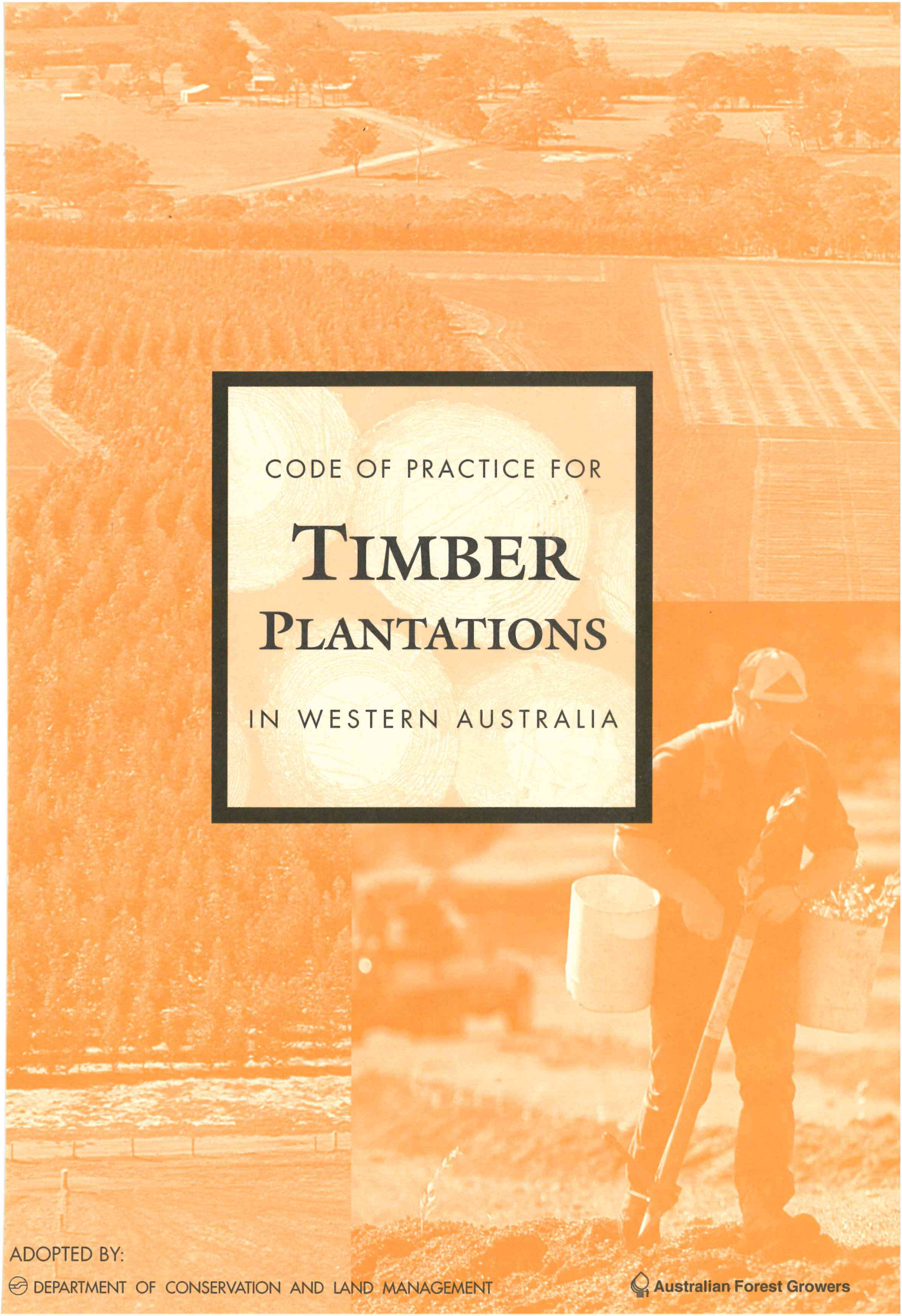

CODE OF PRACTICE FOR

TIMBER PLANTATIONS

IN WESTERN AUSTRALIA

ADOPTED BY:

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Australian Forest Growers

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Hamish Crawford - cover (right), p21
Ray Fremlin - pp 4, 6, 13, 16, 19, 27
Lochman Transparencies - cover (left, inset), pp 10, 14, 22, 26, 28, 30, 31, 32, 33

SECTION 1

SCOPE OF THE CODE OF PLANTATION PRACTICE

1.1 Introduction

Plantations[1] in Western Australia have an important role in providing a sustainable resource for economic development, and as a means of ameliorating farmland degraded by salinity and erosion caused by over clearing. Plantations offer a viable supplementary resource to that of native forests for the supply of wood products to both domestic and international markets. Strategic location of plantations can also assist in the protection of remnant native vegetation and natural conservation values.

The purpose of this Code is to provide goals and guidelines so that operations in plantations in Western Australia are conducted in a manner that is in accordance with the general principles described in the document, *Forest Practices Related to Wood Production in Plantations: National Principles (1996)* while recognising that plantations must be economically competitive.

While the demand for economical wood products is the prime motivation for establishing plantations, additional benefits also ensue: rising water tables may be reversed by trees, and soil conservation is enhanced; belts of trees strategically located provide important shelter for farm stock and crops.

Integrating plantations into traditional agricultural systems (farm forestry) offers farmers alternative sources of income while providing shelter to stock and crops and improving water quality. In some areas the land care benefits of plantation establishment may exceed the direct financial returns.

Achieving the goals and observing the guidelines defined in this Code are tasks for the combined parties associated with a particular plantation. These parties may include the owner of the land on which a plantation is growing, the owner of the plantation, the manager of the plantation and the employees/contractors employed to work in the plantation. The key function however, lies with the person(s), who controls on-the-ground operations. This will generally be plantation managers.

This Code does not include procedures for works which generally reflect individual objectives. While the methods used to establish and maintain plantations vary between growers, the principles, goals and guidelines in this Code apply.

This Code is a guide for the development of individual **plantation management plans** which incorporate **plantation establishment plans**, **plantation tending plans, fire management plans** and **timber harvesting plans**.

The Code of Practice for Timber Plantations has been adopted by the Western Australian chapter of the Australian Forest Growers. The AFG has agreed to advise all private growers of the existence and purpose of the code and emphasise the importance for them to accept the code formally through a sign-off process.

[1]Words in bold lettering are defined on page 36

1.2 The need for a Code of Practice

The purpose of this Code is to provide goals and guidelines so that operations in plantations in Western Australia are conducted in accord with the principles of environmental care, safety, planning, access, establishment and maintenance, timber harvesting, forest protection and monitoring and review as described in the document *Forest Practices Related to Wood Production in Plantations: National Principles (1996),* while recognising that plantations must be grown in a manner that will ensure wood products are economically competitive.

A Code of Practice also facilitates assessment of State timber plantation practice by the Commonwealth. This is required before export controls on timber grown in plantations can be removed.

Sustainable plantations depend upon careful and responsible management. It is essential that plantation practice is compatible with a range of environmental values and responsible land management. The Code is intended to complement related Acts, regulations, management plans, other codes of practice, local government planning schemes and State and national statements that relate directly or indirectly to plantations.

The Code has been prepared so that it is equally suited for application to all aspects of plantation management on both private and **public land** although procedures and strategies may vary.

1.3 Plantation management principles

This Code expresses State-wide principles, goals and guidelines which seek to promote the principles in the document: *Forest Practices Related to Wood Production in Plantations: National Principles (1996).* For convenience these principles are reproduced below.

1.3.1 Principles of environmental care

- Native forests should not be cleared for plantation establishment where this would compromise regional conservation and catchment objectives. In some circumstances it may be appropriate to clear forests that have been severely degraded by impacts such as disease, weed invasion, wind and fire so as to enable rehabilitation through replanting.
- Values such as intensive recreation, high scenic quality, significant geomorphic, biological, or cultural heritage sites, should be recognised in the planning of plantation forest operations.
- Plantation management should comply with State and regional conservation and catchment objectives, relevant planning schemes and legislation.
- Water quality (physical, chemical or biological) should be protected by measures controlling change resulting from plantation activities.
- Water yield should be managed as required by careful planning of operations.
- Soil stability should be protected by measures which regulate site disturbance.

- Soil, water catchment, cultural and landscape values should be protected by the careful location, construction, and maintenance of roads and tracks, and by regulation of their use.
- Fauna, floristic and landscape values should be protected by the careful planning of plantation layout, establishment operations and the reservation and protection of appropriate areas of native vegetation. Such values should be recognised in subsequent plantation management.
- Plantation and adjacent native forests should be protected from the adverse effects of fire and from the introduction and spread of plant, insect and animal pests and plant diseases.
- Operators will be trained in the principles of environmental care.

1.3.2 Safety

- All plantation establishment, management and utilisation will be conducted to comply with the relevant occupational health and safety legislation and policy. In particular all operators should be trained to designated standards in the safe and efficient use of machinery, and be responsible for safe working practices.

1.3.3 Planning

- The State and local governments should, with appropriate public involvement, pursue planning policies that provide secure zoning for commercial planting with the objective that tree planting and subsequent harvesting for commercial wood production should be an 'as of right' use.
- State governments will establish a sound legal basis for separating the forest assets component from the land assets for tree plantings. The Commonwealth Government will consider similar action regarding taxation, capital evaluation, etc.
- Plantation strategic planning should be developed in conjunction with regional development plans.

- The environmental, social and economic effects of all plantation operations envisaged for an area will be considered during the planning process.
- Individual plantation operations will be conducted in accordance with relevant codes of practice.

1.3.4 Access

- Planning for road systems in plantations will be based on both the economic principle of minimising the combined cost of roads and extraction and on the principles of environmental care (see 1.3.1 above).
- Road design will be to a standard consistent with the purpose for which the road is to be used, and capable of carrying the anticipated traffic with reasonable safety.
- Construction and maintenance of roads and associated works will be undertaken in a manner which will ensure compliance with the principles of environmental care (see 1.3.1 above).
- Roads will be closed in wet conditions when unacceptable damage would occur or when such other conditions warrant.

1.3.5 Establishment and maintenance

- Plantation establishment methods should be economically and environmentally appropriate for the particular requirements of the species to be planted and the specific site conditions.
- Establishment of plantations may involve the introduction of selected species, provenances or populations to increase productivity or value. However, management of these plantations should aim to constrain or prevent the introduction of these species to surrounding areas.
- Intensive management practices, such as site preparation, fertilising, weed control, pest and disease control and other operations will be carried out in accordance with codes of practice and be consistent with the principles of environmental care (see 1.3.1 above).

1.3.6 Timber harvesting

- Timber harvesting will be planned and carried out under codes of practice that meet the principles of environmental care (see 1.3.1 above).
- The harvesting plan will consider factors such as harvesting unit size, slope and location of harvesting units; design and location of landings and snig tracks; harvesting equipment; areas excluded from logging; and areas specified for protection and reforestation.
- Harvesting operations should not be conducted in manner which compromises the principles of environmental care (see 1.3.1 above), or where the safety of workers is at unacceptable risk.
- Soil and water values should be protected by progressive rehabilitation and drainage of snig tracks, temporary roads, log dumps and any other earthworks associated with harvesting operations.

1.3.7 Forest protection

- Fire protection planning should be undertaken on a regional basis in coordination with relevant land management agencies and with local bushfire control organisations.
- Plantation health surveillance should be undertaken on a regular basis.
- Where weeds, pests or disease cause significant damage or deaths of trees, prompt specialist advice should be sought to address the problem.
- Use of chemicals, such as herbicides and other pesticides, and other pest control methods in plantation operations will be in accordance with State policies, procedures and approved usage.

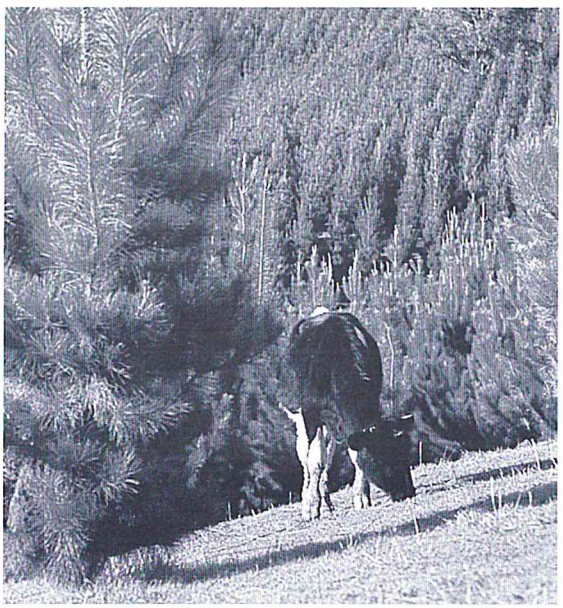
1.3.8 Monitoring and review

- Where practicable, plantation operations should be supervised and monitored by qualified persons and be subject to audit.
- The National Principles should be reviewed and evaluated after three years.

1.3.9 Environmental and economic benefits of plantations

In addition to the *National Principles* this Code emphasises the benefits of tree plantings as a means of reversing land degradation such as salination caused by rising water tables. The land use principles are:

- to plan to achieve maximum benefits that plantations can provide in terms of the integration of environmental and commercial objectives;
- to develop appropriate systems (farm plans, **catchment** management plans, etc.) to achieve the environmental benefits that plantations can provide;
- to use integrated systems (farm forestry), where appropriate, to re-establish deep-rooted perennial plants on cleared agricultural land.



1.3.10 Plantation investment

The viability of plantations and the ability to meet national goals for plantation grown timber products will depend on the level of investment in the industry. The principles guiding the development of investment options, including financial and productivity statements, are:

- investment in afforestation projects is based on complete and accurate information;
- prospective investors are provided with information relating to the nature and risk of the investment, taxation liabilities and concessions, land information, technical methodology, insurance, expenditure forecasts, estimates of returns and related party information.

1.4 Acts and regulations relevant to plantation management

Legal controls on plantation management activities in Western Australia are found in relevant Commonwealth, State and local government Acts and regulations. The overall subject is also covered in policies, guidelines and related codes of practice.

Legislation relevant to plantation activities include the following:

- ***Aboriginal Heritage Act 1972***
  Protects Aboriginal cultural material, Aboriginal sites and declared protected areas.
  Native Title Act 1993
  Protects native title.
- ***Agriculture and Related Resources Protection Act 1987***
  Agriculture Protection Board Act 1950
  Control of declared animals (vermin) and declared plants (e.g. noxious weeds), accreditation for use and storage of 1080 poison.
- ***Bush Fires Act 1954***
  Department of Planning and Urban Development (DPUD) Plantation Fire Protection Guidelines 1991
  Local Government Authority Fire Law and Firebreak notices
  Plantation design, compartment size and layout, firebreak design and minimum firebreak widths, water point requirements, fire equipment requirements, public utility firebreak easements, burning off, restricted and prohibited burning seasons, permit to set fire to bush, plantation pruning and overhang, planting within town site influence zones.
- ***Corporations Law***
  Trade Practices Act 1974
  Public accountability of commercial forest operations. Several State and Commonwealth Acts and codes cover capital raising and formation provisions for plantation investment companies including joint venture arrangements between plantation companies and landowners.
- ***Civil Aviation Regulations***
  Limitations on obstacles surrounding aeroplane landing areas (e.g. airstrips). Limitations on construction of airstrips or runways within five nautical miles of existing aerodromes.

- ***Conservation and Land Management Act 1984***
  Sets objectives for plantations on State forest and timber reserves. Business undertakings for tree plantations. Timber Sharefarming Agreements. Registration of owner's identification code for **private land** and log timber intended to be delivered to a sawmill.
  Wildlife Conservation Act 1950
  Issue of damage licences for management of native fauna damaging plantations, taking of protected flora and fauna, protection of rare flora and fauna.
  Wildlife Protection (Regulation of Exports and Imports) Act 1982
  Oil distilled or otherwise extracted from a plant other than a plant of the genus *Eucalyptus*.

- ***Country Areas Water Supply Act 1947***
  Regulations require clearing licences for removal of native vegetation from within gazetted catchments, including individual paddock trees through to discrete areas of native vegetation, native vegetation compensation in catchments, Agreements to Reserve.

- ***Environmental Protection Act 1986***
  State legislation which permits environmental impact assessment of any proposals that may significantly affect the environment.

- ***Health Act 1911***
  Health (Pesticides) Regulations 1956
  Aerial Spraying Control Act 1966
  Use and application of pesticides in plantations, ground based and aerially based, licensing of pesticide operators, transport and storage of pesticides.

- ***Heritage of Western Australia Act 1990***
  Protects places of significant cultural heritage.

- ***Local Government Act 1995***
  Town Planning and Development Act 1928
  Planning schemes prepared and administered by local government. Plantation establishment applications and approvals, plantation design and firebreak provisions, roading, protection of visual amenity.
  Empowers local governments to make local laws affecting private and public land.

- ***National Competency Standards, Policy and Guidelines 1992***
  Training and **competency**.

- ***Occupational Safety and Health Act 1984***
  Timber Industry Regulation Act 1926
  Employee and employer obligations and duties relating to safety, training and workplace practices.

- ***Quarantine Act 1908***
  Customs Act 1901
  Import and export of forest products to and from Western Australia.

- ***Soil and Land Conservation Act 1945***
  Procedures for the administration and assessment of clearing and protection of soil and native vegetation in Western Australia. Clearing of native vegetation on agricultural land, Agreements to Reserve. Soil conservation notices. Drainage and pumping of water from owner's land to other land or water course. Procedures for harvesting, transport and processing of timber.

The following Acts bind the Commonwealth when making decisions at a Commonwealth level (e.g. exports). An assessment during 1996 is designed to meet all Commonwealth obligations under these Acts and remove the need for assessment of individual applications with respect to plantations.

- ***Australian Heritage Commission Act 1974***
  Assessment and listing of lands on a Register of the National Estate and management to protect National Estate values in those areas.

- ***Environmental Protection (Impact of Proposals) Act 1974***
  Environmental impact assessment for proposals which require a Commonwealth decision and which may have an impact on the environment.

Documents guiding plantation management activities include the following:

- *Forest Practices Related to Wood Production in Plantations: National Principles (1996);*
- *Intergovernmental Agreement on the Environment (1992);*
- *National Competency Standards, Policy and Guidelines (1992);*
- *National Forest Policy Statement;*
- *State Plantations Impact Study (1990);*
- *Wood and Paper Industry Strategy (1995).*

Specific plantation objectives and procedures to be applied to plantations rest with individual plantation managers and it is recommended that procedures be reviewed frequently to account for new technology, scientific information and experience.

In addition to serving as a practice manual for CALM and CALM plantations, endorsement by private plantation growers and adoption by local governments as the standard for review under town planning schemes is an objective in the implementation of this Code.

1.5 Competency in plantation management

Competency to manage plantations within the principles of environmental care is fundamental to the objective of this Code. Training of managers and operators engaged in plantation activities is the responsibility of plantation managers. The principles of competency based training (CBT) should be followed in order to conform to the national strategy for training and provide nation-wide accreditation for practitioners.

1.6 Review of this Code

This Code will be subjected to a periodic review to account for new research information, experience and changes in standards and legislation.

Procedures will be reviewed by each grower organisation on an on-going basis to account for new technology, scientific information and experience.

1.7 Audit of plantation practice

Plantation operations should be supervised by competent personnel and the activities in plantations should be subject to regular audit. Plantation owners and managers should establish a system of internal audit to ensure compliance with this Code.

SECTION 2

GOALS AND GUIDELINES FOR PLANTATION MANAGEMENT

2.1 Explanation

The terms used in this document are:

- ***goal*** - a desired outcome (economic and environmental) adopted to guide the formulation of strategies for the management of plantations;

- ***guideline*** - provides a principle for meeting goals. Guidelines can be either quantitative or qualitative;

- ***procedures*** - detailed methods that are developed to suit regional requirements and specify conditions to achieve a goal.

This Code provides goals to aim for and guidelines to follow when preparing procedures and setting conditions for particular operations on land which is or is to be used for commercial plantations.

This Code does not apply to tree plantings specifically designed for on-farm needs, such as fence posts, firewood, shelter or for aesthetic purposes. Neither does this Code apply to revegetation where trees are established primarily for erosion control, salinity control or for amenity purposes consistent with on-farm and non-commercial values.

2.2 Management plans

Goal

Plantations should be developed according to a plantation management plan, prepared specifically for the purpose.

Guideline:

A plantation management plan will contain sections for different aspects of plantation management, including a:

- plantation establishment plan;
- plantation tending plan;
- fire management plan;
- timber harvesting plan.

Examples of a protocol appear in 3.2

2.3 Plantation location, planning and design

Goals

(1) Plantations should be established according to a plantation management plan prepared specifically for individual plantations. They should account for economic and environmental values, and the need for protection from fire and disease.

(2) Plantations should be established on cleared agricultural land where practicable.

(3) The priority should be to locate plantations to achieve maximum commercial viability, although where there is the potential to halt or reverse the rise in ground water, or an expression of salinity is evident, or likely to become evident, plantings should be located in the landscape such that the best environmental outcome is achieved.

(4) Plantations should be designed such that heritage, environmental, protection and social values are maintained or enhanced.

(5) Plantation boundaries should be confirmed against cadastral boundaries.

Guidelines

Plantations should be designed prior to any activity, taking into account that:

- clearing of native vegetation on public land for plantation establishment is contrary to the policy of the Western Australian Government. However, clearing for plantation establishment may be appropriate if the existing vegetation is severely affected by disease or fire such that **rehabilitation** through replanting is necessary;
- removal of native vegetation in gazetted water catchments requires a permit under *the Country Areas Water Supply (Clearing Licence) Regulations 1981* and *Guidelines* 1994;
- a Notice of Intention to clear an area greater than one hectare is required under the provisions of the *Soil and Land Conservation Act 1945-92;*

- the provisions of the *Aboriginal Heritage Act 1972* and the *Native Title Act 1993* must be adhered to;
- approval to lease land which is part only of a lot and where the term of the lease exceeds ten years is required pursuant to Section 20 of the *Town Planning and Development Act 1928* and the *Local Government Act 1995;*
- plantations must be designed in accordance with the provisions of the *Bushfires Amendment Act 1987*; Department of Planning and Urban Development *Fire Protection Guidelines 1991* and relevant local government authority *Fire Law and Firebreaks Notices;*
- conservation of natural, cultural and heritage values are required under provisions of the *Heritage of Western Australia Act 1990;*
- location of plantations near airports, or construction of airfields in or near plantations must adhere to the *Civil Aviation Regulations;*
- the landowner should establish whether sites of significant landscape and cultural heritage exist through consultation with the relevant authorities and assess, before planning to establish a plantation, whether development will impact on such sites;
- intact native vegetation within 20 metres of a permanent **stream**, swamp, or body of permanent water, and within ten metres of a temporary stream or **drainage line** should be retained to prevent sediment movement into water bodies.
- where there is no native vegetation adjacent to a stream, plantations may be established and harvested provided that water quality values are not compromised. Water quality should be protected by careful planning and control of the location and timing of machine operations during site preparation and harvesting with the aim of minimising both disturbance of the water course itself and the chance of soil being transported into the water course;

- areas of remnant native vegetation that are being considered for clearing should be checked for rare and endangered species subject to provisions of the *Wildlife Conservation Act 1950*;
- plantations should be located with consideration for harvesting requirements, such that haulage distances are not excessive and harvesting can be achieved without detrimental impacts on environmental and heritage values;
- plantations should not be established on steep slopes. (Steep slopes are normally defined as those in excess of 30 degrees but lower slope limits should be applied in areas where the **erosion hazard** is high.) Where existing plantations occur on steep slopes they may be harvested and replanted with commercial species provided soil stability is not compromised. Note: establishment of plantations may be considered on steep slopes which are already cleared and subject to erosion since this may actually improve soil stability;
- where a plantation is designed to provide groundwater control this should be achieved by extensive planting of **recharge areas**;
- strategic areas should be maintained free of flammable vegetation for fire breaks;
- boundary margins should be maintained in accord with planning provisions;
- the benefits of plantations in improving environmental, agricultural economic and social values should be taken into account when preparing submissions for permits under Town Planning Schemes.

2. 4 Plantation roads

2.4.1 Road planning

Goal

Roads and **tracks** adequate for **site preparation**, planting, **tending** and fire protection should be established before these operations commence. **Temporary roads** established for a specific operation and then made redundant should be closed and rehabilitated. All roads should be adequately drained and stabilised.

Guidelines:

- location of roads must adhere to the *Soil and Land Conservation Act 1945*, the *Heritage of Western Australia Act 1990* and the *Aboriginal Heritage Act 1972*;
- plans for permanent and temporary roads should be detailed in the plantation management plan, and should be prepared in advance of planting to enable the roads to be located on alignments and grades that provide the required standard of access without compromising road safety, water quality and other environmental values;
- new roads should be kept to a minimum necessary to satisfy management requirements; to be located in the best landscape position possible (e.g. avoiding stream crossings where possible); to be constructed under suitable weather conditions; to be well consolidated before use;

- planning for temporary roads should be based on appropriate need and field reconnaissance, and with consideration to environmental values;
- roads to obtain access to a particular coupe or harvesting area from an existing road should be outlined in the timber harvesting plan.

2.4.2 Road design

Goal

New or upgraded roads should be designed to a standard that will carry the traffic anticipated in plantations, throughout the rotation and beyond if necessary, with reasonable safety.

Guidelines:

- new or upgraded roads should be designed to accommodate the anticipated frequency, type and speed of traffic, soil and subgrade conditions, road drainage and water quality requirements, and landscape and environmental values;
- **permanent roads** should be constructed on alignments with ruling grades that generally do not exceed 1:10, steeper grades being permissible for short sections totalling up to 15 per cent of total road length. Temporary roads may be constructed on alignments with ruling grades steeper than 1:10.

2.4.3 Road location

Goal

Roads should be located so as to minimise the risk of soil erosion and degradation of water quality. Roads should be located such that environmental and landscape values are not compromised.

Guidelines:

Roads should be located, where possible, such that they:

- are not running adjacent to natural drainage lines, swamps or other areas of restricted drainage;
- minimise the spread of the fungus *Phytophthora cinnamomi* (dieback) and other pathogens;
- minimise the number of stream crossings and other interference with natural drainage;
- minimise the amount of earthworks by running, where possible along ridges and spurs and avoiding steep side slopes and areas prone to slippage:
- minimise disturbance of **riparian zones**;
- avoid areas of significant biological importance;
- permit road surface **run-off** to be discharged into filter strips and away from natural drainage lines as far as practicable.

SECTION

2.4.4 Road construction

Goal

Construction of roads should be planned to coincide with favourable weather conditions and should be well in advance of harvesting operations.

Guidelines:

- road construction should be undertaken when soil is moist, but not saturated, to minimise the risk of erosion while providing sufficient moisture to enable stabilisation of the road surface and subgrade;
- logs, stumps and other debris should not be buried in the load-bearing portion of the road;
- embankments and fills should be stabilised using accepted engineering practices;
- when constructing permanent roads, topsoil should be stockpiled and returned to **batters** and embankments ready for rehabilitation works;
- cleared areas should be kept to a minimum consistent with the need to allow sufficient sunlight and air movement to affect drying;
- table drains, culverts, cross drains and any other drainage structures should be installed concurrently with the formation of the road. Sections of partly constructed road to be left over winter or for other extended periods should be drained by **outsloping** or cross drains;
- to avoid spills of fuel and oil reaching drainage lines refuelling of machinery should be undertaken well away from sensitive areas.

2.4.5 Road drainage

Goal

Roads must be formed, consolidated and drained so as to minimise the impact of run-off on stream water quality and soil erosion at discharge points.

Guidelines:

- roads should be **cross sloped** or **crowned** with table drains to facilitate run-off into culverts or cross drains;
- culverts, cross drains and run-offs should be spaced according to the road grade and must conform to accepted standards;
- drainage from roads should discharge on to rocked spillways or onto undisturbed vegetation. Silt traps should be constructed to avoid direct discharge of water containing soil matter into streams;
- discharge points from roads should be provided before the road enters riparian zones or **buffer** strips.

2.4.6 Road batters

Goal

Appropriate slopes, drainage and revegetation of batters should be undertaken to assist batter stability.

Guidelines:

- batters should be sloped and stepped if necessary to avoid slumps;
- topsoil should be returned to batter surfaces and revegetated;
- catch drains above battered banks should be installed where appropriate to reduce erosion of the batter;
- retaining walls and other structures to be used where necessary to maintain the integrity of the batter.

2.4.7 Stream and drainage line crossings

Goal

Where it is necessary for a road to cross a stream or drainage line, it must be by means of a bridge, culvert or ford designed to meet the transport needs, minimise impacts on water quality and riparian vegetation, and designed to cater for unusual flood events without damage to the structure or to the immediate environment.

Guidelines:

Crossings should account for the volume of the flow, particularly taking into consideration the impact of clearfelling and site preparation practices on run-off into drainage channels.

Construction should ensure that:

- disturbance to the stream bed and banks is minimised;
- fill or spoil material is not unnecessarily pushed into streams and drainage channels, nor into a position where it can move into a stream or drainage channel;
- cement and raw concrete is not spilt into running watercourses as they can be toxic to stream fauna;
- bridges should be designed to allow for significant (e.g. 1:20 year) flood events and be protected by debris traps in areas of regular flooding;
- fords may be constructed on roads where use is infrequent or water flow is light;
- fords should be as wide as the crossing will allow to account for peak flows. The base must be constructed of an erosion resistant material such as concrete, rock or heavy timber, and should conform to the natural bed level of the steam or drainage channel;
- permanent culverts should be adequate to cope with peak flows (e.g. 1:10 year storm events). If water is diverted by a culvert it must be returned to its natural course by a **flume**, rocked spillway or other hard-surfaced construction to minimise erosion. Culverts should be aligned across streams such that the construction does not prevent the movement of aquatic fauna up-stream;
- excavations for bridges, placement of sills or abutments and the positioning of stringers or girders must, as far as possible, be above the high water mark. Earth embankments constructed for bridge approaches should be protected from erosion by revegetation, retaining walls, bulkheads or rock surfaces. Topsoil should be stockpiled for re-distribution to assist rehabilitation;
- Temporary bridges and culverts should be removed promptly after use and the approaches rehabilitated.

2.4.8 Quarries and pits

Goal

Quarries, gravel pits, **borrow pits** and disposal pits must be planned and designed to minimise erosion, prevent the spread of disease, minimise the impact on water quality, and should be unobtrusive and not impact on other environmental values. They must be rehabilitated when no longer required.

Guidelines:

- quarries, gravel pits and borrow pits should be located at a distance from streams and riparian zones so as not to damage the stream and riparian values;
- disposal pits must be located to minimise erosion and should be rehabilitated with vegetation when no longer required. Topsoil must be stockpiled for rehabilitation purposes;
- **hygiene** practices must be implemented to prevent the spread of soil-borne pathogens and weeds;
- run-off from gravel pits and quarries must be directed into areas of undisturbed vegetation and not allowed to run into streams or drainage channels unless soil matter has settled out;
- gravel pits and borrow pits must be rehabilitated within one year of the pit becoming redundant or exhausted. Banks should be battered, compacted areas ripped and topsoil returned before the site is revegetated.

2.4.9 Road maintenance

Goal

Road surfaces and drainage installations must be maintained to protect the road foundation and form, and to provide for continuous, safe drainage.

Guidelines:

- roads should be maintained so the integrity of the surface remains intact and that drainage is not impeded or systems allowed to deteriorate such that erosion may occur;
- vegetation on the verges of roads should be managed to maintain visibility and to prevent drainage systems becoming blocked.

2.4.10 Road closures

Goal

Roads should be closed to heavy traffic (and on occasions light traffic) when weather conditions are such that the integrity of the road surface or foundations will be compromised, or when the run-off from the road will threaten the water quality in neighbouring streams. Roads should be closed when no longer required for management purposes.

Guidelines:

- roads should be closed to heavy traffic when structural damage to the road is occurring;
- roads that are to be permanently closed should be rehabilitated either by planting with a commercial species or appropriate alternative vegetation.

2.5 Silviculture of plantations

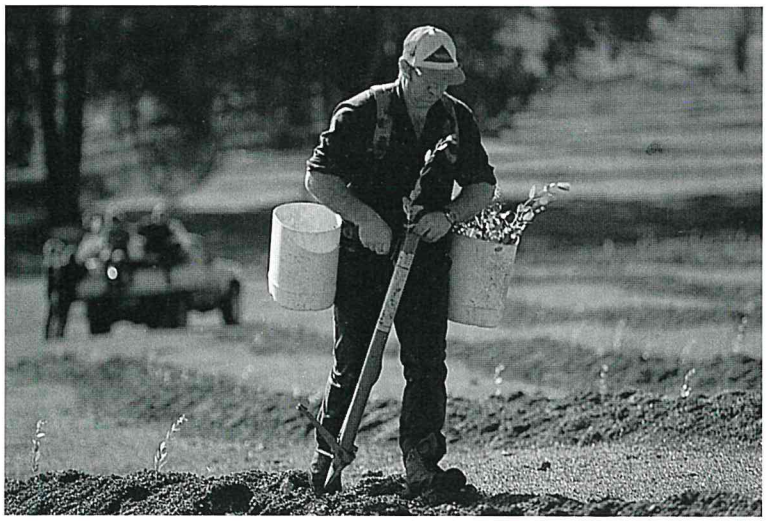
2.5.1 Site assessment

Goal

Sites on which plantation establishment is proposed should be assessed in accordance with accepted site selection methods to ensure that growth is not limited by identifiable site-related factors (i.e. shallow soils, salinity, waterlogging etc.). Site assessment systems should identify areas requiring modification (i.e. ripping, mounding and draining) to ensure acceptable growth, as well as predicting erosion hazard (by water or wind) and other environmental hazards such as nutrient and herbicide movement into water bodies, and the risk of erosion posed by management practices.

Guidelines:

- all proposed plantations should be subjected to site assessment based on accepted scientific methodology;
- soils should be of adequate depth, and rainfall sufficient to sustain a plantation for the entire rotation;
- saline soils likely to affect tree growth should be identified using an electrical conductivity meter or by soil sampling techniques. The risk of rising saline ground waters should be assessed by appropriate technologies;
- site surveys should be carried out with trained staff using accepted standards;
- warnings relating to hazards associated with trafficability, erosion and other adverse environmental impacts such as pollution risks should be provided on the assessment report.



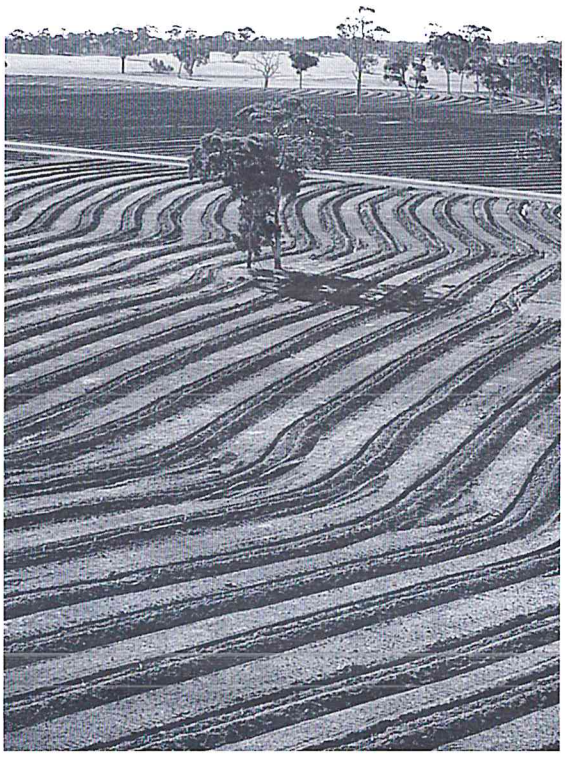
2.5.2 Species selection

Goal

Plantations should be established with species or hybrids selected for their wood producing qualities and suitability to the site, and planted at spacings appropriate to the length of the rotation, the management regime, and the environmental impact on ground water and run-off.

Guidelines:

- plantations should be established with species selected for their vigour, type of wood or other product, adaptability to different sites, productivity, form and resistance to pests, and need not be native to the locality;
- plantations should yield economic volumes of wood or other products.



2.5.3 Site preparation

Goal

Site preparation procedures must be appropriate to achieve desired establishment standards and conducted with due consideration to soil and water values.

Guidelines:

- site preparation activities must adhere to the *Soil and Land Conservation Act 1945;*
- **waste material** should be retained on the site after logging, where practicable, to conserve nutrients and reduce erosion;

- where burning of waste material is the only feasible option, then burning should be carefully implemented in order to avoid erosion, damage to vegetation outside the operational area (e.g. riparian zones) and conducted in accord with fire prevention requirements;
- burning of debris during initial cleanup must be carried out in accordance with local government authority fire law and firebreak notices;
- machinery should not be permitted to disturb the banks of defined streams;
- sites should be prepared by ripping, cultivating and mounding as required to ensure acceptable survival (>95 per cent) and growth of plantations;
- cultivation and mounding should be on or close to the contour on slopes greater than five degrees while the alignment of mounds should facilitate the orderly transfer of excess surface water from the site into natural or constructed drainage channels. If it is necessary to align mounds across the contour, then grade banks should be constructed at appropriate intervals to transfer excess surface water from the site into natural drainage lines;
- on steep slopes (>18 degrees) broadscale cultivation should be avoided and spot applications of herbicides should be prescribed.

2.5.4 Fertilising

Goal

Fertilisers should be used to correct nutrient deficiencies and to stimulate growth. Due regard must be taken of the impact that fertilisers may have on the integrity of surface water bodies, groundwater and estuaries, particularly in relation to eutrophication caused by leaching of nitrogen and phosphorus into these systems.

Guidelines:

- the use of fertilisers must be in accordance with the *Country Areas Water Supply Act 1947* and related *Environmental Protection Policies* for water catchments;
- fertilisers should be applied to plantations as appropriate to the needs;
- fertilisers, particularly nitrogen, should not be applied when soils are saturated;
- effluent should only be applied to plantations where the soils and substrates have been demonstrated to be suitable for such disposal, and approval from the Department of Environmental Protection has been granted;
- plantations should be monitored for nutrient deficiencies and action taken to identify and to correct disorders.

2.5.5 Weed control

Goal

The control of competing vegetation in plantations, including noxius weeds, should be encouraged to ensure initial survival of trees and to promote efficient and economic growth of plantations. Control measures must not compromise other nearby crops or local environmental values.

Guidelines:

- chemicals used to control weeds must be used in accord with the Public Health Guidelines on the use of chemicals in rural areas contained in the *Health Act (1911) - Health (Pesticides) Regulations 1956;*
- herbicides must be applied in accordance with the *Country Areas Water Supply Act 1947* and related *Environmental Protection Policies* for water catchments;
- aerial application of herbicides must adhere to the *Aerial Spraying Control Act 1966;*
- unwanted vegetation, including noxious weeds, should be controlled by methods that do not adversely impact on environmental values. **Integrated weed management** systems should be utilised wherever possible;
- only herbicides that are registered for use in plantations or have been permitted for use by the National Registration Authority, under the national permit scheme, will be used;
- rates and methods of application must be in accordance with approved procedures and specifications on the product label;
- codes of practice for designated water catchments will take precedence over this Code;
- **exotic** trees or plants should not be allowed to spread into neighbouring native forest or woodland from plantations. If this occurs measures should be taken, where practicable, to remove the plants or trees;
- only trained, competent operators will be employed to apply herbicides.

2.5.6 Insect control

Goal

Insect damage to plantations should be managed by selecting genotypes known to be resistant to insect attack, the use of appropriate silvicultural regimes, insecticides and biological control techniques.

Guidelines:

- chemicals used to control insect pests must be used in accord with the Public Health Guidelines on the use of chemicals in rural areas contained in the *Health Act (1911) - Health (Pesticides) Regulations 1956;*
- insecticides must be applied in accordance with *the Country Areas Water Supply Act 1947* and related *Environmental Protection Policies* for water catchments;
- aerial application of insecticides must adhere to the *Aerial Spraying Control Act 1966;*
- integrated pest management systems should be used to reduce the population of insect pests to a point where the need to use insecticides is minimised;

- plantations should be monitored regularly, particularly at times when insect pests are known to be active, to determine the presence of insects and implement control measures when threshold levels are reached;
- where insecticides are used they must be registered by the National Registration Authority or used under permit according to the national permit scheme;
- rates and methods of application must be according to approved procedures and specification on the product label;
- special measures to prevent the introduction of sirex wasp *(Sirex noctilio)* into Western Australia should be taken. Early warning systems to identify outbreaks of sirex wasp should be implemented and control systems for immediate deployment should be in place;
- insecticides should not be used until all adjacent landholders have been notified;
- health and vigour should be monitored and promoted through appropriate management practices to reduce the risk of susceptibility of the plantation estate to disease;
- insecticides should not be allowed to contaminate any water body as they are extremely toxic to fish and crustaceans;
- only trained, competent operators will be employed to apply insecticides.

2.5.7 Control of vertebrate pests

Goal

Declared pests should be controlled in plantations using accepted methods. Native fauna that impinge on the productivity of plantations should be controlled under damage licences issued by the Department of Conservation and Land Management using methods stipulated on the licence.

Guidelines:

- control of animals (native and feral) must adhere to *the Wildlife Conservation Act 1950*, the *Agriculture and Related Resources Protection Act 1987* and the *Agriculture Protection Act 1950*;
- chemicals used to control pests must be used in accord with the Public Health Guidelines on the use of chemicals in rural areas contained in the *Health Act (1911) - Health (Pesticides) Regulations 1956;*
- rabbits should be controlled prior to the establishment of plantations and when known to be present in existing plantations;
- other declared pests should be controlled in plantation areas using accepted methods;
- birds (e.g. twenty-eight parrot, *Barnardius zonarius*, and white-tailed black cockatoo, *Calyptorhynchus latirostris*) should be discouraged from causing damage to plantations or seed orchards by utilising strategies that deter the birds from entering the plantations or seed orchards. Techniques that kill birds should be avoided; however in the event that this action cannot be avoided licences must be obtained from the Department of Conservation and Land Management with the method of control nominated.

2.5.8 Disease control and general plantation health

Goal

Plantations should be established with seedlings from accredited nurseries that are free of disease. Risks posed by disease or environmental stress (e.g. drought) should be minimised by utilising genetically selected stock, appropriate silvicultural regimes, use of registered chemicals and implementing approved biological control techniques.

Guidelines:

- nursery stock should be grown in nurseries accredited under the *Nursery Industry Association of Australia* scheme;
- hygiene techniques should be implemented, where appropriate, to stop the spread of any pathogen and if the introduction of an exotic agent is suspected the *Australian Quarantine Inspection Service (Quarantine Act 1908)* must be informed;
- health and vigour should be monitored and promoted through appropriate management practices to reduce the risk of susceptibility of the plantation estate to disease;
- plantations should be monitored periodically for outbreaks of pathogens and remedial action taken where feasible.

2.5.9 Other tending

Goal

Thinning and pruning of plantations should be encouraged, where appropriate, to maintain plantation health, improve productivity or to maintain the hydrological balance.

Guidelines:

- plantations should be thinned, where required, to maintain stand health and to increase yields of high-value products where this is economically desirable;
- plantations should be pruned to meet specified sawn timber objectives;

- softwood plantations should be pruned in strategic locations for fire protection and to allow easy access in the event of a fire in accordance with *Local Government Fire Law and Firebreak Notices;*
- in areas where there are hydrological objectives, plantations should be located, designed, spaced or thinned consistent with these objectives.

2.6 Timber harvesting

2.6.1 Planning

Goal

Timber harvesting should be based on a timber harvesting plan, an integral part of the plantation management plan. This plan should consist of a map identifying the area(s) to be harvested and roads to be used, and include a statement of the conditions applying to the operation.

Guidelines:

- the timber harvesting plan must comply with the provisions of the *Occupational Safety and Health Act 1984* and associated regulations, the *Conservation and Land Management Act 1984,* the *Forest Management Regulations 1993* and the *Safety Code for Western Australian Logging Operations;*

- the timber harvesting plan should include information, where necessary, relating to:
  - the location of the area(s) to be harvested,
  - the location of the roads and tracks to be used and the direction of travel,
  - the period during which harvesting is to occur,
  - the type of harvesting system to be used,
  - the silvicultural system to apply,
  - methods to preserve the integrity of the soil,
  - maintenance of roads,

- fire protection restrictions,
- seasonal and wet weather restrictions,
- restrictions and methods to prevent the spread of disease and weeds.

The relevant responsible authority may accept an annual timber harvesting plan instead of individual plans.

2.6.2 Felling operations

Goal

Felling operations should be carried out with experienced operators using appropriate equipment with due care for safety and consideration of the principle of environmental care (see 1.3.1 above).

Guidelines:

- all persons employed in timber harvesting operations on publicly owned land must be in possession of a current *Timber Workers Certificate of Registration* under the provisions of the *Forest Management Regulations 1993*. One-off Forest Produce Licence holders are exempt from this requirement;
- felling, trimming and crosscutting operations should be carried out in such place, order and time as stipulated in the timber harvesting plan or by the forester in charge;
- only trees so indicated shall be felled;
- all trees indicated for felling should be felled and utilised according to the timber harvesting plan;

- where practicable, trees should not be felled across streams, rivers and drainage lines. All tops, and other debris generated by the harvesting operation should be cleared from roads, firebreaks, creeks, landings and harvesting tracks;
- trees that have been scarfed or part-scarfed must not be left standing and hangups must be dislodged, and cut-off tops not left leaning against standing trees.

2.6.3 Extraction

Goal

The extraction of timber from plantations should be carried out using appropriate equipment for the plantation conditions and competent personnel to achieve the standards of safety, environmental care and economic efficiency.

Guidelines:

- extraction should be along tracks and roads designated in the timber harvesting plan and should account for the need to preserve the integrity of soil and water values;
- extraction tracks and roads should be closed when weather conditions may result in excessive **soil damage**. The amount of soil damage depends on a combination of soil characteristics, harvesting machinery and weather conditions. Acceptable limits for soil damage should be specified in the timber harvesting plan or field procedures and formal assessments should be conducted if conditions approach these limits. If harvesting operations are stopped due to soil damage, they should not recommence until soil conditions improve;
- harvesting machinery should not enter **stream reserve**s or areas of heritage value;
- all culverts and road drains should be kept clear of soil or logging debris that may prevent the flow of water;
- hygiene measures should be employed to prevent the spread of pathogens, insects and weeds;
- the discharge of engine oil or fuel onto the ground should be avoided. If an accident occurs clean-up systems should be applied immediately. Fuel drums should be located such that there is no possibility of contamination of waterways. Waste oil, empty drums and discarded machinery parts and other waste should be removed from the plantation.

2.6.4 Log landings

Goal

Log landings should be located, constructed, maintained and rehabilitated with regard to the principles of environmental care (see 1.3.1) and safety (see 1.3.2).

Guideline:

- log landings should be located within the plantation or adjacent to major roads unless authorised by the relevant authority.

2. 7 Fire prevention and control

2.7.1 Fire prevention

Goal

A fire management plan is an integral part of the plantation management plan for all plantations. This plan will detail the strategies for fire prevention in plantations and provide the necessary in-field infrastructure to prevent fires spreading and enable fires to be controlled.

Guidelines:

- the size of plantation compartments and firebreak specifications and harvesting equipment should comply with the *Plantation Fire Protection Guidelines 1991* published by the Bush Fires Board of Western Australia, and the Western Australian Department of Planning and Urban Development and; the *Local Government Fire Law and Firebreak Notices;*
- fire prevention strategies are to be in accordance with relevant town planning schemes;
- personnel employed in **tending** and harvesting operations should be trained in fire control to a standard which meets the requirements recommended by the Bush Fires Board;
- refuelling of machinery should not occur within the **plantation area**.
- firebreaks can be maintained free of flammable material on steep slopes provided measures to minimise erosion and preserve water quality are implemented;
- roads and breaks must allow through traffic;
- roads, tracks and breaks necessary for fire prevention and control should be maintained in a trafficable condition;

- prescribed controlled burning should be considered in native forests adjacent to plantations at a regular interval as a means of protecting the plantations and the values of the native forest;
- grazing by domestic animals in plantations should be considered as an additional protection measure;
- fire detection systems should be in place to identify outbreaks of fire as soon as possible so that control measures can be implemented.

2.7.2 Fire control

Goal

Plantation assets must be protected from wildfire and escapes from planned fires. Fires that start in plantations or threaten plantations should be identified and controlled in the shortest time possible. Details of strategies to control unplanned fires should be detailed in the fire management plan for each plantation.

Guidelines:

- fire control activities must adhere to the *Bush Fires Act 1954;*
- water points must be established and maintained in plantations at a density consistent with the specifications in the *Plantation Fire Protection Guidelines 1991;*
- plantation owners and or local Bush Fires Brigades need to be equipped to control plantation fires and plantation owners should be encouraged to join local fire brigades to help prevention and control activities;
- sufficient firebreaks and access points should be provided in plantations to enable direct access forward of a fire in order to implement control measures.

2.8 Research and development

Goal

To maintain an adequate research capacity to improve economic efficiency while maintaining or improving environmental, cultural, social and heritage values.

Guidelines:

- plantation growers should maintain a research capacity or support external research agencies such as the Forests and Wood Products Research and Development Corporation and Cooperative Research Centres;
- plantation owners should support the initiatives of State and Commonwealth governments enunciated in the *National Forest Policy Statement (1992).*

2.9 Safety

Goal

Plantation operations should be as safe as possible and comply with occupational health and safety legislation.

Guidelines:

- plantation establishment, management, harvesting and utilisation activities must comply with the *Occupational Safety and Health Act 1984* and associated regulations;
- minimum safety requirements as stated in the *Safety Code for Western Australian Logging Operations* must be observed;
- operators must be trained and certified to accepted standards in the safe use of equipment, machinery and materials;

- managers, contractors and workers should be jointly responsible for determining safe work practices;
- all operators must wear specified, personal safety equipment for the operation.

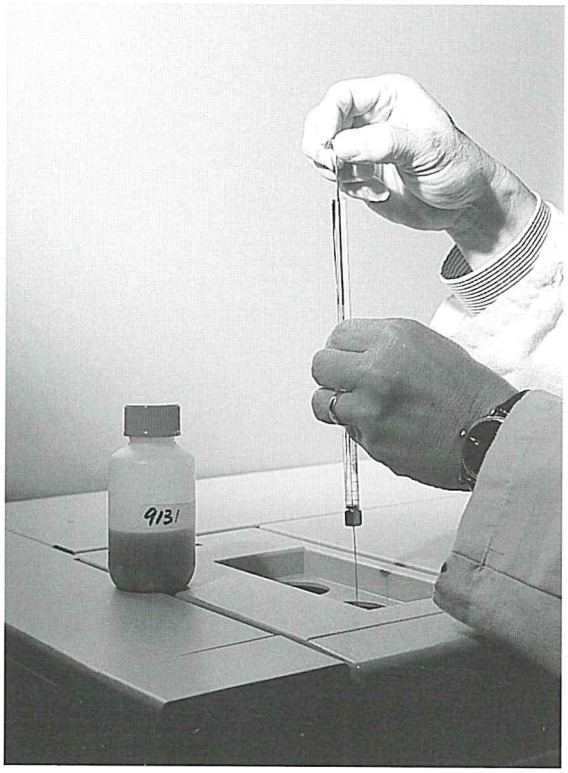
2.10 Competency and training

Goal

Plantation managers, operators of machinery, contractors and workmen who operate in plantations should be competent to carry out prescribed works in plantations in accordance with the *Forest Practices Related to Wood Production in Plantations: National Principles (1996)* and with the technical knowledge necessary for good plantation management.

Guidelines:

- training of personnel who operate in plantations should comply with the provisions of competency based training (CBT) adopted in *National Competency Standards, Policy and Guidelines 1992;*
- personnel required to operate in plantations should be competent to carry out the tasks according to accepted competency standards;
- training should be available to all personnel involved in plantations according to the need to improve competency.



2.11 Plantation investment

Goal

To encourage a high standard of investment in plantations in Western Australia. To provide a realistic understanding of project management and the provision of accurate financial statements and estimates of resource throughout the **rotation** of a plantation.

Guidelines:

- information provided to prospective investors must be in accordance with the *Trade Practices Act 1974, Corporations Law* and the Australian Forest Growers *Guide to Information to be Provided by Afforestation Investment Companies;*
- investors should review information relating to the nature and risk of the investment, expenditure forecasts, estimated project returns, tax-related statements and other liabilities, including taxation and insurance;
- a full description of a project should be available to prospective investors including: the project description, land information, productivity estimates and details of associated parties;
- regular reports should be prepared during the period of the investment to provide information to investors relating to silvicultural and financial matters;
- investors should be made aware of environmental requirements for plantation development and management, adherence to the Code and the obligations of their managers to maintain environmental standards.

SECTION 3

APPENDICES

3.1 Definitions

batter - inclination or shape of a cutting or soil fill beside a road.

borrow pit - an excavation usually close to a road that is used to provide material to construct a road or approaches to a bridge.

buffer - a strip of land abutting a **stream**, swamp, water body or an area of environmental significance which acts as a protective zone from activities in **plantations** that may be detrimental to the integrity of the values of such areas.

catchment - a discrete area of land that drains water into a specific river system. A water catchment may be a series of sub-catchments feeding a major river or a single sub-catchment feeding a **stream** or small river.

competency - a concept that focuses on what is expected of an employee in the workplace rather than on the learning process; and embodies the ability to transfer and apply skills and knowledge to new situations and environments.

cross slope - the formation of a road surface to provide a slope or camber so that water will drain from it.

crown (in relation to a road) - the surface of a road that is shaped to allow drainage of water from it.

designated catchment area - a **catchment** from which water is used for domestic supply purposes.

drainage line (channel) - generally small pathway, either constructed or natural, for water.

erosion hazard - the potential for a site to erode.

exotic - introduced, not native to the area.

fire management plan - specified procedures for preventing and controlling fires in a **plantation**.

flume - an artificial channel of non-erodible material located below a culvert to prevent erosion of the **batter**.

harvesting plan - procedures for harvesting a **plantation** to extract **thinnings** or for clearfelling.

hygiene - actions that decrease the risk of undesirable pathogens, animals, insects or plants from being introduced, spread, intensified or surviving.

integrated pest management - a system or systems that utilise one or more methods to control a pest in a synergistic way to achieve the objective.

integrated weed management - a system that uses two or more methods of weed control in a synergistic way to achieve the objective.

outsloping (in relation to roads) - the formation of a road or **track** surface to provide a slope or camber for water to run off it.

permanent road - a high standard road that is required for silvicultural management and fire suppression activities.

plantation - defined as a stand of trees of three hectares, or larger, that has been established by sowing or planting of either native or **exotic** tree species selected and managed intensively for their commercial and environmental value. A plantation includes roads, **tracks**, firebreaks and small areas of native vegetation surrounded by plantations. Implicit in this definition is the recognition that plantations will be harvested.

plantation area - defined as that part of a **plantation** that is established to trees.

plantation establishment plan - specified details of the establishment procedure for a **plantation**.

plantation management plan - a plan enunciating the management practices necessary to grow a **plantation** consistent with economic objectives and accepted principles of environmental care.

plantation tending plan - specified details of management regimes and operations for a **plantation** after it has been planted.

plantation infrastructure - fixed improvements necessary to manage a **plantation**.

private land - freehold land.

public land - land vested in and managed by a government agency.

recharge area - in hydrology the recharge area is that portion of the landscape where rainfall can infiltrate deeply into the soil profile, from where it may enter subsoil storage, groundwater systems or be drawn upon by deep-rooted vegetation. This is in contrast to a discharge area, where groundwater intersects the soil surface and water can evaporate, be utilised by shallow-rooted vegetation or flow away in surface drainage.

re-establishment - replanting of a **plantation** after harvesting or after a natural disaster.

rehabilitation - the restoration and revegetation of a site disturbed usually through **plantation** road works, and bridge construction.

riparian zone - vegetation bordering a **stream**, river, swamp or any water body that may be in a natural or modified state. A **riparian zone** may be established to trees.

rock spill - a placement of rocks below a culvert outlet designed to prevent erosion of the **batter**.

rotation - a planned period of years between the planting of a **plantation** and its harvest.

run-off (related to road construction) - a short graded channel angled away from a road designed to divert water from the road into undisturbed ground.

silviculture - the theory and practice of managing **plantations** for wood production.

site preparation - the preparation of the site in order to establish a **plantation**.

soil damage - soil damage is defined as:

- the 'A' soil horizon (topsoil) is removed;
- the 'A' soil horizon (topsoil) is mixed with the 'B' horizon (sub-soil usually containing clay);
- severe compaction (normally meaning compaction which will affect germination or plant growth).

stream - the watercourse created by channelled surface or subsurface water as it leaves a **catchment** area. The flow may be permanent (all year flow) or temporary (intermittent flow in wet periods). Features typically expressed by streams include an expression of a valley and a defined channel bed that display signs of water flow.

stream reserve - the area of natural vegetation bordering a **stream** that is not part of the **plantation area**.

stringers and girders - beams or logs used to form the span of a bridge.

temporary road - a road constructed specifically for use in a particular operation. The road is usually not formed or surfaced and is closed after the operation is complete.

tending - the treatment of a **plantation** to maintain, improve and protect the stand.

thinning - the removal of a portion of the trees in a **plantation** to procure a specific product and/or to increase the growth rate on selected retained trees.

track - a **permanent road** that is not surfaced that provides access to a **plantation** for **tending** and fire related activities.

waste material (logging debris) - non-merchantable material that remains on a site after logging operations.

3.2 Protocol for a plantation management plan

A plantation management plan is prepared to provide the relevant information in respect of the way in which plantations are developed and managed and, to demonstrate the means by which the principles of environmental care and objectives of silviculture and protection are achieved.

The components of a plantation management plan will be prepared in advance of the operation and available before operations commence.

Maps and descriptions should detail the following information:

Land Information:

- area
- locality plan and access roads
- natural features:
  - streams, rivers, lakes, ponds, swamps, drains, etc,
  - principal soil types,
  - areas of native vegetation with high natural integrity,
  - areas of remnant vegetation with low natural integrity,
  - significant landscape, cultural and heritage values.
- improvements:
  - buildings,
  - roads, bridges, creek crossings,
  - fences, gates, powerlines, dams.

These features should be included for a distance of 50 metres on adjoining properties.

Plantation establishment plan:

- areas of native vegetation, including paddock trees to be cleared (first rotation),
- management of logging residue (second rotation),
- control of vermin and declared weeds,
- areas to be planted, compartment sizes,
- species to be planted and source of seedlings,
- direction of planting lines in relation to contours and natural drainage,
- description of soil preparation methods,
- description of weed control methods, including rate of herbicides application and buffer zones,
- planting technique,
- access roads and firebreaks.

Plantation tending plan:

- grazing strategy,
- pruning and thinning schedule,
- fertilising schedule,
- weed management
- monitoring and contingencies for pests and diseases,
- road and break maintenance.

Fire management plan:

- property details:
  - contact names and telephone numbers,
  - names and telephone numbers of adjacent land holders,
  - names and addresses of local fire agencies,
  - locality plans showing access roads, firebreaks, water points etc,
- fire prevention details:
  - method of road, track and firebreak maintenance,
  - specific measures to protect powerlines and gas pipelines,
  - firefighting equipment register for locality and details of cooperative arrangements,
  - direction indicators of water points, road signs and other features,
  - fuel reduction program, if applicable.

Timber harvesting plan:

- location of harvesting operations:
  - map showing area to be harvested, extraction tracks and cartage routes.
- timetable:
  - period in which harvesting will occur.
- harvesting operations:
  - felling and extraction procedures.
- machinery and transport:
  - types of trucks to be used for transport,
  - type of harvesting system to be used.
- environmental safeguards:
  - fire protection restrictions, weather restrictions, road maintenance procedures, hygiene systems.
- safety:
  - minimum safety requirements.