National Estate Values in the Southern Forest Region of South-West Western Australia

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- Volume Five -

Appendix 5

Department of Conservation and Land Management - Proposed Forest Management Practices to Protect National Estate Values

AUSTRALIAN HERITAGE COMMISSION

Department of Conservation and Land Management

NATIONAL ESTATE VALUES IN THE SOUTHERN FOREST REGION, SOUTH-WEST WESTERN AUSTRALIA

Volume Five

Joint Report by
the Australian Heritage Commission
and the Department of Conservation and Land Management, WA

February 1992

ISBN 0 642 17045 2

DRAFT REPORT

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APPENDIX 5

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT - PROPOSED FOREST MANAGEMENT PRACTICES TO PROTECT NATIONAL ESTATE VALUES

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This document was prepared by the Department of Conservation and Land Management in co-operation with the Australian Heritage Commission.

1. INTRODUCTION

In 1991 the Australian Heritage Commission and the WA Department of Conservation and Land Management (CALM) jointly carried out a regional study in the Southern Forest Region of south-west Western Australia. The study involved the assessment of places of national estate significance in the Region, and the development of guidelines for the regional protection of the places identified as being significant.

The study is described in the draft report *National Estate Values in the Southern Forest Region, south-west Western Australia* ('the Report'). This appendix (Appendix 5 of the Report) outlines the management practices to be employed by CALM for the protection of places of national estate significance. The methodology used for the assessment of places of national estate significance in the Southern Forest Region is described in Appendix 1 of the Report. The description of national estate values in the Indicative places are described in Appendix 2 of the Report, and other issues relevant to the protection of values in appendices 3 and 4 of the Report.

Concurrent with the assessment of places of national estate significance in the Southern Forest Region, CALM has drafted a new Forest Strategy for the management of the entire south west forests of Western Australia. This review has identified a range of strategies to sustain, in perpetuity, all values of the forests, including national estate values.

Following consultation with the Australian Heritage Commission during the review process, CALM has developed a set of recommendations ranging from additions to the nature conservation reserve system, to the employment of sensitive silvicultural practice in forest harvesting operations. The strategies are summarised in the following sections.

2. ACHIEVING SECURITY OF TENURE FOR FORESTED LAND

Although the area of dedicated forested land in the south west now exceeds 2.1 million ha, a significant area of forested vacant Crown land and other unvested land still exists.

In 1987 the three Forest Region Management Plans recommended that another 360,000 ha of unvested forest land become State forest, national park or conservation park. These plans were endorsed by the State Government and land tenure changes are proceeding slowly through the parliamentary process.

All proposals to secure the reservation of unvested land are required to be submitted to a formal review process involving consultation with State Government agencies and Local Authorities. This is a lengthy process and it is expected that the implementation of the 1987 Regional Plan proposals will continue for the duration of the ten year life of the plans.

In the Southern Forest Region approximately 210 000 ha of unvested land is proposed to be vested in the Lands and Forest Commission and the National Parks and Nature Conservation Authority. A significant proportion of this land is included in the areas proposed for listing in the Register of the National Estate. CALM will continue to seek security of tenure and purpose for these unvested lands.

3. ESTABLISHMENT AND MANAGEMENT OF A RESERVE SYSTEM FOR THE CONSERVATION OF NATURE

Conservation through reserves is one very important way of ensuring that the biological diversity of a region is perpetuated and that intact ecosystems are protected. Reserves must be managed to prevent loss of biodiversity, even in apparently undisturbed ecosystems. CALM has reviewed the principles for the establishment of a comprehensive and representative nature conservation reserve system in its 1991 Nature Conservation Strategy.

A quantitative methodology was employed to assess the adequacy of the reserve system in the Northern and Central Forest Regions, using mapped "vegetation complexes". These complexes

integrate climatic, geomorphic, floristic and vegetation structural data. Because no such maps exist for the Southern Forest Region, a qualitative approach was adopted.

Plant associations and landforms which are poorly represented in existing or proposed reserves were examined. Wilderness values in tall forest, woodland and coastal environments were assessed. The location of rare and threatened taxa was investigated. Priority for additions to the reserve system was given to areas which adjoin existing or proposed reserves.

The assessment of attributes for national estate significance, primarily landforms/soils and vegetation types, the occurrence of uncommon, rare or endangered communities and ecosystems, and the distribution of areas with wilderness values provided valuable data for the assessment of adequacy of the reserve system in the Southern Forest Region.

CALM recommends the following additions to the reserve system in the Southern Forest Region:

2.1 an area of 6 740 ha in Keninup Forest Block adjoining the northern boundary of the Perup Nature Reserve. The area includes 5 200 ha of virgin Jarrah and Wandoo forests and habitat for six declared threatened mammal species;

2.2 an area of 6 410 ha in Talling Forest Block adjoining the southern boundary of the Perup Nature Reserve and the northern boundary of Lake Muir Nature Reserve. This area also contains 2 800 ha of virgin Jarrah and Wandoo forest and important wildlife habitat. Several rare flora species are found within this area;

2.3 an area of 2 445 ha in Charley Forest Block linking the Warren and D'Entrecasteaux National Parks. Virgin Karri, Marri and Jarrah forest and extensive wetlands are represented. Outstanding landform features include Yeagarup Lake, Naenup Swamp and the moving front of the massive Yeagarup dune system;

2.4 an area of 78 820 ha in Powley, Romance, Rate, Hiker, Perillup, Clear Hills part Amarillup, part Karara, Surprise, part Crossing, London, Thames, Roe, part Northumberland, part Chitelup and part Rocky Forest Blocks, linking Mount Frankland and Mount Lindesay National Parks and Lake Muir Nature Reserve. 32 000 ha is virgin forest of Karri, Marri, Jarrah, Wandoo, Rate's Tingle and Red Flowering Gum. Outstanding landforms include Mt Roe, Mt Romance, Lake Surprise, Blue Lake, Monadnocks, wetlands and river valleys. Habitat for numerous threatened taxa and the most extensive forest and woodland areas with high/very high wilderness characteristics are represented in this new reserve;

2.5 an area of 210 ha in Dingup Forest Block. Mature Blackbutt and Jarrah forest adjoining the Wilgarup River;

2.6 an area of 250 ha in Mattaband Forest block. Virgin Karri and Jarrah forest adjoining the northern boundary of Mount Frankland National Park. This area is within a sub-catchment of the Weld River which is designated as a 'benchmark catchment' by the Water Authority of WA.

4. MANAGING FORESTS OUTSIDE THE RESERVE SYSTEM FOR MULTIPLE PURPOSES

Land tenures which are reserved for multiple purposes (State forest and timber reserve) will be managed under a system of "integrated management of values".

This approach incorporates the essential elements of previous forest management systems, such as sustainability and multiple use, and incorporates some of the techniques that have been employed to achieve these objectives. It fundamentally differs from previous systems of management, however, in that it recognises the forest as a single biophysical system rather than an aggregation of useful products (e.g. water, wood, recreation etc) and establishes the overriding objective for management as the maintenance of the forest ecosystem and its processes. This approach means

that the level of use of the forest is determined by the natural processes of the forest, not by the demand for a particular use or group of uses.

The principal elements of an integrated approach to forest management are:

(i) integrated forest management recognises that the forest is a dynamic interconnected system (i.e. one which varies in time and space);

(ii) the principal objective of forest management is to ensure the maintenance of the physical and biological processes that sustain the forest ecosystems. This includes the maintenance of the biological diversity represented in the plant and animal species that are part of the forest ecosystem;

(iii) the identification of all types of values found within the forests, and of the relative significance of each expression of value, assists the application of integrated management;

(iv) an understanding of the dynamics of each type of value enables the development of appropriate objectives for protection, and the establishment of minimum standards;

(v) if the prime objective of forest management is the maintenance of the ecological processes which perpetuate the forest ecosystem, this automatically means that forest management must ensure the maintenance of a balanced forest structure;

(vi) the level of supply of any value from the forest will not exceed levels that would cause forest processes (including a balanced forest structure) to be destroyed, or levels that cannot be sustained in perpetuity;

(vii) the actual level of supply of a particular value will be determined by the degree to which the supply of that value constrains other forest values and the relative priority that the community places on that value relative to others.

The process of assessment of national estate values by CALM and the Australian Heritage Commission has assisted the evaluation of natural environment values throughout the region and integration with other values.

Integrated management of values involves an analysis of the values identified for the forest at both the strategic (regional) level and at the activity (local) level.

The integrated management approach has the capacity to take into account both the spatial and temporal nature of multiple purpose management to ensure values are sustained at an appropriate scale in the forest.

The implementation of this system requires the development of a strategic plan for each value which will define relative areas of significance throughout the forest, what the objective for management of those areas will be, and the environmental standard below which the output of that value should not fall in competition with other values.

CALM recognises there are many agencies outside the Department which have a management responsibility, expertise or interest in how individual values are managed. CALM is committed to community participation in land management decisions and proposes to do so in the implementation of this methodology in integrated resource management. CALM recommends that joint sub committees be formed for each value under the auspices of the Lands and Forests Commission (LFC).

The sub committees would maintain a regular review of individual values, providing advice to the Lands and Forest Commission on environmental standards, management objectives, areas of relative value and research needs.

National estate values will be integrated with other recognised values in areas of forest outside the reserve system. The Australian Heritage Commission will be invited to participate in the joint sub committee to advise on national estate values.

Using the information on national estate values in the Southern Forest Region (Appendix 2 of the Report) and the principles developed for protection of national estate values (Appendix 4 of the Report), CALM staff will plan and implement operations in State forest which are listed in the Register of the National Estate in ways which will minimise adverse impacts on national estate values.

In the past the concept of sustained yield has been focussed on the timber production capacity of forests. There was an implicit assumption that forest management practices that sustained timber yield would also sustain the forest and other forest uses automatically.

CALM's review of forest management has broadened the concept of sustainability to -

- firstly, recognise that the most important elements of the forest to sustain are the physical and biological processes that maintain forest ecosystems and the gene pools represented in the plant and animal species of the forest, and

- secondly, ensure that the values derived (water, wood, recreation etc) from the forest are sustained at levels that do not impair the forest values below the requirements of the community.

Sustained yield is therefore defined as: "the maintenance in perpetuity of all the values and products that the forest can jointly provide, without impairment to the ecological processes that sustain the forest, at levels that are acceptable to the community".

5. SUSTAINING THE FLOW OF VALUES BY MAINTAINING A BALANCED FOREST STRUCTURE

Much as a single tree is one element of a forest stand, so a stand is one element of a forest. Forests contain a mosaic of stands, each at a different stage of development. The two primary eucalypt species of the Southern Forest Region, Jarrah and Karri, have distinct developmental stages which can be described by the characteristics of individual trees within the stand. In Karri stands it is possible to describe these developmental stages according to approximate age.

Because stands within a forest change over time, as a result of natural development, the structural character of a forest changes over time, even when there is no human intervention. For example, a forest with 30 percent of its area supporting immature stands may have that same proportion of land supporting mature stands with the passing of a few decades. In that same time period, stands that are presently mature may pass into the senescent stage.

Forest management in multiple purpose forest will aim to control the way that the forest develops, both spatially and temporally, so that the pattern of stands over the whole forest (reserved forests and multiple purpose forests) is continuously suitable for all values of the forest.

CALM considers that the flow of values from forests comprised of a particular mix of developmental stages can be confidently predicted. It is not possible to have all values available in one stand continuously. However by controlling the pattern of initiation of stand development throughout the forest, all stages of development and hence the flow of all values can be sustained in the forest as a whole. This is the essence of forest management.

National estate values, as with other forest values, will not remain static in space and time. The places to be listed by the Australian Heritage Commission as a result of the regional assessment process focus on areas of highest value. However in terms of both assessment and management they cannot be separated from the system as a whole. Spatial and temporal changes will occur as natural ecosystem processes take their course, and as particular management regimes are applied.

The optimum form of protection for national estate places which are sensitive to impacts arising from timber production activities is reservation. The control of forest structure in national estate areas outside reserves will ensure that the forest values recognised for each place are retained at the local and regional level. The focus of protection of national estate values is at the regional level, taking into account spatial and temporal considerations.

6. IDENTIFICATION AND PROTECTION OF SPECIAL AREAS IN FORESTS MANAGED FOR MULTIPLE PURPOSES

Protection of biological diversity and maintenance of ecological processes will not be achieved effectively in conservation reserves alone. There is strong evidence which supports the need to identify and protect special areas within the forest which possess high biological diversity. There are areas in forests managed for multiple purposes where exceptional aesthetic, cultural and scientific values occur and these sites merit special protection.

Riparian zones are especially valuable sites in the forest for protection of nature conservation, water and landscape values. Species abundance and diversity is greatest in riparian ecosystems for a range of vertebrate fauna including birds, mammals and amphibians. Many endemic fauna and relictual gondwanic fauna are also found in streamside habitat. Streams in forests provide habitat for numerous fish, crustaceans and vertebrate groups.

As well as being a critical source of diversity within the forest system, riparian zones are sensitive to disturbance. They can be altered by soil compaction, erosion and sedimentation. The use of buffer strips along streams in timber harvest areas is widely advocated as a means of filtering sediment by providing a physical barrier to the movement of soil and water.

The importance of stream buffer zones in the forest to protect water values has been confirmed by research conducted over two decades in the Southern Forests. It is known that stream buffers prevent sedimentation, reduce the rise of groundwaters and reduce the discharge of salt into streams.

Throughout the Jarrah and Karri forests there are sites of exceptional importance for habitat diversity. Areas of heath, sedge and herb vegetation, rock outcrops, swamps, lakes, wetlands and woodland formations contain outstanding species richness. Ecotonal features are also significant and valuable sites for wildlife conservation.

Many forest landscapes have high intrinsic aesthetic value. CALM has adopted a systematic approach to the inventory and assessment of visual resource values. The prime goal of visual resource management is to ensure that all uses and activities are planned and implemented so as to complement rather than detract from the visual qualities of the environments in which they occur.

CALM has developed a new system of undisturbed strips and patches of vegetation (including mature forest) to provide for wildlife, hydrological and aesthetic values. This system will also be an important source of protection for some national estate values. In particular these patches will help protect some endemic invertebrate fauna and some gondwanic fauna species.

It is recommended that:

1. all streams, permanent and ephemeral, including valley headwaters and seepage areas will be protected by riparian zones. Timber harvesting will be excluded from these zones;

2. riparian zone width will be variable according to a range of criteria (soil type, slope, type of harvesting, rainfall zone and stream order);

3. ecological boundaries will be used to guide the selection of riparian zone boundaries;

4. the following guideline will be used for selection of riparian zone width:

Stream Order	Width either side (approx)	Total width (approx)	Minimum width either side
First	30	60	20
Second	30	60	20
Third	30	60	20
Fourth	75	150	50
Fifth	200	400	100
Sixth	200	400	100

5. diverse vegetation communities will be protected. These include rock outcrops (>0.2 ha in size), lakes, swamps and other wetland, heathlands, sedgelands, herblands, and woodlands. Ecological factors will also be used to determine the selection of boundaries of these areas. Transitional vegetation (ecotones) should be kept undisturbed for at least 50 m from the edge of the feature;

6. aesthetic zones along roads and other travel routes will be selected and managed according to Visual Resource Management classification and management guidelines. The width of these zones will be variable in accordance with VRM criteria. A minimum width of 200 m will be kept free of disturbance on level 1 travel routes and 100 m undisturbed on level 2 travel routes;

7. movement corridors or links between aesthetic, riparian and diverse ecotype zones will be provided. These links will be chosen to optimise the mosaic pattern of undisturbed forest. Sites with high moisture and high nutrient status will be favoured in the selection of links. The boundaries of upland linkage corridors should be chosen using VRM criteria as well as ecological criteria;

8. no timber harvesting or vehicle movement will occur within designated riparian zones and diverse ecotype zones. Vehicle movement across riparian zones should be restricted to properly engineered and sensitively constructed stream crossings; and

9. road construction activities will avoid transitional vegetation (ecotone) sites and preferred alignments will be located in high open forest communities.

The identification of areas of special significance within the forest is an ongoing process.

It is proposed that:

- all areas of special cultural, biological, aesthetic or physical significance are identified and recorded in the operations Geographic Information System;
- the process of identification of areas of special significance be continually upgraded; and
- managerial strategies be applied to maintain the values of areas of special significance.

7. APPLICATION OF SENSITIVE SILVICULTURAL PRACTICES

Timber harvesting operations in State forest (including national estate places) will be carried out according to silvicultural specifications which have the objective of sustaining all forest values identified for the site.

Silvicultural parameters such as gap size, gap dispersal, cutting cycle, rotation length, temporary exclusion areas, and retained habitat components will be varied according to site conditions and values.

Specific aspects of the management of high value old growth forests and National Estate forests addressed in the silvicultural guidelines are detailed below.

- **Gap size**

  In karri forests the maximum gap (coupe) size is reduced from 200 ha to 80 ha. Gap sizes will range from 1-8 ha, 8-20 ha, 20-40 ha and 40-80 ha depending on zonation for aesthetic, water recreation and wildlife values.

  Average gap size in Karri is expected to be 30 ha.

  In Jarrah forests gap sizes range from 0.25 ha to 10 ha.

  In the intermediate and low rainfall (salt risk) zones gap creation will not exceed 70% of any second order catchment.

- **Maximum dispersal**

  Gaps created by timber harvest in the Karri forest will be dispersed to the maximum level possible within the cutting cycle, and take account of fire protection and road construction constraints.

  In Jarrah forest, minimum strip widths between gaps and minimum cutting cycle stage are set within various aesthetic, hydrological and recreation zones.

- **Retained habitat components**

  In Karri forest, patches of healthy immature, mature and senescent trees will be retained in harvest coupes where they can be protected from intense fire. Understorey vegetation and ground logs will be kept undisturbed in these patches.

  In Jarrah forest, groups of habitat trees, crop trees, ground logs and understorey vegetation will be retained.

- **Rotation length and retained patches of mature and senescent forest**

  Forest values will also be protected by extending the rotation length (up to 250 years) in some patches. This rotation length more closely approximates the average physiological rotation age of Jarrah and Karri. Retention of these additional patches of undisturbed forest beyond the first harvest cycle will ensure that mature and senescent characteristics are perpetuated in the stand until maturation of younger regrowth.

  The guidelines for the retention of additional patches of mature forest within harvested areas are:

- areas on ridges with high nutrient status or high moisture status (e.g. dolerite dykes, upland depressions);

- areas on ridges where retention of mature forests will contribute to maintenance of visual resource values;

- areas with potential for maintenance of future aesthetic values (e.g. adjoining logging roads which will later become public access roads);

- steep slope areas;

- pure Marri areas; and

- areas which will break up relatively large areas of even-aged regrowth and provide a better spatial arrangement of development stages. A maximum distance of 400 m between old growth patches is suggested.

The nature conservation reserve system is the primary source of protection for national estate values within the region. In State forest areas, early in the harvest cycle national estate values will be protected by the measures listed above.

The primary framework for the retention of old growth values later in the harvest cycle is the dendritic pattern of riparian zones in which mature and senescent stages of growth will be represented.

8. USING CODES OF BEST FOREST PRACTICE IN OPERATIONS

CALM will conduct and supervise all activities in the forest in line with specifications and guidelines contained within codes of practice. These codes cover the range of forest activities including forest harvesting and regeneration, road construction, recreation development, prescribed burning, extraction of basic raw materials, use of chemicals and rehabilitation of disturbed sites.

9. PROTECTING THE FOREST FROM HARMFUL INFLUENCES

CALM will implement management strategies to prevent damage to the forest and forest ecosystems from fire, disease, insect pests, weed and feral animals. A major program of control of the introduced fox will be implemented following clear research results showing that the predation by foxes is the major cause of decline in the populations of small and medium sized mammal fauna.