DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

STRATEGIC INFORMATION PLAN

REPORT

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EXECUTIVE SUMMARY

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 clear that the resources available to CALM are inadequate to meet the demands being 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.

This situation can no longer be supported. CALM must 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 issue of staff resources and management. 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 15 corporate subject areas, prioritised according to the department's corporate plan. The 5 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 given 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 major 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 3 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.

SUMMARY OF RECOMMENDATIONS

This list does not represent a priority ordering of the recommendations contained in the plan. It is intended to offer a summary for reference only.

- CALM Corporate Plan (Section 4.2)

  The CALM corporate plan should be further developed to identify Critical Success Factors for CALM and each business unit.

- Priority Business Areas (Section 6.2)

  The priority business areas for further systems analysis are

  - Accounting
  - Calm Estate
  - Forest Produce
  - GIS
  - Records

- Network (Sections 7.3 and 9.5)

  The existing network should be extended to ensure existing CALM business units have access to CALM's information systems. This network should be converted to DEC network as part of the long term hardware strategy.

- Organisation Structure (Section 8)

  A proposed structure for the management of information technology is set out in section 8.3. This needs to be read in conjunction with section 10.6 (Project structure) to ensure the full intent of the organisational structure recommendations is understood.

- Hardware Strategy (Section 9)

  It is recommended that CALM adopt a medium to long term strategy to become a single vendor installation.

- Development Approach (Section 10)

  It is recommended that CALM adopt a formal project approach to information systems development including the use of formal information engineering analysis and design methodology.

- Action Plan (Section 13)

  The priority projects for Phase 2 of the Planning Brief are the Accounting and Calm Estate business areas. The business area analysis of these should commence immediately.

PART A DESCRIPTION

1. INTRODUCTION

1.1 BACKGROUND

The Department of Conservation and Land Management was established under the Conservation and Land Management Act of 1984. CALM commenced operation as a department in March 1985 consisting of an amalgamation of the Forests Department, the National Parks Authority and the Wildlife portion of the Department of Fisheries and Wildlife.

The majority of CALM's computing resources which became available as a result of the amalgamation process came from the Forests Department (Staff and mainframe computer) and the research section of Wildlife. At the time of planning CALM it would appear that little analysis was done on the computing requirements of the new organisation in its new environment. Now that the organisation has to some degree stabilised it is being recognised that the individual resources brought into CALM do not meet the new and combined demands of the new department. Hence the development of this Plan.

The objectives of this plan are to:-

- gain maximum value from investments in information technology;
- plan staffing developments in a way which will inprove information management;
- gain maximum efficiency from application systems development;

- obtain a clearer view of the possibilities for the use of commercial software;

- provide better control of developments in information technology.

A key component of this is the requirement to produce an enterprise model together with its associated entity and business area models to support the information needs of CALM.

The plan as set out in this document is designed to meet these objectives and to provide a firm basis for future use of information technology, the development of application systems to meet information needs and to support the Corporate Goals and Objectives of CALM.

1.2 INFORMATION TECHNOLOGY

It is useful at this early stage to define the term Information Technology as it is used in the context of this planning document.

DOCIT has defined Information Technology as the application of systematic methods and techniques to the collection, handling, storage and dissemination of information.

CARTOGRAPHERS HAVE ALWAY ADOPTED THIS APPROACH.

As such it is not just computing but encompasses other technologies involved in the compilation and manipulation of raw data into information, useful to the organisation.

Today information is seen as one of the most significant resources/assets owned by an organisation. Information technology is therefore as strategic a resource as finance and people and must be managed accordingly.

1.3 THE PLANNING PROCESS

In developing the plan the project team adopted a "top down" planning process supported by an analysis of the published Corporate Plan. This process involved the interviewing of some 64 officers combined with regular interactions with the Project Steering Committee. (See Appendices 1 & 2)

Results of interviews were used to develop the Corporate Data Model which was then linked to the Corporate Plan. The graphical representation of this model, together with its own documentation is attached in a separate report. (Enterprise Model Report)

In addition to the interviews several surveys were carried out to determine views and attitudes of users towards existing systems, to assist in the analysis of the corporate plan and to aid the system prioritisation process. The results of these are documented in Section 6 and in the appendices to this report.

1.4 HOW TO SUCCEED

The road to success in the use of Information Technology is never easy. In fact it is only through a commitment to longer term goals and a preparedness to invest resources in the short term is it possible to reap the rewards. The temptation to adopt short term tactical positions to overcome pressures and constraints is always present and must be avoided in favour of the strategic planning positions.

DOES THIS INCLUDE K.M.P.S.?

The key to success is to be found in the following:

- A commitment from senior managers starting with the Chief Executive.

- A strong management of information technology usage and development.

- Resource allocation in accordance with the Corporate Plan.

- A well motivated staff that is properly managed and directed.

Remember that quality is remembered well after quantity is forgotten. The aim should be to develop 'good' systems, in tune with user and corporate needs and flexible enough to change with the Department.

2. CURRENT ENVIRONMENT

2.1 MANAGEMENT AND CULTURE

CALM is a regionalised organisation with offices ranging as far apart as Kununurra and Esperance. Each region is managed by a senior officer who has a large degree of autonomy in the management of the region.

While the Forests Department imprint is still very evident, the amalgamation of the various functions has been successful at the regional level. This was not so evident at the Head Office level. The physical separation of the CALM offices has tended to work against the development of a unified organisation. For example the view held by many officers in Operations with respect to the Policy Directorate, was of concern. This view was that while the policy Directorate was good at developing policies, this policy is not necessarily relevant to the day to day working of CALM. The project team saw this as a problem of understanding and communication rather than one of substance. As stated the physical dislocation adds to this problem. Another example is that integration of the Woodvale Research group is still not accepted by many officers. To a certain extent this problem is evident in people's attitude towards Information Technology in terms of access to resources, protection of enclaves of resources and to any notion of central control or coordination.

The impact of these influences was felt most by the project team during the analysis of the Corporate Plan. Significant difficulty was encountered in obtaining a consensus view on the relationships between the stated Corporate objectives and strategies and activities actually carried out by officers within Operations.

2.2 CORPORATE PLAN

A detailed analysis of the Corporate Plan as it relates to the Information Planning process is given in Section 4. At this point however several key issues need to be recognised.

The Corporate Plan is considered a base starting point in determining and prioritising information needs. In the case of CALM the plan is well developed. However, in the view of the project team the plan is not well understood by officers within the department, particularly those within Operations. Few senior executives could, with any conviction, positively link their activities in a meaningful way to the stated corporate objectives and strategies.

In the view of the project team the corporate plan is not complete. It needs to be taken further, to identify Critical Success Factors and to establish Performance Indicators for CALM. The lack of these elements of the Corporate Plan was a continuing problem in the information planning process.

* HOW?

2.3 COMPUTING SERVICES BRANCH

The Computing Services Branch is clearly undermanned. The priority list of projects attached to Policy Statement No. 16 (December 1986) lists 31 projects for development after December 1987 and 14 for development and completion before that date. This plan itself identifies 69 potential systems, including those in the policy statement. Whilst some of these projects have a low priority this is still a considerable programme of work. The existing resources will be quite ineffective in dealing with this backlog of systems.

As a result of limited resources it would appear that the Computing Services Branch has not achieved its proper status within the Department as the controlling/ coordinating group for computing. This is evidenced by:

- A significant amount of computing is undertaken outside the Branch. This decentralisation of the computing effort while based on good justification has done little to forward the development of strategic CALM systems.

- The use of contractors and software consulting groups outside the Branch and without adequate input and coordination by Branch staff has seen the development of many systems limited in use to individual operational groups and in which the potential for a wider corporate view has been missed.
  (e.g. Engineering Systems, Stores)

- The Computing Services Branch has become very much burdened with administrative tasks such as the processing of orders for minor hardware and software acquisitions.

- The lack of resources has led to what appears to be a breakdown in communication with users. The Computing Services Branch is seen by potential users to be a barrier to getting on and doing things. The dilemma for the Branch is that many of these 'things' are questionable in terms of CALM priorities and yet inevitably require support and assistance from the central group.

- The major systems in use with CALM (appendix B Policy Statement 16) are basically operational in nature. Many have been developed outside the Computing Services Branch by officers working directly for other branches within the organisation.

2.4 STRUCTURE OF COMPUTING

Curently the computing effort within CALM is very much decentralized and somewhat autonomous within sections of the Department. Staff and funding for computer equipment and systems development are provided from user budgets to the extent that the computing resources from this source rivals the resources available to the Computing Services Branch. This policy appears to be deliberate on the basis of accountability and devolved management responsibility although there is evidence to suggest the policy may have evolved by default and then confirmed by practice. The policy has worked well because of the lack of central resources available to support a more centralised approach.

Consequences of this policy have been:

- Control over computing is rather loose and determined by who has funds rather than by departmental priorities. This is particularly true for approval for new systems and staffing resources.

- No one person has the overall authority for control over, or knowledge of, the direction of computing within the Department.

- There is little coordinated strategic or corporate view for systems development. For example the redevelopment of FMIS has been criticised for its narrow focus when being reworked as CALMIS, through its concentration on existing users and not effectively involving the wider CALM community.

- The level of expertise in many areas, in a computing sense, is questionable, particularly in the areas of systems design, project management and technical proficiency. A parallel issue is the computing professionalism of much of the work undertaken outside the Computing Services Branch. This is not to say that the systems do not work, are not operationally effective or do not meet user needs. Rather, systems tend to be narrowly focussed and operations based. There is no apparent mechanism for strategic input to systems design for systems which should be wider focussed. (e.g. FMIS/CALMIS)

- Systems development work has been disguised under pseudo project work. The reality is that many officers titled project officers, scientific officers or technical assistants are clearly employed to do systems design and development work or provide computing support to other users where the Computing Services Branch resources are either unavailable or not readily accessible. (e.g. MANJIMUP)

2.4 COMPUTER POLICY COMMITTEE

The CPC does not have a high profile with users and senior management. It is seen to be more a bureaucratic impediment than a policy group. It has however provided the one controlling and coordinating force within CALM for computing.

2.5 HARDWARE

The existing mainframe hardware is having trouble coping with the processing load. Priority systems interfere with other production work and some systems such as SPSS can only be run outside normal office hours. Despite CALM having had its own hardware for some time, many systems are still running on external mainframes although the current policy to purchase an inhouse DEC machine will address this issue. With the Concurrent systems, the major tools are basically 3rd generation COBOL and FORTRAN.

The use of Concurrent Computers as the encumbent supplier of hardware is one question which needs to be addressed. Concurrent systems are not in the computing mainstream as far as suppliers of systems go. Also the Department is moving rapidly towards a DEC Intergraph environment to support its GIS/Graphic acivities.

The main deficiencies in the existing environment are seen to be in the areas of:-

- 4GL tools for systems development.
- Non-standard terminal protocols.
- Lack of 3rd party packages (productivity tools and application packages).

The major pluses of Concurrent are:-

- its transaction processing software, particularly in areas of backup and recovery;

- its uncomplicated data base software. This could also be seen as a disadvantage by some as it limits more advanced systems design.

CALM has a significant communications network which to its credit provides a good capability to handle the various systems available to the users which are external to CALM (DEC, CYBER, IBM). The policy of using micros as terminals has to a large extent sheltered users from potential networking problems.

2.7 EXISTING SYSTEMS

A full analysis of the profile of the existing systems is at Appendix 3. This analysis covers the age of systems, user satisfaction levels, the investment in systems, major enhancement cost estimates and estimated redevelopment costs.

The information used to develop these profiles was gathered from surveys of users and computing support staff. To this extent the information presented represents trends and estimates rather than exact details.

In summary the major points arising from this analysis are:

- The total applications investment of CALM is in the order of $1,500,000

- In the order of 70% of this investment is in systems aged 6 years or more ($1,000,000)

- 25% of the investment was identified as being in systems which users want redeveloped ($400,000)

- 13% of the investment is in systems for which major enhancements have been requested by users ($200,000)

- There is approximately 20 man years of work involved in the identified redevelopment and major enhancement requirements of users. These estimates are based on using current tools and systems available to the Department. The use of 4GL and other productivity tools could reduce these estimates by a significant factor.

2.8 GEOGRAPHIC INFORMATION SYSTEM (GIS)

CALM has begun development of a GIS. This has been progressed by the purchase of an INTERGRAPH workstation connected to the Department of Land Administration DEC system. In addition the FMIS system is being converted to run on a DEC system supported by INTERGRAPH systems.

The project team's view of this project is that, whilst appropriate in concept, it has not been pursued as a Corporate exercise.

The GIS project team has been separated both physically and structurally from the Mapping Branch, creating a management rift in the process. Criticism has been levelled at the CALMIS redevelopment project over the lack of consultation outside the narrow focus of FMIS users.

In addition the INTERGRAPH workstation, originally purchased to support training and development in the mapping area has to a large extent been denied to this group due to special project work being undertaken on it.

2.9 CONCLUSIONS DRAWN FROM THE CURRENT ENVIRONMENT

The following issues were drawn from the analysis of the current environment. These were identified as problems to be resolved during the planning process.

- The profile of the Computer Policy Committee needs to be raised.

- The role of the Computing Services Branch needs to be clearly defined.

- The structure of the Computing Services Branch needs to be redefined to provide the right quantity and quality of computing support for users.

- The interaction of the Computing Services Branch with users needs to be more clearly resolved in terms of responsibilities, standards, technical appraisal, project management and funding.

- The development of CALM's GIS needs to be placed on a more formal, structured project basis.

3. FUTURE DIRECTIONS

3.1 INTRODUCTION

In our opinion CALM has little alternative to adopting a higher profile with the use of information technology. The reasons for this are based on:

- The regionalised nature of CALM will necessitate the use of advanced computer access to corporate information to ensure decentralised management can meets its stated corporate obligations in terms of accountability and responsibility.

- Much of the key data held by CALM is used in graphics form at Head Office and Regional centres.

- The need for end users to have access to cheap computing resources to assist in operational activities will ensure the use of PCs increases. This will have a snow balling effect, in the need for central computing resources.

- Future benefits will accrue from greater use of corporate information in the decision making process.

- The complexity of some activities such as those within the Fire subject area can, in reality, only be solved through the use of computer based systems.

3.2 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

The concept of an integrated GIS is the major requirement of most managers within CALM. The need to have access to information from all areas of CALM's activities in both graphical and textual form was the major information requirement identified in the study. This can only be achieved effectively through the use of computer aided mapping and GIS systems.

There is little doubt that the cost of graphics workstations is dropping dramatically. What was prohibitively expensive just 12 months ago now can be provided on $15-20,000 PC based graphics work stations. It is entirely probable that this price could drop further making the GIS available to users right across the CALM network at very little additional cost to the basic PC.

The need for this information to be available at regional and district offices is a major requirement which impacts questions of staffing, networks and computer access.

3.3 EXPERT SYSTEMS

Although this is a new area of computing systems development the project team was made aware of several areas within CALM that would ideally lend themselves to development through the use of expert systems or artificial intelligence approaches. For example the interface to FMIS/CALMIS and logging plans are two such potential applications.

3.4 PRODUCTIVITY TOOLS

Much has been made of 4GL productivity tools. There is sufficient evidence to suggest that if used appropriately significant productivity gains can be made through the use of advanced software development tools. With limited staff resources CALM must closely evaluate the applicability and potential benefits such tools will provide.

3.5 OFFICE AUTOMATION

CALM is very much a regionalised operation. The scope for office automation in the areas of document transfer, electronic mail, diary maintenance etc. is considered extensive. Current attempts in this area are hampered by incompatible word processing systems, a lack of terminals accessible to managers and bad experiences with the NEM software (electronic mail). Against this background there are many examples of successful installations of Office Automation systems in organisations similar to CALM.

3.6 INFORMATION

The need for a Corporate Data view of CALM's information is critical for the future of CALM. The interconnectivity of activities and the regionalised nature of CALM both contribute to this requirement. No longer can CALM operate with stand alone data bases that in reality have department wide application.

3.7 RESOURCES

To meet these future developments the professional computing support within CALM must match the growth. In particular greater control needs to be gained over the dispersed resources. This implies greater co-ordination of resources in terms of ensuring resources are expended according to the overall objectives and priorities and that the resources are managed efficiently and in a professional manner.

4. GOALS, OBJECTIVES AND CRITICAL SUCCESS FACTORS

4.1 CORPORATE PLAN

The Corporate Plan has identified Objectives, Broad Strategies and Major Outcomes (for the period 1987-91)

This provided the project team with a good base on which to develop the Information Planning process. However the plan does not adequately address the area of Critical Success Factors (CSFs). The interview process identified CSFs in terms of:

- lack of public criticism
- accuracy of information available with CALM
- accuracy and effectiveness of CALM management plans
- meeting budget
- adherence to policy
- not making mistakes

In general terms few of these are useful. Most are subjective and unmeasurable.

With this background the project team turned to the 16 major outcomes identified in the plan to provide the CSFs for prioritization of information systems.

4.2 ANALYSIS

The CALM Corporate Plan establishes clear objectives. In summary these are

- Management of Resources entrusted to the department.

- Conservation of the indigenous plant and animal species and environmental processes in natural habitats.

- Facilitate the Public enjoyment of the natural attributes of public lands.

- Seek a better understanding of the natural environment.

The project team circulated senior executives within CALM asking them to link these objectives to the 10 broad strategies identified in the plan. These strategies were then linked to the 16 major outcomes. From this analysis the following Critical Success Factors were identified.

(i) Administration

CALM must be a properly structured and well managed organisation

(ii) Human Resource Management

CALM must maintain an effective, well motivated and professional staff in a safe working environment.

(iii) Financial Management

CALM must have an integrated Financial Management and Reporting system which satisfies both Government needs and the levels of accountability and responsibility of the CALM management structure.

(iv) CALM Estate Management

CALM must have structured information on the CALM estate under its responsibility, to support its management role in conservation, recreation and production.

(v) Public Trust & Participation

The Government, the Public and Industry must understand CALM's activities and be able to participate in its planning processes.

(vi) Timber Management & Production

The timber resources under management by CALM must be managed to ensure long term availability.

(vii) Recreation

CALM must develop a system of functional recreation facilities compatible with the purpose of the areas and in a way which enhances the CALM estate and the return to the State.

(viii) Information

CALM must have access to information about its activities in a way which supports management in the achievement of Corporate Goals and Objectives.

The project team realises that this set of CSF's could be improved on in the sense of fitting more tightly to objectives and strategies. This should be undertaken through the Corporate Planning process. For the Information Planning process, the above CSF's provide an adequate and understandable set to form the basis of the prioritisation process for future Information Systems development.

PART B. ANALYSIS

5. MANAGEMENT INFORMATION NEEDS

5.1 The overall CALM information needs are documented in sections 6, 11 and Appendix 4 of this plan. The interview process identified some key areas which were of concern to senior officers and these have been identified separately in this section

5.2 Geographic Information System (GIS)

The concept of an integrated GIS is the major requirement of almost all managers. The need to have access to information from all parts of CALM readily available, in map and textual form was the major requirement in this area. The development of an integrated GIS is probably the most important project that CALM will undertake in the next few years. To get it right must be a prime objective of the Department's management.

The major areas of interest for a GIS are seen to be:

* Precedents and history
* Theme maps concerning all areas of activity within CALM
* Land status
* FMIS type data
* Integration with the Department's records and other management information systems

5.3 Records

The records system and access to information held on files was the key information issue raised. The current RMS system does not provide the level of service needed by management. Key word searching on both file titles and folio abstracts were requirements most often expressed. This applies to head office, regional and district files.

5.4 Parliamentary Questions and Ministerial

Up to date access to these papers are an important need for most managers, particularly in regional and district offices. Once again the key issue is accessibility and facility for interrogation.

5.5 Financial

The existing systems appear to assist the lower level operational requirements but not management needs. The need for all financial information, including plant, stores, salaries, wages and other expenditure, to be integrated is essential. Curently these are disparate and manually linked systems.

5.6 Research

Research working plans, publications and research data were cited as being of importance as an information source by regional and district officers.

5.7 Mapping

The ability to have access to specific and specialized maps is an important issue. This need is limited to a GIS requirement and is common right across CALM. The fact that computer based mapping resources and facilities are outside the mapping branch (and computing mainstream) is a major issue.

5.8 Library

Access to library information and systems was a major requirement at regional and district level (including Como).

6. INFORMATION ANALYSIS

Information analysis consists of a set of techniques used to develop a comprehensive information base about an organisation. This information base consists of an enterprise model which is a high level view of the structure of the organisation, its functions and its data. The information base is developed and maintained using automated tools. Once the Information Systems Plan is in place, Business Area Analysis studies are carried out on the priority development Business Areas identified in the planning stage. Business area analysis takes a portion of the enterprise model and develops a detailed view of the processes and data needed or used in those processes. Computer application systems can then be identified and constructed from the detailed requirements.

This section of the report describes what has been modelled and the results of the modelling activities. The diagrams and definitions may be found in a separate volume, "Enterprise Model Report".

6.1 ENTERPRISE MODEL

Enterprise modelling creates a high-level view of an organisation. This view is documented through diagrams of the organisational structure, the functions or activities of the organisation, and the data used in those functions.

The structure of the organisation is represented by a decomposition diagram which shows each organisational unit's management or reporting relationship with other units.

The functions of the organisation are represented by a decomposition diagram which shows the component activities of higher level activities. The decomposition process can be continued until the simplest unit of work is identified. All levels of the diagram are classified as activities; there is no hierarchy of functions, processes, activities, or the like.

The information the organisation uses is represented by an entity-relationship model, commonly referred to as a data model. An entity is a thing or concept in which the organisation is interested and which can be described by its attributes. Relationships represent the rules by which the organisation conducts its affairs, describing the relationships between the entities.

Entity-relationship models are drawn for each activity, and these activity views are aggregated into the data model for the whole organisation.

The definition of each object, be it an organisational unit, an activity or an entity, is included in the enterprise model.

The information to develop the enterprise model is drawn from interviewee's descriptions of their functions and the information required to carry out those functions.

6.2 SUBJECT AREAS

The corporate data model was analysed to identify groupings of entities which display a common theme or area of interest. These subject areas were then prioritised according to the Departmental needs based on an understanding of the Corporate Plan.

Fifteen subject areas were identified. The Project Steering Committee members and Divisional Managers were asked to assign priorities to the subject areas according to their perception of CALM's needs as embodied in the Corporate Plan. The results are shown on diagram 6.1, Subject Area Priorities. The column 'Priority Assigned' shows the priority assigned to each subject area resulting from an analysis of the responses. The priority levels are:

1. Immediate analysis required
2. Important area but not immediate
3. To be done when posssible
4. Not important at this time

The scope of each area is set out below, together with a list of existing systems associated with the subject area. The priority for further analysis is also shown.

SUBJECT AREA PRIORITIES

SUBJECT AREAS	Priority Assigned	Number of Responses by Priority			
		1	2	3	4
ACCOUNTING	1	12	1	0	0
CALM ESTATE	1	7	5	1	0
ENVIRONMENT PROTECTION	3				
FIRE	2	6	6	1	1
FOREST PRODUCE	1	7	4	1	1
GIS	1	10	2	0	1
LIBRARY	3	0	2	10	1
LICENCES	2	4	8	1	0
PERSONNEL	2	4	5	4	0
PLANT & EQUIPMENT	2	1	5	6	1
PUBLICATIONS	3	1	3	5	4
RECORDS	1	10	3	0	0
RECREATION OPERATIONS	3	1	2	8	2
RESEARCH	2	1	7	4	1
STORES	3	0	2	9	2

DIAGRAM 6.1

Priority Level 1

1. Accounting

This covers the normal financial systems of general ledger, budgeting, debtors, creditors, cost allocation and financial reporting. Defining interfaces with other systems is of particular importance in identifying source data and the means of capturing that data. Important interfaces include salary and wages allocations from the salary and wages payrolls, credit and cash sales from stores such as nursery and seed stores, commitment accounts from placing LPO's and Government Stores requisitions, material costs from stores issues, etc. Financial reporting requires thorough analysis of reporting requirements at all levels to determine the appropriate departmental and treasury chart of account structures. Treasury updates should be achieved through direct transfer to the Government Accounting System at Centre 4.

Existing Systems: General Ledger
Budgeting
Debtors

Priority Level 1

2. CALM Estate

This area would cover the land information requirements of the department with respect to land in which the Department has an interest through vesting or ownership, agreements with private or other government bodies, proposals to vest or purchase, the need to maintain contact with neighbours, etc. As a corporate data source the needs of regional and district officers must be evaluated. A tracking system for purchase and vesting proposals may be achieved using Records Management System features, while the Office of Titles' data base may provide ready access to owner details.

There is a need to be able to access any precedents relating to specified CALM or other land, which exist in the Department's files system.

Existing Systems: Crown Reserve Register
Pine Plantation Areas

Priority Level 4

3. Environment Protection

The scope of this area covers the identification of degraded sites, a register of sites requiring rehabilitation by the leaseholder, especially mining tenement holders, and the planning and management of rehabilitation activities.

Existing Systems: None

Priority Level 2

4. Fire

Fire can be considered as having three components. Resources would cover the various inventories required such as fuel levels, previous fire records, fire towers, water points and equipment such as aircraft and their maintenance. Planning would cover items such as planning prescribed burns and aircraft surveillance, while operations would deal with weather forecasts, modelling the effect of fire on ecosystems and the progress of prescribed burning programs. The fire suppression model would need to be evaluated to determine its future, establishing its functions, uses and priority as a development area.

Existing Systems: Fire Behaviour (Weather Forecasts)
Plant Management
Fire Simulation
Smoke Predictions

Priority Level 1

5. Forest Produce

The scope of this area is the development of strategies, preparation of inventories, preparation of logging and other resource extraction plans, and production. Production covers recording basic parameters such as customers, contractors and contracts, as well as deliveries, inspections and the calculation of charges, royalties and payments to contractors. Logging plans in particular require an optimisation component to enable the Department to look ahead at the effects of current and past logging operations.

Administrative support in the area of contract and tender processing, and share farming proposals is to be evaluated.

Modelling in areas such as the timber industry may also be supported.

Existing Systems:
- Pine Logging
- Hardwood Logging
- Management Level Inventory
- Pine operation Thinning Schedule
- Hardwood & Pine Permanent Inventory Plots
- Log Volume Calculations
- Piles, Poles & Sleepers

Priority Level 1

6. GIS - Geographic Information Systems

The approach taken here is to define a GIS in terms of the information needs that have been expressed by Departmental officers at various levels. The potential for the use of computer facilities for the more traditional map production process has not been fully evaluated. The essential features of a CALM GIS are to maintain base maps of ownership and topography of the land, to maintain theme maps which are more volatile in nature, to associate these with relevant textual data, provide textual reports where required, and to maintain inventories of selected themes. The information needs are:

- Maintain base cadastral and topographic maps with varying level of detail needed for activities as diverse as aerial surveillance and recreation site planning.

- Maintain theme maps which depict occurrences and quality of natural features and species such as soil types, vegetation types, flora and fauna species, fires, water resources, etc.

- Maintain quantitative inventories of selected themes for planning and analysis.

- Relate maps to textual and associated data and provide textual reports.

- Provide other graphical facilities such as terrain modelling and view modelling.

- Provide for the delivery of mapping services identified above to regional offices.

- Provide overlay facilities for the preparation of composite maps.

- Maintain an inventory of available maps.

Existing Systems: FMIS/CALMIS
Flora Atlas
Integraph Maps
Pine Mapping
Dieback Mapping
Banksia Atlas

Priority Level 2

7. Licences

The scope of this area covers the issue and monitoring of licences which are the responsibility of CALM. The information needs are to determine to whom licences are issued, the purpose of the licences, the CALM land location relevant to the licence and any performance data gathered to monitor the licence conditions. Associated with licences is the area of offences, searches, prosecutions and convictions and other intelligent data needed to assist the protection aspects of managing the CALM estate and the State's wildlife resources.

Issuing of licences needs to be based on commonly accessible information as to terms and conditions, prices, etc, for any resource, and provision of an interface to the accounts systems.

Existing Systems: Kangaroo Management System
Wildlife and Land Licences

Priority Level 3

8. Library

The scope of the library area covers the standard library functions which would be made available at any location maintaining a library, for general access by Departmental officers to determine what books and references are available.

Of similar nature are the various photographic 'libraries' held at various locations, which need to be catalogued and classified by subject area for general access.

Existing Systems: 'INMAGIC', running on a PC at Woodvale

Priority Level 2

9. Personnel

The scope of this area covers the staffing establishment, payroll and cost allocation, training courses and safety procedures. In particular the following information needs have been identified:

- Staff establishment, recruiting, skills, qualifications, location, and mailing lists.
- Staff training needs, training courses, attendees and assessments.
- Safety statistics, incidents and accidents, workers compensation.
- Payroll, implementation of single source data entry for wages pays and job costing, and allocation of salaried staff time to job costs.
- Access to Acts and Awards relating to staff matters.

Existing Systems:	Salary Payroll (Computa-Pay)
	Wages Payroll (Computa-Pay/New System)
	Safety Accidents
	Staff Mailing Lists
	Training Courses
	Telephone Directory
	Noise Level Calculatons
Proposed Systems:	PIMS - Personnel Information Management System, Running at Centre 4

Priority Level 2

10. Plant & Equipment

The scope of this system covers the Department's buildings, equipment and other (minor) assets and their maintenance, scheduling of workshop activities, and management of rentals and sales. The interface to the accounting area for the allocation of equipment costs would be defined.

Existing Systems: Vehicle & Plant Management
Assets Register

Priority Level 3

11. Publications

The scope of this area covers an inventory of publications in various locations for sale or distribution to the public, identifying publications by subject matter, and the management of the public participation program. Sales data through subscriptions or public purchases would also be passed to the debtors system as a credit or a cash sale for accounting purposes. Public participation would cover the maintenance of mailing lists, records of "Friends Of ..." committees and advisory bodies and the administration of public submissions to Management Plans.

The effect of the desktop publishing tools on the information needs of the Information Branch would be evaluated.

Existing Systems: Publications Register
External Mailing Lists
Publications Subscriptions

Priority Level 1

12. Records

The scope of this area covers file location, indexing by keyword of files and folios, tracking of file issues, bring-ups, etc, as the standard registry functions. There is also the need to provide for the efficient processing of ministerials, parliamentary questions and other general correspondence. There is a large body of relevant information contained in the Acts, awards, Crown Law rulings, press releases, etc, which should be assessible by keyword searches.

Existing Systems: RMS - Records Management System
Parliamentary Questions Register
Correspondence Register

Priority Level 3

13. Recreation Operations

The scope of this area covers an inventory of all recreation sites and the recreation facilities located there, the collection and analysis of user survey data, GIS facilities for site planning and landscape evaluation, an inventory of signs to allow their maintenance and replacement to be planned, and the management of leases granted over facilities on the estate. Recreational sites includes cultural and historic sites as well as picnic spots, camping and bushwalking areas, etc.

There would be a high GIS component in terms of planning the development of recreation sites, identifying and enhancing landscapes and providing the public with maps and diagrams.

Existing Systems: None

Priority Level 2

14. Research

The scope of this subject area is related to the administrative aspects of research rather than the subject of a research project. The primary information need expressed, with acknowledgement of the many research publications available, was for knowledge of and access to basic research data. Other needs were for inventories of surveys and research plots.

The research data base aspect of research projects has been addressed through the entity FIELD RECORD in the corporate data model. Related to this entity are entities such as FLORA SPECIES, FAUNA SPECIES, RARE AND ENDANGERED SPECIES (as a subset of the preceeding two), DISEASE, PEST, VEGETATION TYPE, CLIMATIC RECORD, etc. These are physically located through GEOCODE which is related to the entity MAP. The expectation is that where Research data bases are of corporate interest, the detailed information needs will be identified through business area analysis studies in subject areas such as GIS and CALM Estate, and these data bases will form part of the corporate textual/mapping systems.

In any event, the computer is an indispensable tool for performing basic research functions. As such the Research subject area covers an enormously diverse range of projects and research studies which emphasises the role of computing within the Research subject area.

The use of tools such as SPSS, SAS, NTP, Pattern and PC data base management systems such as d BaseIII should continue to be a decision made by researchers and the computing support staff. However, it would be preferable if a common data base management system were used where these particular tools are relevant.

Existing Systems: Research Project Register
Husky portable data capture
+ numerous studies and ongoing research projects

Priority Level 3

15. Stores

The scope of this area would cover stores of various types maintained by the Department. These include the general or main store, the seed store, the nurseries, publications and maps. The purchasing, inventory and issuing functions would be covered, as well as an interface to the accounting system for credit and cash sales processing and cost allocation.

Existing Systems: Seed Store Stocks
Main Store System

6.3 APPLICATION AREAS

Each subject area was analysed to partition it into application areas, which are logical groupings of processes and entities and can be investigated in separate projects with a Business Area Analysis study. This is a preliminary partitioning, which would be confirmed or modified during the Business Area Analysis study, to identify likely resource requirements and scope of the study.

Existing systems, systems proposed by users, and others identified in the Plan have been documented as "possible systems", and mapped against the application and subject areas. All computer systems will be formally identified in the analysis studies, where recommendations for retention, redevelopment, enhancement, development, etc, would be made.

Details of application areas and possible systems may be found in Appendix 4.

The following tables show the mappings of subject areas, application areas and possible systems.

SUBJECT AREA	APPLICATION AREA	POSSIBLE SYSTEMS
ACCOUNTING	CREDITORS	Creditors System
		Commitments
	DEBTORS	Debtors System
		Public Sales (ex Stores)
	GENERAL LEDGER	General Ledger System
		Budgeting System
	JOB COSTING	Expenditure Reporting
CALM ESTATE	CALM ESTATE	Crown Land Register
		CALM Land Register
		Plantation Data Base
		Proposals Register
		Private Property (of interest to CALM)
ENVIRONMENT PROTECTION	ENVIRONMENT PROTECTION	Degraded Sites Register
		Rehabilitation Planning
		Tenements Register
FIRE	RESOURCES	Fire Behaviour (Weather Forecasts)
	PLANNING	Fire Planning
		(Prescribed Burns)
	OPERATIONS	Fire History Data Base
		Fire Suppression
		Fire Effects
		Fire Hazard
		Fire Tower Inventory
		Aircraft Maintenance

SUBJECT AREA	APPLICATION AREA	POSSIBLE SYSTEMS
FOREST PRODUCE	STRATEGY	Inventories, incl Land Use
	INVENTORY	Logging Plans (Product Planning)
	PLANNING	Customers' Data Base
	PRODUCTION	Product Price Data Base
		D Notes/Inspections
		Contractors
		Contracts/Tenders
		Processing
		Share Farming Proposals
		Timber Industry Model
GIS	MAPS	Map Inventory
		Base Maps
	THEMES	Inventories
		File Precedents
		Specific Themes -
		•Fauna & Flora
		• Tenure
		• Administrative Areas
		• Utilities
		• Diseases
		• Pests
		• Water Resources
		• Fire History
		• Rare & Endangered Species
		• Cultural, Historical &
		. Recreational Sites
		• Forestry
		• Soil Types
		• Vegetation Types
		• Climatic Types
		• Geological Types

SUBJECT AREA	APPLICATION AREA	POSSIBLE SYSTEMS
LICENCES	LICENCES	Fauna Management & Kangaroo System Public Licences Collectors Licences Raw Materials/ Concessionaires/Land Leasing
LIBRARY	LIBRARY	Book Lists Photographic Index
PERSONNEL	ESTABLISHMENT	Establishment/Deployment
	PAYROLL	Mailing List/Phone
	TRAINING	Book/Radio Call
	SAFETY	Safety Systems Training Needs Entitlements Payroll - Wages - Salaries - Inc Salaries Allocation
PLANT & EQUIPMENT	PLANT	Equipment Register Building Register Workshop Schedule Maintenance Schedule Minor Assets
	RENTALS	Rental System

SUBJECT AREA	APPLICATION AREA	POSSIBLE SYSTEMS
PUBLICATIONS	PUBLICATIONS	Publication Inventory (STORES) Publication Index (RECORDS) Publications Mailing List/Sales Public Participation System
RECORDS	RECORDS	File/Folio Indexing & Location Ministerials System Parliamentary Questions System Correspondence Register Information Retrieval System • Above elements • Press releases • Awards, Acts • etc
RECREATION OPERATIONS	RECREATION OPERATIONS	Site & Facility Register Visitor Surveys Data Base Site Planning Signs Inventory Concessionaire Leasing Landscape Inventory

SUBJECT AREA	APPLICATION AREA	POSSIBLE SYSTEMS
RESEARCH	RESEARCH	Research Project Register Permanent Plots Type Specimen Register
STORES	STORES	Stores Inventory • Seeds • Aircraft Parts • Nursery • Main Store • etc

*In addition to these there are numerous research projects and studies which require the support of computing and information systems.

7. ISSUES

7.1 The planning process uncovered several key issues effecting the performance of computing within CALM. These are discussed below.

7.2 TECHNICAL AND END USER COMPUTING

In addition to the systems developed within the formal computing framework there is a significant amount of systems development undertaken on micro computers by other professional staff. Much of this ventures into the area of Corporate data systems.

This activity occurs through a range of activities and reasons including:

- the inability of the formal structure to provide the resources.
- the readily available micros
- the availability of PC based packages and facilities.
- the increasing computer literacy of many professional staff.

The overall corporate benefits of this activity are potentially very large; however the growth of this development activity is very difficult to support, coordinate and monitor. In addition the lack of computing professionalism often means that the use of resources is inefficient within the overall context of CALM's priorities. For these reasons it is important to provide the professional/technical users with adequate professional computing support in the following areas:-

- expertise and experience in using micro computers.
- standards and guidelines.
- problem solving solutions
- linkages to and from corporate systems

Given the structure of CALM, this support needs to be regionalised as well as available for Head Office users. The greatest immediate area of need in this respect is in the Forest regions research areas.

7.3 NETWORK

The CALM Corporate Plan has as a major outcome the implementation of a computer network to all region and district offices by 1991 (Corporate Plan section 8.4). The existing network meets a substantial part of this requirement. However future needs could well place pressure on this network particularly in the areas of

- support for graphics data exchange from the GIS to regional offices
- support for an integrated office automation capability
- the need for greater penetration into CALM with terminals

Further extension of the network is recommended to ensure all CALM business units have access to the department's systems.

7.4 MICRO COMPUTERS

The use of micro computers is widespread throughout CALM. The computing power available through this means is considered significant in several areas. Firstly it opens up alternatives for processing not previously available. The use of user friendly tools such as dBase III, Open Access and Word Processing packages has enabled many users to meet their individual needs in a timely and cost effective way. While the major use and justification appears to have been for word processing there is also a steady growth in the use of the computers for data processing activities and user applications.

With this policy has come some problems:

- The coordination of the systems being developed is almost non existent.
- Any coordination of software use is limited.
- The support of the micro systems is to a large extent done by user's peers.
- There is no identification and coordination over the concept of Corporate Data.

As a consequence the true resources used in computing is heavily disguised. One staff member hired basically as a statistician is working up to 60% on computer systems support.

7.5 WORD PROCESSING

There are currently several non compatible systems in use with CALM. Whilst Multimate on PC's is the most common, Display Write is in fact installed in several critical areas. This lack of compatibility has impeded the use of the network for document transfer and exchange of diskettes. As report writing, management documents and research papers contribute to much of the word processing workload, this is a serious deficiency in the hardware/software architecture of CALM.

In addition the PC approach with 3rd party software has meant that many features of office automation have to be developed inhouse with specialist software.

PART C PLANNING

8. ORGANISATION

8.1 DISCUSSION

A major concern of this plan is to improve the effectiveness of the use of Information Technology resources. A prerequisite for this is for CALM to ensure it has control over the information technology activities. As can be seen from Diagram 8.1 information technology activities occur independently across three Divisions and only effectively come together at the Computer Policy Committee level.

In addition, two key activities, Mapping and the GIS project team, which should be closely managed, in fact report to different Divisional Managers. The Corporate Data Model clearly indicates the links between management and geographic information systems. To have these activities reporting through three management streams is not seen to be in the best interests of effective information technology management.

The same argument can be put forward with regard to the other major activities, technical and research computing. The term technical computing is perhaps a misnomer for CALM. In the view of the project team these systems are basically commercial systems dealing in a professional area of CALM's activities. The systems require the application of standard computing techniques and only in a few instances are pure technical solutions required (e.g. computer modelling, matrix manipulation, mathematical solutions, etc.). Thus the separation of this activity from the main computing expertise and resources is seen as more 'politically' motivated than organisationally determined and reflecting a basic problem with CALM where access to funds dictates resource allocations and priorities.

EXISTING CALM STRUCTURE

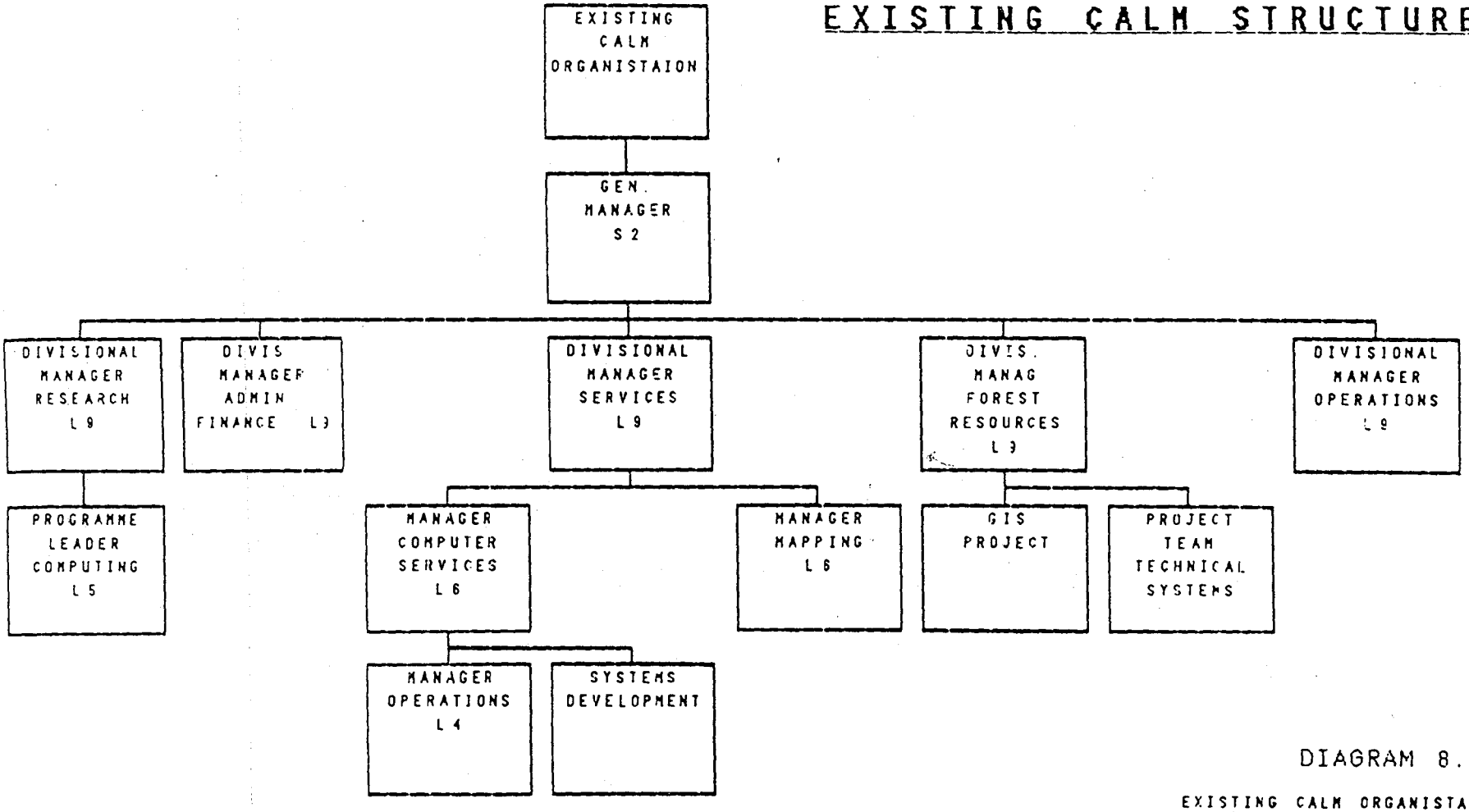


DIAGRAM 8.1

EXISTING CALM ORGANISTAION

8.2 STRATEGIC REQUIREMENTS

The following basic requirements have been identified as the basis for establishing an appropriate organisational structure to support information technology within CALM.

- The Computer Policy Committee needs to be seen to have a relevant role in computing in areas of policy and direction setting and prioritisation of resource allocation.

- The need for a corporate view of information systems needs to be established and maintained.

- One person needs to be responsible and accountable for all information technology activities within CALM including planning and coordination.

- This position needs the status to negotiate and coordinate information technology initiatives across the Department with the full support of the Computer Policy Committee and senior management.

- The decentralised nature of computing needs to be preserved, supported and encouraged as a valuable resource.

- Professional computing standards need to be established and maintained across all information activities.

- The user involvement in, and sponsorship of, systems development needs to be established under the auspices of the Computer Policy Committee,

8.3 PROPOSED STRUCTURE

It is proposed that the following structure be established (See Diagram 8.2).

8.3.1 Computer Policy Committee

The Computer Policy Committee be reconstituted as a sub-committee of the Corporate Executive and chaired by the General Manager. Members should be drawn from the following areas:

- Finance
- Forest Resources
- Operations
- Research
- Services
- Directorate
- DOCIT

Selection should be on the basis of ability and desire to contribute to the advancement of information technology rather than position.

The Committee should accept responsibility for establishing information technology policy and providing direction for the Corporate Executive. Day to day operational decisions should be delegated to the head of information technology. (See 8.3.2)

The impact of this will be to give it a higher profile in the organisation, reduce one level of reporting of the Committee within CALM and free it up for policy formulation and direction setting.

The responsibilities of the Policy Committee are:

- Use the members knowledge of CALM to direct the use of information technology.

- Approve specific major proposals for resource acquisitions.

- Approve information technology plans.

- Determine which projects are to be undertaken, based on established criteria (return on investment, priority, corporate goals, etc.).

- Review project status reports from Project Steering Committee.

- At specific checkpoints in the system's life cycle determine whether projects should continue or be abandoned.

Where necessary, specific sub committees of the CPC may need to be established. In particular a Research Computing Coordinating Committee should be established to coordinate research computing activities.

Similarly each project undertaken should have a Steering Committee established, chaired by a user sponsor. These Committees should report to the Computer Policy Committee on regular and formal basis as agreed (see Section 10.6).

PROPOSED CALM STRUCTURE

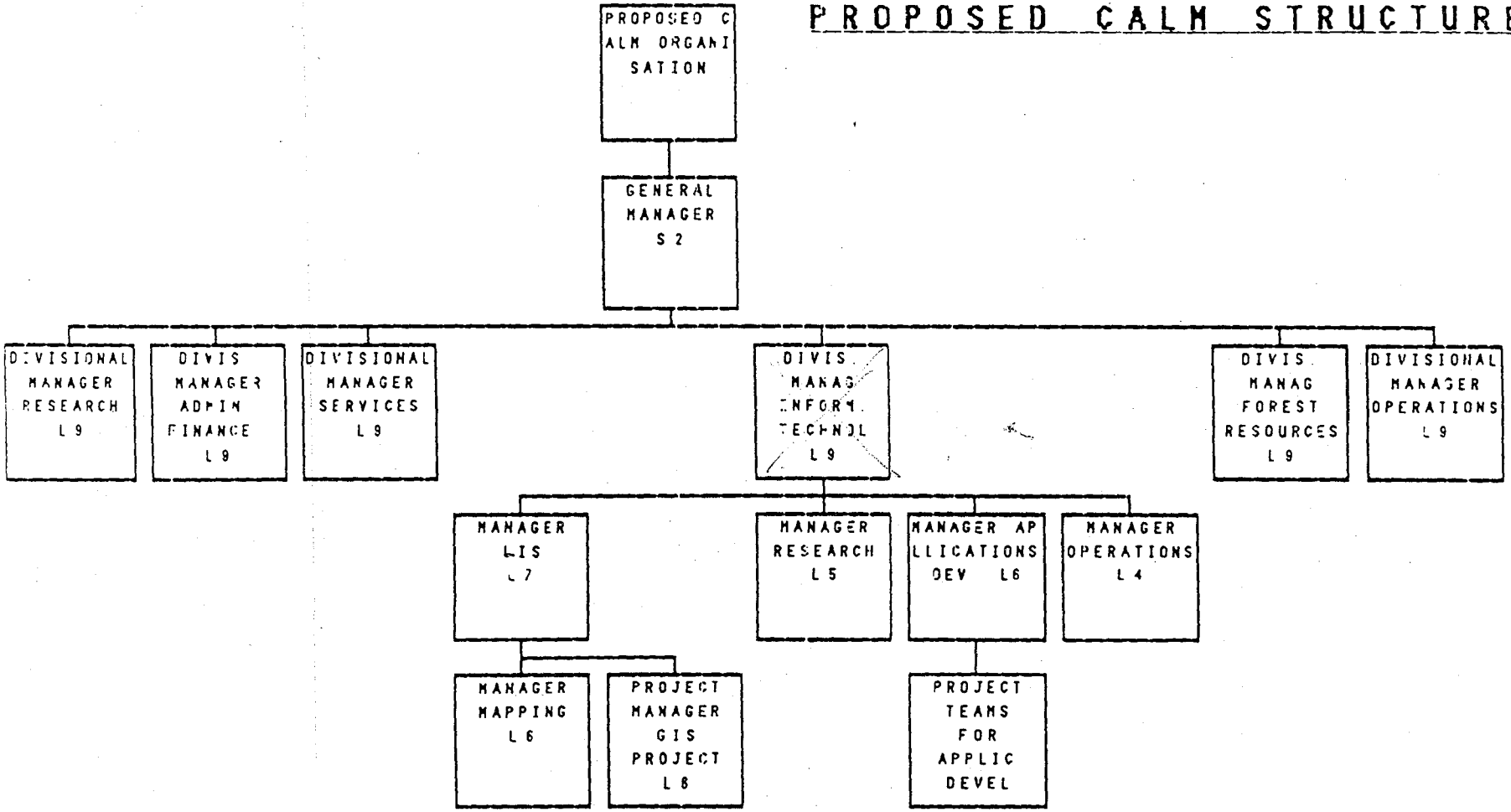


DIAGRAM 8.2

PROPOSED CALM ORGANISATION

8.3.2 Divisional Manager - Information Technology

A new position of Divisional Manager, Information Technology should be created, reporting to the General Manager.

This position should be responsible for all information technology activities. In effect the person would become the executive officer of the Computer Policy Committee.

It needs to be clearly understood that this position is being created not as a highly paid Computer Manager but as an Information Technology Manager.

It is the responsibility of the Divisional Manager, Information Technology to bring information systems and resources out of the computer room and into the business arena of CALM's activities. To be truly effective this function must be part of the senior executive team able to match ever changing technologies with organisational needs.

As mapping is a key method of information storage and dissemination within CALM it is recommended that Mapping Branch be brought under the control of this position. Mapping's future is very much linked to the development of the GIS. As such it should be more closely coordinated under the one directorate.

The level of this position should be Level 9. The future of CALM's ability to harness its information needs, to develop the GIS and to play its part in the overall government rural GIS environment is very much dependent on the level of this position. Anything less than this level will have the effect of either lowering the status of the position and hence of computing relevant to the other Divisional managers, or of attracting only less

qualified and less competent applicants. This position should be advertised outside the service as it is unlikely that anybody inside the service has the wide computing and GIS experience necessary for this position, at this level.

8.3.3 Manager - Land Information Systems (LIS)

A new position of Manager, LIS should be created. The function of this position is to coordinate the integration of the mapping function with the GIS to form a Land Information System section within the Division.

GIS is the major priority area of CALM's information systems. Its success will very much determine the success of CALM in terms of its information availability and decision making capability. In addition, the existing Mapping Branch offers one of the largest potential areas of staff savings from the application of information technology.

This position should be at Level 7 and should be advertised outside the Public Service.

8.3.4 Changed Responsibilities

(i) Manager - Applications Development L6

As discussed earlier, the project team does not believe there needs to be a distinction between commercial and technical systems. It is therefore proposed that an application development management position be established to coordinate and manage all corporate systems development work.

The existing Manager, Computing Services Branch position should be retitled Manager, Applications Development and assume this responsibility.

(ii) Manager Research L5

The existing Research Computing Officer position should be reallocated within the Information Technology Division. Priorities for work should be determined by the Research Computing Committee.

This position should also assume responsibility for research computing within the regions, including the support of users in the use of both PCs and mainframe systems.

(iii) Regional Computing

Existing resources used for computing systems development in the regional technical sections should be identified and retitled to Computing Systems Officers and placed under the direction of the Research Computing Officer.

8.3.5 Other Additional Staff

(i) Project Teams

The potential information systems backlog of 68 systems indicate that any amount of resources could be applied to CALM and it will still be many years before this work is even partly done.

However, the magnitude of the task should not mean that resources are denied. It is proposed that at least 1 project team be established as a priority action to supplement the existing resources. This team should consist of 3 computing staff.

Full staff details are expanded on later.

(ii) Research/Regional Support

There is a huge demand for support in the regional offices for computing activity. In parallel with the successful appointment of regional cartographers, consideration needs to be given to formalising the computing support in these areas.

Initially the location of Computing Systems Officers at Manjimup and Bunbury would go a long way to improving the productivity of the professional staff in the field.

8.3.6 Systems Software Support

The Project Team is concerned that no systems programming support is currently available for the proposed purchase of the DEC/Intergraph hardware. Whilst it is recognised that in general terms mini computer systems do not require the level of support say IBM mainframes do, it is a little naive to expect that no support will be required for this second mini computer system. Experience at DOLA and other VAX sites indicate some resource should be identified, at least in the immediate installation and bedding down phases.

Given the hardware strategy identified in Section 9 of this report, CALM should expect to have at least 1 (Full Time Equivalent) FTE in support of systems software.

It is recommended that a DEC support officer position be established at L 5.

8.3.7 Summary

	New Staff	Level	Priority	Cost*
1.	Divisional Manager IT	L 9	1	$ 60,000 pa
2.	Manager LIS	L 7	1	$ 45,000
3.	Systems Support Officer	L 5	1	$ 35,000
4.	Research/Regional Support	L 2/L3	3	$ 50,000
5.	Project Team Leader	L 4	1	$ 30,000
	Programmer/Analyst	L 3	2	$ 26,000
	Programmer	L 3	2	$ 26,000
				$272,000

* Excluding Overheads

Priorities

1. Priority one has been assigned where, in the view of the Project Team, there is the likelihood of failure if the position is not followed through.

2. Priority two is seen as critical in as much that someone must do the job of this position.

3. Priority three is assigned where the positions should be further investigated. The positions could be mere formalisation of existing activity which needs to be brought under the control of the Information Technology Division.

8.4 PROPOSED STAFFING

8.4.1 Senior Positions

Position	Level	Existing/ Proposed
Divisional Manager	L 9	P
Manager LIS	L 7	P
Manager Applications Development	L 6	E
Manager Research Computing	L 5	E
Manager Operations	L 4	E
Project Manager GIS	L 6	P

8.4.2 Other

Systems Support Officer	L 5	P
Existing Computing Services Staff (unchanged)		E
Existing Inventory Computing Staff (relocated)		E
GIS Project Team (relocated)		E
Research Computing Officer (relocated)		E
Project Team Leader	L 4	P
Project Team Analyst	L 3	P
Project Team Programmer	L 3	P

8.5 ROLE OF DOCIT

The past relationship between CALM and DOCIT could best be described as tenuous. DOCIT is seen by CALM as obstructive and inefficient in its dealings with CALM's problems. In the view of the project team this has been caused by several factors:

- The role of DOCIT in relation to CALM is ill defined and unclear.
- DOCIT has not been involved in CALM and does not understand its needs.
- CALM has largely ignored DOCIT except to gain approval to requests for hardware and software.
- There has been little ongoing communication and contact to develop rapport between the Departments.

This situation needs to be corrected. It is recommended that:

- DOCIT be part of the CPC.
- DOCIT be invited to meet regularly with CALM management to discuss particular issues outside the formal SPC structure. This should include not only the DOCIT consultant assigned to CALM but also the head of the Consulting Branch, Mr R. Smith.
- DOCIT representatives be encouraged to sit on key Project Steering Committees, e.g. the GIS Project.

9. SYSTEM ARCHITECTURE

9.1 DISCUSSION

The existing Concurrent system is operating at full capacity. This in itself creates a problem for long term planning of a System Architecture. Short term tactical decisions concerning capacity required over the next 6-9 months place practical problems in the way of longer term strategic planning.

The information needs of CALM in the GIS area indicate that there is a requirement for a system to support the Intergraph/DEC environment. This is taken for granted and indeed strongly supported in the final architecture as the most effective way to meet the GIS requirements within the total Government GIS environment.

Thus, CALM is faced with the situation that it will be a two vendor installation for some time.

The basis for letting the existing tender for a GIS machine included some research computing.

It is the view of the project team that unless controlled, the non GIS computing workload on the GIS machine will grow steadily with the following consequences:

- the impact on the GIS application will be severe in terms of response times;

- the system will be quickly overloaded.

With the implementation of the proposed GIS management structure it is expected that the growth of GIS applications over the next 12 to 18 months will be significant. It is estimated the impact will be such that by 1989-90 CALM will require the equivalent of a 2nd mainframe (approximately 3-4 MIPS) to support GIS, Research and other computing on the DEC environment.

The ability of CALM with its existing level of resources to support a two mainframe environment must be dubious.

9.2 OPTIONS

The following options are available to CALM.

9.2.1 Upgrade the Concurrent system together with the purchase of the GIS system as currently proposed.

Advantages

- Would resolve the capacity problems immediately.
- Would allow for continued development without interruption.
- The existing skills and knowledge within CALM would be consolidated.
- No conversion of systems would be required.

Disadvantages

- A two mainframe environment would need to be supported.
- The existing Concurrent environment would continue with its known limitations.
- Connectivity of the Concurrent systems to the GIS would be complex and costly.

Comment

This option has the effect of consolidating the existing environment. It is a low risk option. However, there are several points which need to be made about the existing environment:

- Concurrent is not one of the mainstream computer vendors.
- The user base within WA is relatively small.
- Concurrent are deficient in some areas such as 4GL tools and availability of 3rd party system and application software.
- Concurrent run a non standard terminal protocol.
- The existing programing environment has some distinct advantages, including programming aids, an excellent transaction processing system and an efficient data base system.

9.2.2 Change to an all DEC Environment

This option reflects the situation that CALM will have at least one system based on DEC systems supporting the GIS. Thus the option to replace the Concurrent with a DEC machine is considered realistic.

Advantages

- CALM would have a single vendor environment.
- Connectivity between management and GIS application would be done within existing DEC system software.

- The DEC environment offers significant advantages in the use of 3rd Party software particularly in the area of 4GL productivity tools and database systems and other system tools and packages.

- A single DEC environment has distinct advantages in the provision of disaster recovery and backup facilities.

Disadvantages

- To convert Concurrent to DEC immediately would place unrealistic pressures on computing staff.

- The cost of converting immediately would be in the order of $1,000,000 based on today's software tools and systems.

- Existing development schedules would have to be suspended for approximately 9-12 months.

Comment

An examination of the existing systems profile (Appendix 3) indicates that CALM has a significant investment in systems 1 year old or less and in those under development. This indicates that after some lean years the development of computing systems is now starting to take off again. It is difficult to suggest that this initiative should be stifled at this point.

9.2.3 Other Vendors

An option does exist to change to a vendor other than DEC or Concurrent. This could include IBM, Data General PRIME etc.

The project team is of the view that these options do not offer any strategic advantages over the two options detailed above. Whilst each supplier has some unique qualities and advantages none of these are seen to be relevant to CALM.

In general terms they offer all of the disadvantages of the first two options (conversion costs, inability to easily connect to the GIS etc) without any compensating benefits not offered by the two options above.

It is recognised that the option outlined in 9.2.2 would need to be treated as another vendor option in any tender process should it be proceeded with directly.

9.3 STRATEGIC REQUIREMENTS OF SYSTEM ARCHITECTURE

The following requirements list identifies what CALM is seeking out of its system architecture. These are based on the interview process conducted in the planning process, an analysis of potential systems backlog and the existing systems environment.

- GIS

  The need to access graphic and textual data is all pervasive within CALM. The importance of the GIS is dealt with in other sections of this plan. It suffices to say here that any GIS must be based on the "DEC/Intergraph" environment in order to meet CALM's commitment to the wider government GIS requirements and build on the existing knowledge base.

- Network

  CALM must have in place a solid computing network to support access to corporate information by all units within the CALM structure.

- Productivity

  Given the existing restrictions on staffing levels and the future outlook, the productivity of staff resources must be a key management issue.

- Packages

  CALM is not seen to be a big potential user of application packages in the Commercial area. The scope in the research area is however considered significant.

9.4 OPTION 1 V OPTION 2

The decision between these options should be based on the answer to the question:

Should CALM aim to be a single vendor environment?

If the answer is yes then option 2 is strategically desirable. If no the option 1 should be followed.

The recommendation of this plan is that option 2 is the more strategically desirable.

The reasons are:

- DEC offers a better computing environment than Concurrent. This, it is believed, will in the long term provide significant productivity gains.

- The disadvantages of a two mainframe environment are significant in an installation the size of CALM's. Particularly the staff resources and knowledge needed to support the two systems.

9.5 RECOMMENDED STRATEGY

It is recommended that CALM adopt a medium to long term strategy to become a single vendor installation.

This is to be achieved by:

- Upgrading the existing Concurrent to provide sufficient resources to complete existing development work and relieve current capacity problems.

  This could be by purchasing a second concurrent 3240 and additional disk capacity.

- The current GIS tender should be reevaluated (not reissued) in terms of ensuring there is adequate capacity for both GIS and research computing.

- All new corporate system development work should be considered for the DEC system.

- Staff recruitment should be directed at obtaining DEC skills, initially for the GIS system and then for corporate computing.

- The existing network should be converted to a DEC network to achieve the full benefits of the single vendor environment.

It is expected that this should be achieved by 1990.

9.6 SUMMARY OF DEC V CONCURRENT

9.6.1 DEC

Advantages

- Greater access to 3rd party software particularly in the area of 4GL tools and productivity aids.

- Better integration capability between management and GIS applications.

- A one vendor environment.

- Better ability to recruit and keep staff.

- Better capability to provide disaster recovery and backup facilities at a lower premium cost over a multiple vendor environment.

Disadvantages

- Conversion costs for non obsolete existing systems.

- Retraining of staff.

- Development schedules will be severely impacted unless the strategy is implemented over at least a three year period.

9.6.2 Concurrent

Advantages

- Development schedules maintained.

- Existing knowledge base reinforced.

Disadvantages

- Productivity tools limited and untried beyond existing programmer aids.

- Connectivity between management and GIS systems difficult and/or costly.

- Two supplier environment entrenched.

- Difficulty in recruiting and keeping staff

9.6.3 Advantages of Recommended Strategy

- Existing development schedules can be maintained.

- The DEC environment can be assessed with less urgency.

- A final decision can be delayed for 12-18 months.

- It allows for the changeover to be conducted over an extended period.

9.7 COSTS

9.7.1 The following tables indicate likely hardware and other costs associated with the above options. In fact both options incur similar costs for hardware over the next three years, particularly the GIS area.

In drawing up the tables the following assumptions have been made.

- By 1989 the GIS requirement will have exceeded the capacity of the Microvax system. The Microvax will then be used for Research Computing and replaced with a large "DEC" system.

- The capacity requirements are based on estimates provided by CALM which were developed in a separate internal study which led to the current proposals for the Concurrent upgrade and the purchase of the GIS system.

- The use of MIPS as a capacity measure is recognised as defective however for the detail required in this plan it is considered adequate.

TABLE A

CONCURRENT FOR MIS, DEC FOR GIS

1987-88	Existing 3240 continues	(1.5 MIP)		
	Purchase 3260	(3.0 MIP)		$ .6M
	Purchase DEC for GIS	(1.0 MIP)		$ .4M
1990	Purchase DEC for GIS	(4.0 MIP)		$1.0M
	Existing DEC available for Research			
1990	Upgrade on Concurrent required			?
		Hardware Costs		$2.0M
	Total MIPS at 1990	GIS	4.0	
		Research	1.0	
		MIS	4.5	9.5 MIPS

TABLE B

STRATEGY TO CONVERT TO DEC

1987-88	Existing 3240 continues	(1.5 MIP)		
	Purchase 3230 or 3240 secondhand	(1.0 MIP)		$ .4M
	Purchase larger DEC for GIS	(1.5 MIP)		$ .6M
1989-90	Purchase DEC for GIS and MIS	(4.0 MIP)		$1.0M
	Existing DEC available for Research			
1990	Upgrade of Concurrent required			?
	(with DEC)			$2.0M
	Total MIPS at 1990	GIS	4.0	
		Research	1.5	
		MIS	2.5*	8.0

* Management Information Systems (MIS) systems would be utilising part of the GIS computer from 1989-90.

9.7.2 Other Costs

In addition to the straight capital purchase costs for hardware there are other associated costs. These include hardware maintenance and the cost of packages and productivity tools.

Some of these costs will be the same for either option and have been included here so as to indicate the quantum of the required investment as well as the differential in the two options.

- Maintenance — This has been estimated at an annual cost of 10% of the capital cost. This is considered above current industry averages however does provide a reasonable estimate.

- Training — Training costs have been included as being the same for both options.

- Packages — It is anticipated that 4GH and productivity tools will be purchased for the CONCURRENT and the DEC systems under both options.

- Connectivity — This is a cost for Option 1 and represents the requirement to connect the Concurrent to the DEC system.

- Network — An additional sum has been included to convert the existing network to a "pure DEC network as part of the long term strategy.

TABLE C

OPTION 1 - OTHER COSTS

	$,000				
	87-88	88-89	89-90	90-91	91-92
Maintenance	110	160	280	280	280
Training	20	10	10	10	10
Productivity Tools	20	50	-	-	-
Applications Packages	100	-	-	-	-
Connectivity	-	40	30	30	30
Network	20	-	-	-	-
	250	260	320	320	320

TABLE D

OPTION 2 - OTHER COSTS

	$,000				
	87-88	88-89	89-90	90-91	91-92
Maintenance	100	200	280	280	280
Training	20	10	10	10	10
Productivity Tools	20	50	-	-	-
Applications Packages	100	-	-	-	-
Connectivity	-	-	-	-	-
Network	20	100	100	-	-
	260	360	390	290	290

9.7.3 Summary

In summary it needs to be stated that both options would satisfy the needs of CALM and that the success of this plan is not contingent on the recommended option being adopted. It is the view of the project team that the recommended strategy does however provide longer term benefits to CALM which may not be available under the dual vendor option.

Both systems are basically the same until 1990 when the conversion to a DEC environment is completed. On the basis of the above costs this cost would be in the order of $.8M.

To this must be added the cost of converting non obsolete systems still running on the Concurrent. The analysis of existing systems indicates that this would be in the order of $.9M based on estimates made using:

- the existing tools on the Concurrent.
- timeframes and costs associated with using the existing environment.
- and the assumption that no systems are replaced by developments over the next 3 years.

As these assumptions are clearly not representative of the future the cost is likely to be significantly much less than this. Our estimate based on the use of 4GL tools and on straight conversion is that the cost is more likely to be in the order of $400,000 should the conversion in fact be required. With the planned systems development it is likely that this figure would be further reduced.

As part of the long term strategy CALM has the option to convert its existing network to a "pure" DEC network. The estimated cost of this is $200,000.

Thus the estimated cost to convert to a DEC environment will be in the order of $1.5M over the next 3-4 years.

Against this must be set the following gains:

- Connectivity of MIS and GIS under a mixed environment. Estimated cost $30,000 pa and $40,000 capital cost.

- The potential for significant gains in the use of better systems tools under the DEC environment.

- Greater potential for disaster recovery planning.

- More effective recruitment capability.

10. SYSTEMS DEVELOPMENT ARCHITECTURE

10.1 DISCUSSION

This section of the plan deals with the environment in which CALM must develop its application systems. It covers organisational structure for application projects as well as productivity tools.

10.2 STRATEGIC ISSUES

Strategic issues required to be satisfied by the systems development architecture are:

- The corporate data model shows in detail the level of connectivity between subject areas which make up the CALM model. Therefore, systems needed to support this must be able to be connected at the data level.

- There is a need for high productivity from the existing resources.

- The environment must support flexible systems easily modified and easily maintainable.

- System development activity must be controlled and in line with Corporate priorities.

10.3 PACKAGES

An analysis of the Subject Areas identified in section 6 indicates that there are few areas in which the utilisation of application packages will be appropriate for the major applications. It is anticipated that in the accounting area, packages will form a solid base of systems. For example, Budgeting, Creditors and General Ledger systems are readily available and whilst not always specifically aimed at Government they offer significant cost advantages over in-house development.

It needs to be stated that packages, while taking the pain out of system development, still require resources to be applied in other places of the system life cycle. In particular user requirements still need to be clearly developed as the basis for package selection, system implementation still needs to planned and resourced as does training and preparation of documentation.
In the area of PC applications it could be expected that software packages will become more commonly available in the statistical and research data base areas. In addition the use of software such as dBase III and Open Access III will provide significant user productivity if managed correctly.

10.4 PRODUCTIVITY TOOLS

10.4.1 Information Engineering

Part of this plan includes a computer based corporate data model which encompasses the following elements:

- Corporate Entity Model.
- Organisational Structure.
- Activity Model.
- Subject Area Data Models.
- Full Documentation.

To provide the basis for co-ordinating information integration across subject areas this model should be maintained and used as a controlling data administration tool. Information Engineering as a systems development approach provides a key basis for the Business Area Analysis activity (a precursor to the system identification and design phase). This formal approach to systems development is recommended as the basis for CALM system development work. See Appendix 5.

To consolidate the existing work and provide the basis for phase 2 of the project brief (Business Area Analysis) it is recommended that the Information Engineering Workbench product (IEW) be purchased.

10.4.2 4 GL Software Tools

The use of 4GL products is seen as the only realistic approach to developing flexible systems which can be easily maintained and modified as well as providing the necessary productivity to the programming phase of the system life cycle.

Following the inevitable learning curve for products in this category, high programmer productivity should be expected. Experience indicates that better, more user friendly and more comprehensive systems result from the proper use of 4GL tools.

Problems facing CALM in this area are:

- Concurrent is yet to release its own 4GL product and even then it would be at least 9 months (mid 1988) before the product was settled down and capable of being used properly with good local support.

- 4GL products are consistently high resource users and experience needs to be gained in developing systems in conjunction with 3rd generation products (eg COBOL) to gain optional effectiveness.

- While DEC offer excellent DEC and 3rd party 4GL products their use on the GIS machine would need to be closely monitored to ensure they did not impact GIS work.

10.5 END USER COMPUTING

The expectation of PC's usage is now well established in CALM. However, CALM could not be described as a mature PC organisation. It is expected that the use of the PCs outside the initial word processing capability will grow very quickly. The use of spreadsheets, user friendly data base systems and packages such as SAS, SAS GRAPH etc allow users a measure of freedom from the mainstream computing environment.

This use needs support not only from a programing viewpoint but also in areas of peer group support, needs analysis, product selection and in integration with corporation information systems.

To support this CALM needs:

- A support structure for PC users both at Perth and importantly in the regional offices.
- Central co-ordination in package identification, evaluation and selection.
- Guidelines and standards to be adopted by PC users.
- Reporting mechanisms to ensure staff resources are being effectively utilised.
- Long term CALM should consider the implementation of a formal Information Centre with responsibilities for assisting users in accessing corporate data bases, to develop and run small systems and with prototyping. The information centre encourages all users to adopt a consistent approach to data access and manipulation.

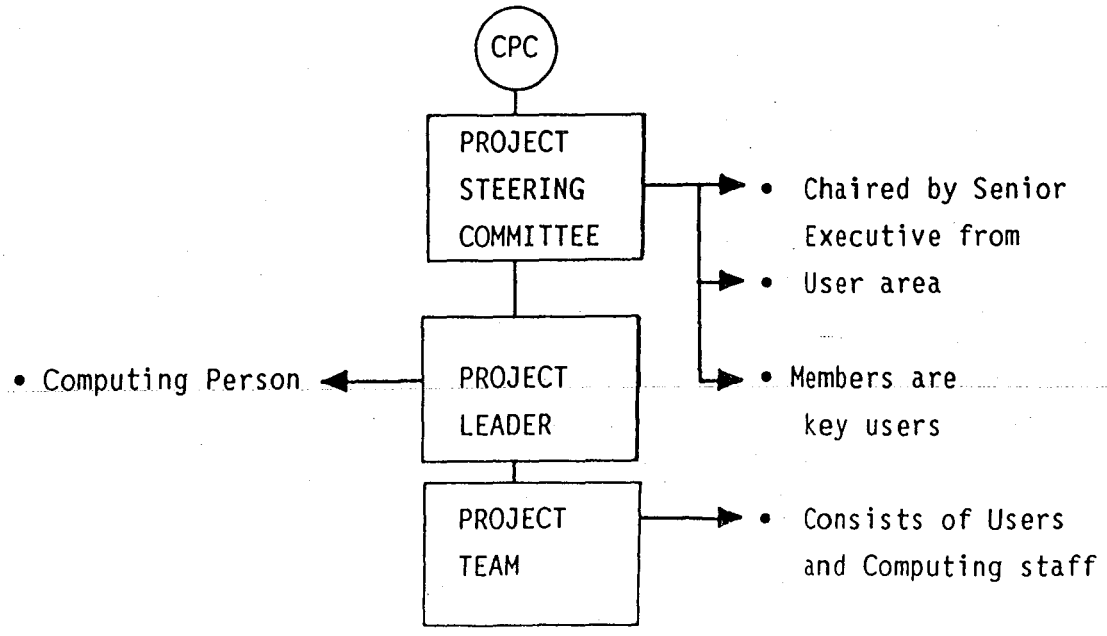
10.6 PROJECT STRUCTURE

10.6.1 CALM's existing project structure for information systems development is considered ad hoc. Examples exist where projects have been structured with proper user involvement and reporting and with good input from the Computing Services Branch. However, other examples exist where this has not happened.

The following structure is put forward as the model for CALM, to be used and modified where appropriate. However, it is essential that the following key attributes are always in place:

- The project is sponsored by a user.
- There is both user and computing staff involvement in the system development.
- There is a formal reporting mechanism back to the Computer Policy Committee.

THE MODEL



10.6.2 Project Steering Committee

The functions are:

- Review and approve the project schedule.
- Monitor project progress through a formal, structural project report.
- Ensure resources are available as and when required by the project schedule.
- Resolve sectorial conflict among users.
- Make major systems design and budgeting decisions.
- Provide management direction to the project manager.

The Project Steering Committee should also report regularly to the Computer Policy Committee on the projects for which it is responsible.

10.7 CONTRACT/CONSULTANCY RESOURCES

It is unlikely that CALM will ever have enough inhouse resources to sustain an adequate inroad to the systems backlog. It is therefore recommended that where appropriate contract and consultancy staff be engaged.

Key aspects of this approach are:

- Internal computing staff must always be assigned to consultancy teams.
- CALM project steering committees must be responsible for any consultancy projects undertaken.

- Contract programmers must be supervised by CALM project leaders or analysts.

- Standards must be adhered to.

CALM should recognise that the use of contractors and consultants can lead to accelerated development which in turn leads to an increased maintenance requirement. Therefore, it does not eliminate the need for ongoing expansion of internal computing staff.

Good human resources management practices need to be employed to ensure CALM staff are not left with maintenance work and contractors with the more interesting and stimulating new development work.

11. POTENTIAL INFORMATION SYSTEMS

This section of the report lists the potential information systems identified during the study. The status of each as a new system not previously implemented, or as a replacement or enhancement for an existing system is shown. Full details of each proposed system are contained in Appendix 4 - Possible Systems.

This list is organised on the same sequence as in the mapping of Subject Areas, Application Areas and Possible Systems list in Section 6.3 of this report.

SUBJECT AREA - ACCOUNTING

1. Creditors System

   Status: New system recommended.

2. Debtors System

   Status: Replacement for the existing Debtors System recommended.

3. General Ledger, Including Budgeting & Expenditure Reporting

   Status: Replacement for the General Ledger, Budgeting and Reporting System recommended.

SUBJECT AREA - CALM ESTATE

4. Crown Land Register

   Status: New system, complementing CALM Land Register is recommended.

5. CALM Land Register

Status: Replacement system for Crown Reserves Register is recommended.

6. Plantation Data Base

Status: Replacement for Pine Plantation Areas System recommended.

7. Estate Proposals Register

Status: New system to be developed.

8. Private Property, of Interest to CALM

Status: New System to be developed.

SUBJECT AREA - ENVIRONMENT PROTECTION

9. Degraded Sites Register/Planning

Status: New system is recommended.

10. Tenements Register

Status: New system recommended; possible access to Mines Department Systems should be investigated.

SUBJECT AREA - FIRE

11. Fire Behaviour (Weather Forecasts)

Status: Enhancement to Fire Behaviour System is recommended.

12. Prescribed Fire Planning

Status: New system recommended.

13. Fire History Data Base

Status: Enhancement of existing PC system to be accessible on the mainframe network.

14. Fire Suppression

Status: Feasibility of enhancements or reworking of Fire Suppression Model to be investigated.

15. Fire Effects

Status: New system is recommended.

16. Fire Resources Inventory

Status: New system is recommended.

17. Aircraft Hours

Status: New system as part of Plant and Equipment systems.

SUBJECT AREA - FOREST PRODUCE

18. Forest Produce Inventory

Status: Replacement of existing MLI (Management Level Inventory) System is required.

19. Logging Plans

Status: New systems to be developed.

20. Customer Data Base/Product Prices

Status: Existing systems support operations satisfactorily.

21. Contractors

Status: Enhancement to existing system is recommended.

22. D Note Records

Status: Existing system supports operations satisfactorily.

23. Share Farm Proposals

Status: New system is recommended.

24. Timber Industry Model

Status: New system is recommended.

SUBJECT AREA - GEOGRAPHIC INFORMATION SYSTEM (GIS)

25. Map Inventory

Status: New system to be part of a generalised store inventory package.

26. Survey Calculations

Status: Function of the GIS to calculate land areas.

27. Theme and Base Mapping

Status: Theme maps are available from FMIS/CALMIS and the Integraph Mapping Facilities; to be enhanced significantly, Access to WALIS facilities/maps to be investigated.

28. Inventories

Status: Currently provided by FMIS to be enhanced to include textual material where approptiate.

29. File Precedents

Status: Precedents held in RMS to be linked or identified separately.

SUBJECT AREA - LIBRARY

30. Library System

Status: Installation of the package 'INMAGIC', installed at the WA Regional Computing Centre, on the new DEC is recommended.

31. Photographic Index

Status: New system to be implemented.

SUBJECT AREA - LICENCES

32. Fauna Management and Kangaroo System

Status: System currently being implemented. No other action required.

33. Public Licences

Status: Facility of Fauna Management System to be implemented.

34. Collectors' Licences

Status: Facility of Fauna Management System to be implemented.

35. Leases and Concessions

Status: New system to be developed.

36. Prosecutions

Status: Facility in the Fauna Management System to be implemented.

SUBJECT AREA - PERSONNEL

37. Establishment/Deployment

Status: PIMS - Personnel Information Management System installed at Centre 4 is to be implemented as required by the Public Service Board.

38. Mailing List

Status: Existing system to be retained.

39. Safety System

Status: Review of existing system to be conducted as part of business area analysis.

40. Training System

Status: Replacement for Existing System, projected for Phase 4 of PIMS.

41. Staff Entitlements

Status: PIMS, to be implemented.

42. Salaries Payroll

Status: Replacement for the existing Computa-Pay System is recommended, requires salaries cost allocation.

43. Wages Payroll

Status: New System is in the process of being implemented.

SUBJECT AREA - PLANT AND EQUIPMENT

44. Equipment Register

Status: Existing system to be reviewed when the business area analysis is done.

45. Building Register

Status: PC system proposed; the proposal should be reviewed to determine corporate requirements.

46. Maintenance/Workshop Schedules

Status: New system is recommended.

47. Minor Assets Register

Status: New system is recommended.

48. Rentals System

Status: PC system proposed as part of Building Register.

SUBJECT AREA - PUBLICATIONS

49. Publication Inventory

Status: Replacement for PC based system is recommended.

50. Publications Index

Status: Recommended as an additional function of the RMS facility.

51. Publication Sales

Status: Existing system provides satisfactory support.

52. Public Participation

Status: Existing mailing list system should be enhanced to cover other aspects of this area.

SUBJECT AREA - RECORDS

53. File & Folio Index and Location

Status: The records Management System (RMS) is currently being implemented.

54. Ministerials System

Status: An extension of RMS has been proposed and is recommended.

55. Parliamentary Questions

Status: An extension of RMS has been proposed and is recommended.

56. Correspondence Register

Status: Currently being implemented under the RMS facility.

57. Information Retrieval

Status: Recommended use of STATUS, the Information Retrieval System which is the basis of RMS.

SUBJECT AREA - RECREATION OPERATIONS

58. Recreation Site Register

Status: New system is recommended, possibly part of the GIS.

59. Visitor Surveys

Status: PC based system being implemented.

60. Site Planning

Status: As a proposed GIS facility this is recommended.

61. Signs Inventory

Status: New system is recommended.

62. Concessionaire Leasing

See Licences.

63. Landscape Inventory

Status: Recommended as a GIS facility.

SUBJECT AREA - RESEARCH

64. Research Project Register

Status: Existing PC system to be enhanced.

65. Permanent Plot Register

Status: New system is recommended.

66. Type Specimen Register

Status: New system is recommended.

67. Research Data Bases

Status: Maintain existing systems. Enhance and replace as necessary for research purposes. Where relevant develop as corporate systems, possibly as part of other business areas (e.g. CALM Estate, GIS).

SUBJECT AREA - STORES

68. Stores Inventory

Status: Replacement of several PC based systems tis recommended.

69. Public Sales

Status: A new system, part PC based existing system, is recommended.

PART D IMPLEMENTATION

12. COST/BENEFITS ANALYSIS

12.1 POTENTIAL BENEFITS

The potential benefits of each of the subject areas with priority 1 or 2 have been estimated. Where systems have been proposed or developed, benefits have been drawn from feasibility reports; in other cases potential benefits have been discussed with relevant officers. The benefits are only indicative of what might be achieved; the enterprise benefits analysis prepared during business area analysis projects would identify the cultural, financial and technical impacts of future systems.

Subject areas for immediate analysis (priority 1) are:

- Accounting
- CALM Estate
- Forest Produce
- Geographic Information System (GIS)
- Records

Each area has been analysed to determine where efficiencies would result, and where possible tangible benefits have been quantified.

12.1.1 Accounting

An integrated systems approach which remedied the current problems with the financial reporting system and catered for data collection at source should result in efficiencies of up to 20% in the Accounts area. This would be equivalent to 5 or 6 full time staff positions, mostly at level 1.

12.1.2 CALM Estate

The efficiency effects of systems in this area have been estimated as 2 full time staff positions from incremental gains at head office and in the regions and districts. The effect would be to free officers for other duties, and would occur at levels 2 and 3.

12.1.3 Forest Produce

Most gains have already been made at the operational level from systems development in this area. Intangible benefits from improved systems would come from better control over resources, better forecasting of future resources and optimisation of logging plans.

12.1.4 GIS

A study of the impact of GIS's in May 1986 identified savings of the order of $3 million. The greater part of this was extrapolated from the calculation of staff time needed to prepare responses to queries posed about the Manjimup Region in March 1986 by manual means. Other benefits come in the preparation of maps, research analyses, and preparation of flora and fauna atlases. A recent example is the preparation of the 3 forest regions management plans where most maps and diagrams were produced on the Intergraph. A late change in usage which would have meant extensive redrawing in a manual system was easily accommodated. Retention of the base data allows it to be used in many other applications.

SINCE ALTERED IN PRACTICE

If a conservative view of the benefits available were set at 25% of the identified benefits in the study, at least $750,000 would be saved per year.

The pervasive use of typical GIS products seen in the course of preparing the Information Systems Plan would indicate that a fully developed GIS with appropriate networking to regions will produce benefits far in excess of the value of its components. To reflect this a greater proportion of the estimated $3M savings in later years has been allowing in estimating benefits.

Efficiencies in the preparation of maps should result in savings of at least 10% in Mapping Branch staff levels, or 3 to 4 full-time positions, at level 3.

12.1.5 Records

The cost benefit analysis for the Records Management System (RMS) prepared in December 1984 identified tangible costs of $170,000 and tangible benefits of $375,000 over 5 years. Tangible benefits included:

• time spent by officers in locating files	$35,000pa
• time spent by officers photocopying	$35,000pa
• save in Records administration time	$ 5,000pa
Total	$75,000pa

Intangible benefits included:

- increased ability to find all relevant information.
- reduce number of lost files.
- increased efficiency in answering land management enquiries.
- Integration of all files into to system.
- use of free text information retrieval facilities.

Priority 2 subject areas (important but not immediate) are:

- Fire
- Licences
- Personnel
- Plant & Equipment
- Research

There are already systems in place for the Fire area while Licences systems are in the process of being implemented. Incremental increased in benefits would come from development of additional systems to integrate these areas. In the Fire area there is also the potential to prevent or reduce losses through the development of the Fire Suppression system, though the potential use and benefits would need careful analysis before proceeding.

12.1.6 Personnel

Implementation of the Personnel Information Management Systems (PIMS) is required by the Public Service Board. Benefits expected include:

- immediate access to detailed information about staff members, positions, qualifications, functions, costs, etc.
- all salaries, wages, awards, benefits and allowances linked to people and positions for budgeting purposes
- more precise and more satisfying support for personnel planning and management
- wide range of standard and user-generated reports.

In the payroll area there will be considerable savings at regional and district level from the implementation of the new wages payroll system, where preparation of pay details and time cost input to the General Ledger has been a manual procedure.

12.1.7 Plant & Equipment

No tangible benefits have been identified. Savings should result from improved control and management of plant and equipment deployment and maintenance, improved stores facilities and improved workshop scheduling.

12.1.8 Research

The improved information flow resulting from computer assistance in this area would require the equivalent of at least one officer.
The following general benefits are available:-

- significant increase of efficiency in the area of information handling and a corresponding reduction in the manual workload;
- the ability to perform complex analyses/tasks otherwise not possible;
- the virtual elimination of bottlenecks in the Presentation and Word Processing areas;
- improved communications on an inter/intra departmental basis;
- better response to external queries, increase in the level of professionalism;
- the added benefit of keeping in pace with technology (critical in the Research environment).

An indirect benefit is the more efficient and productive use of research personnel as more time would be available to perform analyses, planning, administration and information dissemination.

An example of a specific benefit is that ready access to and use of permanent plot information should reduce the risk of damage, and hence reduced efficiency, to plots when officers are preparing other operational plans.

12.1.9 Summary of Tangible Benefits

Accounting	6 x L 1	$ 90,000PA	
CALM Estate	2 x L 2	$ 46,000PA	
GIS	-	$ 750,000PA	
Mapping	3 x L 3	$ 70,000PA	
Records	-	$ 75,000PA	
		$1,054,000PA	(Exc O'heads)

The following table sets out the benefits by the year in which they are expected to be fully achieved, given likely development schedules.

	87-88	88-89	89-90	90-91	91-92
	$,000	$,000	$,000	$,000	$,000
Accounting	NIL	45	90	90	No
CALM Estate	NIl	NIl	46	46	Change
GIS	750	1,000	1,250	1,500	Estimated
Mapping	NIL	23	70	70	
Records	75	100	100	100	
Research	NIL	NIL	25	25	
Yearly Total	825	1,168	1,581	1,831	1,831
Cumulative	825	1,993	3,574	5,405	7,236

12.2 COSTS

12.2.1 The costs in this section are drawn from Table B (Section 9.7) and the proposed staffing summary (Section 8.3.6). In addition costs have been included for the engagement of the equivalent of 1 project team via contractors for application development work.

12.2.2 Summary of Costs ($M)

	87-88	88-89	89-90	90-91	91-92
Hardware	1	1	-	.8	-
Conversion	-	-	.2	.2	.2
Staffing	.1	.3	.3	.3	.3
Contractors	.1	.2	.2	.1	.1
Other Costs	.3	.4	.4	.3	.3
Total	1.5	1.9	1.1	1.7	.9
Cumulative	1.5	2.4	4.5	6.2	7.1

12.3 COST/BENEFIT SUMMARY ($M)

	87-88	88-89	89-90	90-91	91-92
Cost	1.5	1.9	1.1	1.7	.9
Benefit	.8	1.2	1.6	1.8	1.8
	(.7)	(.7)	.5	.1	.9
Cumulative	(.7)	(1.4)	(.9)	(.8)	.1

13. ACTION PLAN

13.1 GENERAL

There are three programmes of activity arising from this plan. They are:

- Support Activities
- Applications Development
- Hardware Initiatives.

Each of these is detailed in this section.

13.2 SUPPORT ACTIVITIES

This programme identifies the management initiatives which are needed to support the developments indicated in the plan.

(i) Computer Policy Committee

The Computer Policy Committee needs to be reconstituted with the General Manager as Chairman. An appropriate membership also needs to be agreed. Appendix 6 details some guidelines on the role of the committee.

COMMENCEMENT : IMMEDIATE

(ii) Staffing

The proposed structure will need to be initiated and argued through the Public Service Board and DOCIT. The four key positions are:

- Director Direction Information Technology L9
- Manager Land Information Systems L7
- System Support Officer L5
- Project Leader L4

The timing of these items will effectively dictate the commencement of much of the work proposed in the development programme.

COMMENCEMENT : IMMEDIATE

The additional staff positions indicated in the plan should be in place by the end of 1987/88 financial year and should come from savings to be made in the implementation of the Accounting subject area systems.

COMMENCEMENT : JULY 88

(iii) Productivity Tools

- **Fourth Generation Languages - 4GL**

  It is recommended that CALM adopt a 4GL tool for future development work. This should be for both Concurrent and DEC systems. For Concurrent the only real option appears to be the vendor product and this should be evaluated when it becomes available (predicted end of 1987).

  For the DEC environment this decision should be considered as part of the wider DEC evaluation.

  COMMENCEMENT : WHEN AVAILABLE
  COST :

- **Information Engineering**

  CALM now has a Corporate Data Model based on the Information Engineering Workbench (IEW) software product. This product should be purchased to consolidate this work and to provide the basis for the proposed Application Development program detailed below.

  COMMENCEMENT : OCTOBER 1987
  COST : $25,000 (Training Inc.)

13.3 APPLICATIONS DEVELOPMENT

This programme identifies the priority areas to be addressed by CALM over the next 12 months.

(i) Accounting

The accounting subject area was the highest priority identified by CALM executives. This confirmed the interview findings.

There is currently a measure of activity being conducted with this subject area (Wages system). This work should continue (Wages). However, it is recommended that:

- A formal business area analysis study be conducted into the accounting subject area identified in the plan.

- This analysis should be an extension of the Corporate Data Model.

- The analysis should:

  - identify actual systems needed to support CALM.

  - the information and process requirements of the systems.

  - provide the base for package identification and evaluation or for development.

Such a project should take in the order of 8 weeks elapsed time and should be conducted by CALM staff. They may need consulting support in the techniques of business area analysis and the use of the IEW product.

COMMENCEMENT : OCTOBER 1987
RESOURCES : 1 CALM PROJECT LEADER
: 1 CALM ANALYST
: 1 USER
: CONSULTANT P/T (IEW SUPPORT)

(ii) GIS

GIS is the driving force behind much of the non financial information needs of CALM. To date initiatives in this area have revolved around FMIS/CALMIS and special projects. The GIS will only be progressed as a corporate initiative with the development of a GIS plan. This plan needs to be in place before any detailed application work is commenced. The plan needs to:

- Identify what a GIS means to CALM.

- Identify in detail the information interactions between GIS components.

- Develop the integration between mapping and GIS.

The development of this plan is seen to be a high priority for the Manager Land Information Systems.

COMMENCEMENT : ON APPOINTMENT OF MANAGER

(iii) CALM Estate

The CALM Estate was seen by a wide range of CALM staff as a key information source in conducting CALM business. Its high priority reflects this need. This project is advanced as a "white Knight" project for immediate development. This implies that it is a system which will have a high profile and exposure to the staff and will indicate the commitment to the plan by senior executives. It is a project which has the following characteristics:

- It provides wide exposure within CALM.

- It is well defined in its scope.

- It is assessed as being a low risk project.

- It is a high priority area to satisfy user information needs.

As with the Accounting project this project should be structured around a formal business area analysis which further develops the corporate data model.

COMMENCEMENT : OCTOBER 1987
RESOURCES : 1 CALM PROJECT LEADER
: 1 USER
: 1 CONSULTANT P/T (IEW SUPPORT)

(iv) Other Priority Areas

Both the Forest Produce and Records subject areas are currently being worked on. This should continue. Whilst they are high priority areas it is recommended that new resources recommended in this plan be channelled into the areas indicated above.

13.4 HARDWARE INITIATIVES

(i) Concurrent Upgrade

There is an immediate need to upgrade the existing Concurrent system. Given CALM acceptance of the recommended long term strategy, this upgrade should be kept to the minimum investment level. This should be on the basis of supporting existing systems, those systems under development and also to provide some margin for growth for these systems.

This could be met by a doubling of the existing CPU capacity from 1.5 to 3.0 MIPS. The acquisition of a second hand system should be considered (eg 3240). This could lead to a saving of $200,000 on planned 1987-88 expenditure.

(ii) GIS

The existing tender for a GIS system should be continued with. In addition, if the $200,000 made available under (i) above is realised this should be put into acquiring additional "DEC" capacity.

Indications from DEC are that $200,000 will provide either:

- An 8250 CPU in place of the Microvax tendered (1.3 MIP vs.9 MIP), or
- An additional Microvax networked to the tendered Microvax (2 x .9 MIP).

These options would need to be evaluated but they indicate that the potential exists to provide immediate capacity to develop systems on the DEC environment.

(iii) Single Vendor Review Point

The recommended strategy allows for the decision to move to a single vendor environment to be confirmed in 12-18 months. This would occur when the GIS system needed to be upgraded either due to increased GIS use or demand to accommodate non GIS applications.

This effectively requires CALM to upgrade to a large DEC system to accommodate the move to the single environment or to reinforce the two vendor environment.

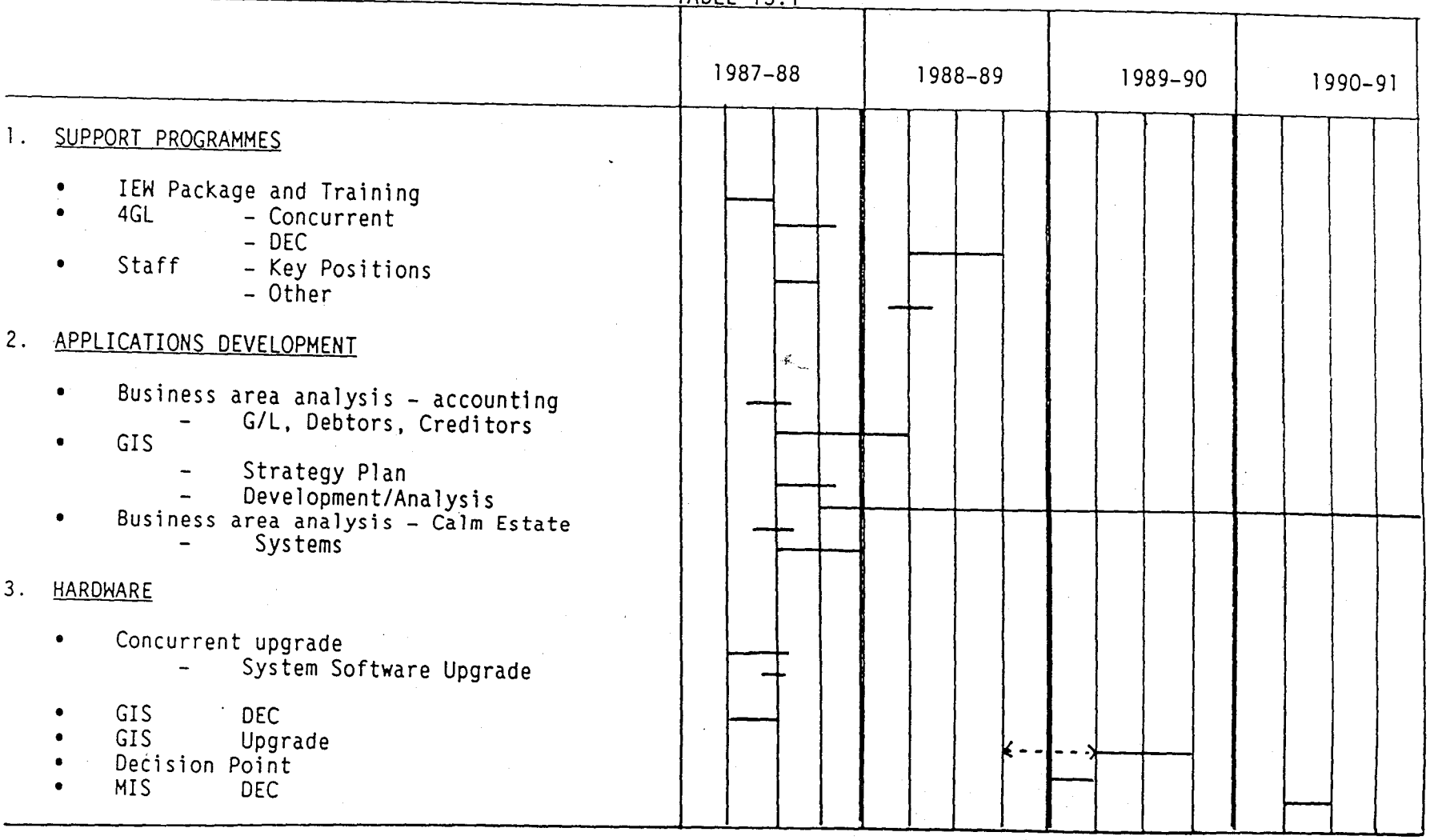
(iv) Network Upgrade

The existing communications network should be upgraded to take full advantage of the single vendor environment. This should be done progrssively over the lead up to the acquisition of the DEC MIS system.

COMMENCEMENT : 1989

FOUR YEAR IMPLEMENTATION SCHEDULE

TABLE 13.1



APPENDICES

APPENDIX 1

PROJECT STEERING COMMITTEE

F. McKinnell	(Chairman) Divisional Manager Services CALM
A. Errington	Divisional Manager Administration CALM
H. Campbell	Manager Inventory CALM
T. Morgan	Manager Computing CALM
J. Kinnear	Senior Research Scientist CALM
D. Cole	Department of Computing and Information Technology (Representative for CALM's interests).
* E. Hopkins	Chief Liaison Officer CALM
* G. Trinder	Arthur Young Consultants
* M. Howe	Arthur Young Consultants

* Project team members.

APPENDIX 2

LIST OF STAFF INTERVIEWED

Syd Shea	Crawley	Executive Director
Roger Underwood	Como	General Manager
Frank McKinnell	Como	Divisional Manager Services
Jim Edwards	Como	Divisional Manager Operations
Alex Errington	Como	Divisional Manager Administration
Don Keene	Como	Division Manager Forest Resources
Peter Hewett	Crawley	Policy Director Forests
Chris Haynes	Crawley	Policy Director National Parks
Barry Wilson	Crawley	Policy Director Nature Conservation
Dexter Johnson	Crawley	Manager Policy Directorate
Alan Hill	Como	A/Manager Finance
Dave Hampton	Como	Manager Land & Wildlife Services
Ian Darragh	Como	Manager Engineering Services
Frank Batini	Como	Manager Environmental Protection
Hugh Campbell	Como	Manager Inventory
Trevor Morgan	Como	Manager Computing Services
Bob Cooper	Como	A/Manager Personnel
Kevin Goss	Como	Manager Information Services
Don Edwards	Como	Manager Mapping Services
Dave Mell	Como	Manager Wildlife Protection
Trevor McGill	Como	Manager Records Services
Per Christensen	Como	Principle Research Officer
Andrew Burbidge	Woodvale	Principle Research Officer
George Malajczuk	Crawley	Manager Economic Services
Jim Williamson	Canning Bridge	Manager Planning Services
Jock Smart	Bunbury	Manager Fire Protection
*John Murch)	Como	A/Manager Forest Resources
*Alison Mason)	Como	Assistant Forester
Wayne Schmidt	Canning Bridge	Manager Recreation & Landscape

*Keiran McNamara)	Crawley	Scientific Adviser
*John Blythe)	Crawley	Scientific Adviser
*Paul Jones	Crawley	Scientific Adviser
Alan Walker	Manjimup	Regional Manager
Alan Lush	Manjimup	Deputy Regional Manager
Cam Schuster	Manjimup	Regional Operations Officer
Peter Stirling	Manjimup	Regional Planning Officer
Alan Sands	Manjimup	Parks and Reserves Officer
Jack Bradshaw	Manjimup	Manager Silviculture
Martin Rayner	Manjimup	Inventory Research Officer
Bill Buchanan	Manjimup	Administrative Assistant
Rae Burrows	Manjimup	Information Officer
Ron Kitson	Manjimup	Senior Forester Timber Operations
Neil Burrows	Manjimup	Research Officer
Grant Waddell-Johnson	Manjimup	Research Officer
Chris Mueller	Manjimup	District Manager
Greham Norrish	Manjimup	Administrative Assistant
Don Spriggins	Bunbury	Regional Manager
Karl Kelers	Bunbury	Deputy Regional Manager
Frank Townsend	Bunbury	Administrative Officer
Bob Chandler	Bunbury	Regional Planning Officer
Neil Taylor	Bunbury	Parks and Reserves Officer
Peter Henderson	Harvey	District Manager
Richard Breidahl	Collie	District Manager
Ken Wallace	Katanning	Regional Manager
Ken Atkins	Narrogin	District Manager
Steve Gorton	Narrogin	District Forester
Cheryl Tonts	Narrogin	Clerical Officer
Mike Choo	Woodvale	Computer Systems Officer
John Kinnear	Woodvale	Research Officer
*Paul Gioia	Woodvale	Computer Systems Oficer
*Ted Griffin	Woodvale	Consultant Botanist
Jenny O'Neal	Woodvale	Librarian
*Colin Pearce)	Como	Research Officer G.I.S.
*Peter Bowen)	Como	Cartographer G.I.S.
Judy Beck	Como	Post Graduate Student

* Joint interviews and/or system demonstration.

APPENDIX 3

EXISTING SYSTEM PROFILE

A. Profile of Systems

1. Number of Systems by Age

This indicates two broad groups, those systems under 4 years and those over 6 years in age.

2. Number of Systems by Satisfaction Level

The majority of systems are rated at a satisfaction level of 5. This reflects the CALM attitude which has been to get system in rather than concentrate on quality. Although the profile should perhaps indicate more systems at level 6 this profile does not indicate serious problems.

3. Number of Programmes by Age

This reflects chart A1 however it can be seen that the majority of programmes are associated with the older systems. This has an impact on redevelopment and conversion options.

4. Number of Programmes by Satisfaction Level

This is as could be expected given the previous charts.

B. Estimated Cost to Redevelop

1. Estimated Cost to Redevelop all Systems

The current investment in systems stands at $1.5m. The majority of this is in systems over 6 years old.

2. Estimated Costs for Identified Systems

As one would expect the costs associated with major enhancement work are for systems less than 3 years old and for redevelopment with systems over 6 years old.

3/4 Redevelopment by Satisfaction Level

These reflect previous charts on satisfaction level.

C. Full Time Equivalents

1. Maintenance of Systems by Age

The FTEs required to support the systems parallel previous charts.

2. Maintenance of Systems by Satisfaction Level

As could be expected this profile indicates the additional support for systems with lower satisfaction levels.

3. Maintenance by System Type

This chart, although indicating some absolute differences does not indicate any major problems given the small number of resources in the Department and the accuracy of the recovery.

Implications

1. The majority of systems have an overall satisfaction level of 5. This suggests that they are at an acceptable level of user satisfaction although one would hope that the majority would have fallen into the 6 category.

2. The older systems 6 years+ are in fact the larger systems and this is where the major investment lies.

3. The major cost for required redevelopment is attributable to systems over 6 years old. This is estimated at $365,000 out of a total redevelopment cost of $1,575,000.

4. There is in the order of $200,000 estimated for major enhancement work. This is, as one would expect, for systems under 4 years old.

5. The systems identified for redevelopment mainly fall in the satisfaction level 5 category.

6. The indications from the FTE required for maintenance are that there is a significant proportion of time spent on this activity. Given the level of resources this must be of concern.

Summary

A. Redevelopment

- To convert all systems to a new mainframe would involve a redevelopment cost in the order of $1.5m.

- Of this approximately $.4 M is justified on the basis of being required anyway.

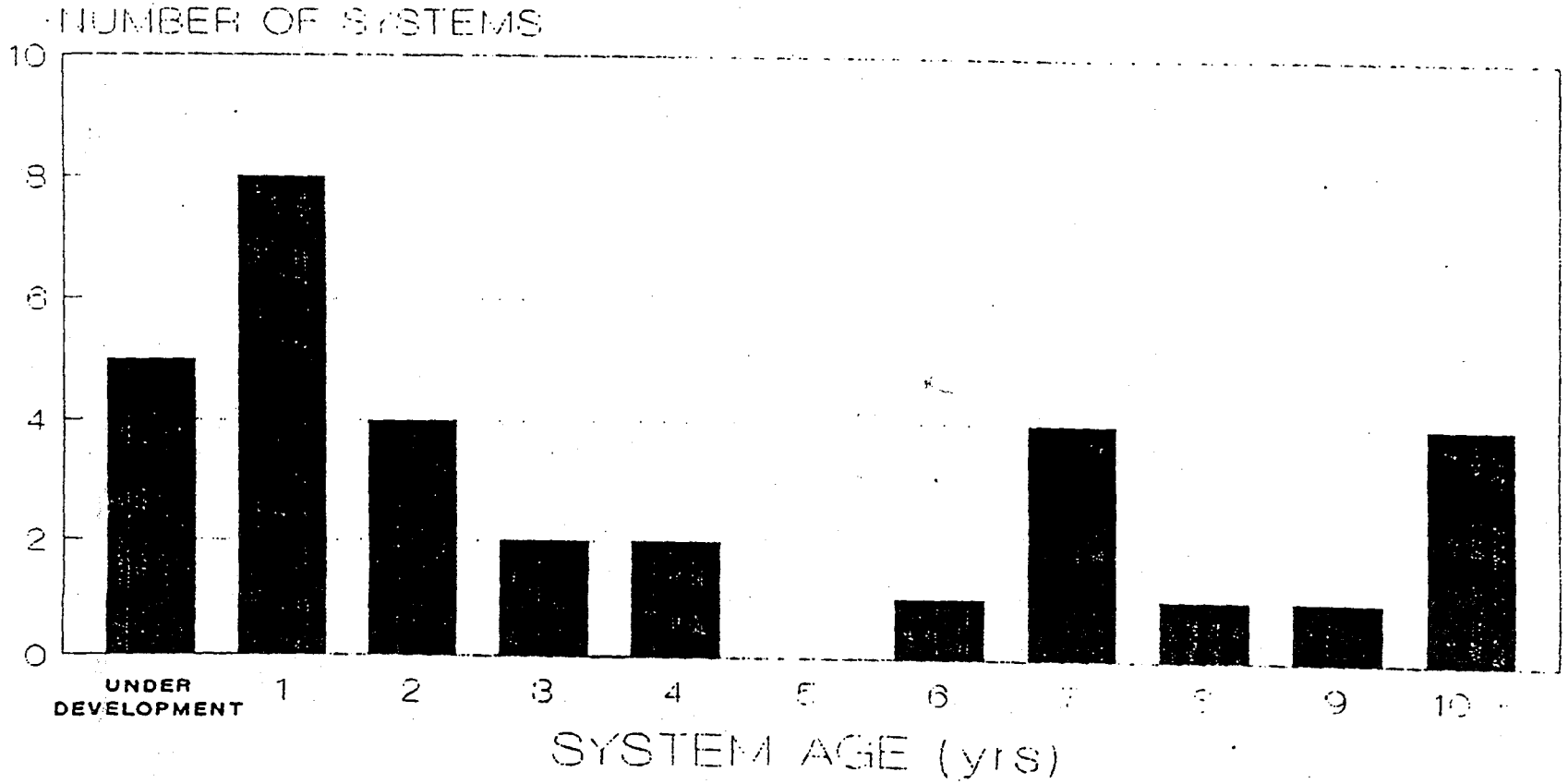
- Another $.2 m is justified on the basis of systems requiring major enhancements that could be built into any redevelopment.

- This leaves approximately $.9 to $1 as the true redevelopment cost.

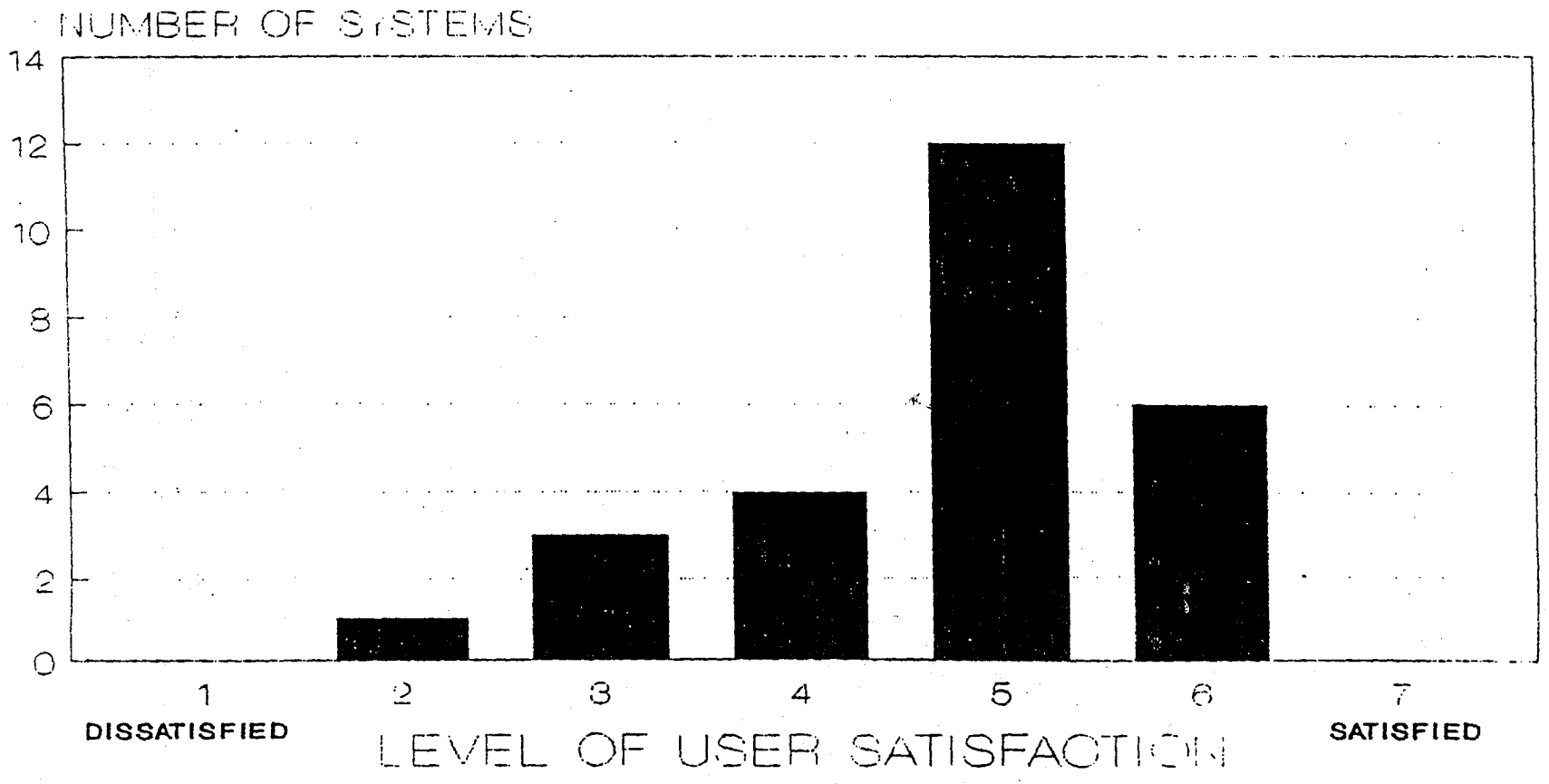
B. Workload

- There is approximately $.6 m required for major enhancement and redevelopment work waiting to be done.

EXISTING SYSTEM ENVIRONMENT
NUMBER OF SYSTEMS BY AGE

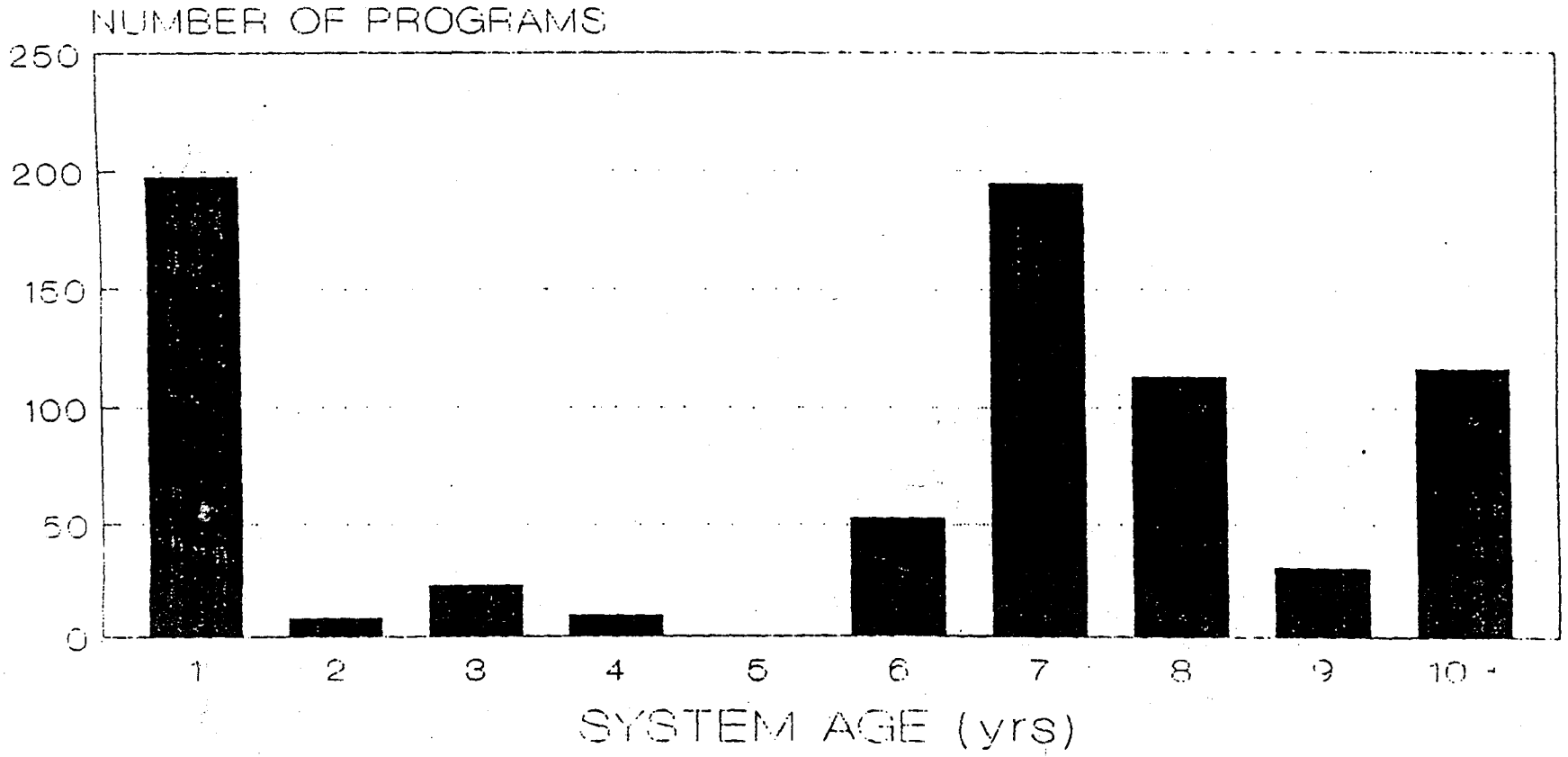


EXISTING SYSTEM ENVIRONMENT
NUMBER OF SYSTEMS BY SATISFACTION LEVEL

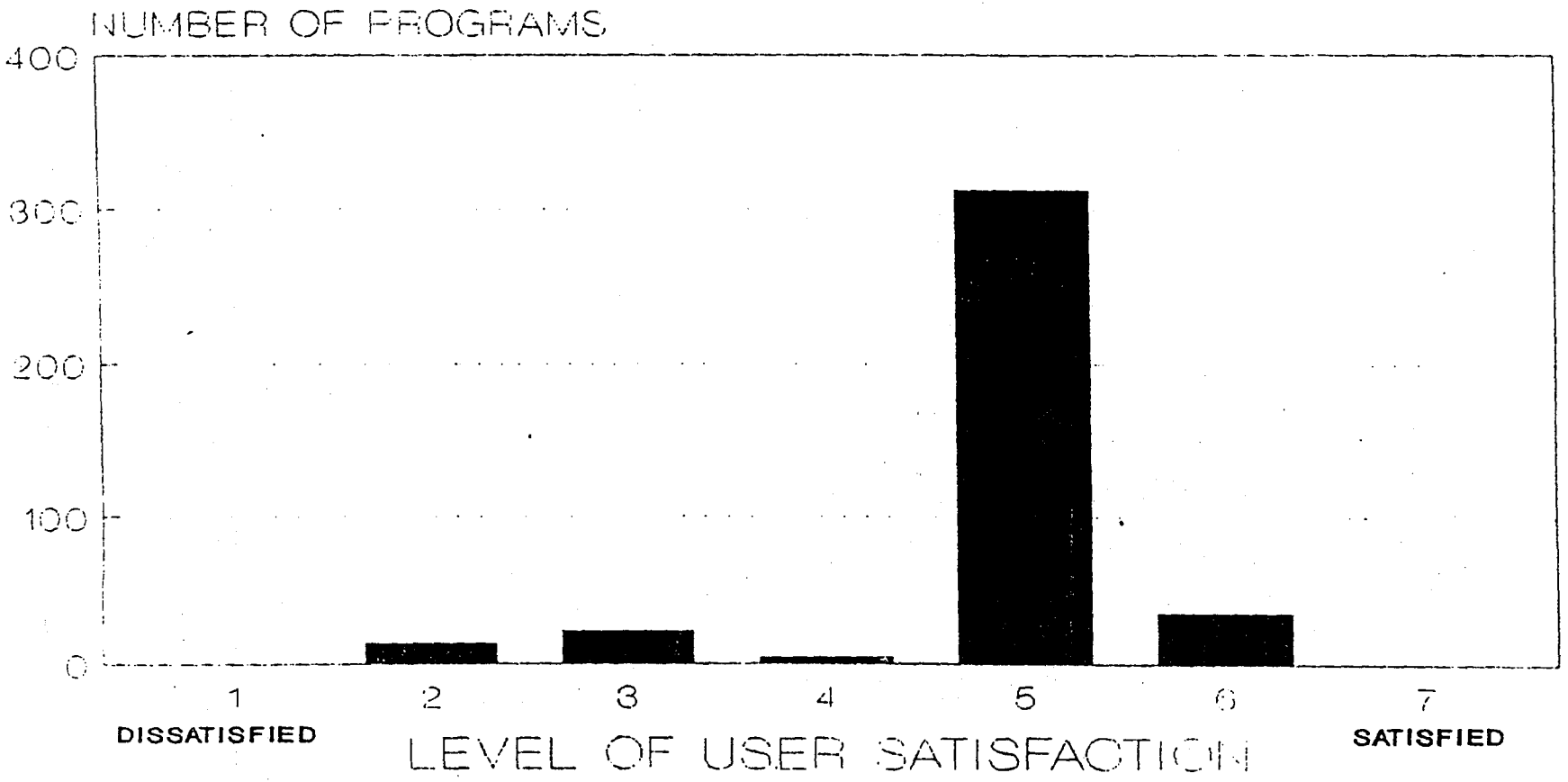


SISP PROJECT TEAM

EXISTING SYSTEM ENVIRONMENT
NUMBER OF PROGRAMS BY AGE

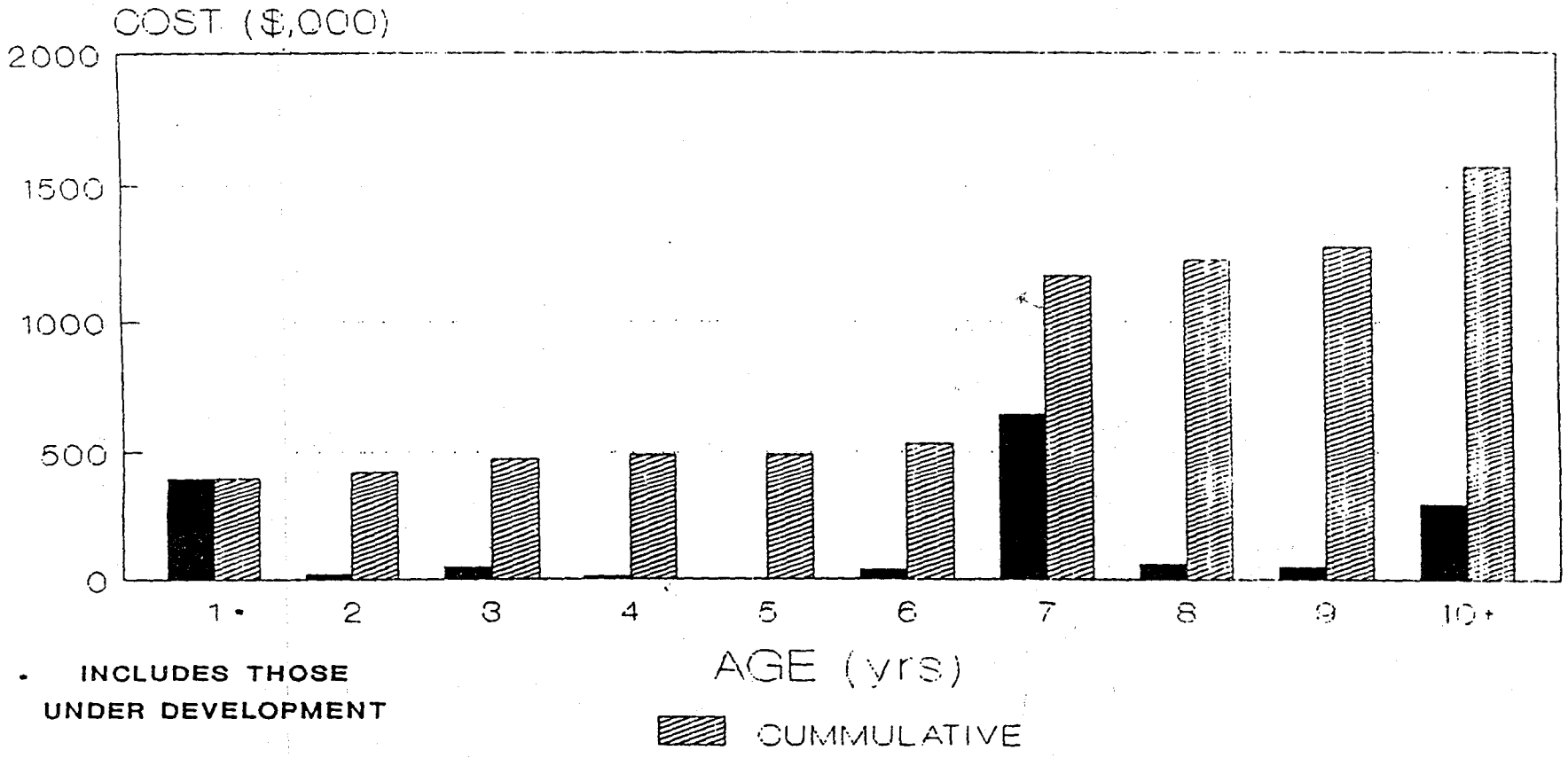


EXISTING SYSTEM ENVIRONMENT
NUMBER OF PROGRAMS BY SATISFACTION LEVEL



BISP PROJECT TEAM

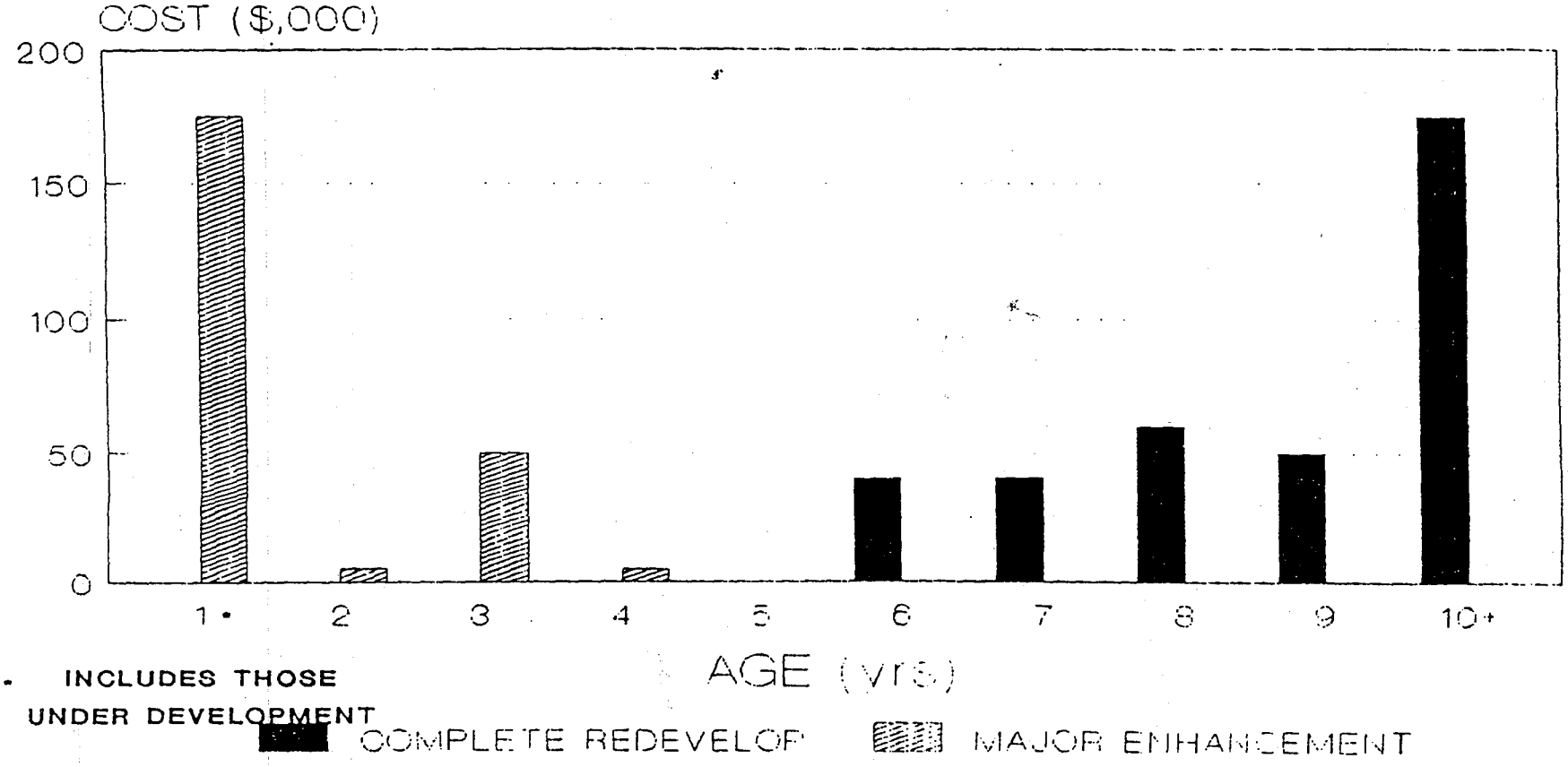
EXISTING SYSTEM ENVIRONMENT
ESTIMATED COST TO REDEVELOP
ALL SYSTEMS - BY AGE



* INCLUDES THOSE UNDER DEVELOPMENT

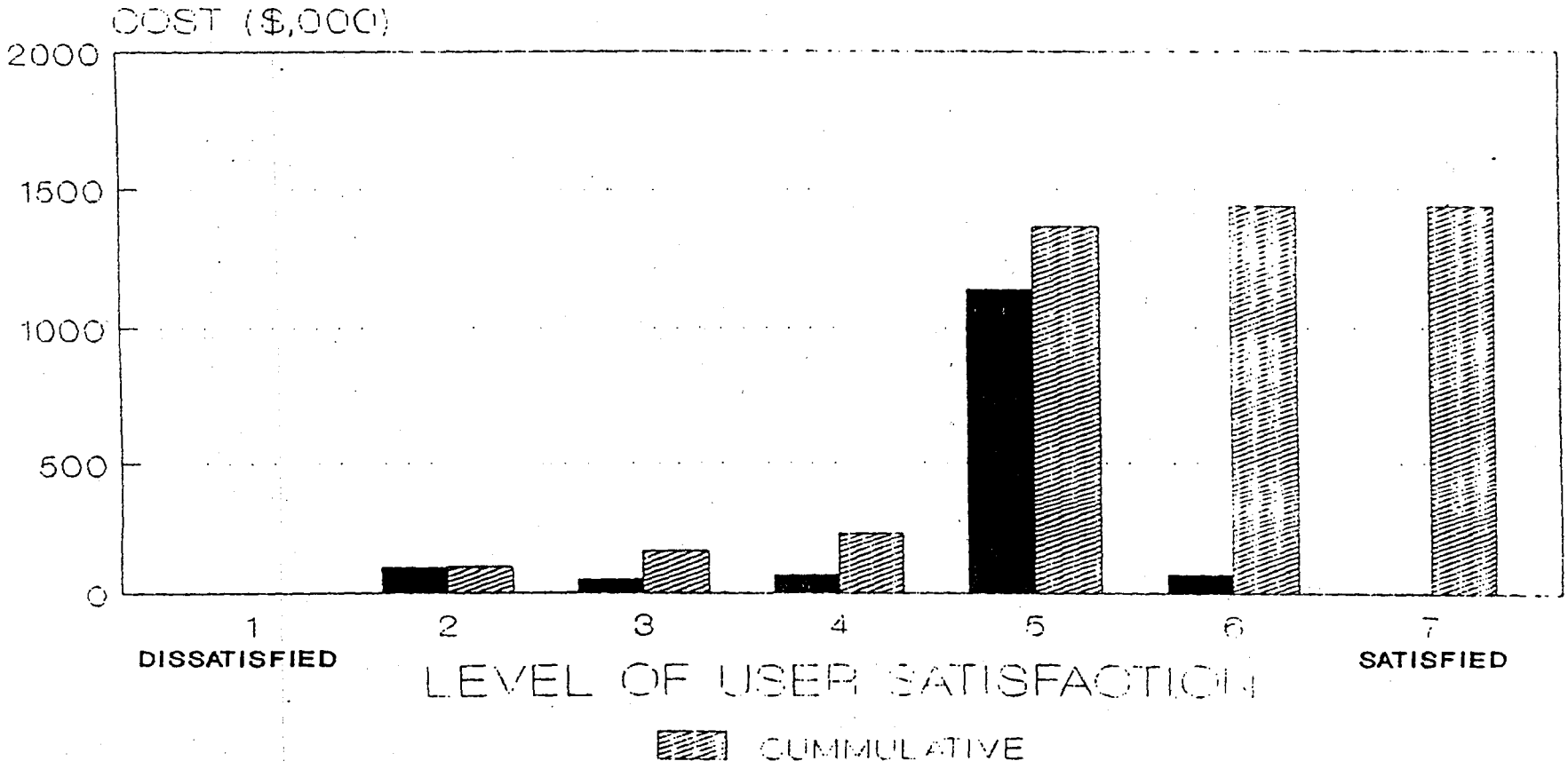
SISP PROJECT TEAM

EXISTING SYSTEM ENVIRONMENT
EST COST TO REPLACE SYSTEMS IDENTIFIED FOR COMPLETE OR MAJOR REDEVELOPMENT



SISP PROJECT TEAM

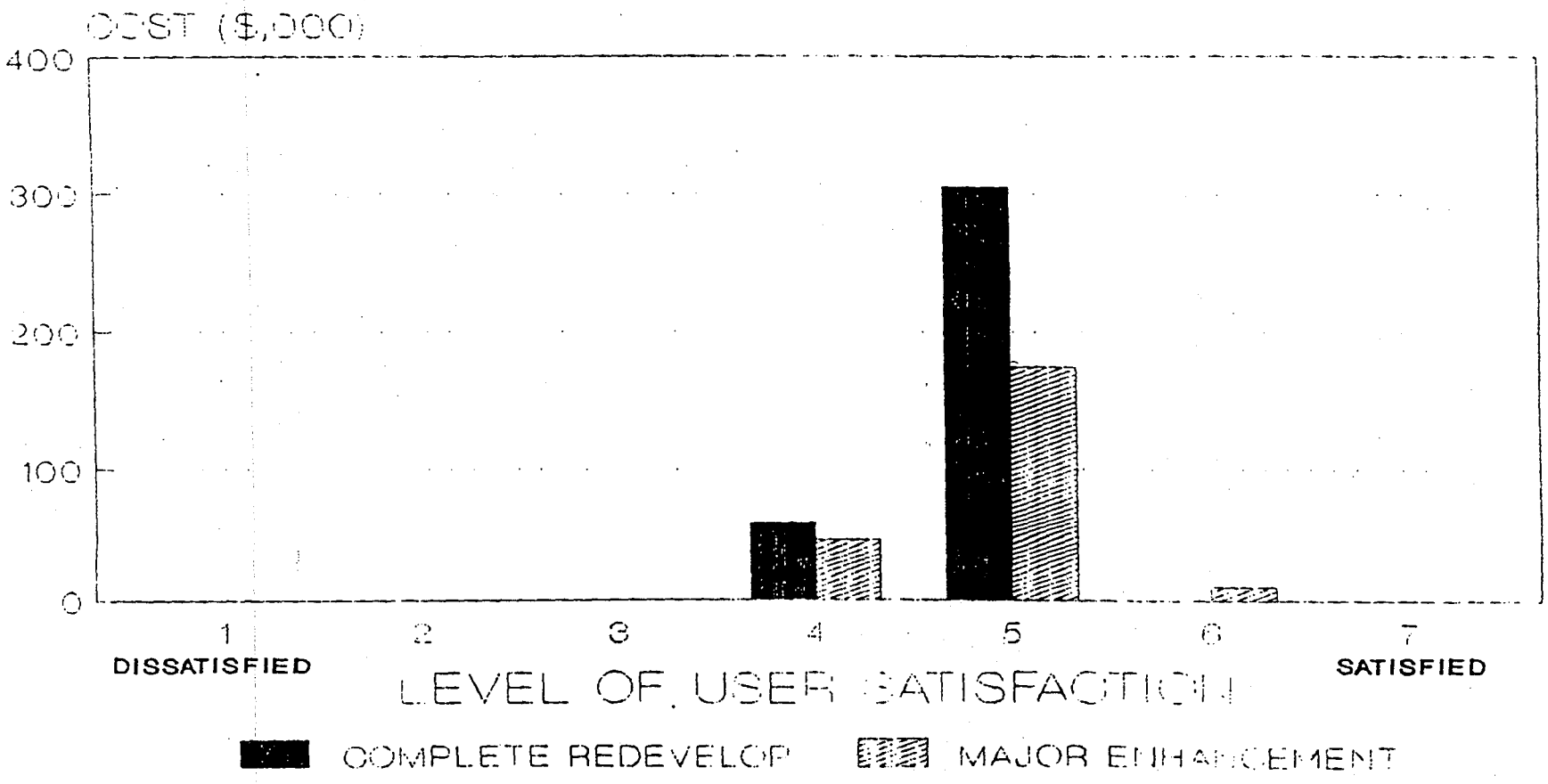
EXISTING SYSTEM ENVIRONMENT
ESTIMATED COST TO REDEVELOP ALL SYSTEMS BY SATISFACTION LEVEL



SISP PROJECT TEAM

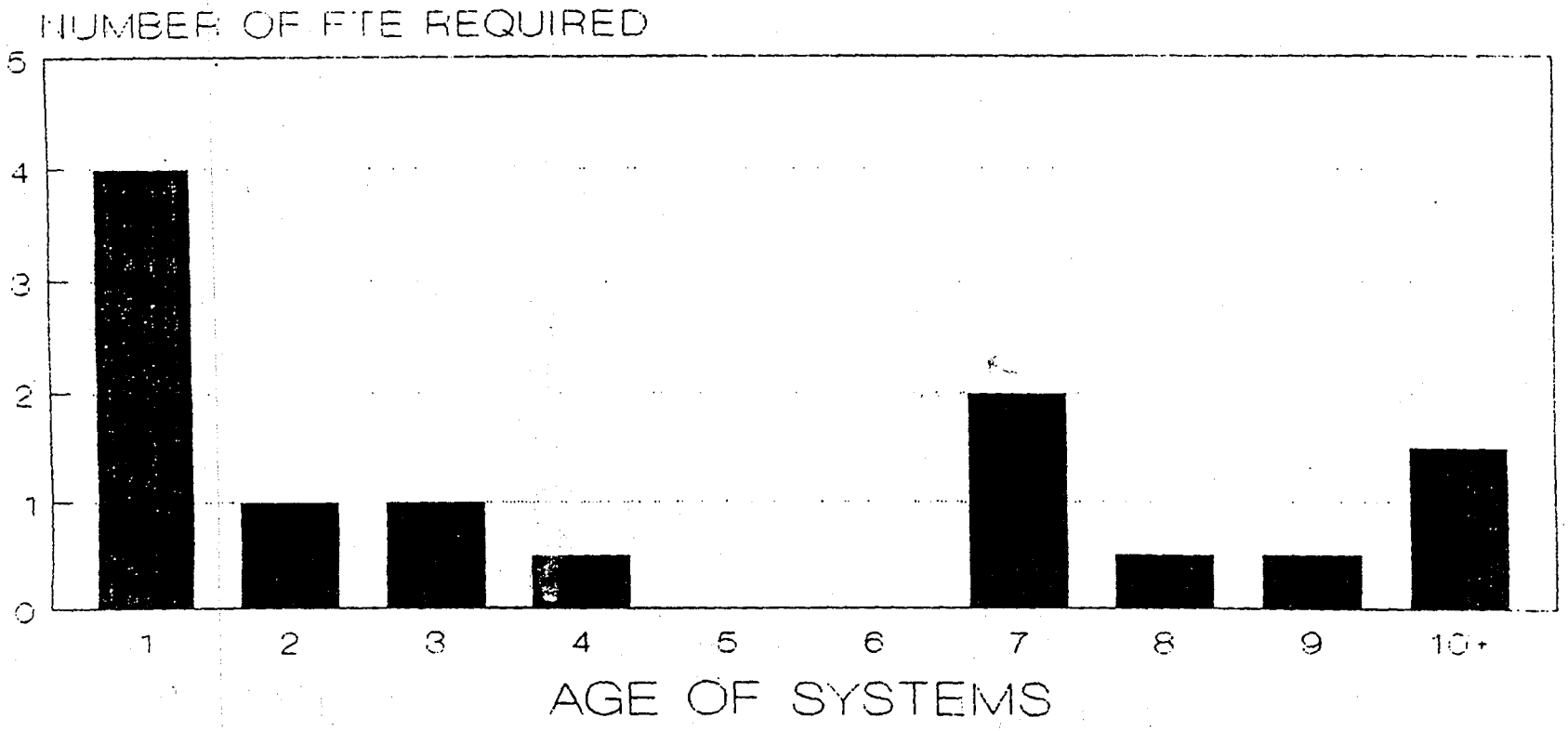
EXISTING SYSTEM ENVIRONMENT

EST COST TO REPLACE SYSTEMS IDENTIFIED FOR COMPLETE OR MAJOR REDEVELOPMENT



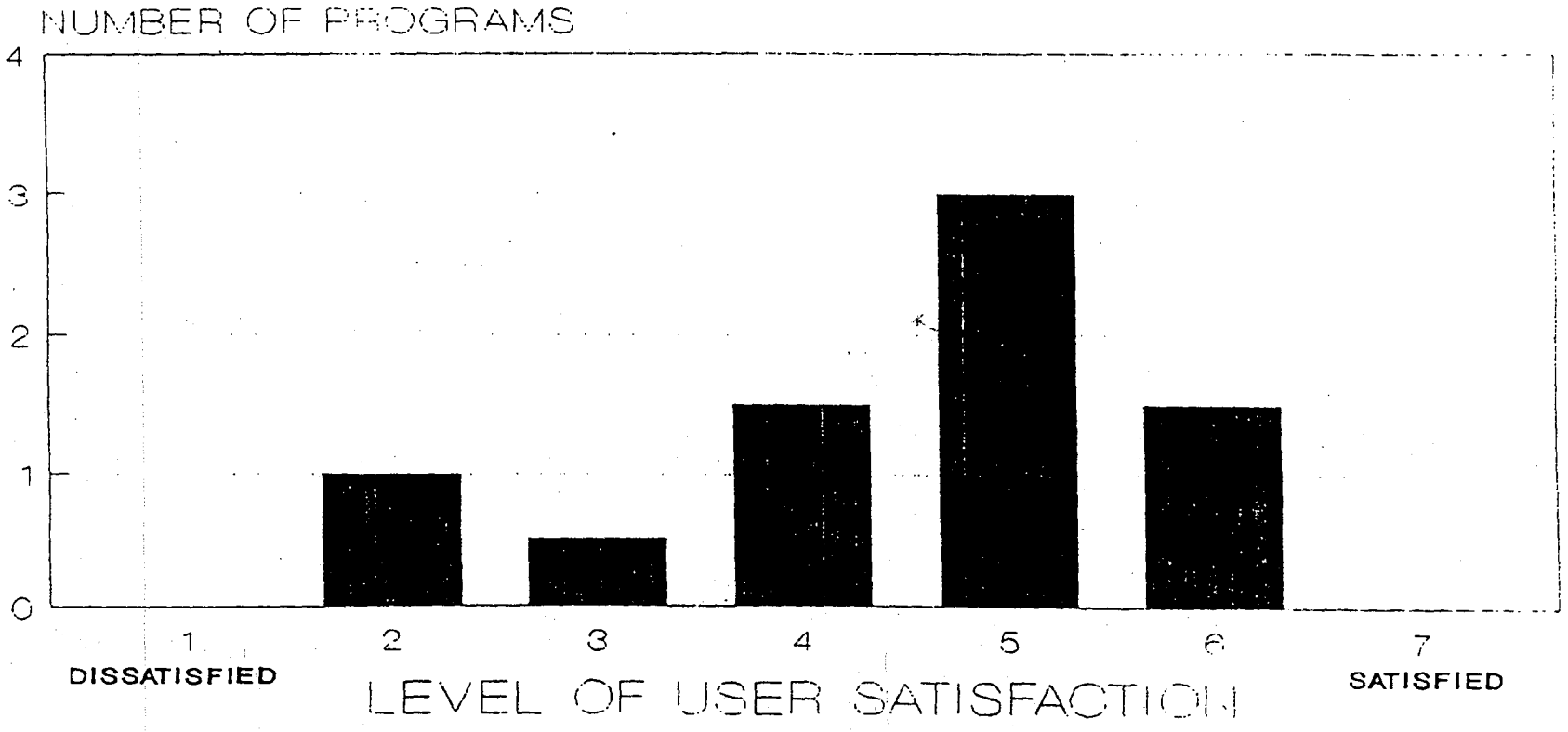
SISP PROJECT TEAM

EXISTING SYSTEM ENVIRONMENT
NUMBER OF FTE TO MAINTAIN SYSTEMS BY AGE OF SYSTEM



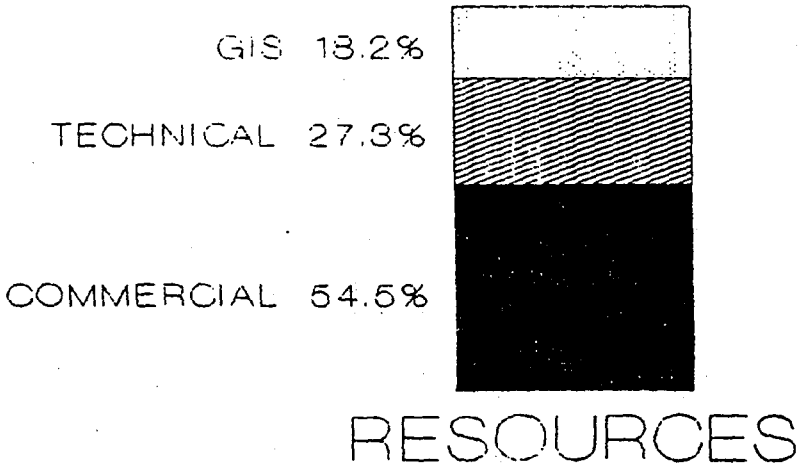
SISP PROJECT TEAM

EXISTING SYSTEM ENVIRONMENT
NUMBER OF FTE TO MAINTAIN SYSTEMS BY SATISFACTION LEVEL

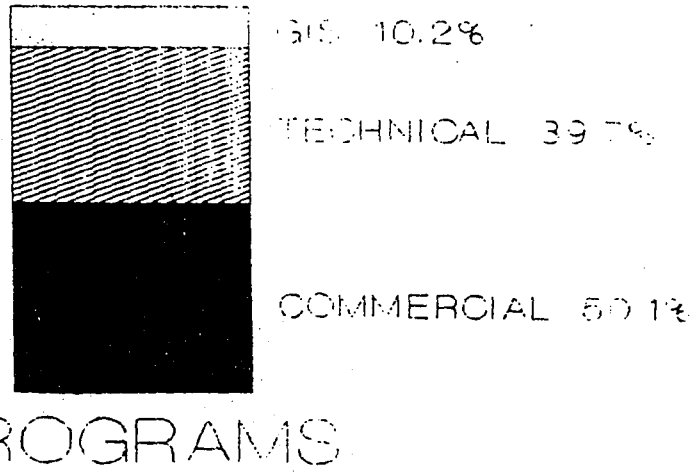


SISP PROJECT TEAM

EXISTING ENVIRONMENT
FTE TO MAINTAIN SYSTEMS
BY TYPE



RESOURCES



PROGRAMS

APPENDIX 4

POSSIBLE SYSTEMS

11. POTENTIAL INFORMATION SYSTEMS

This Appendix of the report describes each potential information system identified during the study. Details of each proposed system showing the scope, information needs satisfied, business functions supported, benefits and constraints are set out for each system.

This list is organised on the same sequence as in the mapping of Subject Areas, Application Areas and Possible Systems list in Section 6.3 of this report.

SUBJECT AREA - ACCOUNTING

1. Creditors System

   A system to automate the placing of requisitions and LPO's, the acknowledgement of receipt and clearance for payment to creditors so that the recording and clearing of commitments and the maintenance of payment registers can be done efficiently. The system would need to permit local printing of cash orders for prompt payment to local suppliers and contractors.

2. Debtors System

   A system to integrate all credit and cash transactions and provide common debtor facilities for all CALM customers. The system would be integrated with the General Ledger.

3. General Ledger, Including Budgeting & Expenditure Reporting

A system to establish a chart of accounts appropriate to management and operational levels of the department and for the reporting requirements of the Treasury Department. Flexibility to modify the list of jobs is needed. For budgeting the system needs to support preparation of the budget at all levels. For reporting purposes the system needs to accept data from source transactions such as salary and wages payroll, the plant system and stores for materials issues.

SUBJECT AREA - CALM ESTATE

4. Crown Land Register

A list of Crown Reserves showing identification, vesting, area, land type, purpose and mining or lease commitments.

5. CALM Land Register

A register of all pertinent CALM land showing vesting, land area, locations, purchases and alienations.

6. Plantation Data Base

A subset of the CALM Land Register which sets out all details of land areas under plantation including pine and eucalyptus species, and identifies the various parameters by which the details may be presented.

7. Estate Proposals Register

This system would record and track all proposals for estate variations such as land purchases, vestings, excisions and alienation. Past variation proposals would be recorded.

8. Private Property, of Interest to CALM

Essentially a simple list of properties of interest to CALM due to associations with other parties, proximity to CALM land, etc. Ownership details obtained from Office of Titles. Occupier details obtained from local Shires.

Note: New auto-accessing system now in use. — Oct '87

SUBJECT AREA - ENVIRONMENT PROTECTION

9. Degraded Sites Register/Planning

A system to record degraded sites with a view to establishing priorities for rehabilitation, and to provide guidelines and precedence advice for individual projects, including conditions and values to be followed.

10. Tenements Register

A system to record those mining tenements which effect CALM land. To identify their location, the holder and current activities.

SUBJECT AREA - FIRE

11. Fire Behaviour (Weather Forecasts)

Provision of accurate and timely fire weather forecasts to all district and other office locations.

12. Prescribed Fire Planning

A system to assist the preparation of prescribed burning programmes and to compile and provide reports on progress.

13. Fire History Data Base

To provide a data base of previous fires, especially wildfires, accessible as a corporate resource. The text should be linked to the fire themes in the GIS.

14. Fire Suppression

To provide a model to generate wildfire scenarios which would be used for strategic planning and fire training.

15. Fire Effects

To develop a model to simulate the effects of fire on conservation values, identifying and mapping the progress of regeneration following a fire.

16. Fire Resources Inventory

A system to record resources used in fire operations such as water points and fire towers to provide assistance in maintenance of these resources.

17. Aircraft Hours

Part of the plant and equipment area which would log aircraft hours for input to the maintenance function, as well as updating progress on the prescribed burning programme.

SUBJECT AREA - FOREST PRODUCE

18. Forest Produce Inventory

A system to classify and quantify available resources on land systems of interest to CALM for both management and resource conservation purposes.

19. Logging Plans

A system to assist with the development of logging plans, including the ability to optimise logging plans for sustainable yield.

20. Customer Data Base/Product Prices

Systems to provide efficient customer recording and processing, and to maintain appropriate price structures for customers and produce.

21. Contractors

A system to assist with the preparation of contracts and tenders, and to provide a suitable data base of contract terms, conditions and prices.

22. D Note Records

A system to ensure Delivery Notes, Inspection Certificates and Inspection activities are correctly compiled and processed.

23. Share Farm Proposals

A system to record and track applications for sharefarming ventures, and to manage accepted proposals in areas such as silviculture regimes, annuities due, etc.

24. Timber Industry Model

To provide a model of the marketing factors for the various products available relevant to production capabilities and Australian and world demand for different products.

SUBJECT AREA - GEOGRAPHIC INFORMATION SYSTEM (GIS)

25. Map Inventory

One aspect of a generalised stores inventory system to provide an inventory of maps available at various locations.

26. Survey Calculations

A system to calculate the area of land from survey data.

27. Theme and Base Mapping

The provision of computer assistance in the creation and maintenance of base maps such as cadastral and topographic maps, and theme maps of subjects relevant to CALM. Where possible, other computer maintained maps would be accessed for CALM purposes.

28. Inventories

The provision of quantitative measures and textual information associated with the instances of the distribution or occurrences of species.

29. File Precedents

A system to provide sufficient identification and cross-references to allow relevant file and folio data to be associated with theme and base maps.

SUBJECT AREA - LIBRARY

30. Library System

Provision of standard library facilities for books, journals and other reference material held at the main library and other locations, for general enquiries and reference searches by departmental officers.

31. Photographic Index

A system to catalogue and classify photographs, slides, etc, held at various locations, for general enquiries and subject matter searches.

SUBJECT AREA - LICENCES

32. Fauna Management and Kangaroo System

To provide for the preparation of inventories, the issue of licences and recording of returns from persons or organisations operating in the industry.

33. Public Licences

To provide facilities to issue licences to the public from various office locations, recording payments made for input to the General Ledger.

34. Collectors' Licences

A system for the efficient issue of licences for collectors of flora species such as wild flowers on CALM land.

35. Leases and Concessions

To provide a system for registration of leases and concessions to operate a business on or using CALM facilities.

36. Prosecutions

A system to record intelligence on suspects as well as actual protection activities such as searches, seizures, prosecutions and convictions.

SUBJECT AREA - PERSONNEL

37. Establishment/Deployment

A system to record staff details, skills, education and work history. Identifies current positions and their holders (or vacancies) for staff planning and deployment.

38. Mailing List

To provide suitable lists for communications with staff; distribution lists, telephone directories and radio numbers.

39. Safety System

To provide for recording of safety statistics, lost time accidents, and analysis' and reporting relative to staff, location and accident type details.

40. Training System

A system to record training needs, prepare courses, send staff to courses, and record assessments.

41. Staff Entitlements

To provide a record of staff leave entitlements.

42. Salaries Payroll

A system to calculate and prepare salaries for CALM staff, including Group Certificates. The system would need to identify jobs worked on by direct input of job codes or propotional allocation, for allocation to job costs in the General Ledger.

43. Wages Payroll

To provide a system to record pay elements, accept time sheets, calculate and prepare pays, including Group Certificates and allocation to job costs.

SUBJECT AREA - PLANT AND EQUIPMENT

44. Equipment Register

To provide a system to record the details of all major plant items, their deployment and allocation of costs to job costing in the General Ledger.

45. Building Register

To record all CALM buildings and to control any rentals and/or other charges associated with the buildings.

46. Maintenance/Workshop Schedules

To provide a system associated with the Equipment and Building Registers for the identification and management of maintenance and workshop activities.

47. Minor Assets Register

A system to list all minor assets, the officer responsible and their location, for insurance, maintenance and reporting purposes.

48. Rentals System

A system to invoice and monitor rents for the use of CALM buildings.

SUBJECT AREA - PUBLICATIONS

49. Publication Inventory

To be a subsystem of a stores inventory system which records the stock at various locations.

50. Publications Index

Part of the Records Management System (RMS), to provide an index by subject matter of publications which are the responsibility of Information Branch but are not held in the library system.

51. Publication Sales

A system to manage public subscriptions to CALM publications, to record mailing lists for publications, and to process sales to the public. An interface to the Debtors System is proposed.

52. Public Participation

A system to assist with the recording and analysis of public submissions on management plans and other public participation areas of CALM.

SUBJECT AREA - RECORDS

53. File & Folio Index and Location

A system to record all files and folios (as applicable) by title, location and subject area. Facilities include file issues and location, bring-ups, etc. The system would also require indexing of files and folios by keywords for retrieval. File in branches, regions, etc, would be recorded in the system.

54. Ministerials System

A system to provide for the urgent nature of ministerial correspondence in terms of registration and preparation of the response material.

55. Parliamentary Questions

To provide for the urgent nature of parliamentary questions in a manner similar to Ministerials.

56. Correspondence Register

A system to cover the registration of correspondence, issue to the appropriate officer, and final disposition of the response.

57. Information Retrieval

A system to provide for keyword indexing of non-file information from text or abstracts, and available for general enquiry.

SUBJECT AREA - RECREATION OPERATIONS

58. Recreation Site Register

An inventory of all recreation sites and facilities associated with them such as scenic walks, swimming, camping, toilets, etc. An important feature would be the ability to make enquiries such as which sites cater for the handicapped, which have camping, etc.

59. Visitor Surveys

This system would record the results of visitor surveys for analysis. A flexible approach is necessary to allow surveys for differing purposes to be constructed and processed.

60. Site Planning

A system to provide assistance in planning the development and enhancement of recreation sites. Essentially a GIS subsystem including the use of detailed topographic maps, and terrain and landscape modelling.

61. Signs Inventory

A system to record the age, location, type, etc, of signs set up on walk tracks, in national parks and reserves, etc. The system would assist with planning sign preparation and maintenance. By having appropriate location information, walking itineraries could be printed.

62. Concessionaire Leasing

See Licences.

63. Landscape Inventory

This system would record landscapes with particular scenic values on the CALM estate to be considered when plans for other CALM activities are being prepared and for recreational purposes.

SUBJECT AREA - RESEARCH

64. Research Project Register

This system would record relevant details of research projects, indexed in various ways to assist management. Past projects and planning for future projects would be incorporated. One important feature would be an inventory of research data bases resulting from the projects.

65. Permanent Plot Register

A system to register and record the measurements from permanent plots associated with the estate. This would aid preservation as the plot register would be accessible to officers preparing other plans.

66. Type Specimen Register

This system would record the details of specimens of flora and fauna held at various offices.

67. Research Data Bases

Where relevant, data bases of corporate interest are upgraded to provide information services to other branch users.

SUBJECT AREA - STORES

68. Stores Inventory

This system would aim to be a generalised system which would record inventories of differing types of stores at many locations. The system would provide for replenishment and issues with an interface to the General Ledger for materials costing where relevant.

69. Public Sales

Where stores inventories are available for public sales, such as seed stocks, nursery stocks and publications, the system would provide an interface to allow credit sales to be processed through the Debtors System and cash sales to be posted to appropriate General Ledger accounts.

APPENDIX 5

INFORMATION ENGINEERING METHODOLOGY

See attached document:

"Information Engineering"

By James Martin

APPENDIX 6

COMPUTER POLICY COMMITTEE

This appendix has been included in the plan to provide a checklist of issues which are seen to be appropriate to the Computer Policy Committee.

The following points need to be considered by the CPC as it formalises its membership role and responsibilities. Specifically the CPC should:-

- Be a key factor in the success in the implementation of Information Technology through its ability to utilise each member's knowledge of the organisation, its objectives and plans to direct Information Technology in a way consistent with the department's Corporate Plan.

- Be the group which approves specific proposals for the acquisition of computing equipment and services.

- Be the sponsor for the development of appropriate Information Technology plans.

- Approve specific projects based on agreed and documented criteria including such factors as return on investment, cost benefit, strategic value, etc.

- Determine priorities for the allocation of resources, both financial and staff.

- Resolve disputes resulting from the implementation of Information Technology, claims on resources and the setting of priorities.

Specific issues which traditionally inhibit the success of the CPC concept include:-

- Poor attendance by members.
- Poor preparation by both those seeking decisions from the CPC and by members in reviewing meeting material.
- Lengthy, time wasting meeting formats which inhibit policy making discussion and concentrate on mechanical reporting.
- A "squeaky door" approach to resource allocation and priority setting thereby missing key strategic opportunities.
- Decision delays through deferral and detailed critical reviews which hold up the major thrust of project proposals.

These problems can be avoided through good committee management and a clear understanding of the role and responsibility of the CPC and the contribution required by each of its members.