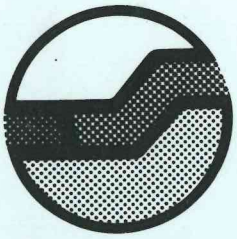

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

WESTERN AUSTRALIA

INFORMATION TECHNOLOGY PLAN 1989-1991

April 1989

INFORMATION TECHNOLOGY PLAN
DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

CONTENTS

EXECUTIVE SUMMARY

This Information Technology Plan describes how the Department of Conservation and Land Management (CALM) proposes to use information technology to meet its requirements for information management.

CALM recognises that the availability of timely and accurate information on all aspects of its operations and resources is a vital factor in achieving the objectives set out in its Strategic Plan 1989-93. Information is, in fact, a resource as important as finance or staff, and CALM is prepared to devote an appropriate proportion of its total effort to achieve an effective information management system. This is reflected in major outcomes 8.4, 8.6 and 8.2.1 directly and indirectly in that virtually all major outcomes require the application of IT for their successful completion.

This task is made more difficult by the unique blend of information required by the Department. In addition to the usual administrative activities of a Government Department, it operates as a commercial organisation in some of its activities and increasingly will have to be accountable to the standards of the commercial sector. At the same time it has large requirements for forward operational and land use planning procedures which involve the extensive use of geographic information systems (GIS).

Because it is dealing with land and forest management where the activity extends over many years, there are unusual record-keeping and financial management requirements. CALM carries out a great deal of research on many aspects of land management and needs to monitor the impact of research trends and operational activities. It also operates in a highly politicised environment where there is a constant need for flexible and innovative enquiry systems.

The coming two years are crucial for information management in CALM. After a hiatus in IT development from 1982 to 1987 caused by the circumstances surrounding the formation of the Department, there is a great surge of activity on several fronts. The major initiatives in progress are a move towards an all-DEC environment for major corporate systems, a new integrated general ledger, payroll, sundry debtors and stores management system, a major expansion of GIS capability and automation of map production, a move toward the adoption of an integrated data base management system for the Department, the development of the information systems required to support the Government's new Tree Trust scheme and (most importantly) the integration of major corporate systems. It is vital to be able to pass data from the logging information system to the accounting system and to be able to relate expenditure for wages, salaries, stores and plant, etc. to data held in the GIS.

All these activities are completely dependent on the outcome of the 1989/90 budget process, since all these new systems will operate on a VAX and a processor much larger than the Department's present Intervax 350 is necessary. Another vital ingredient to the success of these initiatives is recruitment of an information resources manager to oversee them.

This IT Plan complies with the guidelines promulgated by DOCIT in respect of training, use of consultants and schedule of outcomes. The most important outcome for the next 12 months is the adoption of a comprehensive accounting system which will, for the first time for CALM, and probably for any Government Department, give accurate total costing of all aspects of its activities.

CHAPTER ONE

INTRODUCTION

1.1 Background

The Department of Conservation and Land Management (CALM) was formed in 1985 from the amalgamation of the Forests Department, the National Parks Authority and the Wildlife half of the Department of Fisheries and Wildlife. It has responsibility for land and resource management on some 18 million hectares of State forest, national park and nature reserve, scattered over the whole of Western Australia. It has also recently assumed responsibility for delineation and management of the State's marine parks.

The Department has a highly decentralised structure, with over 1000 of its 1400 staff located in rural areas. Its work is extremely diverse, covering the following aspects (the list is by no means exhaustive):

- field station payment of 500 wages staff and contractors
- field payments of road construction and logging contractors
- control of the harvest of 1.5 million m^3 of timber each year
- control of the kangaroo harvesting industry
- native wildlife (flora and fauna) protection over the whole of WA
- a large research organisation
- a specialised land information section, producing maps for field operations
- a strong planning organisation for land use and operational control
- on ground recreation management in parks and forests
- extensive feral animal and weed control programmes
- a strong fire control and fire management organisation
- a fuel reduction burning programme, extending over 300,000ha each year
- extensive use of computer-based geographic information systems in planning
- the regeneration of 2500ha of karri forest and 14000 ha of jarrah forest each year
- a silvicultural improvement programme in the jarrah forest
- the establishment of 2500 ha of new pine forest and 10,000 ha of new eucalypt forest each year (the latter as contractor to a new Tree Trust organisation)
- a strong public education programme and rural advisory service
- commercial tree plantations on CALM's own land as well as share-farms on private property.

The objectives and mission of CALM are explained in greater detail in the attached Departmental Corporate Plan.

These diverse functions result in what is perhaps a unique blend of information flows and requirements, since it is necessary for operational control of resource utilisation to have on-line information on level and location of harvests, for forest establishment operations to maintain tight control over costs, to assess land management constraints for operational and land use planning and to provide instant response for natural disaster combat situations.

Of the component agencies formed into CALM, only the Forests Department had a strong history of computer-based management systems development. The present CALM general ledger system is no more than a patched up version of the Forests system, as are a number of other systems in use. Several of these have been recognised for some time as being inadequate for the wide range of tasks required of CALM.

Improvement of these systems as well as their integration to provide better information for senior management has been the subject of much debate within the Department. CALM now recognises that the problem is not one of information technology management per se, but of information management. It has therefore taken a series of steps to develop its information management in an integrated way.

1.2 Recent Activities in IT

The first step was to engage a consultant (Arthur Young Ltd) to prepare an Information Strategy Plan (ISP). The recommendations of the consultant were considered by the Departmental Policy Directorate and adopted almost in toto (see below). One part of the ISP concerned the computer hardware strategy to the programme suggested, of moving progressively to an all-DEC mainframe environment and this has been implemented accordingly.

The second step was to evaluate Departmental requirements for redevelopment of new accounting systems which would:

- provide for a computer based wages payroll system
- integrate with the logging operations information system (LOIS)
- provide for wages and overhead allocation to functions
- provide for committal costing of stores purchases and contracts.
- provide for allocation of all salaries and associated costs with the Department's work programmes.

The changes in the functions of the Department of Services during the past year have added the requirement for a stores ordering, control and payment system to the above.

The decision was made not to develop a new integrated accounting/stores system from scratch but to evaluate commercial software systems and adapt one as necessary.

The urgent requirement for the field wages payroll system made it necessary to develop that system in house, but in such a way as to facilitate incorporation into a larger accounting system. A major revision of the chart of accounts has been made to bring the system into line with the Department's mission as outlined in the corporate plan. During the last four months, extensive discussions have been held with Public Service Commission and Treasury staff to assess the possible use of PIMS and GAS in CALM operations. Both these Departments now recognise that CALM's unique blend of information requirements necessitates the use of an internal accounting system (but with provision for passing the required data to GAS for Treasury purposes). Following the preparation of a comprehensive system requirements document, a tender has been advertised.

The third step was to carry out an internal study of the feasibility of moving toward an integrated data base management system for the entire Department. This was initially prompted by the need to pass data between major systems, e.g. general ledger and LOIS, but the concept was expanded to include all the Department's data bases, with access via a central data dictionary (subject, of course, to suitable security arrangements). A study team developed a set of requirements for such a DBMS and a tender has been advertised.

CALM recognises four major information streams:

(a) management information such as accounting, stores, vehicle costing, payroll, forest inventory;
(b) land informataion such as the FMIS, Integraph and Arc-Info systems;
(c) commercial information, covering the hardwood and softwood LOIS;
(d) research information, largely held in field research stations but access to which is required for response to parliamentary questions or for management plan development. The category also includes statistical analysis systems such as SAS and SPSS.

The progressive development of effective information systems in these four areas, and their welding into an integrated system, is seen as a major objective of this Department. The achievement of this objective will require an appropriate combination of human resources, training and finance for hardware and software purchase.

It will also require a suitable staffing structure within CALM. Some steps toward the development of an Information Resources Branch, which will eventually encompass all major information sources, have already been taken. A Land

Information Section has been created, and a manager appointed, to incorporate the former Mapping Branch and GIS Group. The position of IR Branch Manager was advertised, but no applicant was judged suitable for the requirements of the position. It is intended to advertise it again early in 1989, at a higher level, subject to the approval of the Public Service Commission.

The Department's library was transferred from the Research Division to the Information Resources Branch during 1988. There has been much discussion over the choice of computer-based library system. After evaluating several approaches, it was decided the most cost effective solution was to enter into an agreement with the Agriculture Department to jointly fund the purchase of the ADLIB system. This will reside on the Agriculture Prime computer but can be accessed by CALM terminals. In this way the two main land managing Departments will have access to each other's library database.

Additional staff positions have been made available in the programmer/analyst and systems support areas, in line with the recommendations of the ISP.

1.3 New Requirements

1.3.1 Tree Trust Project

A major new information requirement has recently emerged in connection with the tree sharefarming schemes which CALM administers. Initially, CALM developed tree sharefarming with farmers in the lower South West to provide a pine plantation resource, and this required detailed, long term (30 years) records of costs and annuity payments. More recently, the Government has approved the commencement of a very large (10,000 ha per year) reforestation programme with Eucalyptus globulus to provide the resource for a major pulp mill development. This will entail the formation of a Trust to raise public funds to finance the programme. The project provides a whole new set of constraints and requirements for precise accounting and linkages with GIS, LOIS and with timber inventory systems. This new information system must be operational by 30 June 1989 and, unfortunately, is likely to require an in-house system development.

1.3.2 More Intensive Planning for Bauxite Mining

One of the consequences of the formation of the Lane-Poole reserve was the redirection of the Pinjarra bauxite mining operation into forest which is largely free of dieback disease. There are plans, in cooperation with Alcoa, for major improvements in mining procedures to minimise the spread of dieback disease in this forest. These plans will require the extensive use of GIS techniques in a much more intensive and complex planning process.

CHAPTER TWO

INFORMATION STRATEGY PLAN

2.1 Genesis of the Plan

During 1986 and early 1987 it became increasingly apparent to senior management in CALM that its information systems, in terms of software and the necessary hardware infrastructure, were inadequate to meet the greatly expanded operational requirements of CALM compared with those of its constituent agencies. Arthur Young Ltd were commissioned to carry out a study of its information requirements and systems in May 1987. The attached Strategic Information Plan was produced in August 1987.

2.2 Executive Summary of the Plan

"The Department of Conservation and Land Management has been involved with computing for a number of years via the Forests Department and the Wildlife section of the Department of Fisheries and Wildlife.

At the time of planning CALM it would appear that little analysis was undertaken on the computing/information requirements of the new organisation. Now that the reorganisation has somewhat stabilised, it is now clear that the resources available to CALM are inadequate to meet the demands placed on information needs by the role and structure of the new department.

The lack of resources and the high demand levels has tended to direct computing activities towards operational systems with little consideration for a corporate view of information needs. This has been reinforced by the structure and allocation of computing resources, particularly people and funding.

The demands on the Department in terms of accountability and performance require CALM to adopt a much higher profile in the use of information technology with particular emphasis on corporate information needs. This includes the need to ensure that information is widely accessible across the organisation and in a form that is relevant to the user. In particular, the availability of CALM information in graphical and related textual forms is a priority requirement of both senior management and operations level staff.

To meet this challenge CALM will require to increase the resources available to information technology areas on several fronts. While the question of hardware strategies dominates most discussions it is felt that this pre-eminent profile is not warranted.

The cargo-cult approach that hardware will resolve the problems of CALM is not warranted and hides the key issues of staff resources and management control. CALM staff resources are considered inadequate to meet the needs created by its corporate role. Without proper staff resources CALM is unlikely to progress its information plans.

The plan developed in this document attacks CALM's requirements on four fronts.

Firstly the plan establishes, at a corporate level, the information needs of the Department. It identifies fifteen corporate subject areas, prioritised according to the department's corporate plan. The five priority areas requiring immediate analysis are:

- *Accounting*
- *CALM Estate*
- *Forest Produce*
- *Geographic Information Systems*
- *Records*

In addition the corporate information model indicates a list of 68 potential systems needed to satisfy the department's information needs.

The second area is that of staffing resources. To meet the backlog of systems identified above, CALM could utilise any number of staff. Given the existing and future prospects for staff the plan has identified key positions on which to build the resources needed. As systems are developed and implemented staff savings should be fed back into the information technology function until a stable self-supporting group has been established.

The third area addressed in the plan is the hardware strategy. Two options are developed within the plan. Both options, the Concurrent/DEC environment and the single vendor environment, will meet the demands of CALM <u>given</u> the staff resources are made available. The single vendor (DEC) environment is recommended as being more strategically desirable and one which will provide for long term gains over the dual vendor environment. This comes at a cost which has been identified as being in the order of $1.5 million over the next 3-4 years. The strategy recommended allows for CALM to work progressively towards the single vendor situation with the <u>major</u> decision point occurring in about 12 months.

The fourth area of the plan is the creation of the supporting environment in which to develop information systems. To meet the challenges caused by large user demands and limited resources, productivity must be a major goal of the existing resources. For this, 4GL productivity tools, formal project management and user involvement in systems analysis and design are paramount. The plan

outlines how this should be achieved starting with the Computer Policy Committee and the project development processes needed to support information systems development.

In summary, the commitment of CALM over the next 4-5 years will be in the order of $6-7 million to achieve the plan. Against this, significant gains are expected which provide a breakeven position in 4-5 years and then provide an ongoing benefit in the order of $1 million pa.

It cannot be expected that the next three years will be easy. There is no magic elixir for success. Success will only come from:

- *a strong commitment to information technology from senior management*
- *strong controls and management of information technology resources*
- *allocation of resources to meet corporate objectives*
- *a well motivated and committed staff that is properly managed and directed"*

2.3 Outcomes of the Plan

The most important outcome of the 1987 ISP were the realisation that the Department's problems were not data processing or system development problems, but information management problems, and that information is a vital resource, as important as finance or human resources.

From this flowed a strong commitment by the CALM Policy Directorate to upgrade the status of information management within the Department and to give it the resources required.

Management actions subsequently taken were:

1. Formed an Information Resources Management Branch, with a structure similar to that proposed in Diagram 8.2 of the Plan.

2. Created four more staff positions for the IR Branch.

3. Upgraded the CALM concurrent 3240 to a much larger 3280 to relieve congestion on that system.

4. Purchased a VAX 250 for geographic information system (GIS) and research computing.

5. Adopted a policy of working toward a one-vendor mainframe environment.

6. Adopted a progressive mainframe upgrade path based on the DEC VAX series.

7. All new systems were bought or developed for the VAX.

8. Commenced progressive movement of all new/redeveloped systems into the VAX as from December 1988 (when the upgrade of the VAX 250 to VAX 350 was expected).

9. Commenced a system development approach firmly based on formal information engineering analysis and design methodology with the purchase of the ECT software package.

10. Set up a Task Force to draw up detailed specifications for tender for an integrated general ledger/payroll/stores system for the VAX, with a target initiation date of June 30, 1989.

11. Set up a Task force to develop detailed specifications for tender for a comprehensive integrated database management system for use Department-wide. This project has now gone to tender.

12. Set up a Task force to draw up specifications for the systems required to link the Department's GIS, accounting and commercial systems for the forthcoming Timber Trust organisation.

13. Made new investments in workstations and staff training to commence a major move into automated land information systems.

14. Advertised the I.R. Manager position in 1988. No applicant was considered suitable for the position. It is intended to re-advertise the position at a higher level (subject to Public Service Commission approval) early in 1989.

15. Appointed a Manager Land Information System and amalgamated the former GIS and Mapping Groups.

16. Reconstituted the Departmental Computer Policy Committee with the General Manager as Chairman and other members of the Operations Directorate as members.

There have been a number of notable achievements over the last two years: the savings on use of external mainframes have been achieved as forecast; major new systems such as the decentralised wages payroll system, the Kangaroo Management System and the Logging Operations Information System (LOIS) developed and put into operation; a major reduction in the number of system maintenance requests; and a major expansion in the use of personal computers over the Department's network.

The CALM physical network, based on dedicated Telecom lines, now extends from Albany to Kununurra. At the present time a major hardware upgrade is in progress, exchanging old Perkin-Elmer terminals for PCs which can be used as Concurrent and VAX terminals or stand alone.

CHAPTER THREE

CURRENT EQUIPMENT AND MAJOR SYSTEMS

3.1 Hardware

3.1.1 Mainframes

CALM currently has a Concurrent 3280 purchased in 1987/88, equipped with 3200mB disk drive capacity and magnetic tape backup. This unit is connected to the Department's State-wide network of dedicated Telecom lines extending north to Kununurra, east to Kalgoorlie and south to Albany. Most field offices of the Department are now on the network. The only exceptions are Katanning, Moora, Esperance, Broome, Exmouth and Merredin district offices. The three forest regions are equipped largely with 10-12 year old Perkin-Elmer "dumb" terminals, which are in the process of being replaced by PCs.

The Concurrent is used for all Logging Operation Information Systems (LOIS), for general ledger and payroll, for some scientific work (SPSS in particular) and for fire management systems. This machine is currently utilised to about 60-85% capacity and although a marked rise in use of LOIS is expected over the next two years, the transfer of accounting systems and RMS to the VAX will leave adequate CPU capacity for expected requirements.

The other mainframe is an Intervax 250, an Intergraph - modified version of the Microvax II. This is a 1 Mip machine, installed in January 1988 with 1900 mB of disk drive and magnetic tape backup. Initially used for GIS development and production work, for which it was running at 90-100% of capacity by December 1988, this unit was scheduled to be upgraded to an Intervax 350 (based on a Microvax III processor) which has roughly three times the CPU capacity and 4000 mB of disk space. [Note, this upgrade took place in January-February 1989].

This upgrade will allow the transfer of RMS to the VAX (and at the same time allow an upgrade to V.3 of RMS, long sought by the Records Section), an expansion of GIS usage and the first phase of the new Departmental accounting system to be accommodated. However, the system will be marginal for these requirements and will need early expansion (see Chapter 6).

Because of the close links between the LOIS and the sundry debtors module of the accounting system, it is necessary to be able to link the two mainframes.

After extensive consultations with suppliers, it is planned to achieve this early in 1989 with an Ethernet connection.

3.1.2 Workstations

Currently, CALM has an Interpro 32 and an Interpro 32C in the Land Information Section as workstations. It also uses two NEC Powermates, running Microstation software as datacapture workstations. With the expected increasing demand for regional and specialist branch access to GIS technology, it is planned to extend the provision of workstations to Kelmscott, Manjimup and Bunbury regional offices, as well as Planning and Recreation and Landscape Branches.

The present thinking is that over the 2-3 year time horizon processing will increasingly be carried out on workstations, and the function of the mainframe, for GIS use at least, will increasingly be as a file server/data manager.

There seems no particular reason why CALM should remain committed to Interpro if cost-effective alternatives are available.

3.1.3 Personal Computers

Early in the development of PCs, CALM tended to restrict the types of PC purchased. At one stage, only IBM and Olivetti PCs were used, but with the passage of time this policy has broken down. There is now a wider variety of makes in use: Cleveland, IBM, Olivetti, Atari, NEC and Xebec. The boom in PC numbers in the last two years has been largely caused by expansion of word processing facilities across the whole spectrum of the Department's operations. No particular disadvantage has been seen in the proliferation of makes of PCs since all use the MS-DOS operating system. Even the importance of that aspect is declining as the barriers between different systems, e.g. between MS-DOS and Macintosh, are being steadily removed.

Of more significance is the variety of word processing systems in use and problems caused by different disk drives (5½", 3½", high density and double density). A more recent trend has been to replace aging "dumb" terminals with PCs which, with suitable software, can be used as a terminal to Concurrent or VAX or as a stand alone PC. This has greatly enhanced PC utilisation at many country centres.

3.2 Network

As mentioned elsewhere, CALM depends on a network of dedicated Telecom lines for contact with country centres. It has studiously avoided dial-in facilities in order to avoid the possibility of penetration of its systems by outsiders. As CALM operates in a number of very sensitive areas, this is a real danger.

The Government communication strategy clearly has considerable relevance to the future development of the CALM network and the outcome of the DOCIT tender will be watched with keen interest. CALM has a particular interest in the early development of high speed data exchange systems within the WALIS environment.

3.3 Software

3.3.1 Accounting Systems

CALM currently uses a general ledger system developed in-house by the Forests Department some ten years ago when there was very little proprietary accounting software on the market. The system has been enhanced several times but is now quite inadequate for the sort of financial management CALM requires.

The approach adopted has been to carry out a comprehensive definition of the Department's accounting requirements and then try to purchase a commercial software package off-the-shelf, adapting it as necessary to our requirements (in the hope the adaptions required will be relatively minor).

An urgent need for salaries cost allocation to major programmes and for a computer-based payroll system for field wages payment resulted in the development of in-house systems for those tasks. These will be modified as required for the VAX environment if necessary when the new accounting system is purchased.

3.3.2 Other Management Information Systems

CALM has a number of major management information systems which have been developed in-house to cover requirements peculiar to its land and resource management roles. These include kangaroo management and shooter licensing, forest inventory and fire management. Where it has been possible to purchase off-the-shelf systems this has been done, e.g. the RMS Records Management System, bearing in mind the potential for standardisation within government. The approach has been that where a standard government system has been identified and will fulfil Departmental requirements then that system will be used.

3.3.3 Land Information Systems

CALM has a major investment in its in-house Forest Management Information System (FMIS), several modules of the Intergraph system and the ESRI Arc-Info Geographic Information System. Each system has special attributes required for some aspect of Departmental requirements and they are used in an integrated fashion, with interfaces to permit interchange of files between all three systems.

Intergraph is also used with Microstation software for data capture purposes.

3.3.4 Commercial Systems

CALM's requirements cover timber harvest records, royalty payments for a wide range of forest products, payment of logging contractors, monitoring of levels of harvest and the issue of harvesting licenses. Currently two systems are in use, one for the softwood side of the Department's operations and one (LOIS) for the hardwood side of its operations.

The softwood system was developed some 8-10 years ago and is now virtually obsolete. The hardwood system is much more comprehensive and is only nearing the end of its initial development and therefore has an operational life of at least five years before a major re-write will be required. It is currently being modified to blend in to it the features of the softwood system so that by mid-1989, CALM will have one comprehensive LOIS which will be able to handle virtually any forest product. This is quite a unique system, far in advance of anything else used in Australia, and perhaps elsewhere. Given the proper support and marketing, it is believed to have considerable potential for sale, especially in South East Asia.

3.3.5 Research Systems

Research Division uses three main packages for statistical analysis - SPSS, SAS and PATN - as well as a number of other proprietary packages for special purposes. dBASE III Plus and dbxl are also used extensively.

3.3.6 Development Systems

Within the computer services section of the IR Branch, the ECT package is used for development of data and entity models during the formulation of system requirements. 4GL usage has so far not been a major feature of in-house systems, but the wider use of the DEC mainframe will permit a move into 4GL use, with consequent benefits to the speed of system development.

3.3.7 Personnel Information Management System

In accordance with the government's direction that PIMS be developed by the PSC and used by Government Departments and Authorities, CALM has been progressively implementing the system since 1987.

The current implementation of the Leave Sub-System, brings the major portion of the implementation phase of PIMS in CALM to a close.

In addition to the familiar PIMS Establishment Report, the system is capable of other on-line or printed reporting of information, including appointment, employee, classification, vacancy, higher duties, training and (soon) leave.

PIMS will provide a saving in staff time in the processing of entitlements etc. and when fully developed, will be a useful instrument for FTE control.

The full extent of the relationship of PIMS to payroll system(s) in CALM is yet to be resolved.

CHAPTER FOUR

STRATEGIES FOR SYSTEM DEVELOPMENT

4.1 Management Information Systems

4.1.1 Accounting

The very core of the Department is its financial management system. A new general ledger system is required which can be integrated with the existing payroll costing system for wages, a salary payment and costing system, the present plant hire costing systems, sundry debtors and the LOIS. Extensive studies of systems requirements have been carried out and a tender for a DEC-based package has been advertised with the objective of having the system operational by June 30.

The connection to LOIS, which is resident on the Concurrent 3280, will require incorporation of Ethernet equipment into the system. Discussions have been held with suppliers and a development strategy has been worked out.

4.1.2 Stores

As mentioned earlier, the changes in the Department of Services have necessitated the adoption of an internal stores ordering, stores control and payment system. This has presented an opportunity to incorporate committal accounting for all stores and contracts in the general ledger, thus allowing much better management of the Department's finances. The new Stores system must therefore be compatible with the Accounting system. Staff have been redirected to this area as a matter of urgency, with the objective of completing the system by September 1989.

4.1.3 Plantation Operations Control System (POCS)

This requirement was referred to in 1.3 above. Essentially it records management information (expenditure, timing of cultural operations etc.) and relates it to specific areas in the GIS. Temporary staff have been engaged to complete this project and provide the necessary linkages to GIS and accounting systems. In view of the sensitivity surrounding Government/private sector partnerships, such as the Tree Trust, the need for precise managerial and accounting information is paramount. The system will clearly require sophisticated enquiry facilities to enable it to deal with the expected attention it will attract in Parliament and the public arena.

4.1.4 Records Management

CALM currently uses version 1.3 of RMS, converted to run on the Concurrent mainframe. Deficiencies in the system, prohibitive costs involved in conversion as well as limited space on the Concurrent have led to the requirement to have

RMS installed in a VAX environment. The transfer will take place in February 1989 and will require data conversion and upgrading to version 3.1. The finances are available for this project in 1988/89 and will be used for data conversion, upgrading, hardware and software purchases as well as a maintenance agreement to ensure RMS is maintained when required and upgraded as new versions become available. An ongoing commitment of between $8,000-$10,000 is required for the annual maintenance agreement.

RMS v 3.1 will offer the opportunity to work towards a single filing system for the Department, with consequent improvements in office efficiency. It will also allow access to the system by all staff once the VAX has been upgraded as proposed in 1989. This aspect will be further studied during 1990, when the major projects of accounting and DBMS have been successfully implemented.

4.1.5 Kangaroo Management and Licensing

During 1987 and 1988 much effort was devoted to the development of a specialised software system for management of the State's kangaroo harvesting industry. This became urgent due to Commonwealth Government requirements. The system included licensing modules which were designed to be common with licensing requirements for other activities such as apiary site permits and flora picking licences. It is intended to continue development of these modules into operational systems during the coming 12 months.

4.1.6 Miscellaneous Systems

This group includes a number of systems such as mailing lists for research publications, mailing lists for paid subscriptions to the magazine Landscope, plant hire costing and control. These are all operational systems with no anticipated major developments for the present, apart from routine maintenance.

4.1.7 Office Automation

This is rather a neglected area in CALM. An attempt to introduce an electronic mailing system on the Concurrent network failed because the system was not user friendly and did not meet user requirements fully. It also coincided with the widespread introduction of facsimile equipment in the Department. CALM's activities are such that there is a large requirement for the rapid transmission of diagrams or parts of maps, and for this facsimile is uniquely suited. Despite this, it is felt there is a place for a good electronic mailing system which could lead to significant savings in telephone costs. It is proposed to re-examine this area during 1989.

This problem is largely tied up with a failure to involve senior management in the IT revolution. Of the ten officers at Level 9 or above in CALM, only two use microcomputers themselves on a regular basis for word processing and other tasks. This is symptomatic of a deficiency in senior staff approach to the use of IT generally. It is proposed to

address the situation in the 1989/90 financial year by training and awareness sessions, and by provision of suitable equipment. So far this group has had lowest priority for supply of personal computers. CALM also has a requirement for the development of local area networks at some centres to improve the efficiency of word processing and to facilitate the rapid, interactive editing of major reports and land management plans. The first of these LANS is being developed at the Planning Branch at Murdoch House (Canning Bridge). Over the next three years further LANS will be developed for the senior staff and publications areas.

4.1.8 Library

As mentioned above, CALM has entered into an agreement with the Agriculture Department to jointly fund the purchase of the ADLIB library system, together with joint funding of training and leasing costs. This project has a three year development plan which includes an upgrade for the Prime computer at Agriculture. CALM will use the two PCs at present in the Library as terminals to the Prime.

4.1.9 Forest Inventory Systems

A range of specialised systems has been developed over the years for processing forest inventory data. A major new system to support a new hi-tech approach to inventory is nearing completion and will become an important factor in forest management during 1989. This new forest inventory is a key factor in the implementation of the Government's Timber Supply Strategy.

4.2 Land Information Systems

4.2.1 Intergraph

During the past year two more modules were added to the Intergraph system. Little further expansion of this system is envisaged in the near future. The Department's previous Intergraph terminal was exchanged for an Interpro 32 and an Interpro 32C and two NEC PCs were purchased with digiting tablets and microstation software. This has enabled the Department to markedly increase its rate of data capture and to make further progress along the path of automating its mapping functions.

The strategy for the use of the Intergraph system is that it will be a centralised and specialised system for automated map production, data capture and to store the digital graphical data base. It is not a system which lends itself to use in field stations. A considerable amount of staff training in the mapping group is still required to make optimum use of the Intergraph capabilities and it is planned to continue this on a systematic basis.

To complement the data capture prgramme, additonal graphic terminals are required for data editing, processing and map production/presentation.

4.2.2 FMIS

FMIS was developed as far back as 1979 and has been progressively refined since. It is a powerful system for the specialised requirements of forest managers and has features which are not available in Intergraph or Arc-Info GIS systems. As such it will continue to have a place in CALM's land information system, although it will receive less attention for enhancement over the next three years.

4.2.3 Arc-Info

The ESRI Arc-Info GIS has many powerful features for spatial analysis which suit CALM requirements for operational land use planning. So far, it has been a centralised, specialised system at Head Office, but it is particularly well suited to use for operational tasks in regional field offices. Lack of staff has so far prevented the development of suitable interfaces for Arc-Info to suit field requirements. These problems are expected to be resolved early in 1989, with the result that over the next two years there will be a major push for developmental activity in this area.

An example of the use of the system will be in planning and operational control of the new system of road, river and stream reserves in the Southern Forest Region, as required by the EPA and the Minister for CALM. The Department has engaged two more highly qualified landscape architects for this very sensitive project but they will be unable to complete it without extensive use of Arc-Info.

It is proposed to purchase workstations for the Manjimup, Kemscott and Bunbury regional offices in the 1989/90 financial year and provide the necessary staff training and backup from specialists in Perth. Each unit would be equipped with a digitising tablet, plotter and use appropriate GIS software.

The specialised land information requirements of CALM's remote field stations are being studied with the intention of adopting a system suitable for them, but which can be integrated with the Department's overall land information data base. This may take the form of a PC version of Arc-Info, or an equivalent system. This requirement is allied to the need for a Reserves Information System - a more useful form of the present Crown Reserves Register - and systems to aid monitoring of a wide variety of biological attributes of an area. Both are important facets of the Corporate Strategy 7.2.1, the establishment of a comprehensive data base on occurrence and conservation status of the State's ecosystems and species.

4.2.4 WA Land Information System (WALIS)

CALM has taken a leading part in the development of WALIS for several years, actively promoting the concept of a unified State LIS. For some years CALM used the WALIS VAX for developmental and production work on the Intergraph

until the purchase of its own VAX in 1987. It still uses the WALIS VAX for systems which are not available on its own VAX. The need for various Government Departments to interchange land information is continually growing. It is hoped the WA Government communications tender will finally provide the physical framework to enable on line access to information around the Departments. The need for such a framework is becoming increasingly urgent. This, combined with the completion of the State digital cadastre will enable a vast expansion of the use of geographic information systems in WA.

CALM will continue to actively support WALIS and participate in developments over the period of this plan. It will, for example, contribute large amounts of topographic information to the State's digital topographic database.

4.2.5 LIS/GIS Strategy

The demands for system development in this area are intense and becoming more complex every year. It is necessary to develop a formal LIS/GIS Strategy to ensure development occurs in an orderly and logical manner. It is intended to have such a Strategy completed by June 1989.

4.3. Commercial Systems

This information management group includes the hardwood and softwood Logging Information System (LOIS). At present, there are two systems, the older softwood system now requiring redevelopment for the expected large increase in softwood harvesting in Western Australia in 1992/93. The newer hardwood LOIS is still being progressively refined and is now a very comprehensive software package with definite prospects for sales to other forest managing organisations. CALM has cooperated with Concurrent Computer Ltd in offering the system to the New South Wales Forestry Commission. Should a sale be successful, CALM will endeavour to market the system through a software house as it has no desire to engage in the activities required to support commercial software systems, although it would offer technical support, at cost.

Over the 1989/90 financial year the softwood system will be incorporated into the hardwood LOIS to form a single, very comprehensive and efficient system. Because LOIS is new it will continue to run on the Concurrent until the next major redevelopment is required, estimated to be 6-8 years away.

This is one of the most important systems in CALM, since most of the Department's income of $40.327 million in 1987/88 is received through timber sales, or from the recovery of in-forest costs from logging operations for which CALM is the prime contractor. The significance of the latter can be gauged from the fact that by mid 1989, nearly all of the State's 1.5 million m^3 of timber harvest will

be processed through this one system. When the Tree Trust sharefarming scheme is in full production the figure will be 2.5 million m^3. CALM is completely dependent on the system for the payment of its logging contractors, with a turnover of $11.219 million in 1987/88.

4.4 Research

The main research uses for IT are for statistical analysis using the SPSS and SAS, together with associated data base structures. This area is one of the best developed, in terms of IT, in CALM. Over the next three years covered by this plan it is anticipated there will be steady development in the areas of staff training, integration of research data bases into the overall Departmental system and extension of the present use of data logging equipment for direct capture of data in digital form.

No significant increases in hardware are foreseen for research as it is now reasonably well catered for in this regard. However, some older PCs are approaching replacement. In particular, the problem of when to replace 8086 chip machines with the more modern 80386 equipment must be faced in the near future.

There is a continuing requirement for a high level of specialist computing support for research staff.

CHAPTER FIVE

MANAGEMENT OF PERSONAL COMPUTERS

5.1 Introduction

Management of personal computers (PCS) within CALM presents problems due to the dispersed nature of the Department's operations and the rapid expansion in us of PCs. There are now in excess of 190 PCs scattered over the State. In the main these are stand-alone desk type units, but there are several transportable and laptop models.

For some years the Department's policy has been to standardise on MS-DOS based PCs. As a result it has a wide variety of makes in use: IBM, NEC, Atari, Olivetti, Xebec, Compaq, etc. There is also a large investment in MS-DOS software, since each PC is purchased with its own software for the particular purposes desired. Corporate licences have been used so far only for SAS. The wider use of corporate licences needs investigation.

5.2 User Support

Despite having one officer devoted exclusively to PC user support, staff are experiencing many problems, basically due to lack of training - especially in the field stations. CALM has attempted to meet the training requirements of users by a combination of sending staff to outside courses and one to one or small group training by the user support officer. As this has proved inadequate, approval has been given to employ an additional user support officer for 6 months to do nothing but run a series of internal user courses. At the same time, it is hoped to begin a programme of rationalisation of software, especially for wordprocessing, to concentrate on the more easy to use packages.

If the use of PCs continues to expand as expected, it will be necessary to provide PC support staff for each major user group in CALM, in much the same way Research Division does now.

5.3 Introduction of Macintosh Hardware/Software

It has been apparent for some time that the simple, intuitive Macintosh approach to PC use has much to offer CALM, particularly in areas with some specialist needs and for staff who are relatively infrequent PC users. In the past the difficulty of communicating with the Concurrent mainframe and with the MS-DOS environment have prevented the use of this equipment. However, the communication difficulties have now been resolved and the Mac makes a very suitable terminal for the VAX.

A start has been made to introduce the Macintosh to specialist groups in CALM and this process will continue over the next three years.

5.4 PC Purchasing Problems

There is normally a large time delay between placement of a requisition for a PC and filling of an order. This results in numerous phone calls, time wastage and frustration. In order to alleviate the situation districts, regions and branches are being asked to forecast PC requirements in advance of the financial year so that bulk orders can be placed. This procedure may also permit significant discounts to be achieved.

CHAPTER SIX

CAPACITY PLANNING STUDY

6.1 Introduction

With the hardware strategy outlined in the Information Strategy Plan and accepted in principle by the Department together with the implementation of the first stages of that strategy, it became essential to carry out a capacity planning study to provide a framework for budget bids and work programme planning purposes.

The basis of the study was a series of discussions with branch managers and specialist staff in which they were asked to put down their planned work programmes for the next three years and to estimate the implications of those programmes for computing requirements. All respondents were re-interviewed to evaluate their responses in terms of Government policies and the Departmental corporate plan to ensure all projects included in the final capacity plan were firmly based on programmes which were assured of funding.

The capacity plan so developed was based on the premise that the Concurrent would be virtually allocated to commercial operations (timber harvesting and licensing) and that all GIS, most scientific and all new MIS systems would be located on a VAX system.

The outcome of the study is shown in Table 6.1, which lists expected Vax CPU requirements as at mid 1989, 1990 and 1991. It is emphasized that all projects listed in the table are in progress and are not in any sense a "wish list". One major CPU user, the Jarrah Inventory Project, has been capturing field data all through 1988 and is scheduled to commence a very heavy programme of data collation and analysis in mid-1989. This project is a key obligation under the Government's Timber Supply Strategy for WA. In most cases, the figures in Table 6.1 are soundly based on experience running the systems indicated.

Table 6.1 indicates that CALM will require 1.1 MIPS of CPU in mid 1988, 5.4 in mid-1989, 10.2 by mid-1990, building up to 14.3 MIPS by mid-1991. The largest area of CPU usage is the GIS area, which reflects the very heavy CPU requirements for these systems when operating in the spatial analysis mode. It should be noted this study was carried out before the announcement of the Government's Tree Trust Scheme, which, as outlined previously, will add further load to the system and before the finalisation of moves to incorporate an integrated database management system onto the VAX. This will add a further "overhead" to the CPU. For these reasons, the requirements outlined in this table are firmly believed to be very conservative. All previous capacity plans of this nature have proved to be very conservative, with the inevitable result of overstressed hardware, frustrated users and severe limitations on the Department's capacity to meet its obligations.

Table 6.1

Department of Conservation and Land Management IT Plan 1989-91

Expected Vax Power Requirements 88/89

	Current Mid 88	Mid 89	Mid 90	Mid 91
MIS				
RMS		.3	.4	.5
Gen Ledger, etc		.3	.3	.3
Stores		.1	.3	.3
File Precedents			.5	.6
Other				.6
Sub Total		.7	1.5	2.3
GIS				
Land Information				
CALM Estate (Tenure)	.1	.3	.4	.5
Topography		.1	.2	.2
Resource/Health		.1	.2	.2
Management Plans	.1	.1	.1	.2
Cartography	.1	.1	.2	.2
GIS Projects & Applic				
Resource Inventory				
FMIS	.3	.5	.7	.9
Jarrah Inventory		.5	1.0	1.5
Karri Regrowth		.3	.2	.2
Pine Plantations		.1	.2	.5
Protection				
Fire Modelling	.1	.2	.2	.2
Dieback Modelling			.3	.3
Planning				
Landscape Model		.1	.3	.3
Road/Stream Reserve		.3	.5	.7
Reserves Info Sys		.1	.2	.3
Plotting	.3	.6	.9	1.2
Sub Total	1.0	3.4	5.6	7.4
Research				
Flora & Fauna Atlas		.2	.3	.3
Species, Biogeogr		.1	.3	.5
Herbarium			.1	.2
SAS	.1	.5	1.0	1.5
Research GIS Work		.5	1.0	1.5
Monitoring Policy		.2	.4	.6
Sub Total	1.1	1.5	3.1	4.6
Grand Total	1.1	5.6	10.2	14.3
Size of Computer Reqd	1.6	7.7	14.6	20.5

6.2 Hardware Requirements 1989-1991.

The current upgrade of the VAX from an Intervax 250 to an Intervax 350 will be completed in mid January 1989. This will take VAX capacity from 1 MIP to 2.9 MIPS. As can be seen from Table 6.1, this will be completely inadequate, compared to the expected need for 5.4 MIPS by mid 1989 and 10.2 MIPS the following year.

It is therefore proposed that the 1989/90 budget bid should include provision for VAX processor capacity equivalent to 15 MIPS. A processor of 8 MIPS capacity would satisfy requirements for 1989 but we would once more be in the position of having a saturated CPU in only one year's time - the same position we have been in for several years now. Alternatively the purchase could be spread over two years with 8 MIPs in 1989 and a further 7 MIPs in 1990 although this would mean accepting a period of stringency before a new processor was delivered in 1990/1991.

It is essential that the minimum of 8 MIPS extra capacity be provided in the forthcoming budget, otherwise it will not be possible to meet the information requirements of several major Government programmes, nor to continue the present thrust of GIS development.

CHAPTER SEVEN

HUMAN RESOURCES FOR IT ACTIVITIES

7.1 Information Resources Manager

The position of Information Resources Manager was advertised at Level 8 early in 1988 but did not attract an applicant considered to be suitable for requirements of the position. Information management is a skill area which is still in relative infancy and there are few people in the field.

It is proposed to advertise the position again early in 1989, this time at Level 9, and to raise the management of information in CALM to the status of a Division. It is considered essential to obtain a person of high calibre to oversee the major developments planned for the next few years in the Department.

7.2 Use of Temporary Staff/Consultants

As a general rule CALM prefers to use in-house staff for all information needs but it is recognized there are some areas where the necessary expertise does not exist within the Department and the use of specialised consultants is justified. There are also occasions when time constraints on a project are such that Departmental resources are unable to cope.

In practice, therefore, it is necessary to use a judicious mixture of in-house and consultant skills, recognizing the strengths and weaknesses of each. In the engagement of consultants the guidelines developed by DOCIT are used and advice on performance of specific consultants obtained by reference to DOCIT or to other Government Departments.

7.3 IT Training

7.3.1 IT Training Plan

The Department is in the process of developing an IT Training Plan for each Branch or Region. The plan will clearly define training requirements at several levels:

(a) operational staff user requirements
(b) IT awareness for management groups
(c) IT training for manager groups

The priority area at this stage is clearly that of users in the field, as the isolation of many CALM staff makes it difficult to cater to their needs. In the past user needs have been inadequately served by an officer travelling to the worksite and working through systems in use and providing on the job assistance. It is now proposed to bring staff into regional centres for special training

courses which will have a greater component of theory in them. The hope is that if staff know the principles involved they will be more able to resolve the inevitable small problems which occur from time to time. It is also believed that people gain more from an environment where common problems can be aired and worked through.

The second priority is IT training for executives and managers, where there are some areas of deficiency, especially in some specialist groups.

As with all other CALM staff training programmes the training will be strictly on a needs basis and will be done with the active assistance of the Department's training staff. Although many of the training programmes will be conducted in-house, the Department will continue to use external courses where it is cost-effective to do so.

7.3.2 Training for Staff

A separate requirement for training is that necessary for staff who will be required to use the new systems planned for introduction over the next 12 months. This will be especially important in 1989 due to the adoption of the new accounting and stores purchasing systems and the special problems of the Tree Trust project. The accounting and stores systems will require a number of regional workshops prior to their adoption, involving Accounts and Stores Branch personnel in addition to IR Branch staff.

For the reasons outlined above an unusually large amount has been requested in the 1989/90 budget for staff training. The DOCIT guidelines for level of expenditure on training will be exceeded by a wider margin.

CHAPTER EIGHT

REQUESTS FOR THE 1989/90 BUDGET CYCLE

8.1 Commitments

This category includes commitments for hardware and software licences and maintenance and must be funded if any of these systems is to continue.

Firm commitments are:

	1988/89	1989/90
Staff costs	13,000	15,000
Service and contracts	48,000	57,000
Stationery	26,000	32,000
Concurrent maintenance contract	91,000	98,000
software licence fees	31,000	35,000
VAX 350 maintenance contract	58,000	80,000
software licence (Intergraph) etc.	29,000	55,000
Accounting and RMS package maintenance	-	19,000
Microcomputers	2,000	63,000
Computer network maintenance	11,000	12,000
Dedicated Telecom line rentals etc.	145,000	150,000
Total	454,000	666,000

8.2 New Hardware Purchases

8.2.1 Mainframe

One VAX 8820 with 32mb memory, tape backup and 2000mb disk storage, controllers, etc.	1,760,000
Three Intergraph 32 workstations (or equivalent) for Manjimup, Bunbury and Kelmscott Regional Offices	90,000
Total	2,390,000

8.2.2 Personal Computers

Four PCs for district offices at Moora, Meredin, Broome and Exmouth (including printers)	24,000
Six PCs for other districts	36,000
Provision of laptops/Macintosh PCs for senior staff (6)	50,000
LAN Equipment/software for GM Module, Crawley	20,000
14 PCs for Research at Woodvale, Como Dwellingup, Manjimup, Herbarium, Karratha, Hillarys, Busselton	66,000
Total	196,000

8.3 Software Purchases

Stores modules for integrated accounting system	40,000
Operating software for VAX 8820	50,000
Upgrade DB, DD, 4GL for 8820	450,000
Transfer Accounting to 8820	35,000
PC Arcinfo or equivalent	11,000
Total	586,000

8.4 Network

Funds are requested for the equipment and line rentals to add the remaining six field offices to the CALM network:

Dedicated lines	21,000/yr
Modems etc	6,000
Total	27,000

8.5 Joint Venture with Agriculture Department

Costing of CALM share of ADLIB software, etc. as set out in Attachment 4	24,000
2 PC Terminals (Como, Herbarium)	6,000
Network changes	5,000
Total	35,000

8.6 Indicative Budget Requirements 1990/91 and 1991/92

Commitments	1990/91 $	1991/92 $
Hardware		
Mainframe	-	1,100,000
Disks	40,000	40,000
Workstations	100,000	200,000
PCs IBM Compatible	100,000	100,000
Mac	30,000	30,000
Printers etc.	15,000	15,000
LAN	12,000	12,000
Software	50,000	50,000
Network	20,000	20,000
Library System	27,000	23,000
Maintenance	590,000	650,000
Other costs	280,000	300,000
Research	150,000	160,000

8.7 Predicted Outcomes for Financial Year 1989/90 (Subject to Funding)

8.7.1 Accounting

CALM will have implemented its comprehensive general ledger/payroll/salaries/stores management/sundry debtors system and for the first time will be able to accurately assess the total costs of all aspects of its activities. This capability is believed to be unique in Government.

8.7.2 Data Base Management

CALM will have implemented an integrated data base management system for the whole Department. All staff will have access, via a data dictionary, and subject to suitable security protection, to a wide range of data held in its various data groups.

8.7.3 GIS

GIS technology will have been in operational use at Manjimup, Bunbury and Kelmscott regional offices for the implementation of the new road river and stream reserve system, the visual forest management system and far more intensive operational planning.

8.7.4 Staffing

No staff reductions will be possible as a result of the anticipated increases in productivity from all the initiatives now in train. The concept that productivity improvements will enable a reduction in staff levels is irrelevant to CALM, given the great scope of the tasks allocated to it by Government. The achieved improvements will merely make it possible to reallocate resources to areas presently treated inadequately or not at all.

CALM staff will have significantly improved their level of computer literacy and there will be a very significant decline in requests for PC user support.