators and criteria for survey and monitoring will not provide protection from incorrect decisions. DNR in Queensland currently is considering the use of environmental monitoring programs and is exploring alternatives for flora and fauna surveys. Blanket pre-logging surveys, for example, are considered to be too costly and inefficient for routine use. Instead, strategic allocation of survey effort may be more likely to detect changes in the structure and composition of forest ecosystems. Similarly, DEPA is considering strategies for monitoring the state of National Parks and their success in meeting various management objectives including biodiversity conservation. However these goals are achieved, all monitoring and compliance activities must carry with them a protocol that ensures that whenever indicators are measured, the chances of failing to detect important changes are also reported. Without these reports, the system is blind to the possibility of potentially serious impacts.

The assessment of options depends on evaluating the consequences of management decisions in the face of uncertainty. Impacts must be detected against a background of natural environmental variation, measurement error, and ignorance concerning biological processes. If survey techniques are to be useful in helping regulatory agencies achieve sustainable management, their effectiveness must be documented. For example, how likely is it that a particular sampling regime will detect rare species? How many samples would be required to detect a species with a given degree of reliability? Which survey strategies are most likely to detect changes of a particular magnitude? How likely is it that the sampling strategy will be able to distinguish environmental impacts from natural, background variation? How many samples, of what kind, are required to detect a trend in population size against a background of observational uncertainty and environmental

variation? A system that reports on the likelihood of detecting changes of specified magnitudes will be able to answer these questions. A system that is blind to the likelihood of detecting changes will be unable to answer them.

The central issues in assessing methodologies and the quality of these activities may be summarised simply as an evaluation of the likelihood that they will achieve their purpose. This is a statistical property of the design and implementation of monitoring and research designs. It is directly measurable, it provides a simple key to the adequacy of existing work and a tool to guide future monitoring and research plans.

Restating the precautionary principle, if there is a reasonable chance (or a plausible *prima facie* case) of an impact with serious or irreversible consequences, then it is better to be on the safe side and take preventative measures than to wait until the impact is proven beyond reasonable doubt. The degree of precaution exhibited by an industry or an agency in using or regulating the use of the environment will be reflected in the probability with which it can detect an impact of a given magnitude. Such an approach suggests the onus of proof is shared by all individuals or agencies that benefit from using the environment or are responsible for regulating its use. It creates circumstances in which sound scientific method is encouraged and a framework within which the activities of a regulatory agency may be audited and against which its performance may be judged.

The current system

Existing monitoring systems include the Transect Recording and Processing System (TRAPS, DPI QBII), National River Health Program (DNR), Forest Monitoring Plot Network (FMP NET, DNR) and the Statewide Landcover and Trees Study (SLATS, DNR).

The State Land and Tree Survey provides biennial monitoring against specifications in the tree management planning kit, for tree clearing on leasehold land. It includes 150 ground inventory points per scene.

Databases on locations of fauna and flora are held by the Queensland Museum and the Queensland Herbarium, respectively. Typically these are presence only data, although more recent quadrat samples provide presence/absence information. There is no information on the reliability or completeness of maps of the distribution of species based on these data.

The document entitled ‘Conservation Status of Queensland's Bioregional Ecosystems’ provides a basis for evaluating the status of broad ecological communities based on substrate and floristics described by a few dominant canopy species.

The Queensland Herbarium has completed a vegetation map of SEQ at a scale of 1:100,000 as part of the RFA process. The map is based on approximately 2500, 0.1 ha quadrat samples of vascular plants. This map may be used to evaluate the extent, tenure and conservation status of floristic communities. Mapping of forest types (including structural measurements) is conducted by DNR.

DEPA published ‘Agenda 2000’ (1995) which acknowledges the need for research and monitoring programs. The document does not provide details about implementation, and specifies that these activities are largely devolved to regions. The objective of the ESFM team in DEPA is to implement an EMS in parks and then to the remainder of the organisation, although this intention has not yet been formally approved.

DPI Forests is responsible for monitoring foliage harvesting. Monitoring involves the establishment of one permanent quadrat for each species in each compartment, each containing a minimum of 20 harvestable plants. Half of the plants are harvested each year, and half are used as a control. Plant heights and numbers are recorded and ANOVA is used to detect trends between controls and impacts, and between years. In addition, there is random monitoring of harvest rates to ensure that no more than 1/3 of harvested plants have been taken. There is no information on the adequacy (statistical power) of these samples

There are no data on trends in biophysical variables associated with grazing activities. There are very few data on biophysical variables associated with other activities undertaken in forests such as recreational use, honey production or foliage harvesting. Most surveys monitoring programs concern activities associated with timber harvesting. The reliability and adequacy of these surveys have never been measured or reported.

Comment

The State's controlling bodies have monitoring responsibilities. However, none of the Acts governing nature conservation (IPA, NCA, EPA, *Land Act 1994*) stipulate the forms of measurement or the specification of standards for assessing compliance. In the absence of any compelling legislation, no Departmental policies or guidelines make reference to compliance standards, although DNR's draft policy includes a reference to the need to report on their ability to detect change. No operational procedures exist that describe the measurement or reporting of compliance standards for nature conservation or adherence to codes of practice on any land tenure. In the absence of the information and analyses required to judge the reliability of survey and monitoring information, any claim that current activities are ecologically sustainable cannot be substantiated. At best, they should be viewed as an article of faith.

DNR notes deficiencies in monitoring protocols to include the absence of:

- agreed indicators
- specific standards for measurement
- agreed limits of acceptable change.

There are no agreed measures of the adequacy of prescriptions to conserve soil, water, flora or fauna. DNR employs remote sensing, and permanent and temporary forest measurement sites to monitor forest condition. Long-term environmental reference sites are planned but are not yet implemented.

There is no independent evaluation of the extent and quality of information databases for ecologically sustainable forest management, for single species, ecosystems or landscape scale conservation. The majority of the State's threatened flora and fauna have not been methodically surveyed or monitored. The survey of threatened plant species in SEQ conducted as part of the RFA added substantially to existing knowledge. 32 of the 64 target species in that project were documented in field studies. The forest vertebrate fauna study emphasised the need for an extensive systematic survey of terrestrial vertebrates to provide information on the abundance and distribution of forest-dwelling species. The detectable effect size and statistical power of the monitoring program implemented for foliage harvesting has not been evaluated. Thus, the efficacy of the monitoring program is unknown. There is no legislated requirement for independent audit of the monitoring activities.

Monitoring programs should be designed to ensure that ecologically important changes in species abundances and composition are likely to be detected at a variety of spatial scales, for each of the activities that constitute threats to biodiversity, namely cattle grazing, wood production, recreational activities, foliage harvesting, fire management, and other forest products. Monitoring should be audited at rates that are likely to detect breaches of agreed standards.

There is a need to involve indigenous people in the process of survey and monitoring. There is no need to divorce the requirements for monitoring for biodiversity from the process of monitoring for cultural heritage values. Indeed, there may utility in combining measures that reflect attributes of value to both perspectives. Involvement of indigenous people in the environmental audit protocols will contribute to building capacity and understanding of shared cultural and conservation needs. Auditors for cultural heritage and biodiversity values should jointly report on compliance with provisions of relevant management plans. Review of the code of forest practice should include a regular review (e.g. 5-yearly) of the whole code and regular compulsory assessment of prescriptions relating to biodiversity in the light of emerging knowledge. There should also be a requirement that this involves the best available scientific specialists.

APPENDIX 5 FORESTS AND CARBON

1. ESSENTIAL BACKGROUND INFORMATION

i. All carbon accounting undertaken at regional or national scales must be considered in the context of the global carbon cycle. The problem is that the global carbon cycle has been disrupted by human perturbation, and there is now more carbon in the atmosphere than there should be with subsequent effects on (among other things) weather and climate.

ii. The main pools of carbon are as follows: the atmosphere holds about 750 Gt (G = one giga = one billion); terrestrial landscapes sequester about 60 Gt per year (the annual uptake rate); terrestrial ecosystems hold in steady state (i.e. long term average) storage about 2,190 Gt; and there are about 39,000 Gt in the oceans; modern industrial society emits about 5.5 Gt of carbon into the atmosphere annually.

iii. Three steps must be taken to restore stability (i.e. homeostasis) to the global carbon cycle: (1) reduce the emission of carbon into the atmosphere by modern, industrial society; (2) increase the annual uptake of carbon from the atmosphere by terrestrial landscapes through new plantations and modifying land use practices; and (3) protect and add to the long term, average carbon store in native terrestrial ecosystems, in particular, forest ecosystems (note that the consensus is that the oceans are unlikely to naturally sequester any more carbon from the atmosphere).

2. HOW MUCH CARBON IS IN FORESTS?

i. About 70-75% of the carbon stored on land is held in forest ecosystems. Roughly half of the carbon in a forest is found in the soil and half in the biomass. Most of the soil carbon is in the top 30cm. Of the carbon in the biomass, around 85-95% is found in the trees. The amount of carbon in trees depends on (a) the percentage of organic matter which is carbon and (b) the density of the wood. Eucalypt woody organic matter is about 48% carbon (pine is about 49%). The density of wood varies with the species but is typically around 0.6-1.3 g/cm3 (though some non-Eucalypt native species can be around 0.4-0.6).

ii. In a native forest the amount of carbon will depend upon: (a) logging history; (b) species composition (which determines wood density); and (c) other ecosystem characteristics (governing factors like growth and decay rates). As trees age, all other factors being equal, they increase in size and store more carbon. However the relationship between age/size and the amount of carbon is non-linear, i.e. a 2.5m diameter tree contains about 80 tC, a 2m diameter tree about 50 tC, and a 1m diameter tree only 10 tC. This means that one large tree of 2m diameter has a great deal more carbon than 10 trees of 0.2m diameter.

iii. The impact of logging is poorly studied and contentious. Two major potential impacts are: (a) it removes the older and hence larger trees and therefore most of the biomass carbon; and (b) it can disturb the surface and to varying degrees the top 30 cm of soil, causing the carbon stored here to oxidise and be released into the atmosphere. Most of the estimates of forest carbon are from logged sites and therefore potentially underestimate the carbon storage of an undisturbed native forest. Very few estimates of forest soil carbon exist in either logged or unlogged forests.

3. HOW MUCH IS FOREST CARBON WORTH?

It seems highly likely that emission trading will be a reality. This could produce very positive social, economic and environmental outcomes for Queensland if the issue is handled correctly. In particular, there is the potential to exploit emission trading through investment (especially foreign investment) in plantations. If this eventuates then such forests will have a new market value.

As noted above, globally, the long term average reservoir of carbon stored in native forest ecosystems represents about 75% of the total terrestrial carbon store and plays a critical role in regulating atmospheric carbon concentrations. However current international protocols have not been established that allow for this reservoir to be incorporated into emission trading schemes. Nonetheless, it is enlightening to value this reservoir by using the possible market value of carbon when traded under the proposed emission schemes. This may be in the range of $2.00-$20.00/tonne. Valuing native forest ecosystems

in this way provides an index of the carbon opportunity costs involved in different forest management scenarios.

i. Taking the top end of the potential emission trading market value, and the numbers given above in 1.2 and 2.1 the potential carbon opportunity cost index for the world's forest ecosystems is about thirty trillion dollars (i.e. 30×10^{12})

ii. The various carbon pools in a forest are: (a) the vegetation (both above ground and below ground components); (b) the forest floor litter; (c) coarse woody debris (fallen dead wood); and (d) soil. A forest carbon inventory is calculated by summing the carbon stocks in the each of these pools. To get an areal estimate the total is multiplied by the area of land under forest cover. This figure is then multiplied by an estimate of the potential market value of carbon per tonne (e.g. $20/t).

iii. Here are some indicative values that can be used to estimate the amount of carbon per unit area in SEQ:

(a) Vegetation

- Data on the amount of wood in a forest should be available from forest inventory records. The amount of wood tends to be reported as 'volume of wood per unit area' (e.g. m3/ha). If data supplied for vegetation are in the form of wood volumes, then the values need first to be converted to mass by multiplication with an appropriate value for wood density. Wood densities for Eucalypts range from 600-1300 kg/m3. The mass of wood then needs to be converted into carbon mass equivalent because only 48% of organic matter is carbon. These two steps are incorporated into the following equation:
- Mass of carbon (kg) = volume of wood (m3) * wood density (kg/m3) * 0.48
- Data on the amount of biomass below-ground (i.e. roots) are very scarce. In Australia, values have been found to range from 5.8-31.6 tC/ha.
- Alternatively, below-ground biomass can be estimated roughly as being 15-20% of the above ground biomass.

(b) Litter

- The amount of carbon in forest litter ranges from 2.5-26.3 tC/ha

(c) Coarse woody debris

- The amount of carbon in woody debris is also poorly known. In Eucalypt forest, values have been found to range form 2.0-65.0 tC/ha.

(d) Soils

- Soil carbon density in Australian Eucalypt forests has been found to range from 108-369 tC/ha.

4. HOW MUCH CARBON IS IN SEQ FORESTS AND HOW MUCH IS IT WORTH?

i. Using average figure given above in 3.3, a very rough estimate can be made of (a) the amount of carbon in forest in SEQ and (b) its potential carbon opportunity cost index, assuming

- market value	= $20/t
- wood density	= 900 kg/m^3
- carbon content of organic matter	= 0.48
- below-ground biomass	= 15% of above-ground biomass
- litter	= 10 tC/ha
- woody debris	= 30 tC/ha
- soil carbon	= 150 tC/ha
- carbon density in above-ground biomass of non-productive area forests	= 100 tC/ha
- the percentage of above-ground tree volume represented by sawlog volume	= 70%

therefore,

(a) Public Land	
(i) non-productive forest area	= 1.04 million ha
total carbon in non-productive area	= 317,200,000 tC
potential market value	= $6,344,000,000
(ii) productive area	= 557,857 ha
total carbon in productive area	= 108,567,550 tC
potential market value	= $2,186,799,320
(b) Private Land	
total area of forest	= 1.4 million ha
total carbon	= 267,002,240 tC
potential market value	= $5,340,044,800
(c) All forests in SEQ	
total carbon	= 692,769,790 tC
potential carbon opportunity cost index	= $13,870,844,120

ii. These figures are conservative and probably an underestimate due to uncertainties associated with among other things: the total amount of woody fibre on private forest; the amount of carbon in each forest pool; available forestry statistics; and variation in wood densities. Also, SEQ comprises many different forest ecosystems which will vary in terms of their carbon inventories, and there is about 1.5 million m^3 of non-sawlog and optional log in public forest which has not been accounted for here. Finally, the market value of carbon has yet to be determined (though note that the Sydney Futures Exchange is planning to start a Futures Market in emission trading).

APPENDIX 6 BACKGROUND INFORMATION ON THREATENING PROCESSES

List and maps of the distributions of rare plants and animals have been used to guide conservation priorities. This approach is useful for the conservation of those species that appear on the lists and that are adequately mapped, but it may be a flawed guide to many species and ecosystem conservation because some threatened groups are under-represented and others are over-represented in the lists, depending on the distribution and intensity of survey effort, and on their life histories and the reasons for their rarity (McIntyre, 1992). Thus, this approach is best seen as part of a global strategy that includes ecosystems, threatening process, CAR reserves and so on, and cannot be the sole vehicle for achieving conservation objectives.

Frequently, effective conservation strategies involve the identification of the causes of environmental change, and the implementation of management practices to limit those changes or modify their effects (Caughley and Gunn 1996). A threatening process is a process that detrimentally affects, or may detrimentally affect, the survival, abundance, distribution or potential for evolutionary development of a native species or ecological community. An advantage of the management of threatening processes is that it serves to improve the chances of persistence of several species simultaneously, and that it identifies the cause of a problem, targeting resources such that they rectify the cause (Caughley and Gunn, 1996).

In the face of the enormous number of species that require attention, it will be most effective to focus conservation effort on the processes that result in population decline. In a way, it is analogous to treating population decline as a symptom, and looking for, and correcting, the causes of that symptom (Burgman and Lindenmayer 1998).

Despite the attractiveness of managing threatening processes, there are few places that provide a legal or political mandate for their identification, classification and management. The State of Victoria provides legislation designed to halt and reverse the decline of species through the identification of threatening processes (the *Flora and Fauna Guarantee Act 1988*). The Act defines threatening processes as ones, which pose a significant threat to the survival or evolutionary potential of a range of flora and fauna (Section 11, p. 8, Government of Victoria, 1988). Between 1988 and 1993 a total of 12 threatening processes were listed under the Flora and Fauna Guarantee Act. While only few of these are relevant to SEQ, they serve to illustrate the scale of application of the concept in practice.

Threatening processes nominated under the *Victorian Flora and Fauna Guarantee Act 1988* between December 1988 and September 1993 (from Burgman and Lindenmayer 1998, after Wilson and Clark 1995).

Nomination Number	Potentially threatening process
41	Use of *Phytophthora*-infected gravel in construction of roads, bridges and reservoirs
48	Soil and vegetation disturbance resulting from marble mining
100	Loss of hollow-bearing trees in Victorian native forests
118	Removal of wood debris from Victorian streams
131	Predation of native wildlife by the introduced Red Fox
181	Increase in sediment input into Victorian rivers and streams due to human activities
186	The use of lead shot in cartridges for the hunting of waterfowl
197	Alteration to the natural flow regimes of rivers and streams
201	Introduction of exotic organisms into Victorian marine waters
204	Introduction of live fish into waters outside their natural range within a Victorian river catchment after 1770
211	Soil erosion and vegetation damage as disturbance in alpine regions of Victoria caused by cattle grazing
230	Alteration to natural temperature regimes of rivers and streams

Currently, The *Nature Conservation Act 1992* allows the Minister to impose an interim conservation order if there is a threatening process acting to adversely affect a threatened species, important habitat, or 'area of major interest'.

APPENDIX 7 BIODIVERSITY CONSERVATION

Background and the current system

Planning for the protection and maintenance of biodiversity has the following main elements:

- strategic planning documented in interconnected regional and forest management plans and associated ministerial conditions;
- development of species profiles and associated survey activities;
- use of Codes of Practice;
- development of Forest Harvesting Plans;
- development of Species Management Plans,

The *Nature Conservation Act 1992* requires an integrated and comprehensive nature conservation strategy across all tenures. Private land may be dedicated as Protected Areas. Under the NCA, Coordinated Conservation Areas involve reaching agreement with landowners and entering into a binding management protocol. One has been negotiated successfully. It provides for Conservation Agreements between the State and private landholders, initiated by the private owner, in which the agreement is formalised as a covenant on the property. It allows the Minister to declare 'critical habitat', effectively creating a National Park. The Act allows for the Minister to impose an interim conservation order if there is a threatening process acting to adversely affect a threatened species, important habitat, or 'area of major interest'.

Management plans for threatened, vulnerable and rare species are mentioned in the NCA, but they are not required. Listing of rare or threatened flora and fauna occurs under the NCA, through the Scientific Advisory Committee. Submissions for listing are received from the DEPA and the Queensland Herbarium, who apply the IUCN criteria to all proposals before submission. Public nominations are made directly to the Scientific Advisory Committee. The Committee makes formal recommendations that are then gazetted under the NCA. There is no explicit mandate under the act for the protection of rare and threatened ecosystems.

The DEPA Corporate Program Strategic Plan is comprehensive in committing to maintaining biodiversity and associated values. It includes little detail on planning, implementation or monitoring.

The policy of DNR is committed to the sustainable production of forests within a balanced conservation program. Its work is conducted within a multiple use setting intended to maximise community net benefit. The EPA is reviewed formally on an annual basis by the Environment Protection Council.

DEH has a strategic initiative devoted to achieving the establishment of Protected Areas within the framework of bioregional ecosystems (Sattler and Williams, in press).

Planning for forest management in State forests, timber reserves and leased crown lands is guided by the Management Priority Area Zoning System, to be replaced by the Multiple Use Management Planning System. The objective is to reconcile biodiversity conservation with other uses (cultural heritage, timber, grazing and so on) within planning units. These range from about 40 ha to about 300 ha in size, depending on the region and landscape. Operational Plans within these management units are guided by Harvest Plans, Plantation Plans, Fire Management Plans and DEPA Plans. DEPA plans are not relevant to management of State Forests. Individual species protection is governed by Species Management Profiles. These rely on known occurrences and expert maps of potential distribution. Species Management Profiles are developed routinely by DNR for all taxa listed under the NCA. They act as an interim protection measure until full management plans for each species have been developed. When forest operations request information on the distribution of threatened species, co-ordinate data are used to specify a 5 km circle around each location. These candidate species are considered and may be taken into consideration if the species or its habitat are considered to be present in a management unit.

Foliage harvesting rights within State forests are compartmentalised. Exclusive rights are auctioned by tender through DPI Forests, providing resource security for three to five years. In SEQ, the industry is dominated by a single operator who conducts about 70% of the trade. Several smaller operations contribute the balance of activity. Export Authorities are issued by Environment Australia and licences

to take the flora are issued by DPI Forests. Both organisations take a direct interest in managing ongoing monitoring activities. Constraints and guidelines exist in the form of a Code of Practice, and a constraint that pickers will not remove more than 1/3 of any plant each year.

Analysis

There can be no unequivocal scientific prescription for sustainable management of biodiversity, although a system that delivers ecological sustainability will have some identifiable components. For example, the Elaborated Principles for ESFM (Appendix 1) state that population numbers should stay within the bounds of natural variation across all tenures. All options for managing forests are likely to produce some changes from the current situation and social decisions need to be made about which changes are more or less desirable and acceptable. Current fire regimes and combinations of forest ages and structures differ from the past. Decisions need to be made by society about whether to accept the current situation as a starting point for ESFM or whether we should seek to return to some previous state. Given the unpredictable and uncontrollable nature of fires, extreme weather events and other more subtle processes that can affect population and community dynamics and even evolution itself, and given that we know of only a small proportion of biodiversity, it is unlikely that scientists can stipulate a mix of species that will be sustainable into the indefinite future. Similarly, research has shown that there is no small number of species that can be used to indicate the sustainability of biodiversity generally. Therefore, the concept of ESFM with respect to biodiversity needs to be defined as a set of clear and achievable objectives that Australian society and other stakeholders will find acceptable.

There is no clear legislative base for strategic planning or the implementation of landscape-scale conservation goals. DEPA and DNR have no systematic research program for evaluating biodiversity conservation at a landscape scale, apart from vegetation mapping at scales of 1:100,000 to 1:250,000. Provisions of the NCA provide for plans for threatened species. There is little evidence of regional and landscape scale planning or legislative commitment to planning at this scale and it appears that collection of data to support such planning is at a very early stage.

Many of the ecosystems and vegetation types in SEQ are degraded or substantially altered by the effects of activities including land clearance, unsustainable timber harvesting and grazing. If ecologically sustainability is to be achieved, then management strategies will be required to conserve species and ecosystems at a landscape scale, irrespective of their current condition. This will almost certainly require rehabilitation and ecological restoration of some systems, especially old growth forests. It will require the establishment of reference areas for each of the ecosystems to be conserved, and reporting against targets for conservation and restoration. The reference areas will need to be sufficiently large to incorporate the full suite of natural disturbance processes that are typical of the community in its natural state.

The success of a network of conservation areas depends first on the identification and protection of areas that best achieve the goals of comprehensiveness and adequacy. Rates of vegetation clearance in Queensland are such that this becomes the priority for conservation in the short term. The RFA is likely to complete an analysis that examines the comprehensiveness, adequacy and representativeness of Queensland's Protected Areas network. This work should provide a platform for the development of a strategic plan for establishing a reserve network. Some of this work is already in hand in State Government instrumentalities, and should continue with full support and adequate resources.

There is a significant number of protected area management plans to be written. Only two management plans had been completed for SEQ by the end of 1998, and a further three were in draft form. State Government expenditure on management of Protected Areas is relatively low by Australian standards (expenditure on a per-ha basis is roughly 1/3 of the Australian average). DEPA intends to complete 12 plans per year for the next 5 years, to complete the task.

Typically, priorities are set through an informal process of the evaluation of risks and consequences. There are no clear Government policy directives regarding the development of priorities for Protected Areas. This is particularly important in circumstances in which recreational use and biodiversity conservation objectives conflict. Considerable staff time and resources are devoted to managing recreational and commercial use of

National Parks. As a result, there is a lack of data upon which to base management decisions, and little time is devoted to monitoring and enhancing biodiversity values. There is no centralised strategic plan (at State or regional level) for biological survey or monitoring, no audit protocols for biodiversity status, and no reporting mechanisms for performance in managing Protected Areas for biodiversity. In particular, there is no explicit feedback mechanism between recreational activity pressures, revenue generation, biodiversity conservation needs, and resource allocation.

Conflicts arise as a consequence of landuse adjacent to National Parks, especially when these uses are particularly detrimental to the values of that park. These effects are the result of things such as cattle grazing, domestic pet incursion, arson, and water quality impairment. In addition, priorities for management and resource allocations do not always reflect the biodiversity values in parks where these values are the primary motivation for the protected area. In such cases, independent formal advice would provide policy support and provide motivation for management initiatives.

Several draft recovery plans have been developed under Commonwealth guidelines using Commonwealth funding; focusing on nationally threatened species. Conservation Plans prepared under the NCA are legally binding (termed 'subordinate legislation', Section 119, NCA). Their focus on regulation and legal enforcement has inhibited the application of this mechanism. To date, only six such Plans have been written. A change in the legislation could allow the development of management or recovery plans under State legislation that would have greater utility. The change should allow officers of the State to write management and recovery plans for threatened species, the contents of which may be binding, without the need to invoke subordinate legislation.

The NCA provides for the definition and protection of rare species, those that are scarce in samples, or have restricted geographic distributions. This has lead to the inclusion in the protected species protocols of several species that are naturally rare in the landscape but that are not threatened. It would be more useful for the purposes of conservation for the category rare to be redefined to incorporate near-threatened taxa. For example, it may define these species as rare taxa outside Protected Areas and subject to a threatening process. This would provide a mechanism to manage species to prevent them entering the threatened category, resulting in pre-emptive management to avoid unwanted outcomes.

The process of listing a threatened species via the Scientific Advisory Committee may take 12 months or more. There are circumstances in which threatened species are identified and the processes that threaten them are imminent. There is an urgent need to create a process by which submissions for listing may be fast-tracked, by Ministerial intervention or some related mechanism.

The declaration of 'critical habitat' effectively excludes land development from the nominated area, including activities that do not threaten the nominated species, and over-rides any existing Development Plans. Such consequences may inhibit the use of this mechanism. It would be more effective if there was a mechanism for protecting critical habitat that did not involve sanctions unless they are embodied in a management or recovery plan. This would allow managers to target management of those activities that create the threat without impinging on other benign activities.

There are no provisions in the NCA for dealing with multiple species issues, especially in circumstances where the management requirements of different species conflict. Such conflicts may be resolved, but usually at a scale above individual planning units, by providing enhancement of different species in different areas, or at different times. Such strategies require planning at regional scales.

A considerable proportion of the forests under State and private control support cattle grazing. Yet the SE4.2 Report on Forest Grazing states that there have been no studies on the environmental impacts of cattle grazing in native forests within the SEQ region. Many of the Species Management Profiles completed to date identify species as sensitive to the effects of grazing. There are no management prescriptions or Codes or Practice that govern the effects of grazing on threatened flora or ecosystems. There are no explicit audit requirements for compliance. Several stakeholders voiced the opinion that grazing, particularly in grasslands, may be compatible with flora and fauna conservation if properly managed, and that excessive grazing was the source of problems. Interactions between grazing impacts and fire management activities may pose significant threats to substantial

portions of the threatened flora unless managed conservatively.

There are only weak systems in place that enable the State Government to conserve important forest ecosystems on Freehold Land. Freehold lands means that there are no restrictions on the deed of grant and that the land owner has bought the timber rights. However, the *Nature Conservation Act* 1992 provides the Governor in Council substantial powers with respect to nature refuges.

One possible option is to use Statutory Covenants to protect nature conservation values on Freehold Land. A statutory basis is essential so that the covenant is registered against the title and therefore runs with the land. The landowner remains the land manager and continues to operate the farm as they see fit. However a legally binding agreement is reached that ensures in perpetuity the protection of specified conservation values on the farm.

The Queensland State Government is presently developing a State Covenant programme within the Land Services program of DNR. Policy options include establishment of a Land Trust (or some such Statutory body) that will enter into Covenants with land owners for nature conservation purposes. The key point is that land owners could be financially compensated for entering into such Covenants, with the Land Trust raising the money to compensate a farmer for, in effect, forgoing their timber rights. Developments in emission trading are one potential source of income for such Statutory Covenants.

There is potential to provide landholders with financial incentives to manage privately owned natural landscapes for biodiversity.

Performance-based payments could be centred on a process of initial survey to establish resident values (threatened species, extent of ecosystems, condition of ecosystems and so on), periodic audits to measure trends in indicators, payments based on performance, measured by the audits, and additional payments for enhancement of the values. Other options include rate relief for land holders who comply with voluntary management guidelines.

Planning typically relies on best available information. Such a planning environment creates no incentives to achieve minimum data standards. Because there are no standards, there is an implicit assumption that whatever is available is sufficient for the task at hand. Without standards, there will be no feedback between decisions and the consequences of those decisions. For example, if growth and yield models make predictions at the scale of an individual planning unit, planners use the best estimates to allocate sustainable sawlog supplies. If the predictions are unreliable at the scale of a planning unit, it will compromise scheduling and local planning. If the predictions are unreliable at the scale of a zone, it will compromise long-term planning for sustainable yield. These issues are intimately related to issues of monitoring and compliance auditing.

The application of management guidelines for threatened species relies on known occurrences and expert knowledge. Many of the management prescriptions rely on buffers and related local protection strategies. There are no data on the effectiveness of these measures. There is a need to audit the application of Species Management Plans and their outcomes, to ensure that they are applied reliably and effectively.

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