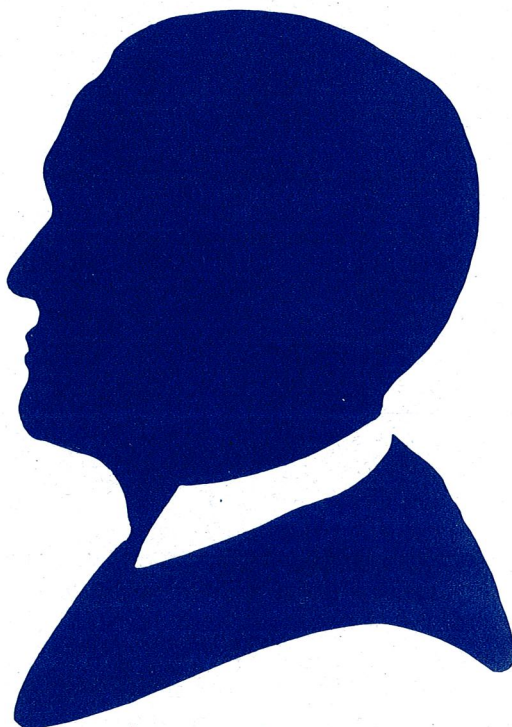


C.E. LANE POOLE MEMORIAL TRUST

LANE POOLE AWARD
STUDY TOUR, 1990-91



A REPORT TO THE TRUSTEES

By

A. RYNASEWYCZ

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C.E. Lane Poole Memorial Trust

The Lane Poole Memorial Trust was established to commemorate the work of Charles Edward Lane Poole, and, in particular, the connection between the former Conservator of Forests and the late Thomas Cullity.

Lane Poole was appointed Inspector-General of the Woods and Forests Department in Western Australia in 1916, and was responsible for establishing the legal framework on which the State's forestry operations have since been carried out.

That legal framework was the 1918 Forests Act. Before the Act was introduced there was no legislation to control the amount of timber cut, the place and manner of cutting, or to regenerate the forest after cutting.

When Thomas Cullity graduated from the University of Western Australia in 1918, Lane Poole offered him the newly created position of Utilisation Officer in the Forests Department, which he held for one year before leaving to start up Millars' new commercial kilns at Yarloop.

Thomas Cullity maintained an interest in forestry and timber for the rest of his life and founded Cullity Timbers in 1928 and Westralian Plywoods in 1943. From these companies WESFI was formed.

The Trust was initiated by WESFI Chairman Denis Cullity in 1983, and developed by a Board of Trustees representing the former Forests Department and WESFI.

The current Chairman of the Board is the Executive Director of the Department of Conservation and Land Management, Dr Syd Shea.

The WESFI connection resulted from a belief held by Lane Poole that forestry needed an interdisciplinary approach to cater for the needs of society.

Contents

Introduction	1
Acknowledgments	3
South Australia: Woods and Forests Department	4
Victoria: Department of Conservation and Environment .	11
New South Wales: The Forestry Commission	20
Conclusion and Recommendations	27
References	33

1

Introduction

The Lane Poole Study Tour Award enabled me to visit the three states of South Australia, Victoria and New South Wales to investigate the way they plan and implement their timber harvesting procedures.

The South Australians are very experienced in softwood plantation management. I spoke to planning personnel on their data storage and their planning system, and on how this information is drawn together and used to produce a harvesting plan.

As for Victoria and New South Wales, little is known here about their planning system and methods. Both states have been managing their hardwood forests for a considerable length of time and have come under a great deal of pressure from outside bodies. These are mainly conservation groups who have been critical of their logging practices. I followed their planning methods through to see how the constraints and criticisms are incorporated into their operational plans.

Since completing the tour, I have been reviewing the inventory planning methods and incorporating worthwhile changes. Matters outside the scope of planning have been brought to the attention of relevant staff.

Subjects examined during the tour:

1. Harvesting plans

- integration of products
- constraints
- integration of constraints
- format of plan
- presentation of plans

2. Consultation during planning

- with other sections of the department
- with outside interest groups

3. **Liaison during implementation**
 - with contractors
 - with customers
4. **Provision of information**
 - to neighbours
 - to pressure groups (mainly conservation)
5. **Control of contractors**
 - Supply commitments
 - Monitoring performance
6. **Record systems**
 - Monitoring removals
7. **Education**
 - Changing public perception

Itinerary

Adelaide	18-20	November 1990
Mt Gambier	21-23	November 1990
Melbourne	24-27	November 1990
Warragul	28-29	November 1990
Orbost	30	November 1990
Eden	1-4	December 1990
Bombala	5	December 1990
Batemans Bay	6	December 1990
Sydney	7	December 1990
Perth	8	December 1990

A. Rynasewycz
Senior Forester, Bunbury Region

Acknowledgments

I would like to express my gratitude to the Trustees of the Lane Poole Award for granting me the opportunity of visiting three states. In particular, I would like to thank the people listed below for helping me and providing me with valuable information on my tour. Their assistance was much appreciated.

Contact Officers

Rick Underwood (Adelaide)

Lew Parsons (Mt Gambier)

Detler Vogt (Mt Gambier)

Richard Gizsbers (Melbourne)

Brian Royal (Eden)

Ross Smith (Sydney)

South Australia: Woods and Forests Department

The Woods and Forests Department manages extensive areas of softwood plantations, particularly in the Mt Gambier region. Large-scale harvesting operations in this region produce approximately 500,000 m³ of sawlogs each year, and are reliant on accurate and detailed information. All information is provided by the Forest Resource Division.

Adelaide: Head Office

I was given an introduction by the Forester Operations on the structure of the Woods and Forests Department. This was followed by field visits to surrounding districts.

Kuitpo District

Pine harvesting - approx. 5000 ha pine shared with adjoining district.

Inspected radiata stands PYR 48 T3.

Inspected radiata stands PYR 18 Now reserved.

Checked harvesting plans - short and medium term.

Short-term plans (12 months) - produced by logging supervisor (schedule).

Medium-term plans (five years) - produced by Forest Resources section.

- Reviewed every three years.
- Produced in table form.
- Support by 1:10,000 scale plan.
- Yields based on *Bulletin No. 23 - Yield Regulation in SA Pinus Radiata* (referred to from now on as Bulletin 23).

Mt Crawford District

Pine harvesting - approx. 5000 ha plantation.

Inspected harvesting operations - a clearfelling operation.
Total cut in district = 36,000m³ SE. This provides for seven customers and two minor mills.

Products cut: 1. Preservation (round products)
2. Sawlogs x 10 classes
3. Plywood x 5 classes

Contractors - Contractor is also the customer
- Contract supplies other customers
- Some departmental fallers still employed

Liaison - Supervisor liaises directly with customer on a weekly basis
- Daily with logging supervisor
- Blue stain not a problem. Sawlogs have been left in the field for periods of 4-5 months.
- Sawlogs measured individually into diameter classes (graduated ruler)

Plantation Thinning Schedule

- Initial stocking 1600 spha
- N.C.T. to 900 spha at nine years
- First thin to 550 spha at 13 years

Contract Periods.

- Contracts are written for two years with an option for a further two years

Mt Gambier (S.E. Region)

Three Districts:	Mt Burr	20,000 ha	plantations
	Mt Gambier	24,000 ha	"
	Penola	14,000 ha	"

		Regional total	58,000 ha

The harvesting section in Mt Gambier consists of a harvesting manager, one harvesting forester, and eight field supervisors (including one for roading).

**Volumes supplied from South Australia's
Mt Gambier region**

Mills	Products by Volume					
	Sawlogs	Pulp	Preservation	Panel	Scrimber	Sizes
Departmental						
Nanquarry	100,000					300+
Mt Gambier	160,000					200-300
Mt Burr	110,000					120-200
Preservation			30,000			
Private						
SEAS/SAPR	12,000 (Pinaster only)					
CSR/Softwood	86,000					150+
APCEL		200-270,000				75-280
CELLULOSE		40,000				75-280
Mt Gambier Ind.	30,000					200-550
McDonald's	10,000					150-350
Inter. Panel & Lumber				43,000		200+
SATCO/SGIC					10,000	75-150
	508,000	310,000	30,000	43,000	10,000	

Inspection Plantation Operations

- Rennick Plantation (Victorian plantation harvested by South Australia).

T1 operation Age 24

Stocking 2000 spha --> 800 spha

Products cut: 1. Posts 2.1 m
 2. Strainers 2.4 m
 3. Pulp 4.9 m

Points of interest

- 1 Thinning always commences from the leeward side of prevailing winds - this is now a consideration in 2R areas.
- 2 Selection marking is done at right angles to the extraction row.
- 3 Pressurised backpacks are used to selection mark from the extraction row - operators do not walk between rows, hence increasing production.
- 4 Contractors remove dead or dying stems as part of the contract; this is to control sirex.

5 A harvesting machine segregates wood into separate products alongside the extraction row.

- **Myora Plantation** (17,000 ha)
C/F operation Age 58 Stocking 150-200 spha
Volume removed 400m³ per ha

Points of interest

- 1 All C/F logging is done with full length extraction using skidders. Logs are placed on skids for cross-cutting.
- 2 Following sawlog extraction, 'Low Residue Logging' is implemented.
All residue greater than 150 m diameter and 2.4 m in length is removed by a forwarder and placed on the compartment boundary.
- 3 Residue logs are offered to mobile spot-mill operators.
- 4 Remaining residue is processed into furnace chips which are used to fuel the power generating complex at Gambier.
- 5 The cutover site is left for a full season, allowing the debris to dry.
- 6 The area is seeded with lupins.
- 7 With dry debris, a Marden Chopper Roller is used to cover the area. The results are excellent, with very little exposed soil and greatly increased survival.
- 8 Planting is done by hand between existing stumps to avoid post-planting treatments and tractor access problems.
- 9 For initial establishment of plantations, scrub control is very important - it is better to finance extra scrub control and reduce post-planting fertiliser applications.
- 10 Storage of softwood logs. After the Ash Wednesday fires, some 500,000m³ of sawlogs were stored in Lake Bonney. With hindsight, the Department of Woods and Forests believe it is better to store sawlogs on a hard surface under water sprinklers. This supports CALM's current policy on stockpiling.

Sawmills Visited - Mt Gambier Region

Nangwarry Sawmill

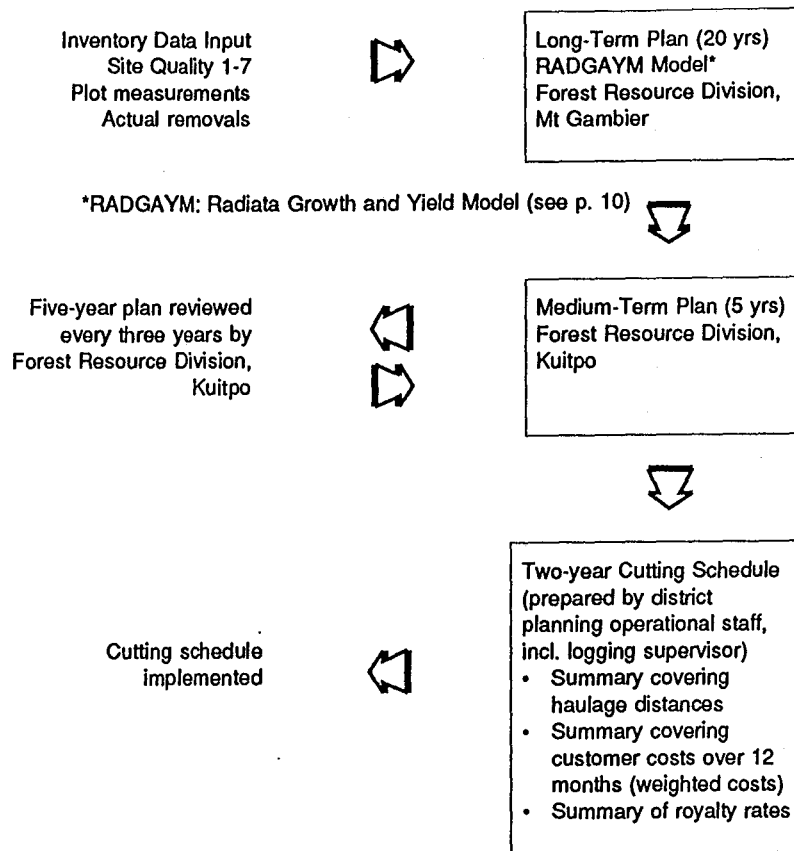
\$6.4 m spent in 1989-90.

Handles the larger sawlogs (300mm+).

Mt Burr Sawmill

Handles the smaller sawlogs (120-250mm).

Planning Chart



Establishment Plan (Replanting Program)

This plan is produced to cover five years of replanting following clearfelling operations. Areas damaged by fire or drought are also included. Factors requiring consideration in the plan:

- Mix of summer/winter areas
- Haulage distance mix
- Site quality mix
- Protection requirements
- Roding requirements

Areas are treated as units, preferably of 100 ha in size.

Current establishment practice

- 1 Leave the site for one year, preferably two.
- 2 Prepare the area with Marden Chopper Roller - remove all natural regeneration.
- 3 Burn any remaining heaps on the perimeter of the area.
- 4 Soil-survey the area.
- 5 Weed-survey the area (at the time of the soil survey).

- 6 Weed-control by air using granule chemicals on 2R sites.
- 7 Hand-plant on 2R, tractor-plant on first rotation.
- 8 Do not apply fertiliser at time of planting.
- 9 Apply fertiliser 12-18 months after planting.
- 10 Weed-control for the second time at 12-18 months.
- 11 Establish growth plots 18 months after planting - measure diameters and heights. Measure plots each year for five years. Monitor copper and zinc deficiency.
- 12 Provide treatment as required.

Inventory

A great deal of emphasis is placed on mapping site quality. Proving the site quality of a stand means knowing its productivity and how it should be treated.

Site quality mapping is done at age 9½ years by ground-stripping at 60 metres and mapping uniform stands. Each site quality should then be represented by establishing temporary plots.

There are seven categories of site qualities, ranging from SQI (High Productivity) to SQVII (Very Low Productivity). Refer to Bulletin 23.

Pine Planning - Use of Site Quality Assessment

Site quality (SQ) assessment is the first step in planning commercial thinning operations. It also gives good reliable stocking counts and the conditions of each stand.

Plantations are broken up into logging categories. Each logging category consists of:

- Plantation Code.
- Location Code.
- Compartment Code.
- SQ code. Plots established are grouped by SQ strata, e.g.:
 - 0401 - SQIV Plot 1
 - 0402 - SQIV Plot 2
 - 0501 - SQV Plot 1

Any site quality area of less than 5 ha is automatically moved up to the next class.

Volume data is expressed in current volumes and future volumes with increment adjustment for the latter. Volumes are expressed in 17 classes of U.B. volumes in 5 cm classes.

Inventory is carried out 18 months after each thinning operation and then projected for growth in 5 cm classes for the following seven years.

The final summary covering each logging category shows:

- 1 Plantation code
- 2 Location code
- 3 Compartment code
- 4 Nett affected area
- 5 Next operation type
- 6 Year of inventory
- 7 Year due for operation
- 8 Site quality classes/areas
- 9 Stocking before and after
- 10 Standing volume x 17
 increments x 17
- 11 Next operation vol. x 17
 increments x 17

The model used in South Australia since 1983 to calculate and predict volumes is the Radiata Growth and Yield Model (RADGAYM). Discussions on this model with Dr J. Leech, who was responsible for carrying out extensive work on the model, concluded that although the RADGAYM was a useful model it would be very costly to set up. His recommendations suggested that if we intend setting up a system we should look at the model used by the Victorians, the Forest Resources Information and Yield Regulations (FRIYR).

FRIYR is a fully integrated system for forest planning using a relational database management system. It predicts annual growth, wood yields, costs and financial returns for specified silvicultural and management strategies over a variable planning period.

The Cost of Setting Up FRIYR in WA

1	Sun workstation	35,000
2	Loading information at \$1/ha (Based on WA = 70,000 ha)	70,000
3	Licensing costs - 20% of 35,000	7,000
4	Other costs	30,000

	Total cost ready for use	Approx \$142,000

For further information, contact may be made with Jan Wild, of Victoria's Department of Conservation and Environment, via Martin Raynor.

Victoria: Department of Conservation and Environment

The Department of Conservation and Environment manages a diverse forest, with coupe management practices similar to those of CALM. A large number of harvesting operations which I observed were in regrowth stands. Volume information was lacking, and gathered as required by visual assessment. All planning was performed at work centres (equivalent to CALM Districts) by planning staff. The area managed by each work centre was markedly smaller than most CALM Districts.

Dandenong Region

Recreation Planning

Dandenong Region is close to Melbourne. It has a population of 200,000 (that of Melbourne is 2.7 million), with predictions of an increase to 250,000 by the year 2020. In view of the surrounding population, recreation is given a high priority in managing the surrounding lands. It rates higher than timber production and competes with domestic water catchments for government funding.

Current Directions in Recreation Planning

- 1 Planning for recreation should cater for specific groups rather than compete with facilities of a higher standard provided by other government agencies.

Forest users usually want quiet, passive areas rather than highly used areas.

- 2 Areas should include provision for:
 - firewood collection
 - motor bikes
 - horse riding
 - walking trails
- 3 Market research should be used to find out what people want.

- 4 Interpret any sites of interest and provide facilities away from them to avoid overuse in the immediate area.
- 5 There should be liaison with local tourist groups - this is very important.
- 6 Tours with private operators should be developed. Many people are intimidated by not knowing access routes to the forest.
- 7 The timber industry should be involved:
 - demonstration cutting
 - craftwood outlets
 - souvenirs/paintings
 - mill tours
- 8 Walk trails need good, clear information. Each trail should offer information about what it offers, how far it goes, how difficult it is to walk, and who it is suitable for.
- 9 Potential recreation sites should be identified and early planning begun. Such areas might include the Lower Collic River, the Brunswick River and the Preston valley.
- 10 Recreation should be developed from centres referred to as 'hubs'. These are areas of concentrated recreation activity.

Melbourne - Planning Branch

Satellite Imagery (Landsat)

Satellite imagery is currently being used. Further developments are being planned.

Standard scale at 1:250,000 can be reduced to 1:25,000 scale. Negatives at 1:25,000 can be used to produce any required scale, but resolution is lost as scale increases. Imagery is available every 16 days. The intention is to use imagery to plot cutover areas of 10 ha to an accuracy of 10-15 metres (scales of 1:6000 colour).

Geographical Information System (GIS)

The geographical information system (GIS) used in Victoria is a computer-based overlay system which draws information together and is then easily manipulated to explore the best options to manage a particular area of forest. Storage of data is done to a single standard and this avoids the usual problem of varying standards and presentations when a system is left to individual

districts. The GIS currently provides information for broadbase planning; it is not specific enough for narrow fields. The system is based on distance and area calculations and provides for user needs.

Current Levels of Data:

- 1 Corporate Library
Held on basic map sheets referred to as corporate layers.
- 2 Regional Library
Information held in regional layers and used for specialised uses.

GIS Structure:

Corporate Library 1:100,000 sheets
17 layers for each theme

Regional Library 1:100,000 Sheets
(Non-corporate layers x 7)

- Reserves
- S.B.B.
- Firewood
- Wildlife Corridors
- Land Management Units
- 1:25,000 Forest Blocks
- Stand Classes
- Forest Streams
- Contours

The FORPLAN model uses information from the corporate and regional library, enabling it to be quickly processed to provide various options and information in graph form.

Of the current 16 regions, seven are now fitted out with GIS workstations. The Victorians propose to install GIS in the remainder. The hardware will cost approximately \$20,000, the software \$20,000.

Establishing a GIS Workstation

The following points were noted in discussion on setting up a GIS workstation.

- 1 A person with land management experience (e.g. a forester) should be selected for operator training.
- 2 Training should be for twelve months, at a training centre preferably removed from the work area.

- 3 The operator should be supported by a draftsman to avoid costly delays in data input.
- 4 The operator's expertise should be used to introduce GIS into the districts.
- 5 The operator must become an expert in the system, and be responsible for managing it and for training and developing other staff.
- 6 The operator must be responsible for preparing information for the system and for standardising themes between districts.
- 7 The operator must be responsible for incorporating information from other departments and, in return, providing information to them. There must be agreement on standards.
- 8 As much time as necessary should be spent on capturing accurate information. Base maps must be accurate and if at all possible should be 1:50,000 scale.

In Victoria, regional staff selected to set up the GIS workstations are trained at Head Office in a module set aside for training purposes only. This has worked very well and a similar direction should be taken here in training.

Sustainable Yield Forest

A computer-based system using spreadsheets is set up as part of the GIS network. This system allows for the following:

- 1 Expected yield x products (4 sawlog grades and 1 pulp).
- 2 Expected growth.
- 3 Use of silvicultural prescriptions.
- 4 Area statements
- 5 Stand structures (stands may be grown)

The computer is also able to utilise satellite imagery, allowing for enlargement for studies of greater detail on type of cutting, boundary location and coupe dispersal. It is intended to incorporate imagery information into area statements. I found this very interesting, with the use of updated technology to assist in strategic planning. It is certainly an area which CALM should pursue if it is not already planned for in the Land Information Branch.

Contact: Melbourne Head Office (Richard Gizbers).

Forest Management Plans

There are generally three parts to a Victorian forest management plan.

PART 1 - Resource information

PART 2 - General coverage of area

PART 3 - Prescription section

Samples of forest management plans covering the Otway and East Gippsland areas are available at Bunbury Region.

Contractor Controls

A computer management system has been set up which keeps a record of all industry employees and allows for a penalty point system to be used. Any breaches made by an employee to the timber regulations or logging code are recorded against the employee by a Regional person after consultation with the Departmental Harvesting Regulation Officer. Based on the demerit point system.

A registration fee of \$30 for three years applies to all employees. All new employees in categories 1 and 2 must attend a minimum of one week's training.

Category Grading:	1	Chainsaw Operator
	2	Faller
	3	Machine Operator (Bush)
	4	Truck Driver
	5	Other (hand tool operation)

Training is carried out by a training organisation outside the Department. The same organisation also does the assessments. This is similar to what is being done here, but our system should be expanded to include machine operators and truck drivers. We should also consider introducing the penalty point system.

Bunbury Region has copies of the Timber Harvesting Regulations and the Code of Practice (Code of Forest Practices for Timber Production).

Traralgon Region - Central Gippsland

Traralgon Region has a number of operational areas. Each operational area consists of six forest blocks with one or two established work centres. The district offices report directly to the regional planning officer in the regional office. The procedure is as follows.

Approval Procedure for Harvesting Plan

- 1 The regional planning officer advises the district Operational Area Production Planning Officer (known as the OAPP) of the likely annual demand.

- 2 The **district planning officer** commences planning and is responsible for the following:
 - a) conducting field inspections of proposed coupes.
 - b) obtaining volumes for coupes
 - i. actual removals from adjacent coupes
 - ii. visual assessment
 - c) deleting areas not available
 - i. streams/catchment/landscape
 - ii. flora/fauna
 - iii. significant sites
 - d) deciding prescriptions to apply to coupes
- 3 The **district planning officer** then produces the first draft of the harvesting plan.
- 4 The operational area's **production team** approves the draft plan. The production team consists of four functional groups:
 - a) Protection Branch
 - b) Silviculture Branch
 - c) Soil Section
 - d) Fauna and Flora Section
- 5 The draft plan is then approved by the **regional manager**.
- 6 It is then sent for comment to the **Cutting Area Review Committee** at head office, who return it to the district planning officer.
- 7 After the district planning officer has made the necessary modifications, the draft plan is returned to the **regional planning officer** for approval via the **regional manager**.
- 8 The regional manager submits the draft plan to the **Forest Management Area Advisory Committee**. That committee may comment on the plan.
- 9 The regional planning officer distributes the plan to industry.

There is pressure from the Department to disband the Government-formed Cutting Area Review Committee (step 6), which tends to stall the planning process. This committee consists of representatives from the Conservation Council and the Land Conservation Council, the Transport Authority, and the timber industry. The Department believes that the Forest Management Area Advisory Committee (step 8) at a local level is more productive. The committee consists of shire and roading authority representatives, tour operators, and recreation groups.

I believe that there is scope in our planning process to include a similar advisory committee.

Plan Format

Planning is done on 1:25,000 scale contour plans with coupes shown in colour. Planning of coupes covers three years. Coupe information is transformed into a cutting summary table, which is

then supported by prints. The draft is then submitted for approval as covered.

Monitoring and Recording

Cutting is photographed twice each year. Photography is backed up by submissions from districts on 1:25,000 scale prints - similar to the CALM system. Cutting information is transferred to official records - similar to CALM's Hardwood Operation Control System (HOCS) - and stored at 1:25,000 scale.

Each forest block is colour-coded on the record print for easy identification. Each record print represents a compartment which is also allocated a number for assisting in monitoring product removals.

The Department also keeps a logging coupe register. This consists of a compartment print and volume-removed table where all details of harvested volumes are recorded. Each compartment print has coupe boundaries defined and the coupe identification number entered against it; the number is then transferred to the volume table with necessary details entered.

Technology

Logging planning is done at 1:25,000 scale and is very detailed. However, the new GIS information is being captured at 1:1,000,000 scale, which means that the information is too broad for detailed planning as required in producing harvesting plans. Therefore, the Department thinks that GIS is some 10 years away from being used in producing logging plans.

At a strategic level of planning, GIS (through two programs, FORPLAN and SUSTAINABLE YIELD, using spreadsheet data and graphics plus satellite imagery), is very well developed. But at the operational level there is certainly room for improvement in producing medium-term and long-term plans, making inventory of available volumes, and taking into account protection and disease management. An area requiring attention in WA is the consultation with groups within CALM (e.g. Wildlife and Flora), and with outside bodies similar to the Forest Management Area Advisory Committees which Victoria has set up.

Flora and Fauna Management: State Conservation Strategy

The Strategy states that operations should be sustainable in all values, including fauna. The Flora and Fauna Guarantee Act sets the direction of management on all lands, including private

property, and allows for compensations and incentives (such as the granting of funds to fence off a selected block of ground containing rare flora). The Act prevents the taking or damaging of plants to the point of suspending logging operations.

The management of flora and fauna has an impact on logging coupes, prescriptions and roading. Currently, six biologists are employed by the Department to survey all forest blocks and to provide resource information. The database includes sites of significance and a register of rare fauna. In its printed form it is called the *Ecological Survey Report*, copies of which are available from Bunbury.

Harvesting Operations

Harvesting operations are supervised by a logging supervisor, who has progressed through the work force and has completed selected studies, including TAFE courses. A supervisor covers two or three coupes (15-25 ha each) with a total output of 10,000m³ sawlogs and 20,000m³ pulp. This takes as much as 75% of his time.

Contractors are responsible for in-coupe roading.

Orbost Region, East Gippsland

Each forest management area includes four operational areas. Each operational area (approximately six forest blocks) is catered for by four planners, including science officers (levels 1 and 2), who are responsible to the regional planning officer. The volume planned for is approximately 174,000m³ sawlogs. Licences are issued for 15-year periods with tenders for one 1-year period. A licensee is allowed to cut plus or minus 30% of this annual allowable cut. For a period of five years the maximum allowable is 110% of the allocated volume. Within each operational area a volume summary is produced showing low and high volume areas. Planning is based on old resource information (HARIS). Visual assessment of coupes is the main source of volume estimates.

Flora and Fauna Planning

Limited sightings of the long-footed potoroo in the East Gippsland region have caused this species to be declared endangered. Current policy is to reserve any State forest where sightings have occurred.

Each area of sighting requires an exclusion of 400-500 ha, which often conflicts with logging planning.

The Department's solution to this problem is to select priority search areas and carry out field surveys of areas where the potoroo is likely to be found. If nothing is found, the area becomes available for logging. If a sighting is made, the area becomes a reserve for five years and a research project is begun. No burning is permitted.

Flora and fauna surveys are done by a team of six - three zoologists, two botanists, and one technical assistant.

For each block of 8-10,000 ha, a field survey requires 20 field days. Each surveying team covers three blocks in a year at a cost of \$60,000 a block.

New South Wales: The Forestry Commission

The New South Wales Forestry Commission is managing its lands under difficult conditions, with conservation groups constantly threatening court action. This holds up logging operations and makes logging planning very difficult.

Eden Region

The Eden region is formed of three districts with a total of 185 employees. It covers an area of 250,000 ha of hardwood forest, 17,000 ha of softwood, and a recent purchase of 14,000 ha. Another 141,000 ha of this region consist of National Parks and are managed by the Australian National Park and Wildlife Service (ANPWS). A further 25,000 ha are currently being vested in the ANPWS.

Areas of national estate may be logged if the operation does not conflict with the values the area has been set aside for.

One pulpmill is licensed for one million tonnes per year, but is currently supplied with 530,000 tonnes per year. The total resource available to the pulpmill is affected by 10%, owing to the loss of 25,000 ha of State forest to National Parks.

There are four sawmills in the region and two more outside, requiring a total supply of 65,000m³ per year.

The Conservation Movement

Conservation groups are extremely active in New South Wales. The following suggestions were made by persons involved in defending the Forestry Commission's activities against the local 'greenie' movement.

- 1 Create restricted areas (based on safety) in forest areas which come under attention. This is possible under the Forest Commission Act.
- 2 Construct gates and place notices.

- 3 Use police to remove trespassers - the Commission's officers should not get involved except to assist police.
- 4 Introduce training for industry personnel - restrain from violence.
- 5 Set up a communication co-ordination centre for Commission-police communications.
- 6 Elect a media liaison officer within the region.
- 7 Take photos of disruptive groups, and use video to record events - experience has shown that protesters do not like to be photographed or filmed.
- 8 When protesting groups take over machinery on roads or landings, stop all operations and request police assistance.
- 9 If possible, move contractors to other areas until protesters leave the area.
- 10 Check on issues that are raised, research issues well, and then respond. A positive attitude is important.

Eden District

Timber harvesting planning is based on resource level inventory.

Planning is done on a base map which has pre-planned coupes marked on it. This allows for alternative coupe selection, which is the current practice. Once coupes have been selected, coupe plans at 1:15,000 scale are produced by the district planner.

Coupe plans are then taken into the field by a planning assistant, who records details of land features onto the coupe plan (1:50,000 with 5 m contours). This becomes the preliminary plan.

The preliminary plan is used to highlight rock outcrops, gullies, and the positions of coupe roads and landings. This is presented to the contractor, who is required to field-inspect the areas with planning officers for their input. On final inspection and agreement, a final coupe plan is produced which forms part of the harvesting plan. The harvesting plan is then checked against the Priority Management Plan for sensitive sites.

Harvesting plans are approved by the district foresters and copies are issued to the following:

- district
- marketing foreman
- contractor
- logging crew (if not closely supervised by the contractor)
- customer

Environmental Checks

During the preparation of the coupe plans an environmental review is made of each coupe in the form of a checklist. A sample (NSW 4) is available at Bunbury Region.

For each harvesting plan (12 months) an environmental impact statement must be prepared to cover all coupes where activity is expected. These statements must be prepared and approved before any activity begins in the forest.

A sample of an environmental impact statement is available at Bunbury Region.

Records and Constraints

Areas cutover are marked on coupe sheets and submitted to the District Planning Officer for recording. Average coupe size is 50 ha.

Visual resource management requires reserves of 50-100 m wide left along major roads. Canopy removal of 50% is allowed.

Flora-fauna surveys are carried out by local staff on a coupe-by-coupe basis.

Consultation

There does not appear to be consultation with the following groups:

- wildlife protection
- silviculture
- public meetings (as in CALM's 'Como Groups')
- landscaping planners

Harvesting Plan: Bombala District

District planning staff do not believe that GIS will be used in the near future to help create a harvesting plan. At present a personal computer is used with spreadsheet software, and staff resources are being directed towards setting up a record system.

The annual demand for timber in Bombala District is 26,000 m³ sawlogs and 224,000 tonnes pulp. There is only one grade of sawlogs, based on less than 26% defect. Royalties are calculated at \$23/m³. Logs below specifications are offered at \$15.50/m³, which is at pulpwood royalty. Industry operates under a 12-monthly licence.

Logging planning is done once a year due to State and Commonwealth interjections. It is carried out at district level once the regional planning officer advises of industry demands:

- 1 The district planning officer and the operations officer produce the plan together.
- 2 The plan is approved by the district forester and submitted to the regional manager.
- 3 The regional manager submits a copy of the plan to the Department of Primary Industry for their comment.
- 4 After the Department of Primary Industry approves it, the plan is implemented by the operations forester and assisting foreman (who is the direct supervisor of the logging units).

Pine

Plantations are measured at age 3 by establishing temporary plots and taking height, diameter and stocking counts. Plantations are remeasured at age 10. There is one plot every four hectares with a maximum of 25 plots per site, and each plot covers 0.025 ha (12.62 m radius).

A software program is used to calculate mean height, basal area and stocking.

The first thinning is scheduled at age 13.

Planning volumes:

- 25,000m³ sawlogs (greater than 19 cm)
- 2 1520,000m³ preservation

Thinning schedule:

1st	Age 13
2nd	Age 21
3rd	Age 25-26
4th	Age 30
C/F	Age 35

Bega District

The following is a system used by this district to store information on Aboriginal sites.

- 1 Site information is provided by the Australian National Park and Wildlife Service (ANPWS).
- 2 An overlay trace is prepared for each base map. The map is clearly marked on the trace, including its four corners.

- 3 Each site is clearly numbered on the trace (with no further information). This can be used by district staff to check if any sites exist on a particular forest block.
- 4 Confidential information is stored in a separate location, and is cross-referenced to the numbers on the trace. The district forester has access to this information.

Batemans Bay Region and District

Logging planning is based on a 12-month period (the calendar year), but the region wishes to change to longer-term plans.

There are three medium and two small sawmills in the region. They operate on a 12-month licence, though this is soon to be reviewed with the writing up of a Timber Strategy. Royalties are based on geographic locations:

- coastal \$29.70/m³ sawlogs
- hills \$21.00/m³ sawlogs
- tablelands \$25.00/m³ sawlogs

The district's logging plan is based on resource information obtained in 1983 for coastal areas only:

- District area = 140,000 ha State forest with 50% coastal, 40% hills and 10% tablelands.
- Planning volumes per year:
 - 15,000 m³ sawlogs in coastal area
 - 5,000 m³ sawlogs in hills area
 - 29,000 tonnes of pulp from selected coupes
 - 3,500 m³ mining props
 - 5,000 poles
- VRM zones may be cut with 60% removal, 40% retention rates

The log grading used is as follows:

- Quota logs = specification log, 40 cm Dia UB x 2.4 m
- Compulsory non-quota - below specification:
 - T.E.D. UB 25 cm straight
 - Butt dia UB 36 cm straightSawmillers are encouraged to utilise these at a reduced royalty.
- Doubtful logs ('Z' logs) - large logs outside specifications are offered to sawmills at pulp royalty rate.

The priority management plan (a combined Regional Management Plan and Land Use Management Plan) is consulted at the start of planning. Documentation and tables are held in Multi-Mate for easier changing and adding of information. Some parts are left blank under main headings which require regular updating.

Increased Revenue

The Batemans Bay district recognises suitable areas for gravel and rock extraction which would have minimal impact on the surrounding forest or little conflict with land use. This is a potential source of revenue.

Sydney Head Office

The Management Planning Division in Sydney is formed by two branches: the Community Affairs branch and the Planning and Environment branch. The Environment branch replaced the Silviculture section.

Much emphasis is placed on environmental planning. In particular, the NSW State Environment Act has had several impacts:

- All government authorities must take environmental issues into account.
- If any activity is likely to significantly affect the environment, an Environmental Impact Statement (EIS) must be prepared and approved.
- An EIS must be prepared for any significant areas.
Environmental reviews are prepared for normal operations in less sensitive areas of State forest; the position is continually changing as interpretations change and conservation pressure increases. Currently, logging operations in cutover forest are covered by an environmental review, and any operations in old growth forest must be supported by an EIS.
- There is a strategy now in place recognising all significant old growth forests and progressively being covered by EIS's with public input.
- Part of an EIS must include site-specific information and include flora and fauna surveys.
- Related costs for preparing an EIS:
 - Consultant's costs for 600 ha = \$30,000
(With 60 management areas throughout NSW, each EIS costs approximately \$100,000.)
 - Four Forestry Commission solicitors are employed to present their cases at \$200,000 per year.
- Levels of environmental checks:
 - Environmental checklists covering
 - burning
 - logging within EIS
 - Environmental review
 - some logging
 - Environmental Impact Statements
 - management priority areas
 - old growth logging

Another direction the Commission is taking is to produce more detailed environmental reviews rather than fully prepared, costly environmental impact statements. This procedure is yet to be tested in court hearings.

Rainforest Act 1982

The above act was introduced in 1982 by the Government of the day. It removed some 100,00 ha of old growth forest from production forests and transferred it into National Parks. This has had a significant impact on the resource available to the timber industry, but the Government has made a firm decision not to erode the remaining rainforest resource. The Commission has had to plan within the available areas but is once again facing pressure from conservation lobby groups demanding more exclusions.

6

Conclusion and Recommendations

Some of the recommendations covered in this section will be further discussed with staff in the Inventory Branch and introduced where necessary. Recommendations affecting sections outside the Inventory Branch will be followed up with relevant staff at a later date.

As for planning methodology and production of logging plans, I see no major changes required in our organisation other than the setting up of databases on computers for easier retrieval and use. I believe our hardwood planning is superior to that of the other states at the regional level, but it is not so at the strategic level, which is more advanced in Victoria.

South Australia is certainly more advanced in softwood planning at strategic and operational levels. We need to urgently review the Plantation Operation Thinning Schedule (POTS) or look at purchasing the FRIYR system and implement it in CALM. The use of GIS is another area requiring attention, but CALM must be prepared to support the introduction of the system with advanced equipment and extra staff for longer term gains. It is important to employ extra staff with forestry backgrounds followed up with intense training at a departmental training centre to achieve a high standard in a relatively short time (12 months).

Judging by staffing levels in the three states visited, I believe that the Inventory section at Bunbury should be presenting a case for further staffing increases. We should be aiming at improving our planning and covering all constraints, present and future, to a high standard to avoid unnecessary criticism, particularly from outside bodies. Failure to achieve this means the loss of credibility and may mean costly defensive action, as has been experienced in New South Wales. That state now employs four full-time legal people assisted by contracted part-time persons with an expenditure of over \$200,000 per year. Currently, we do not face the same levels of conservation group pressure, but we cannot become complacent. We need to maintain and improve our handling of environmental issues in our planning.

To achieve this we require more specialised people to carry out other assessments and to integrate these with operational plans. We also need to increase staff so that we may do our work properly and meet all demands.

Other recommendations are listed below under State headings.

Recommendations

South Australia

- 1 On the computer, design standard tables and introduce them into pine harvesting plans.
(Spreadsheets are used extensively in South Australia to prepare pine logging plans.)
- 2 Evaluate the Plantation Operation Thinning Schedule (POTS) and the supporting sub-systems to see if it can be used for medium and long term planning. If not, pursue the use of FRIYR.
(South Australia makes extensive use of a growth and yield model for medium and long term planning. They recommend FRIYR.)
- 3 If possible, make it a condition of a harvesting contract that the contractor is responsible for the removal of dead or dying stems, safety issues, and sires control practices. In severe drought areas, however, CALM should engage a separate contractor especially for this work.
(The former is one of the conditions of a South Australian harvesting contract.)
- 4 At plantation establishment stage, we should take account of prevailing winds to assist in following up thinning operations. This should apply also to replanting 2R areas.
(This is the practice in South Australia.)
- 5 Investigate the practice of selection marking from the extraction row and at right angles by the use of a pressurised knapsack.
(This practice in South Australia allows machine operators to see better and increases marking production.)
- 6 For all clearfelling operations, discuss with the contractor the use of full-length extraction to a main landing using skidders. Introduce the method if it is successful.
(This is the practice in South Australia.)

- 7 Investigate the possibility of introducing 'low residue logging' in our plantations.
(The term is used in South Australia to mean the removal of all residue greater than 150 mm diameter and 2.4 m length from the coupe. For further details see p. 7.)
- 8 Following 'low residue logging' and one year's drying, roll the debris with a Marden Roller.
(This treatment in South Australia reduces competition, improves the soil and increases survival rates.)
- 9 Discuss with Silviculture branch the idea of giving high priority to scrub control at the time of establishment.
(South Australia has found that it is better to finance extra scrub control and reduce post-planting fertiliser application.)
- 10 We should pre-select plantation sites with adequate water supplies and locate similar supplies for existing major plantations.
(Current CALM policy covering sawlog salvage after a fire is the establishment of landings fitted with watering systems - ponds or lakes will not be used in future. The South Australians have found that method less successful than the one recommended.)
- 11 We should provide for extra assessing capacity during site-quality mapping for monitoring growth and trace element deficiency over five years.
(This is the practice in South Australia.)

Victoria

- 1 A medium and long term recreation plan should be produced for the Central Forest Region working in closely with other organisations and authorities.
(Victoria's recreation planning takes a high profile in areas surrounding populated areas. Allowances are made for projected population increases and the recognition of areas which are likely to be used.)
- 2 Future expansions and development of recreation sites should be covered by market research. If staffing becomes a problem, students studying in this area can become involved.
(One emphasis in Victoria's recreation planning is to find out through market research what people actually want in a recreation site.)

- 3 Design tour routes, call for expressions of interest, engage tour operators, then follow up with training. Operators need to be accredited and must perform to our standards.
(Victoria achieves greater public exposure of the Department of Conservation and Environment by engaging accredited tour operators.)
- 4 As an aspect of recreation planning, CALM should liaise with the timber industry in their efforts to improve their public image by demonstrating mill operations and forest operations, and becoming involved in demonstration forests and outlets for craftwood, souvenirs and paintings.
(This is increasingly the practice in Victoria. For further information refer to p. 11.)
- 5 Potential recreation sites should be identified in the Central Forest Region and early planning commenced. Main target areas should include the Brunswick River and the Preston Valley/Lowden area.
(Victoria produces future recreational development plans by recognising potential recreation sites and commencing planning early.)
- 6 A project should be set up to introduce satellite imagery into CALM's monitoring of cutover areas.
(The intention in Victoria is to use this technique in monitoring areas down to 10 ha coupes.)
- 7 Geographical information system (GIS) work stations should be given a high priority in CALM, with supporting staff allowed for. Staff selection, training, with accurate detailed data capture suitable for downline users, should also be implemented.
(The use of a GIS in Victoria's regional centres is being pursued and introduced. Already 50% of the centres have GIS. For further comments refer to p. 12.)
- 8 A detailed computer system should be set up to provide detailed yield information on the whole of the forest which is integrated with GIS. This can be developed to produce similar information for strategic planning and can be incorporate with the Jarrah Inventory project.
(Satellite imagery is used in Victoria to adjust for cutting. The yield is adjustable for growth and manipulated by using various cutting prescriptions.)
- 9 A penalty-point system should be further investigated and introduced into CALM, in consultation with the timber industry.

(A penalty-point system is used in the Victorian timber harvesting section which allows for disciplinary action to be taken against contractors or their employees. For further information refer to the Victorian Timber Harvesting Regulations 1989, held in Bunbury Library.)

- 10 The Central Forest Region should consider presenting harvesting plans to a local elected committee. This should improve relationships with the local people and increase their understanding of CALM'S planning techniques.
(In Victoria, harvesting plans are successfully presented to a local Forest Management Area Advisory Committee in each operational area.)
- 11 CALM should further investigate introducing a logging coupe register into the HOCS system, with an added print showing volume/product removed or supported by a register.
(This is the practice in Victoria.)
- 12 CALM should provide for flora and fauna surveys over areas planned for logging. This should be covered by specialist staff or trained field staff in each district. These surveys should also include:
 - Sites of significance
 - Rare fauna register*(Flora and fauna surveys play an important part in the overall management of a Victorian forest block, including areas covered by harvesting plans. The Department of Conservation and Environment likes to be seen taking an interest in this area before the public demand information. For further information refer to pp. 17 and 18.)*
- 13 CALM should continue to make the regional Inventory section responsible for maintaining uniform standards in harvesting planning, monitoring and record systems. The number of Inventory planning positions should be increased by two - one each for Hardwood and Softwood - so that we may continue to improve the standard of planning and field checking.
(The Victorian system has no uniform planning standards. Planning is done mostly at work centres (districts), not at regional level.)

New South Wales

- 1 CALM should pursue current works on National Estate listings and provide for all areas of Central Forest Region a follow-up information section.

(Areas of National Estate listings are well covered in New South Wales, and the purpose of listing is well understood.)

- 2 CALM should continue to defend its attitudes towards logging with a positive attitude. Our planners need to continue their work and be aware of public concerns, and to incorporate these concerns into planning to head off any confrontation. However, we need to do more in the flora and fauna assessment area so that we may improve our understanding and counter any criticism.

(As it has for many years, the NSW Forestry Commission faces some harsh criticism and action from the Conservation movement, causing dissatisfaction at all levels of the management. It has incurred enormous legal costs to the State Government and great losses in timber revenue.)

- 3 Detailed field inspections of each coupe should be carried out by operational personnel, followed by a final inspection between a CALM supervisor and industry representatives. Details of in-coupe roadings, landings and unprocurable areas should be agreed to and issued to industry representatives by the districts.

(This is the practice in New South Wales.)

- 4 Visual Resource Management (VRM) reserves covering timber production areas can be logged but should allow for only a 50% canopy removal.

(This is the practice in New South Wales.)

- 5 Inventory section should recommence the establishment of pine plots and maintain a re-measurement program to monitor the growth performance of our plantations.

(In New South Wales, pine inventory plots are established and measured at ages 3 and 10.)

- 6 CALM planners should obtain suggestions from the WA Museum and other authorities about confidential storing of site-sensitive information.

(A simple system of storing sensitive site information is in place in New South Wales. It consists of an overlay trace and register.)

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