

Johnstone River Catchment

Management Strategy

July 1994

PREFACE

Integrated Catchment Management (ICM) provides an unparalleled opportunity for the owners and managers of our land and water resources, in conjunction with the communities of the Johnstone River Catchment, to determine and mould our future.

Long term sustainable and balanced use of these vital resources depends on sound management by this generation to ensure that the generations who follow us will be able to continue to utilise these natural assets.

A large number of highly qualified technical people, working within our Technical Advisory Groups (TAGS) have provided us with comprehensive reports on the state of the catchment in the key areas of land management, river management, water resources and habitat management.

From these reports, we have drawn together this Catchment Management Strategy which seeks to present a broad overview of the catchment, the management issues and the strategies to address these issues.

The Strategy is the first part of a two part output package of the Pilot Study. The second part is a series of Industry/Stakeholder statements.

We are very conscious of the fact that ICM will only become a reality if ordinary individuals who have an impact on our land and water resources, that is everybody who lives in the catchment, embrace and adopt the practices that will achieve sound natural resource management. Our Industry/Stakeholder statements seek to draw out of the overall Strategy those issues and recommendations which are relevant to specific groups, and present this information in a way which attracts their interest and attention.

When we began this Pilot Study 3 years ago we had few models to follow. The deliberations of this Committee in developing this strategy package have provided each of us with a unique learning experience which has enabled us to form personal views of ICM and the wider issues associated with natural resource management.

We have attempted to encapsulate our thoughts and experiences on these important emerging issues in the statement containing recommendations to Legislators and Administrators. We trust that these will contribute to the shaping of future Government policies on these vital issues.

ICM, like Landcare, with its emphasis on community involvement, provides an ideal vehicle to address the issues and to develop a duty of care and a sense of stewardship towards our natural resources, so that the generations who follow us may enjoy a rewarding and productive life in this most beautiful part of Australia.

I would like to place on record my sincere thanks to the members of the Pilot Study Committee who have worked in a voluntary capacity over the past 3 years, all making their individual contribution to this, the final product.

I also extend my Committee's special thanks for the contribution made by our Co-ordinator, Mike Merin. Without his dedication and hard work the comprehensive outcomes of this study would not have attracted the interest or critical acclaim they have. His contribution has been complimented by the untiring efforts of Narelle Ferguson. Thank you both.

We commend this Strategy to you as the base from which we can begin working together to ensure our future.

Charles Loudon
CHAIRMAN
JOHNSTONE RIVER CATCHMENT CO-ORDINATING COMMITTEE
July 1994

THE PILOT STUDY COMMITTEE

This Catchment Management Strategy has been developed and reviewed by the **Johnstone River Catchment Co-ordinating Committee**. Membership of the Committee during the period of Strategy development and review and the respective group representation has comprised:

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Cattle producer and pawpaw grower of East Palmerston. (HORTICULTURE)

MR ALAN BLAIR

Lecturer in Agriculture/Horticulture at the Johnstone College of TAFE. Member of the Johnstone Region Landcare Group. (LANDCARE)

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MR BASIL MICALE

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Small businessman. Recreational Fisherman. (RECREATION)

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STUDY CO-ORDINATOR

MR MICHAEL MERRIN

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SUMMARY

INTRODUCTION

This Strategy has been prepared to document the findings and the deliberations of the Johnstone River Catchment Co-ordinating Committee from the Pilot Study of the catchment, which was an early initiative of the Queensland Government's Integrated Catchment Management (ICM) program.

The Strategy provides for the future management of the natural resources of the Johnstone River catchment by adopting a co-operative and co-ordinated approach involving the whole catchment community and Government working together to address issues of common concern.

Outcomes

The Management Strategy will provide for better strategic management of the natural resources of the catchment and encourage open and objective decision-making in accordance with the values of the catchment community. However, it will not resolve all of the existing problems of the catchment, nor will it provide all the information necessary to enable problems to be solved.

The Strategy

Provides a framework for future management of the natural resources of the catchment;
Identifies priorities for strategic action to manage key natural resource issues;
Identifies responsibilities for undertaking priority actions.

- Proposes implementation arrangements and mechanisms for co-ordinated actions to address priority issues.
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While development of the Strategy has focussed on the catchment of the North and South Johnstone Rivers and its outcomes will have direct relevance to this area, it is considered to have applicability to adjacent areas of the Wet Tropical Coast of Queensland. Communities and agencies with an interest in these adjacent areas are therefore encouraged to consider the recommendations contained in the Strategy in this wider context.

Information gathered during the course of the Pilot Study has been incorporated into a Geographic Information System (GIS) for the catchment and may be accessed and expanded upon during future implementation programs. Examples of the data contained on the GIS have been produced in an Atlas of the Catchment, which complements this document.

Key Issues and Recommendations

The principal recommendations from the Strategy are summarized below for each of the key issues areas discussed in the document, namely:

- Land Management;
- Water Management;
- Riverine Management;
- Habitat Management;
- Implementation.

LAND MANAGEMENT

Key Issues

- Impacts of land use allocation and development decisions on related resources and systems.
- Impacts of land management practices on related resources and systems.

Principal Recommendations

- Encourage and support Local Authorities to develop comprehensive Planning Schemes and policies which incorporate wider resource and environmental management objectives.
- Promote the adoption of sustainable systems for agriculture through the development and adoption of Best Management Practice Guidelines and Property Management Planning programs for dairy, beef, horticulture and cane industries.
- Identify and manage high impact catchment disturbances by development of appropriate management plans or compliance with relevant Best Management Practice Guidelines.

WATER MANAGEMENT

Key Issues

- Competition over allocation of available resources.
- Maintenance and enhancement of water quality for in-catchment downstream purposes.

Principal Recommendations

- Develop and implement a Management Plan for the allocation and management of the available resource.
- Establish a co-ordinated program for management of water quality, based on identified environmental values and relevant indicators, in accordance with the proposed State Environmental Protection Policy for Water.
- Establish mechanisms to provide for community and stakeholder involvement in the management of water resources and its quality.
- Establish a Water Quality Working Group (WQWG) to co-ordinate water quality management in the catchment, with representation from the Department of Environment and Heritage (Convenor), Department of Primary Industries, Johnstone and Eacham Shire Councils.

RIVERINE MANAGEMENT

Key Issues

- Lack of clear management responsibilities throughout the catchment.
- Narrow focus and reactive nature of current management approach.
- Lack of co-ordination with management of related systems.

Principal Recommendations

- That the existing management arrangements and role of the Johnstone Shire River Improvement Trust be reviewed to determine appropriate arrangements for the wider role of river management.
- That the Trust be renamed the Johnstone River Management Trust and be the lead agency for river management in the lower catchment.
- That river management be undertaken in a strategic and proactive way through the development of a Riverine Management Plan.
- That the Trust establish co-operative management arrangements with other agencies and organisations to ensure a whole of catchment approach.
- That the Trust adopt a business-like approach to its operations which is also open and accountable to the community.

HABITAT MANAGEMENT

Key Issues

- Preservation of areas of terrestrial habitat critical to rare and threatened species.
- Loss of instream habitat quality.
- Loss of estuarine and wetland habitats.

Principal Recommendations

- Maximise the habitat values of existing protected areas (World Heritage Area, marine and National Parks, Environmental Reserves) through proper management and protection strategies.
- Encourage the voluntary retention of habitat on freehold land through:
 - Awareness and example;
 - Incentives and technical support;
 - Voluntary agreements.
- Identify critical areas in need of protection and establish appropriate protection arrangements.
- Develop procedures to ensure the protection of significant wetland and estuarine habitats.

IMPLEMENTATION

Key Issues

- Implementation of Catchment Management Strategies.
- Integrated delivery of Government programs.
- Stakeholder review of Government programs.
- Monitoring and review of Catchment Management Strategies.

Principal Recommendations

- Establish a permanent and incorporated, non-statutory Catchment Co-ordinating Committee to:
 - Provide community input, strategic direction, promotion and oversight of Catchment Management Strategies;
- Develop a Memorandum of Understanding between the Catchment Co-ordinating Committee and the nominated lead natural resource management agencies which establishes the process and mechanisms for:
 - Roles and responsibilities of the CCC and the agencies;
 - Bi-annual Catchment Conferences;
 - Development of Implementation Plans and Focus Activities addressing Priority issues from the Strategy.
- Retain and enhance the role of the existing Catchment Centre to:
 - promote ICM and the Catchment Management Strategy with the community;
 - Support implementation of the Strategy through industry and community groups and the nominated lead agencies.
- Develop and maintain linkages with other ICM groups, other regional planning and management initiatives and Government to provide a regional focus for ICM in the Wet Tropics Region.

1. INTRODUCTION

1.1 INTEGRATED CATCHMENT MANAGEMENT

Integrated Catchment Management (ICM) is a concept which is based on a co-ordinated approach to the management of natural resources in Queensland. Its overall purpose is to integrate the management of land, water and related biological resources in order to achieve their sustainable and balanced use.

ICM seeks to draw together those involved in primary production, environmental conservation, land use planning, river management and other aspects of natural resource management, to work together to manage these resources on a whole-of-catchment basis.

1.2 THE STATE ICM STRATEGY

The implementation of ICM in Queensland is being guided by the State Integrated Catchment Management Strategy.

The Strategy:

- Provides a framework for fostering co-operation and co-ordination between the many landholders and other resource users, community groups and government agencies;
- Is dependent on landholders, the community and government having a co-ordinated catchment-wide approach for addressing issues affecting them;
- Encourages all people who use or manage land and water resources to use practices which maintain, restore or improve the quality and productivity of those resources;
- Recognises that there will be many situations where existing groups and organisations can address important environmental problems.

1.3 PRINCIPLES AND OUTCOMES

The principles on which the Strategy is based are:

- Land and water resources are basic and interactive parts of natural ecosystems and their management should be based on river catchments as geographic units which account for the interactions between these resources;
- River catchments are continuously changing in response to natural processes and human activity and their management must take account of these changes;
- The management of land and water resources must be co-ordinated with decisions based on the best available information;
- Sound land and water management is best achieved through the informed action of individual users and managers of these resources;
- A balance between economic development and conservation of land and water resources must be maintained.

The Strategy will help to achieve:

- An understanding and accounting by all users and managers of land, water and related biological resources of the effects of their decisions and actions on these resources;
- Co-operation and co-ordination between the community and government in their land and water resource management activities;
- Economically viable industries within an ecologically sustainable framework;
- Clean water, fertile soil and ecologically diverse and productive ecosystems.

The success of the ICM Strategy depends on the long-term involvement of the community and government. By working together using the approach outlined in the ICM Strategy, we can ensure that our land and water resources continue to meet our needs now and in the future.

1.4 JOHNSTONE RIVER PILOT STUDY

The Johnstone River Catchment Pilot Study was the first attempt to implement the Integrated Catchment Management concept in Queensland. It was initiated to gain practical knowledge and experience in this new approach to sustainable resource management and to develop a model for the introduction of ICM in other areas of the State.

The Pilot Study commenced early in 1991 under the Queensland Government's Integrated Catchment Management Program, with the establishment of a community based Catchment Co-ordinating Committee to direct and oversee the Study. Membership of the Committee is representative of a wide cross section of the catchment community, covering agricultural, industrial and community interests, supported by staff from the Department of Primary Industries.

The Pilot Study has been operating from a prominent shop-front Catchment Centre in Innisfail since mid-1992. This arrangement has proven invaluable to establishing a credible and community orientated presence for ICM in the catchment, and to the effective functioning of the CO-Ordinator and the Catchment CoOrdinating Committee, particularly in relation to liaising with industry and community organisations and Government agencies.

The major roles of the Committee in the Pilot Study were to:

- Address complex natural resource management issues that involve the community and government;
- Provide a forum for stakeholder input and discussion;
- Prioritise issues;
- Develop and promote and adoption of catchment management strategies to address priority issues.

The Committee determined that it would carry out this role in the following manner:

- Act as a co-ordinator to bring together the people and organisations in the catchment who have responsibility for land and water use. To consult, examine issues, identify solutions and agree on actions;
- Encourage by publicity, demonstration and example, sound management practices to achieve long term sustainable use of the catchment's resources;
- Review the programs and activities of Government Departments and agencies and offer advice on priorities as seen from a community point of view;
- Provide the Minister for Primary Industries with an independent and broad industry and community view on management of the catchment;
- Act as "honest broker" in assisting with the resolution of disputes involving the use of land, water and other natural resources.

In carrying out its tasks, the Catchment Co-ordinating Committee has adopted the following general principles:

- Resources should be managed to ensure long term sustainable and balanced use;
- All individuals and sectors of the community have a responsibility for sound resource management and therefore a right to have their concerns heard;
- Decisions relating to management should be made on the basis of facts and the best available information;
- Change, where needed, should be achieved by awareness, demonstration, co-operation and consultation, rather than confrontation;
- Change should be managed at a rate which minimises community dislocation, while maintaining adequate protection for the environment;
- Costs involved in implementing decisions which benefit the wider community should be borne on an equitable basis across the community;
- Legislation to achieve change should be used only as a last resort.

1.5 CATCHMENT MANAGEMENT STRATEGY OVERVIEW

The major focus of the Pilot Study in developing the ICM concept has been the preparation of a Strategy for the future management of the natural resources of the Catchment.

This document details the principal elements, processes and products of the Catchment Co-ordinating Committee's deliberations on these issues, since the inception of ICM in the Johnstone River catchment in 1991.

The document builds on the Draft Management Strategy which was released for comment in March 1993. The Draft Strategy has been reviewed extensively by Government Departments and Agencies (at both the policy and operational levels), Local Government, industry and community groups and research organisations. The responses from these organisations have been considered by the Committee in the preparation of this Strategy.

Section 2 of the document provides an introduction to the catchment, with an overview of the physical social and economic resources which make up the catchment today. Section 3 outlines the key elements and processes involved in the development of the Strategy, while Sections 4 - 7 detail the individual strategies addressing the priority issues under each of the four Key Issue Areas for resource management. The concluding section outlines the preferred model for Strategy Implementation, providing details of the mechanisms and processes proposed to translate the Strategy into meaningful outcomes leading to sustainable use of the catchment's natural resources.

2. JOHNSTONE RIVER CATCHMENT OVERVIEW

2.1 INTRODUCTION

The Johnstone River catchment is a rich and diverse region supporting a range of agricultural industries in an area of outstanding natural beauty.

The prosperity of the area is based upon its unique combination of land, water and vegetation resources and their development over the period of human settlement. The continuance of this prosperity will depend increasingly on the efficient use and management of these resources which underpin the area's economic and environmental vitality.

This section of the document highlights some of the key elements of these natural resources and the socio-economic developments which impact on them and which are, in turn, impacted upon by the processes which drive the catchment system.

Additional information on the natural and social resources of the catchment is contained in the Johnstone River Catchment Atlas which has been produced in conjunction with this strategy. Copies of this Atlas have been made available to the key management agencies, industry groups and community organisations with responsibilities for implementation of the Management Strategy throughout the catchment.

2.2 THE NATURAL RESOURCES

Physiographic Regions

The Johnstone River Catchment comprises a total area of some 1639 square kilometers on the wet tropical coast of Far North Queensland. For the purpose of the Pilot Study, the area has been classified into four broad physiographic regions which have been referred to in this document as:

- **Tableland Area**, comprising the south-eastern section of the Atherton Tableland and making up some 30% of the catchment area;
- **World Heritage Area**, which dominates the mid-reaches of the catchment (but also includes the coastal ranges) and comprises nearly 45% of the total area;
- **Undulating Lowlands**, covering the steep to undulating agricultural lands between the escarpment and the coastal ranges, which makes up 20% of the catchment;
- **Floodplain and Estuarine Zone** which comprises the area inundated by the 1967 flood event, making up the balance of the area.

These areas are identified in the map of the Pilot Study Area at Figure 2.1 on page 15.

(MAP)

Geology

The oldest geological unit comprises Barron River metamorphics which are fine grained sedimentary rocks of marine origin. These form the majority of the World Heritage Area landscapes including the Moresby and Basilisk Ranges. They are associated with red and orange clayey soils and usually support luxuriant vegetation.

Resulting from major earth movements about 300 million years ago, granitic rocks were thrust up through the older rock formation. The softer marine rocks were gradually weathered away and eroded, exposing the granite which is now evident as large mountains such as Mt Bartle Frere and the Walter Hill Range.

Later volcanic activity gave rise to the Atherton basalts which form the majority of Tableland segment in the upper reaches of the catchment and underlies the course of the Johnstone River almost to its mouth.

The youngest unit in the catchment comprises alluvial sediments on the floodplain derived from weathering and erosion of the three older units.

Soils

Soils derived from metamorphic rocks are usually well drained, uniform to gradationally textured, with dark to reddish brown surface overlying a well-structured clayey sub-soil. Associated fan-slopes are usually lighter textured. They cover the major part of the World Heritage Area and minor areas on the Tableland and in lower slopes.

Soils formed directly on granite rock are commonly well-drained, gradationally textured with dark brown, sandy clay loam surface soil over red sub-soil. There are minor areas of outreach fans with lighter textured soils. These soils occupy significant areas of the World Heritage Area, with only minor areas on Tablelands and lower slopes.

Soils derived from basaltic rock are mainly deep red, friable, structured and well drained. They occur throughout the catchment, including some minor areas on the floodplain.

Soils formed on alluvial sediments vary according to their landscape position with elevated parts of river levees having well drained soils, while lower areas are less well drained and in some locations swamps have developed. Alluvial soils occur mainly on the floodplain and in part of the lower slopes area.

Hydrology

The Johnstone River system drains one of the wettest regions in Australia, with average annual rainfalls ranging from around 1800 millimetres to in excess of 4000 millimetres. The

Catchment area contributes, on average, nearly three million megalitres of runoff per year, however runoff can vary considerably from year to year.

The catchment hydrology is dependant on two main factors - the relatively intense seasonal tropical rainfall, followed by a relatively long duration dry period in which there is little significant rainfall, and a variable catchment physiography. In general, in the upper part of the Catchment (The Tablelands) rainfall results in both runoff and infiltration into the underlying rocks which, because of their porous and permeable nature store water and subsequently drain to provide baseflow during the "dry" season. The central part of the catchment - defined by the World Heritage Area - is generally an area of high runoff with little infiltration. It therefore contributes little to baseflow of streams during the dry season. The floodplain responds instantly to rainfall. Rivers and streams rise and fall rapidly as do watertables. The floodplain is the freshwater "receptacle" of the catchment.

Vegetation and Fauna

The catchment exhibits a remarkably rich and varied range of natural vegetation as a consequence of the rainfall, and the variations in landform, soils and elevation. The granite ranges of the great escarpment tower 1000m above the coastal plain ensuring sufficient rainfall to support many different structural types of rainforest. The changes in elevation result in a cool temperate forest type on the higher mountains, through to complex types of tropical rainforest on the foothills below. These rainforests contain many rare plants and are home to the richest variety of fauna to be found in Australia. Much of this area has been included in the Wet Tropics World Heritage Area.

While much of the coastal plain has been cleared for agriculture, melaleuca woodlands and lowland rainforest are still present. The coastal fringe supports a rich diversity of mangrove species which grade into rainforest above the tidal beaches.

The majority of the larger animals in the area are found on the Atherton Uplands, above about 300m. Rainforest specialists include several species of ringtail possums, a tree kangaroo, and numerous species of native rats, carnivorous marsupials and small wallabies. The area is home to several large colonies of fruit bats, on whom many rainforest trees depend for pollination and fruit dispersal.

Very few rainforest animals are found on the lowlands, although rainforest is still present in some places. This pattern of animal distribution is thought to reflect historical vegetation patterns over the past few million years when the climate was much drier.

This area is also home to many species of birds, the largest being the southern cassowary. Unlike some of the other rainforest fruit eaters, the cassowary depends on access to other vegetation types to survive. Mangroves and open woodland vegetation on the coastal plains are important food sources when the rainforest fruits are finished.

The waterways and wetlands of the catchment also support a diverse range of aquatic life, with over 120 fish species having been identified, including a number of economically important species such as the barramundi.

Loss and degradation of aquatic habitat, particularly through destruction of riparian vegetation, siltation of watercourses, the proliferation of exotic grasses and destruction of wetlands, have occurred throughout the developed areas of the catchment.

It has been suggested that these losses could have significant consequences for a number of species of importance to the recreational and commercial fishery.

2.3 SOCIO-ECONOMIC DEVELOPMENT

Over the past 100 years, approximately 50% of the catchment area has been cleared and developed for human settlement, principally for agricultural production.

Today, the catchment supports a number of significant primary industries and associated processing and support facilities which underpin the regional economy and the prosperity of the catchment's population.

The Tableland Zone supports the major part of the regional dairy industry, with some 20 000 hectares devoted to dairy production. The co-operative dairy processing plant in Malanda is a significant local employer. The gross value of dairy production from the catchment for 1991/92 was estimated at some \$45 million.

Sugar production has traditionally been the dominant agricultural industry in the lower catchment. The area assigned to cane in the catchment currently stands at around 15 000 hectares, having experienced a slight decline in recent years. Three sugar mills, Babinda, South Johnstone and Mourilyan, process cane from the catchment. Due to a combination of low production due to poor growing conditions and depressed world markets, value of production in 1001/92 was reduced to approximately \$50 million.

The horticultural industry is now a significant industry in the catchment, with rapid expansion over recent years, particularly in the banana industry. It is estimated that in excess of 2500 hectares are currently in production, predominantly on the lower slopes of the catchment, with annual production valued at some \$60 million. Pawpaws and tropical fruits are also grown in this zone.

Beef production is practised both on the Tableland and in the lower catchment and is significant in terms of the area of some 25 000 hectares involved. An export meatworks in Innisfail processes beef from the area.

Other primary industries in the catchment include a substantial commercial fishing fleet based in Innisfail, tea production on the lower slopes and Tableland (where processing is also now carried out) and aquaculture.

The total value of primary production from the catchment for 1991/92 is estimated at \$170 million.

Fertiliser supplies of around 7 300 tonnes of nitrogen and 17 000 tonnes of phosphorus are purchased annually for use in primary production in the catchment.

Primary production and processing is supported by a range of service and support industries. A major foundry in Innisfail manufactures specialist products for local, national and export markets.

Tourism is increasing in importance in the catchment, with flow-on effects from the rapid increase in activity in the Cairns region, combined with the potential of the World Heritage Area, highlighting the potential for further development in this sector of the local area.

The catchment supports a population of approximately 18 000. Around 60% of the population resides in the main urban centres, Innisfail and Malanda, while rural residential development is significant and expanding.

The area is serviced by effective transport and communications infrastructure. The Palmerston Highway provides access through the catchment, linking the Bruce Highway at Innisfail with the road network through the Atherton Table and beyond.

3. STRATEGY DEVELOPMENT

3.1 INTRODUCTION

The development of the Catchment Management Strategy has required a complex process of strategic planning and negotiation on issues relating to the use and management of the catchment's resources. This has involved broad community and agency input and the consideration of many often conflicting views to reach an agreed position on these issues. This process has involved a number of different elements including community involvement, information sharing, inquiry, familiarisation and negotiation by and within the Catchment Co-ordinating Committee throughout the duration of the Pilot Study.

This section outlines the principal elements of that process, leading to the identification of the key issues to be addressed and the development of strategies and recommendations for future resource management.

3.2 VISION

In the process of developing this Strategy the Catchment Co-ordinating Committee has adopted the following broad vision of the future for the Johnstone River Catchment.

The Johnstone River Catchment will continue to support a prosperous and responsible community through a diversity of viable primary industries and associated processing and support enterprises in a rich and diverse tropical environment.

Our vision will be achieved through the responsible and co-ordinated management of the natural resources of the catchment (land, water, vegetation and wildlife systems) to ensure that they continue to meet the economic, social and environmental needs of present and future generations.

3.3 GOALS FOR MANAGEMENT OF THE CATCHMENT

- To manage the use and development of the land, water and vegetation resources and associated wildlife systems in a way which avoids, remedies or reduces adverse effects of the availability and quality of these resources.
- To encourage the adoption of affordable and sustainable land management practices and farming systems which minimise land degradation and enhance productivity.
- To ensure the viability of primary industries through the preservation of quality agricultural land.
- To ensure the equitable and efficient allocation of water resources of suitable quality to meet current and future needs for all purposes.
- To ensure the stability and functional integrity of the river systems in the context of both natural and developed landscapes.
- To maintain biodiversity and the preservation of native wildlife communities through the retention, protection and re-establishment of terrestrial and aquatic habitats.

3.4 ELEMENTS OF THE PROCESS

At the commencement of the Pilot Study, there was little information available relating to the condition of the catchment's natural resources on which to make an objective assessment of priority issues.

Initial activities focused on development with the Catchment Co-ordinating Committee of an appreciation of the catchment, its resources and the issues relating to them. This involved the compilation and presentation of existing data and knowledge in a discussion paper, followed by briefings, seminars, inspections and workshops involving a wide range of industry and community representatives, Local Authorities, Government agencies and academic and research institutions.

Specialist technical advice to the Committee was provided through a number of Technical Advisory Groups (TAGs) drawn from relevant speciality areas. These Groups have functioned on a needs basis throughout the Pilot Study.

Organisations represented on the Technical Advisory Groups have included:

Bureau of Sugar Experiment Stations
Mourilyan Sugar Mill
South Johnstone Sugar Mill
CSR Victoria Mill, Ingham
Atherton Tableland Co-operative Dairy Association
Department of Transport
Department of Environment and Heritage
Department of Education
Department of Lands
Department of Business, Industry and Regional Development
Department of Housing, Local Government and Planning
Department of Primary Industries
Wet Tropics Management Authority
Johnstone Shire Council
Johnstone Shire River Improvement Trust
Eacham Shire Council
Queensland Electricity Commission
CSIRO
Australian Institute of Marine Science
Great Barrier Reef Marine Park Authority
James Cook University
Griffith University
Queensland University of Technology
Telecom Australia
INCITEC Limited

The key elements of the process adopted for development of the Johnstone River Catchment Management Strategy are outlined in Figure 3.1 on page 23.

Milestones in this process have included:

- Formulation of Catchment Co-ordinating Committee (December 1990)
- Preparation of an initial Issues Paper by DPI (April 1991)
- Formation of Technical Advisory Groups and identification of issues (July 1991)
- Nomination of major interrelated issues by Committee (January 1992)
- Draft statements for key issues areas presented to Committee (April - July 1992)
- Preparation of initial draft strategies for key issues (September 1992)
- Review by Committee (October 1992 - January 1993)
- Release of Draft Management Strategy (March 1993)
- Technical Review by TAGs (July 1993)
- Review by Lead Agencies (April 1993 - April 1994)
- Review by Government, Industry and Community Groups (April 1993 - April 1994)

Following its release in March 1993, the Draft Management Strategy has been reviewed extensively by Government Departments and Agencies, (at both the policy and operational level), Local Government and community groups and research organisations. The responses from these organisations have been reviewed by the Catchment Co-ordinating Committee in the preparation of this Strategy.

3.5 KEY ISSUES

The process for development of the Johnstone River Catchment Management Strategy required the initial identification and confirmation of the key interrelated natural resource management issues which were of concern to the various management agencies and stakeholder groups in the catchment.

Through a process of consultations, inspections, and workshops involving industry and community groups and Government agencies, a significant number of wide ranging issues were identified. These were grouped under four broad Key Issue Areas as follows:

Land Management
Water Management
Riverine Management
Habitat Management

Specific issues are outlined under these Key Issue Areas in the sections which follow, with each Key Issue Area addressed under the following headings:

Introduction
Overview
Goals and Objectives
Principal Recommendations
Strategies

3.6 STUDY OUTPUTS

The documented outputs from the Pilot Study comprise:

- Strategies addressing the specific issues identified under each of the four Key Issue Areas;
- Recommendation to the key industry and stakeholder groups with specific recommendations relevant to the particular group;
- Catchment Atlas, containing maps relating to the natural resources of the catchment, produced from the extensive GIS data sets compiled for the Study.

These documents are separate, but complementary outputs from the Study and should be considered accordingly. The major elements of this document - the Catchment Management Strategy - comprise the individual Strategies addressing the issues under each of the four Key Issue Areas, in Sections 4 to 7 following, together with the concluding Section 8, which details the preferred model for Strategy Implementation.

STRATEGIES

The strategies presented in this document have been developed to provide direction to those agencies and organisations with responsibilities for natural resource management in the catchment.

Each strategy is documented in a presentation which:

-
- Identifies the key actions required to address the particular issue;
 - Identifies those organisations with a lead responsibility for undertaking the actions;
 - Indicates the outcomes which the strategy will deliver;
 - Provides targets for achieving significant milestones.
-

It will be the responsibility of those agencies and organisations identified in the strategies to carry out the necessary operational planning required for implementation. Where necessary, this will involve liaising with other relevant organisations and operating in a co-ordinated and co-operative way to achieve the identified outcomes.

It should be recognised that the issues being addressed in this strategy are closely interrelated, hence the need for an integrated package of proposals to adequately manage the issues. This is essentially the role of Integrated Catchment Management - to integrate the management of resources that are naturally interrelated.

Consequently, it is likely that some degree of duplication and overlap in the strategies put forward under the various key Issue Areas will occur. This demonstrates the complexities involved in dealing with interrelated issues such as these and reinforces the need to adopt an integrated approach to their management. Where overlap has occurred in the following sections, related strategies have been referenced in the documentation.

3.6.2 RECOMMENDATIONS TO STAKEHOLDER GROUPS

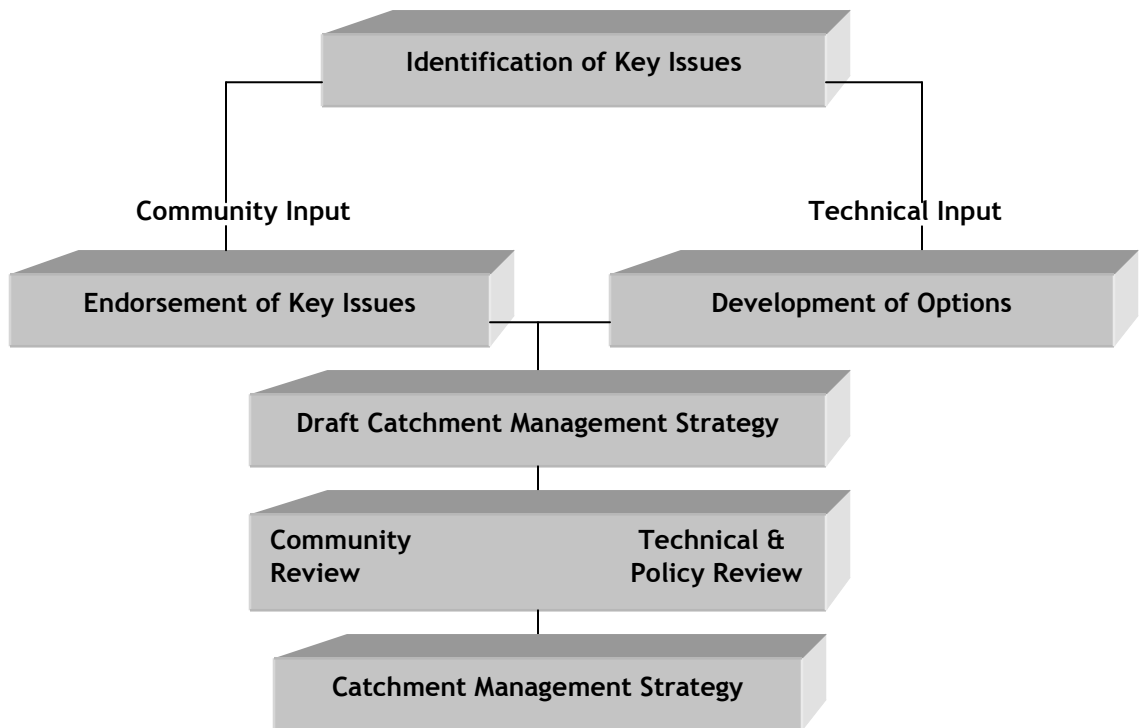
Implementation of ICM is dependant on each sector of the community being aware of and fulfilling its responsibilities. Accordingly, the Pilot Study has also made recommendations in pamphlet form for wide distribution to key industry and stakeholder groups and the broader community. These have been prepared for the following:

-
- Animal Industries (Dairy/Beef)
 - Cane Industry
 - Horticulture Industries
 - Manufacturing and Processing Industries
 - The General Public
-

These “Stakeholder Statements” contain recommendations for Best Management Practice Guidelines and/or actions for the stakeholder groups which are practical expressions of the strategies and actions as they relate to each group. They are intended to be reviewed and updated as required to reflect current best practices and best available technology identified by on-going research and development programs.

FIGURE 3.1

PROCESS FOR DEVELOPMENT OF CATCHMENT MANAGEMENT STRATEGY



4. LAND MANAGEMENT

4.1 INTRODUCTION

The way in which the land resources of the catchment are used and managed is arguably the most crucial issue to be considered in this Strategy. It is not only the foundation for the continuing prosperity of the catchment, but also the source of many of the issues and concerns which impact upon other components of the catchment system.

Land management, as discussed in the context of this document, has essentially two (2) components. It refers to:

- The use to which the land has been allocated, and
- the way in which that particular land use is managed.

The Johnstone River catchment is some 1 630 km² in area. Nearly 50% of this has been cleared for agricultural development and human settlement. Most of the remaining area of the catchment is now listed as part of the Wet Tropics of Queensland World Heritage Area.

4.2 OVERVIEW OF LAND MANAGEMENT ISSUES

This section considers the productivity and environmental effects of land uses in the Johnstone River catchment, as well as issues relating to competition between different land uses. Issues of concern include:

- Inappropriate land use allocation;
- Loss of prime agricultural land and viability of agricultural industries;
- Soil erosion and sedimentation;
- Impacts on water quality and instream habitat;
- Loss of native vegetation and wildlife habitat;
- Conflicts between adjacent land uses;
- Impacts of localised activities such as infrastructure development, drainage, land clearing, fire, mining and fossicking.

In the preparation of this strategy, the catchment has been divided into four (4) physiographic zones for the purpose of issues analysis, namely:

- Tableland Area;
- World Heritage Area;
- Undulating Lowlands;
- Floodplain and Estuarine Zone.

The key issues within each of these zones are summarized below under the headings of - Agriculture, Urban, Rural Residential and Infrastructure.

4.2.1 TABLELAND AREA

Agriculture

The main land uses in the upper catchment are dairying and beef cattle production. There is only a relatively small area of cultivation for cash crops in this zone, principally tea and macadamias.

The key management issues relate to pasture degradation and soil erosion. Most soil erosion appears to occur as gully erosion (which is quite severe in some areas), from farm laneways, cattle tracks, dam borrow areas and spillways.

Pasture regeneration, land clearing for pasture development and weed control on steep slopes (>30%) can also be a source of erosion, however this usually occurs in small scattered areas as only relatively small areas are cultivated each year.

The impacts of effluent disposal from dairy operations on surface and groundwater quality in the area are also an issue of concern.

The loss of vegetation along streamlines and cattle access leads to bank erosion, siltation and water quality decline in some streams.

Urban

Urban development results in larger areas of high runoff potential from buildings, roads and intensively used areas.

The impacts on water quality and watercourses during the development phase as well as the on-going effects from urban stormwater runoff and waste disposal need to be addressed.

Rural Residential

These areas have expanded rapidly in the zone in recent years. They can place increased pressures on available water supplies, while the waste disposal implications for water quality are also of concern, particularly in adjacent streams and groundwater aquifers which are often used as a source for domestic supply.

Sound land use planning is required to avoid problems of non-compatible adjacent land uses where agricultural chemicals are used.

Where developments occur in areas which require clearing, any substantial increase in the edge disturbance of adjacent areas can have a significant impact on the health of the remaining habitat.

Infrastructure

The impacts of infrastructure development, notably roads, are seen most clearly during the construction phase, but there are some high road cuttings which are still unstable many years later, providing a continual source of sediment to adjacent waterways.

Table drain construction and maintenance requires more suitable techniques which allow stability to be achieved more readily. All aspects of runoff control, including co-ordination of runoff and culvert location, are important in reducing erosion.

4.2.2 WORLD HERITAGE AREA

This Area is now under the control of the Wet Tropics Management Authority which is in the process of developing a Management Plan for the Area in accordance with its responsibilities under the listing agreement.

The main issues in the Wet Tropics World Heritage Area relate to the remnant infrastructure of forestry logging tracks and the existing access tracks for power transmission lines through the area. Maintenance of ex-forestry tracks has been neglected and there are some significant erosion locations where corrective works are required for stabilisation. The impact of roads and power lines should be managed to enhance the visual amenity of the area.

Control of feral animals and plants is an issue that needs to be addressed. Concerns have been expressed on the impact of both animals and plants from and to adjoining lands.

In major rainfall events such as cyclones, this area of the catchment contributes significant amounts of coarse sediments to the river system.

4.2.3 UNDULATING LOWLANDS

Agriculture

This zone of the catchment has the largest area of intensive agriculture and therefore the largest area of cultivated lands.

Soil erosion has been the main agricultural issue in this zone. The adoption of green cane harvesting and minimum tillage practices has resulted in a very significant reduction in the amount of soil erosion occurring in ratoon cane. Plant cane is now the most susceptible stage of the cane crop cycle.

Some cane land may be regarded as too steep to ensure sustainable long term production.

Areas planted to bananas have increased dramatically in recent years, increasing demands on water supplies in the area. Concerns have also been raised about the levels of chemical use and exposure of the soil to erosion.

Urban

There are several small towns in the lowland zone. The major concerns in this area occur where practices carried out on surrounding agricultural land (such as aerial spraying) impact on urban dwellers.

Expansion of urban areas onto good agricultural land also needs to be considered in future planning policies.

Rural Residential

Rural residential and small area hobby farms occupy a significant area in this part of the catchment. The issues this raises are similar to those of the urban areas.

The impacts of this type of development on the depletion and potential contamination of the groundwater resources of the area also require careful consideration in the location and approval of further development.

Infrastructure

The main impacts of infrastructure in this zone relate to roads and sugar cane railways. Cuttings and table drains in several areas require attention to ensure that erosion is reduced to acceptable levels.

Runoff co-ordination (i.e. co-ordinating road and cane railway cross drainage) is also required in some locations.

4.2.4 FLOODPLAIN AND ESTUARINE ZONE

Management issues in this zone are diverse and complex. In broad terms they relate to:

- The impacts of flooding;
- Impacts of development on existing land use;
- Significant wetland and estuarine habitat areas.

Agriculture and Industry

Sugar cane is the major crop grown on the floodplain and can cope reasonably well with the flood conditions experienced regularly in this zone. Other crops include bananas, pawpaws and small crops.

Major issues relate to drainage of land for agricultural development and the resultant conflicts relating to preservation of water resources and wetland habitats. This is particularly relevant with regard to groundwater resources as wetlands and shallow groundwater aquifers are closely inter-connected.

In this part of the catchment, significant and localised habitats occur, and the impact of agriculture here appears to be greater and more closely linked to habitat condition than in the other, larger zones of the catchment.

In addition to the drainage issue, development has also resulted in the loss of riparian vegetation, stream bank instability and siltation of the river system.

Development on the floodplain has also led to the loss of natural flood retention areas, resulting in increased levels of flooding in other areas.

The location of aquaculture operations on the floodplain also needs careful consideration in planning.

Similarly, the impacts of existing and proposed industrial development on the floodplain need to be carefully considered.

Urban

The town of Innisfail, along with other smaller settlements is located on the floodplain and consideration needs to be given to the location of future urban expansion for the area to minimise additional costs associated with flood risk.

Impacts of urban settlement on water quality and habitat destruction from development, stormwater runoff and waste management need particular attention. The possibility of flood inundation and the proximity of critical aquatic and marine habitat areas need to be considered for all future developments.

Rural Residential

The location of rural residential development on the floodplain raises similar issues to those above. Additional problems relating to evacuation are also likely in flood situations.

Infrastructure

Both road and rail links to Innisfail traverse the floodplain. The proposal by the Department of Transport to construct a new highway bypass across the floodplain raises issues concerning effects on flood levels. Co-ordination of drainage between transport infrastructure and adjacent lands will also need to be carefully addressed to minimise adverse impacts.

4.3 GOALS AND OBJECTIVES

Goal

To maintain and enhance the productive capacity of land resources of the catchment for all beneficial uses.

Objectives

- Have a co-ordinated planning framework that ensures sustainable and economic use of land resources.
- Minimise impacts of land use on water resources and natural systems.
- Have sustainable and economic agricultural production.
- Reduce soil erosion from agricultural lands to less than 20 tonnes/ha/year.
- Preserve existing areas of critical habitat and areas of high environmental value.

4.4 PRINCIPAL RECOMMENDATIONS

The principal recommendations required to achieve the above objectives are as follows:

- Encourage and support Local Authorities to develop comprehensive Planning Schemes and policies which incorporate wider resource and environmental management objectives.
- Promote the adoption of sustainable systems for agriculture through the development and adoption of Best Management Practice Guidelines and Property Management Planning programs for the dairy, beef, horticulture and cane industries.
- Identify and manage high impact catchment disturbances by development of appropriate management plans or compliance with relevant Best Management Practice Guidelines.

4.5 LAND MANAGEMENT STRATEGIES

STRATEGY LM 1:

Develop planning schemes and policies which achieve balanced use of land, water and related natural resources.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Allocate land in accordance with its suitability for the proposed use	Local Authorities
<ul style="list-style-type: none">• Preserve good quality agricultural land	Local Authorities
<ul style="list-style-type: none">• Provide for the preservation of critical areas of habitat	Local Authorities
<ul style="list-style-type: none">• Ensure that land use allocation decisions take account of:<ul style="list-style-type: none">- impacts on available water resources- potential for contamination of water resources (surface and groundwater)- impacts on adjacent land uses- impacts on critical habitat	Local Authorities
<ul style="list-style-type: none">• Provide advice on the above issues to assist Local Authorities in the Development of appropriate land use policies	DPI, DEH
<ul style="list-style-type: none">• Have active public participation in the development and review of Shire Planning schemes	Local Authorities

OUTCOMES:

- Local Authority Planning Schemes which incorporate wider natural resource management objectives

TARGETS:

- Johnstone Shire Planning Scheme - 1994
 - Eacham Shire Planning Scheme - 1997
-

STRATEGY LM 2:

Co-ordinate land use planning and development on the floodplain.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Allocate lead responsibility for floodplain management to Local Authority through Shire Planning Scheme	DHLGP
<ul style="list-style-type: none">• Develop management plans to address impacts on land and infrastructure development based on DPI Floodplain Development Guidelines and incorporate into Shire Planning Scheme (See Strategies LM 5 and LM 6)	Local Authority
<ul style="list-style-type: none">• Support and provide assistance to Local Authority in development of floodplain management plans	DPI, DEH

OUTCOMES:

- Clearly defined responsibilities and approvals process.
- Reduced property and production losses from flooding.
- Maintenance of important floodplain and estuarine systems.

TARGETS:

- Management plans incorporated into Planning Scheme by June 1996.
-

STRATEGY LM 3:

Implement property management planning to achieve sustainable and economic agricultural production.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Develop property management planning programs for cane, dairy, beef and horticulture industries	DPI
<ul style="list-style-type: none">• Ensure all relevant agencies and groups are involved in property planning processes	DPI
<ul style="list-style-type: none">• Promote and encourage landholder involvement in property management planning on a sub-catchment basis	Landcare Groups, Industry Organisations
<ul style="list-style-type: none">• Investigate need for incentives required to maximise implementation of property management planning by industry groups and make recommendations to Government	COC
<ul style="list-style-type: none">• Provide follow-up assistance and support to ensure implementation of property management plans	DPI/BSES

OUTCOMES:

- Improved long term agricultural productivity.
- Reduced off-site impacts.

TARGETS:

- Effective programs being delivered to identified industries by June 1995.
-

STRATEGY LM 4:

Encourage best farming practices in all agricultural industries through the adoption of voluntary Best Management Practice Guidelines.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Adopt agricultural land suitability as the basis for future agricultural development	Industry Organisations
<ul style="list-style-type: none">• Implement soil conservation and runoff control measures on all sloping agricultural land susceptible to erosion	Landholders
<ul style="list-style-type: none">• Adopt best practices for cultivation, stock and pasture management, fertiliser and chemical application	Landholders
<ul style="list-style-type: none">• Retain and preserve existing areas of natural vegetation on waterways and steep lands and replant where it has been removed (Relates to Strategies RM5 and HM2)	Landholders, Local Authorities, RIT/RMT
<ul style="list-style-type: none">• Provide off-stream water supplies (or controlled access) for stock to protect riparian zone	Landholders
<ul style="list-style-type: none">• Adopt Timber Industry Code of Practice and DPI Guidelines for logging operations on private lands	Landholders
<ul style="list-style-type: none">• Utilise degraded and unproductive agricultural lands for agro-forestry where appropriate	Landholders

OUTCOMES:

- Erosion from agricultural land less than 20 tonnes/ha/year.
- Reduced siltation and contaminant inputs to waterways.

TARGETS:

- Best Management Practice Guidelines for key agricultural industries developed and adopted by June 1995.
-

STRATEGY LM 5:

Develop and implement measures to reduce adverse impacts of non-agricultural land uses.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Develop new design criteria and guidelines to minimise soil loss from development and maintenance of road and rail infrastructure	Local Authorities DOT
<ul style="list-style-type: none">• Program construction and maintenance works during low rainfall periods	DOT, Local Authorities, Mills
<ul style="list-style-type: none">• Co-ordinate drainage between public and private infrastructure and adjacent lands	Local Authorities
<ul style="list-style-type: none">• Establish and implement soil, water and vegetation management plans for new urban and rural residential development	Local Authorities
<ul style="list-style-type: none">• Establish runoff and sediment control plans for new quarries and encourage application to existing sites	Local Authorities
<ul style="list-style-type: none">• Identify hazardous sites (dumps, dips, heavy metals) and develop and implement management plans	Local Authorities, DEH
<ul style="list-style-type: none">• Establish/review effective waste management plans for new and existing industrial sites	DEH

OUTCOMES:

- Reduced impacts from localised catchment disturbances and potential contaminating sites.

TARGETS:

- Infrastructure management plans in place by June 1995.
 - Residential Development plans in place by December 1995.
 - Industries and hazardous sites plans in place by December 1994.
-

STRATEGY LM 6:

Develop and implement arrangements to reduce adverse impacts of agricultural drainage on natural systems and existing developments.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Identify all potential impacts in consultation with community and agencies	DPI
<ul style="list-style-type: none">• Assess drainage proposals against hydrological impacts	DPI
<ul style="list-style-type: none">• Develop comprehensive procedures to assess impacts and mediate outstanding issues	DPI
<ul style="list-style-type: none">• Incorporate arrangements into Management Plans under Shire Planning Scheme	Local Authorities

OUTCOMES:

- Stable hydrological systems.
- Maintenance of important floodplain and estuarine systems.

TARGETS:

- Incorporated into Management Plans and Shire Planning Scheme by June 1996.
-

STRATEGY LM 7:

Promote research and development into priority areas for sustainable agricultural production.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Develop techniques to minimise soil loss in caneland during plant cane cycle	Cane Industry, BSES
<ul style="list-style-type: none">• Develop practical measures for disposal of animal effluent from dairy farms	DPI, Dairy Industry
<ul style="list-style-type: none">• Support the Nutrient Cycling and Transport Study to determine more efficient fertiliser management strategies	Industry R & D Corporations, LWRRDC
<ul style="list-style-type: none">• Promote research into management of the riparian zone to reduce nutrient and particulate inputs into streams	CCC
<ul style="list-style-type: none">• Support agricultural industry groups in the promotion of future NRM related R & D needs to research and funding organisations	CCC

OUTCOMES:

- Gaps in priority research and development for agriculture in the catchment addressed.

TARGETS:

- All identified projects to be initiated by December 1994.
 - New projects initiated within 1 year of notification to appropriate body.
-

5. WATER MANAGEMENT

5.1 INTRODUCTION

The need to more effectively manage the water resources of the catchment has become apparent from an analysis of factors associated with recent and emerging issues relating to allocation of available supplies and water quality.

Proper management of the water resource requires a consideration of a number of fundamental elements, namely:

- Assessment of the available supply;
- Equitable allocation of available supply to all legitimate uses;
- Quality of the resource and its suitability for consumptive and non-consumptive use, both within the catchment and in the marine environment.

These will be considered here in relation to the issues which have been identified to date.

5.2 OVERVIEW OF WATER MANAGEMENT ISSUES

5.2.1 WATER SUPPLY AND ALLOCATION

Increasing demands for water in various parts of the catchment have highlighted the need for more comprehensive management arrangements in place of the present incremental approach, to prevent over-commitment of surface and groundwater resources. It is also apparent that there is a need to address potential conflicts over allocation of the resource. As competition for the resource intensifies, the existing approach is being increasingly challenged, leading to escalating costs for management.

Requirements for non-consumptive uses (environmental and recreation) are also being increasingly recognised and will have to be considered in future allocation policies.

On the Tableland, increased demand for irrigation supplies has placed further stresses on many of the tributary streams and groundwater aquifers in the area. Rural residential expansion has also contributed to increased demands on both surface and groundwater supplies.

The rapid expansion of horticulture, particularly the banana industry in the lower catchment, has dramatically increased the demand for irrigation water in this area. There are now serious concerns over the level of commitment of the resource in a number of significant sub-catchments such as Mena Creek (including Utchee, Meunbah, Miskin and Stewart Creek), Rankin Creek and Berner Creek.

The high levels of commitment of surface water have in turn placed greater reliance on the groundwater resource in this area, where the expanding rural residential areas are heavily reliant on groundwater supplies.

The maintenance of base flows in streams has been identified as one of the priority issues of concern for aquatic habitat in the catchment. Provision for this purpose must be recognised as a legitimate use and be taken into consideration when available supplies are located.

Allocations need to be based on a comprehensive assessment of the resource in terms of the quantity available for allocation and the reliability of supply. This information for the catchment is not yet available.

It is considered that effective management must primarily emphasise the notion of water as a valued natural resource (and the full range of potential functions and values this implies) before it is made available as a commodity for use.

Key issues and needs relating to water supply and allocation include:

- Assessment of available surface water flows and groundwater aquifer yields at various levels of risk;
- Assessment of existing and future commitments for consumptive and non-consumptive use;
- Development of a clear set of policies, procedures and regulations for allocation of the available resource;
- Involvement of stakeholders in the management of the resource.

5.2.2 WATER QUALITY

Issues relating to water quality provide the focus for many of the strategies outlined in this document.

Water quality reflects the health of the catchment and is largely determined by what happens on the land. The quality of the water in the catchment and its area of influence are affected by all land uses and human activities, be they agricultural, urban or industrial. Instream processes and activities can also be a significant influence.

Water quality has declined due to a combination of inputs from all of these factors, in the form of increased levels of nutrients, sediments and chemical contamination from diffuse and point sources throughout the catchment.

The extent of this contamination has not been fully assessed to date. Monitoring studies initiated in conjunction with the Pilot Study in 1991 under DPI's Downstream Effects of Agriculture Practices (DEAP) program are attempting to quantify the current state of the water quality. Early results indicate that quality has deteriorated, particularly in the more disturbed parts of the catchment; however, further investigation is required to quantify the levels of contamination and its likely sources.

A further factor complicating assessment of water quality is the lack of valid indicators, particularly for potable and environmental uses.

The main areas of concern with regard to water quality impacts in the catchment include:

- Water supply for domestic use;
- Potential for contamination of groundwater supplies;
- Deterioration of aquatic ecosystems - freshwater, estuarine and marine.

While many of the factors which contribute to declining water quality are addressed in the strategies for Land Management in the preceding section, a number of issues relating to management of water quality still need to be highlighted. These include:

- Confusion over management responsibilities and lack of co-ordination, with a number of agencies operating in the area of water quality management without effective co-ordination mechanisms;
- Lack of understanding of the overall quality of the catchment's water resources;
- Lack of valid water quality indicators and guidelines for various use categories;
- Involvement of the catchment community in the determination of water quality objectives and on-going management of water quality.

5.3 GOALS AND OBJECTIVES

Goal

To ensure the equitable and efficient allocation of water resources of suitable quality to meet current and future needs for all purposes.

Objectives

- Have rational policies in place to allocate available resources in an equitable and sustainable manner.
- Have a co-ordinated program to ensure appropriate water quality for the catchment and its area of influence.
- Have a high level of community and stakeholder involvement in water resource management.

5.4 PRINCIPAL RECOMMENDATIONS

The principle recommendations for management of the water resources of the catchment and its quality are:

- Develop and implement a Management Plan for the allocation and management of the available resource.
- Establish a co-ordinated program for management of water quality based on identified environmental values and relevant indicators, in accordance with the proposed State Environmental Protection Policy for Water.
- Establish mechanisms to provide for community and stakeholder involvement in the management of water resources and its quality.
- Establish a Water Quality Working Group (WQWG) to co-ordinate water quality management in the catchment, with representation from Department of Environment and Heritage (Convenor), Department of Primary Industries, Johnstone and Eacham Shire Councils.

5.5 WATER ALLOCATION STRATEGIES

STRATEGY WA 1:

Undertake and maintain an up-to-date audit of the surface and groundwater resources of the catchment.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Assess the total resource available for use at various levels of risk	DPI
<ul style="list-style-type: none">• Assess the consumptive demand from all uses - domestic, industrial, irrigation and stockwatering	DPI
<ul style="list-style-type: none">• Estimate non-consumptive demand for environmental flows and recreation requirements	DPI
<ul style="list-style-type: none">• Identify areas of over-commitment and limited availability	DPI
<ul style="list-style-type: none">• Review and update audit on a regular basis	DPI

OUTCOMES:

- Comprehensive assessment of current status of availability and level of commitment.
- Rational basis for the determination of future allocation policies.

TARGETS:

- Assessment of priority sub-catchments completed by December 1994.
 - Initial catchment audit completed by December 1995.
-

STRATEGY WA 2:

Development management plans for the allocation and management of available water resources in consultation with the catchment community.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Identify priorities for resource allocation through consultation with community and stakeholder groups	DPI, CCC
<ul style="list-style-type: none">• Develop policy options for allocation based on audit results and community priorities	DPI
<ul style="list-style-type: none">• Review with community and implement preferred option	DPI, CCC
<ul style="list-style-type: none">• Promote self management of the resource through establishment of Water Advisory groups in priority sub-catchments	DPI
<ul style="list-style-type: none">• Evaluate and review plans on a regular basis, through Water Advisory Groups and stakeholders	DPI

OUTCOMES:

- Effective management based on clearly defined policies known to all stakeholders.
- Reduced conflicts and costs of management.

TARGETS:

- Management plans for priority sub-catchments by December 1995.
-

5.6 WATER QUALITY STRATEGIES

STRATEGY WQ 1:

Undertake an inventory of water quality throughout the catchment.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Establish the Water Quality Working Group (WQWG)	DEH
<ul style="list-style-type: none">• Identify and document current monitoring programs by various agencies (including parameters, sites, sampling techniques)	Water Quality Working Group
<ul style="list-style-type: none">• Document current water quality criteria for various categories of use	Water Quality Working Group
<ul style="list-style-type: none">• Collate existing water quality data and assess against current criteria	Water Quality Working Group
<ul style="list-style-type: none">• Identify shortcomings in current monitoring programs and data, and make recommendations to CCC for future action	Water Quality Working Group

OUTCOMES:

- Current assessment of water quality status and relevance of existing monitoring activities and criteria.

TARGETS:

- Water Quality Working Group established by December 1994.
 - Initial status report prepared by June 1995.
 - Recommendations for future program by December 1995.
-

STRATEGY WQ 2:

Develop a co-ordinated water quality management plan for the catchment.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Identify environmental values for water quality management through consultation with community and stakeholder groups	DEH, Water Quality Working Group, CCC
<ul style="list-style-type: none">• Establish ambient water quality objectives based on environmental values	DEH, Water Quality Working Group
<ul style="list-style-type: none">• Develop practical guidelines to meet water quality objectives in consultation with user groups	DEH
<ul style="list-style-type: none">• Develop and implement an integrated program to monitor performance towards objectives	DEH
<ul style="list-style-type: none">• Regularly review trends and recommend actions to address deficiencies in the program	Water Quality Working Group
<ul style="list-style-type: none">• Provide reports on water quality status to the community on a regular basis	Water Quality Working Group

OUTCOMES:

- Effective management of water quality in accordance with agreed objectives.
- Community better informed on water quality status.

TARGETS:

- Management plan in place within 1 year of gazettal of Environmental Protection Policy for Water.
 - Water quality status reports produced quarterly.
-

STRATEGY WQ 3:

Reduce contaminant inputs to surface and groundwater systems from point and diffuse sources.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Review existing discharge licences to ensure conformity with current water quality objectives and review where necessary	DEH
<ul style="list-style-type: none">• Ensure that all potential contaminating point source discharges are licensed	DEH
<ul style="list-style-type: none">• Adopt DPI guidelines for on-site sewage treatment and disposal systems for protection of surface and groundwater	Local Authorities
<ul style="list-style-type: none">• Promote recommended land management practices which reduce contaminant inputs (Refers to Strategies LM 4 and LM 5)	CCC, Industry Organisations, Landcare Groups

OUTCOMES:

- Targeted water quality performance to meet agreed objectives.
- Compliance with current policies and guidelines.

TARGETS:

- Existing licences reviewed within 1 year of adoption of water quality objectives.
 - Sewage guidelines adopted by Local Authorities by June 1995.
-

STRATEGY WQ 3:

Investigate and promote research into priority water quality issues.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">Assess the sources and levels of contamination of water quality from urban areas and develop remedial action plan to address priority sources	Water Quality Working Group
<ul style="list-style-type: none">Finalise current DEAP research projects (nutrient and sediment movement, agricultural, chemical contamination) and make recommendations on best practices to be adopted	DPI
<ul style="list-style-type: none">Develop draft water quality criteria for fresh-water and marine ecosystems	DEH, GBRMPA
<ul style="list-style-type: none">Promote and sponsor research into the development of valid microbiological water quality indicators relevant to the catchment environment	CCC, DEH
<ul style="list-style-type: none">Identify specific research needs of the community and promote to research and funding organisations	CCC

OUTCOMES:

- Priority research needs identified and addressed.
- Relevant water quality indicators and objectives developed.

TARGETS:

- Finalise DEAP outcomes by December 1995.
 - New projects initiated within 1 year of notification to appropriate body.
-

6. RIVERINE MANAGEMENT

6.1 INTRODUCTION

Issues relating to management of rivers, streams and their associated riparian zones throughout the catchment have been highlighted as key areas of concern by the community over the period of the catchment study. This has reinforced the initial views of the Johnstone Shire River Improvement Trust which initiated the move towards an ICM approach to river system management in the late 1980s.

Streams can be considered as the arteries of the catchment. Their health and their ability to effectively carry out their functions are essential to the health and well-being of the entire catchment system and its downstream area of influence.

This section of the strategy provides a brief diagnosis of the health of the catchment's waterways and outlines future arrangements and priorities for management.

6.2 OVERVIEW OF RIVERINE MANAGEMENT ISSUES

To date, no management plan has been prepared for the Johnstone River from a whole of catchment perspective. Previous management plans had their emphasis on providing *heavy* engineering solutions to perceived river management problems without necessarily considering implications to the stream system as a whole.

Few of the recommendations from these previous studies have actually been implemented, largely due to a lack of public support for the proposals.

There is now widespread public and professional recognition that processes resulting in stream bed and bank erosion and siltation are amongst the most serious problems impacting upon our waterways. Such processes have numerous adverse impacts, including:

- Potential loss of public and private infrastructure;
- Loss of adjacent agricultural land;
- Increased risk and impact of flooding;
- Decreased water quality;
- Decreased stream and riparian habitat values;
- Loss of stream aesthetic and recreational values.

This management strategy seeks to broaden the horizons of river management to reflect the greater expectations of the community. It should be considered in conjunction with the strategies for Land, Water and Habitat Management outlines elsewhere in this document.

The issues relating to Riverine Management have been considered for each of the four physiographic zones of the catchment, namely:

- Tableland Area;
- World Heritage Area;
- Undulating Lowlands;
- Floodplain and Estuarine Zone.

The issues identified in each of these zones are largely based upon recently performed audits of representative streams from each zone which provide an indication of the issues to be addressed. Further investigation will be required, particularly in identifying the linkages between the problems in various areas, before a riverine management strategy can be finalised.

6.2.1 TABLELAND AREA, JOHNSTONE RIVER (North)

Issues

Loss of land as streams incise and widen.

Infrastructure such as roads and bridges threatened by head-cutting and resultant stream widening.

Downstream deposition of mobilized sediment results in the degradation of land and stream values.

Prognosis

Cycles of channel incision and widening will continue.

The zone will continue to represent a sediment source impacting on downstream areas.

6.2.2 WORLD HERITAGE AREA

Issues

Damage resulting from former land use activities such as mining, logging and road construction continue to cause stream instabilities in specific locations.

Some minor damage from feral animal activity leading to localised bank erosion and loss of riparian vegetation.

Prognosis

Streams in the area appear to be inherently stable. This situation should be enhanced under future management by Wet Tropics Management Authority (WTMA).

Impacts of prior land use, feral animals and increasing recreational and tourist activity on streams in the area will require close monitoring and liaison between the river management agency and WTMA.

6.2.3 UNDULATING LOWLANDS

Issues

The North Johnstone River generally appears to have stable bed and banks. There are however some instances of bank erosion resulting from slumping and scouring.

Some course instability is evident in the South Johnstone River particularly in the vicinity of the South Johnstone township.

Headward erosion is evident in many of the smaller tributary systems, resulting in the loss of adjacent land, endangering public and private infrastructure and acting as a sediment source contributing to siltation in downstream areas.

Prognosis

A major course change on the South Johnstone River is likely if urgent action is not undertaken to implement erosion control works.

Problems with gullying tributary streams are likely to continue through cycles of widening and deepening.

6.2.4 FLOODPLAIN AND ESTUARINE ZONE

Issues

Flooding of the floodplain area results in considerable economic losses to both the rural and urban sectors of the community. River bank instability is prevalent in the streams throughout the area. Siltation of the river channels is an area of concern though the extent of the problem has not been defined. The lack of native riparian vegetation has resulted in the infestation of stream banks by exotic weeds and grasses.

Prognosis

Continued erosion in the upstream portion of the catchment, and within the zone itself, will result in further siltation of the estuarine areas. In an effort to maintain capacity, the stream channels will attempt to widen, resulting in the loss of adjacent land and threatening infrastructure. Remaining riparian vegetation could be lost as a consequence of widening processes, resulting in a further reduction in aesthetic and habitat values. Channel avulsions may occur as a result of siltation of the present channel alignment.

Flooding and drainage problems will escalate as a result of reduced channel capacities and further development of the floodplain.

6.2.5 MANAGEMENT ISSUES

Responsibilities relating to management of the river system currently rest with:

- Private landholders;
- River Improvement Trust;
- Government Agencies, including DPI (Water Resources) and Department of Environment and Heritage.

Present management arrangements are a source of confusion to both the community and within some of the agencies. Recent examples of this confusion have highlighted the need to simplify arrangements to provide an integrated management response which is clear to the community and to streamline the approval procedures for development applications.

Historically, river management has been narrow and reactive in nature, focusing primarily on flood mitigation works and *hard* engineering solutions to *fix* problems at particular locations after the event. In many instances, this work has been carried out with only a limited appreciation of factors contributing to the problem, thereby requiring recurrent attention to maintain the initial works.

Rather than focusing simply on localised *hot spots* in the river channel, it is now widely recognised that river management should be considered within the wider context of the riverine corridor and as an integral element of the overall catchment landscape. This broader approach requires a thorough understanding of the physical and biological processes associated with the riverine environment. This will enable the development of effective, long term solutions to management of river systems under the influence of change from natural and development induced processes.

Management will thus have to adopt a more proactive, adaptive and flexible approach if we are to ensure that our river systems are to maintain their functional integrity. As the functions of river systems cannot be divorced from the social, economic and resource management issues of adjacent areas, particularly on the floodplain, there is also a need to link river management initiatives to Local Authority Planning Schemes and the management plans of other agencies to ensure an integrated approach to management of the riverine corridor and adjacent landscape elements.

These factors point to the need for a whole of catchment perspective to be adopted and the need for co-operative and integrated management arrangements to address the issues involved.

6.3 GOALS AND OBJECTIVES

Goals

To ensure the stability and functional integrity of the river systems of the catchment in the context of both natural and developed landscapes.

Objectives

- Establish organisation and management arrangements which foster a whole of catchment approach to management of the river system
- Minimise loss of land and damage to public and private assets from stream migration, loss of channel capacity and flood overflows
- Maintain and enhance the biological as well as the physical integrity of the river system

6.4 PRINCIPAL RECOMMENDATIONS

The principal recommendations for future management of the river system are:

- That the existing management arrangements and role of the Johnstone Shire River Improvement Trust be reviewed to determine appropriate arrangements for the wider role of river management.
- That the Trust be renamed the Johnstone River Management Trust and be the lead agency for river management in the lower catchment.
- That river management be undertaken in a strategic and proactive way through the development of a Riverine Management Plan.
- That the Trust establishes co-operative management arrangements with other agencies and organisations to ensure a whole of catchment approach.
- That the Trust adopts a business-like approach to its operations which is also open and accountable to the community.

In establishing the River Management Trust, particular consideration should be given to the structure and membership of that body to ensure that it is broadly representative of the interests involved in riverine management.

Pending establishment of the River Management Trust, the existing Trust should initiate and implement the balance of the above recommendations and the strategies which follow.

6.5 RIVERINE MANAGEMENT STRATEGIES

STRATEGY RM 1:

Establish arrangements which foster a whole of catchment approach to river management.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Review existing Trust role, structure and membership to reflect wider role of river management	DPI, RIT
<ul style="list-style-type: none">• Review administrative procedures to allow for efficient Trust operation	DPI, RIT
<ul style="list-style-type: none">• Change the name of the Trust to the Johnstone River Management Trust	RIT
<ul style="list-style-type: none">• Formalise recommended changes by amendment to the legislation	Minister for Primary Industries
<ul style="list-style-type: none">• Encourage other agencies to incorporate river management initiatives into their Planning Schemes and management plans	RIT/RMT
<ul style="list-style-type: none">• Develop mechanisms for co-operative management of the riverine environment with other agencies and organisations	RIT/RMT

OUTCOMES:

- Management arrangements consistent with the wider functions and roles for river management.
- Integrated approach to river management.

TARGETS:

- Recommendations from review finalised and submitted to Minister by December 1995.
-

STRATEGY RM 2:

Adopt a strategic and proactive approach to riverine management.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Identify and confirm priority river management issues in consultation with stakeholders and relevant agencies	RIT/RMT
<ul style="list-style-type: none">• Develop a management plan, addressing the priority issues	RIT/RMT
<ul style="list-style-type: none">• Develop a program for implementation of management plan outcomes	RIT/RMT
<ul style="list-style-type: none">• Identify beneficiaries of river management works and develop a case for appropriate levels of funding	RIT/RMT
<ul style="list-style-type: none">• Develop operational policies and guidelines for on-going river management and promote to landholders and other stakeholders	RIT/RMT

OUTCOMES:

- Strategic issues identified and addressed.
- Business-like management approach.

TARGETS:

- Management plan in place by December 1995.
-

STRATEGY RM 3:

Promote and participate in programs to encourage land and water management practices which benefit the riverine environment.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Develop working arrangements with other agencies, Landcare and other groups involved in land, water and environmental management	RIT/RMT
<ul style="list-style-type: none">• Identify, promote and participate in collaborative projects to enhance the riverine environment	RIT/RMT, Landcare Groups, Local Authorities
<ul style="list-style-type: none">• Establish a nursery in the lower catchment to provide stocks for riparian and other revegetation projects	NQAPJB

OUTCOMES:

- Co-operative management of inputs and causal factors.
- Enhanced riverine environment.
- Increased awareness of influences affecting river systems.

TARGETS:

- Projects initiated in 1994/95 financial year.
-

STRATEGY RM 4:

Promote and investigate new and cost-effective techniques for river bank stabilisation and riparian zone management.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Identify suitable sites for trial projects which address priority issues	RIT/RMT
<ul style="list-style-type: none">• Develop co-operative arrangements with research and funding bodies, other agencies and groups, to establish projects	RIT/RMT, DPI
<ul style="list-style-type: none">• Support/initiate funding proposals for priority projects	CCC
<ul style="list-style-type: none">• Monitor and evaluate trials and modify treatments as required	RIT/RMT

OUTCOMES:

- Effective and economic protection of land and assets.
- Reduced sediment inputs from bank erosion.
- Enhanced riverine environment.

TARGETS:

- One project each in the upper and lower catchment zones initiated by June 1995.
 - Other priority projects initiated within 1 year of identification and development.
-

STRATEGY RM 5:

Enhance the environmental values of the river system.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Encourage retention of existing native vegetation on all waterways in the catchment	CCC, Local Authorities, Industry Groups
<ul style="list-style-type: none">• Develop a strategic revegetation plan for streams in co-operation with relevant agencies and groups	CCC
<ul style="list-style-type: none">• Provide incentives and support to landholders to revegetate riparian zones	Local Authorities, DEH, WTTTPS, CRRP, RIT/RTM
<ul style="list-style-type: none">• Establish and vegetate dedicated esplanades along waterways	Local Authorities
<ul style="list-style-type: none">• Develop and implement guidelines for the sustainable extraction of sand and gravel resources which minimise adverse impacts on the riverine environment	DPI, RIT/RTM
<ul style="list-style-type: none">• Restrict cattle access to waterways by provision of fencing and off-stream or controlled watering points	Landholders

OUTCOMES:

- Improved condition of instream and riparian habitat.
- Reduced contaminant inputs to streams.

TARGETS:

- Revegetation plan developed by June 1996.
-

STRATEGY RM 6:

Develop a recreation management plan for the river system.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Establish a working group with representation from WTMA, Local Authorities, RIT/RMT and relevant Government agencies	RIT/RMT, Dept of Tourism, Sport & Racing
<ul style="list-style-type: none">• Identify and document current recreation uses, their location and intensity/frequency	Working Group
<ul style="list-style-type: none">• Identify future projections for active and passive recreation	Working Group
<ul style="list-style-type: none">• Assess likely impacts of current and future recreational activities on river system	Working Group
<ul style="list-style-type: none">• Develop strategies and guidelines to minimise adverse impacts.	Working Group
<ul style="list-style-type: none">• Incorporate outcomes into the management plans, programs and activities of relevant agencies	RIT/RMT, WTMA, Local Authorities

OUTCOMES:

- Impacts of future recreational use recognised and addressed.
- Limits to sustainable recreational use determined.

TARGETS:

- Establish Working Group by June 1995.
-

7. HABITAT MANAGEMENT

7.1 INTRODUCTION

A consideration of the maintenance of the values of the natural habitat is seen as essential to the management of the natural resources of the catchment.

Many of the issues raised here have already been listed in one or more of the key issue areas addressed in the preceding sections. Highlighting them in the context of habitat management reinforces their significance and provides more detailed strategies which can be incorporated into comprehensive management arrangements which address all key inter-related issues in an integrated approach.

7.2 OVERVIEW OF HABITAT ISSUES

Habitat issues for the catchment have been identified principally through two separate studies undertaken for the Pilot Study, supplemented by consultations with other agencies and organisations for confirmation and prioritisation.

These studies focused on terrestrial and aquatic habitat issues respectively. Key issues to emerge from the assessments are outlined below.

7.2.1 TERRESTRIAL HABITAT

- Insufficient recognition and consideration of habitat and wildlife values in planning and development processes and decisions.
- Impacts of clearing for agricultural and rural residential development on native forest communities.
- Need for protection of significant remnant forest habitats for rare and threatened species, notably the cassowary.
- Retention and rehabilitation of wildlife corridors linking viable areas, using waterways as a central feature.
- Management of Wet Tropics World Heritage Area and impacts on adjacent lands.
- Loss of significant wetlands and associated vegetation communities on the floodplain.

The significance of these issues in the different catchment zones is discussed briefly below.

Tableland Area

This area has been extensively cleared for agricultural development. Virtually all areas of native forest cover on gentle to moderately sloping country on basalt soil have now been cleared.

Significant areas are currently being cleared for further development, with most activity now concentrated on areas of lowest economic productivity - generally steep country on granitic and metamorphic soils.

Most of the intact forest remnants suffer from disturbance of some kind, leading to a reduction in habitat values. Disturbances include cattle grazing along margins, recreation activities, fire intrusion, access and logging. Land development, particularly for rural residential purposes, has also had an impact on these areas.

World Heritage Area

Essentially, issues in relation to habitat in this zone will be addressed through the strategic and management plans being prepared by the Wet Tropics Management Authority. Consequently, only brief attention has been given to these issues in this study, as detailed assessments will be undertaken by the Authority as it proceeds with development of its management plans.

Obvious issues identified in the study relate to the legacy of previous logging operations and the remnant infrastructure of that activity. Other emerging issues relate to the increased recreational activity, which is likely to concentrate on the streams in the area and the potential impact on water quality. The spread of exotic weeds, feral animals and organisms has also been recognised as a potential threat to natural habitat values of the Area.

Future management arrangements for the Area will also need to take account of the impacts of management decisions on adjacent freehold lands.

Undulating Lowlands

This area has been significantly cleared of native vegetation. Major habitat loss has occurred since 1977, with most clearing activity concentrated on basalt areas between the North Johnstone River and the Palmerston Highway and on steep metamorphic slopes in other locations.

Virtually all areas of remnant vegetation on private lands have been degraded by effects of logging and wind damage. The resultant open canopy structure promotes the establishment of exotic species, particularly the vine *Thunbergia grandiflora* which is rampant in many remnant areas. In some limited areas, it has totally destroyed the forest.

Damage has been exacerbated as clearing has progressed, leaving remnant areas increasingly exposed to wind damage.

Fire is also a significant degrading influence in this zone and has been almost universally responsible for the destruction of the narrow bands of vegetation along drainage lines as well as the margins of some hillside forests.

A significant area of natural habitat remains in the upper parts of the catchment of Boolabah and Mundiburra Creeks and adjacent streams. Promotion of maximum habitat retention in this area would have significant wildlife and landscape values, as well as safeguarding the lower catchment.

Floodplain and estuarine zone

Apart from the mangrove areas, most of the remaining natural habitat in this area is various forms of melaleuca swamp with very small areas of sclerophyll-dominated vine forest and palm vine forest. The main area of occurrence is in the catchment of Ninds Creek between the Bruce Highway and the coastal Moresby Range. Some small remnant areas of melaleuca swamp occur to the west of the Bruce Highways and south of Innisfail.

All forest types in this zone may be considered potentially threatened as a result of the intensive development of the coastal plain throughout the Wet Tropics. Locally, these predominately swamp habitats appear to be important habitat for the cassowary.

There has been large scale clearing activity within this zone, and most of the habitat on freehold lands has now been cleared, much of it within the last three years.

Most of the remaining habitats of the Floodplain Zone are developed on soils of impeded drainage, the better drained areas having already been largely developed. In the face of drainage activities aimed at a general lowering of water tables, the maintenance of these swamp habitats will become increasingly difficult, and their rehabilitation, once they are destroyed, is virtually impossible.

These habitats are also threatened by massive invasion from the exotic tree *Annona glabra*, and by late dry season wildfires which can often burn into the peat layer resulting in death of the canopy trees.

The maintenance of other forest types within the swamp forest complex cannot be separated from the problems of maintenance of the swamp forests themselves, as it is unlikely they would be able to survive in isolation.

7.2.2 AQUATIC HABITAT ISSUES

Major issues identified by an assessment of the stream habitat at nearly 200 sites throughout the catchment are outlined below:

Destruction of streambank vegetation

This would appear to be one of the more critical issues. Streambank vegetation performs a wide variety of functions from preventing erosion and filtering out nutrients and contaminants to providing snags for fish life. Over 54% of the agricultural sites surveyed on the tablelands and 24% of coastal sites were classed as having the worst level of disturbance.

Proliferation of exotic grasses

Exotic grasses, particularly paragrass are well established in rivers and creeks throughout the catchment with more than 90% of sites showing some degree of infestation. Paragrass can choke waterways, decreasing flow and increasing flood vulnerability and siltation.

Increased siltation

It is self evident that siltation is a significant problem throughout the catchment. Sand bars are a dominant feature of the lower estuary. Siltation can result in the loss of habitat of fish and other stream life and the smothering of eggs, spawning sites and food sources.

Damage by feral and domestic animals

Cattle and feral pigs cause considerable damage to stream beds and banks. Specifically, they destabilise banks, increase siltation and hinder the re-establishment of vegetation on the banks. Cattle were found to cause considerable disturbance to streams on the tablelands while pigs caused damage to stream banks throughout the catchment but notably in the World Heritage Area.

Exotic fish species, including *tilapia*, have been detected in various parts of the catchment, however their potential impact on the aquatic system has not been assessed to date.

Base river flows

Retention of a base flow in streams is necessary to maintain the natural ecology and resilience of stream habitats. Base flows assist in maintaining water quality, channel morphology, substrate characteristics and general stream habitat.

Wetland destruction

Freshwater and marine wetlands contribute enormously to both biological productivity and hydrological stability. In the latter case wetlands act as a buffer during peak flows helping to diffuse excess discharge. Juvenile barramundi move upstream to these swamps during the summer wet season months.

The destruction of these wetland areas through agricultural and urban development impacts on fisheries not only because of the physical destruction of habitat but also because of the reduced energy input, in the form of detritus, to the main river system from the swamps. Tidal gates also contribute to the degradation of wetland areas. They prevent or hinder the upstream migratory behaviour of juvenile fish such as barramundi.

The aquatic habitat study found that the total area of wetlands in the catchment decreased by about 60% over the period 1951 - 1992. All of the net losses were as a result of the reclamation of freshwater (non-mangrove) wetlands. The most significant losses were of *Melaleuca* forests (78%), particularly to the south of the estuary in the Ninds Creek catchment. Mixed *Melaleuca* communities also declined by about 44%. The other major freshwater wetland categories, palm/pandanus and freshwater swamp/reeds, were reduced by 64% and 55% respectively. Freshwater wetlands to the north and west of the river confluence have almost completely disappeared. There was a slight increase in the total area of mangroves due mainly to colonization on the southern foreshore and at the mouth of Ninds Creek.

One of the largest existing freshwater swamps was on the headwaters of Ninds Creek, where drainage and reclamation works were threatening this and other wetlands. It has been suggested that at least some of these wetland areas may be on acid sulphate soils. This being the case, ill-considered reclamation could not only result in unproductive agricultural land, but potentially cause significant environmental problems including fish kills.

Water quality impacts

Water quality is a major determinant of the health of aquatic ecosystems. Potential threats to water quality in the freshwater and marine environments include:

- nutrient rich runoff from agricultural areas;
- contamination of aquatic biota from agricultural chemicals and heavy metals;
- nutrient and coliform loads from urban stormwater runoff, sewage disposal and leachate from landfill waste disposal and toxic sites;
- accidental industrial spills.

Snag management

Snags provide very important habitat for many native fish species including sooty grunter, barramundi, mangrove jack, jungle perch and others. They primarily function as refuges and provide shelter for juveniles. Snags can also function as spawning sites and traps for nutrients and food sources. On the negative side they can be responsible for accretion of sandbars, can redirect flow so as to cause bank erosion, or can be a navigation hazard.

The importance of snags to the ecology of the river system should be recognised as an integral part of stream management activities.

7.3 GOALS AND OBJECTIVES

Goal

To maintain biodiversity and the preservation of native wildlife communities through the retention, protection and re-establishment of terrestrial and aquatic habitats.

Objectives

- Protect key terrestrial habitat areas of importance to rare and endangered species.
- Protect estuarine and wetland habitats of biological and economic significance.
- Improve diversity and productivity of instream ecosystems.

7.4 PRINCIPAL RECOMMENDATIONS

The Committee recommends that the objectives for Habitat Management be achieved by:

- Maximising the habitat values of existing protected areas (World Heritage Area, Marine and National Parks, Environmental Reserves) through proper management and protection strategies.
- Encouraging the voluntary retention of habitat on freehold land through:
 - Awareness and example;
 - Incentives and technical support;
 - Voluntary Agreement.
- Identifying critical areas in need of protection and establishment of appropriate protection arrangements.
- Developing procedures to ensure the protection of significant wetland and estuarine habitats.

7.5 HABITAT MANAGEMENT STRATEGIES

STRATEGY HM 1:

Maximise the habitat values of existing protected area.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Develop management plans for National Parks in total accordance with the cardinal principles of the Nature Conservation Act 1992 Clause 17 (1) (a) & (b) only	DEH
<ul style="list-style-type: none">• Develop management plans for all other protected areas	WTMA, DEH
<ul style="list-style-type: none">• Give due regard to the rights of adjacent landholders in the development of management plans	WTMA, DEH
<ul style="list-style-type: none">• Provide resources to allow effective management to be undertaken in accordance with management plans	WTMA, DEH

OUTCOMES:

- Effective protection of native fauna and flora in National Parks, World Heritage Area and other protected areas.
- Co-operative management between responsible agencies and landholders.

TARGETS:

- Management plans for National Parks and World Heritage Area to be implemented from December 1995.
-

STRATEGY HM 2:

Retain and enhance natural habitat values on freehold lands.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Complete mapping of terrestrial habitat in the catchment	DEH
<ul style="list-style-type: none">• Identify key areas for retention and/or rehabilitation	CCC, DEH Local Authorities
<ul style="list-style-type: none">• Incorporate habitat retention incentives into Local Authority Planning Schemes and development approval processes (Relates to Strategy LM 1)	Local Authorities
<ul style="list-style-type: none">• Encourage retention through voluntary Conservation Agreements	DEH, Local Authorities
<ul style="list-style-type: none">• Promote revegetation of degraded areas through programs such as WTTPS, CRRP and DEH (CNC)	CCC, Local Authorities, DEH, NQABPJB
<ul style="list-style-type: none">• Develop fire management policies and techniques for the protection of remnant vegetation and promote to landholders	QFS, Local Authorities

OUTCOMES:

- Identification of key areas for management and rehabilitation.
- Active community involvement in habitat management and rehabilitation.

TARGETS:

- Identification of key areas by June 1995.
 - Strategic revegetation plan developed by June 1996.
-

STRATEGY HM 3:

Protect and rehabilitate wetlands and other significant aquatic habitats in the flowplain and estuarine area. (Relates to Strategy LM 2)

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">Identify and delineate remaining critical habitat areas	DEH, DPI
<ul style="list-style-type: none">Prioritise importance of habits in terms of commercial, recreational, environmental, scientific and hydrological significance	CCC, DPI, DEH, Local Authority
<ul style="list-style-type: none">Develop mechanisms for protection of critical habitat and incorporate into Local Authority Planning Schemes	DPI, DEH, Local Authority
<ul style="list-style-type: none">Discourage actions by adjacent landholders which threaten integrity of critical habitat	Local Authority, Industry Organisations
<ul style="list-style-type: none">Identify lands suitable for wetland rehabilitation	DPI, DEH
<ul style="list-style-type: none">Develop restoration methodologies and implement	DPI, DEH
<ul style="list-style-type: none">Relocate Innisfail dump from existing wetland site and restore	Local Authority
<ul style="list-style-type: none">Promote the importance and conservation value of wetland habitats to the community	CCC

OUTCOMES:

- Preservation of significant aquatic habitats and hydrological systems.

TARGETS:

- Critical areas identified and assessed by June 1995.
 - Recommended protection mechanisms developed by December 1995.
-

STRATEGY HM 4:

Re-establish riparian vegetation throughout the catchment.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Develop a riparian revegetation plan for the catchment in conjunction with riverine and land management agencies (Relates to Strategy RM 5)	CCC
<ul style="list-style-type: none">• Provide technical and financial resources to support landholder action on revegetation	DEH, DPI, Local Authorities, NQAPJB
<ul style="list-style-type: none">• Develop realistic incentives to encourage landholders to re-establish riparian vegetation and promote to Government	CCC
<ul style="list-style-type: none">• Adopt outcomes of above and incorporate into Planning Schemes, programs and projects of relevant agencies	RIT/RMT, DEH, DPI, NQAPJB, Local Authorities

OUTCOMES:

- Improved instream habitat values.
- Links between significant remnant habitats developed.

TARGETS:

- Revegetation plan in place by June 1996.
 - Recommendations on incentives to Government by June 1995.
-

STRATEGY HM 5:

Encourage Government at all levels to play a lead role in habitat management.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Develop and implement guidelines for protection of habitat values on public lands.	DOL, DEH, DOT
<ul style="list-style-type: none">• Prepare guidelines to minimise impacts of development/infrastructure works on habitat values (Relates to Strategy LM 5)	DOT, DEH, Local Authorities
<ul style="list-style-type: none">• Incorporate environmental protection and assessment mechanisms in Local Authority planning and development processes (Relates to Strategy LM 1)	DHLGP, Local Authorities

OUTCOMES:

- Demonstrated commitment by Government to environmental management.
- Reduced impacts of development on terrestrial and aquatic habitats.

TARGETS:

- Guidelines in place by December 1995.
 - Mechanisms incorporated into Planning Schemes by June 1996.
-

STRATEGY HM 6:

Promote the retention and rehabilitation of habitats through awareness, support and incentives.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">• Develop awareness programs to highlight the benefits of habitat retention on:<ul style="list-style-type: none">- Improved agricultural production and farm management;- Protection of water quality;- Value of timber resource;- Aesthetic and scientific values;- Property valuation.	CCC, Local Authorities, DEH, DPI
<ul style="list-style-type: none">• Provide technical support to assist landholders in retention, establishment and management of vegetation areas.	DEH, Local Authorities, GA
<ul style="list-style-type: none">• Lobby all levels of Government to provide realistic incentives to encourage habitat retention and repair	CCC

OUTCOMES:

- Increased awareness of benefits of environmental management.
- Effective support to landholders and other agencies to retain and enhance habitat values.

TARGETS:

- Awareness programs initiated by December 1995.
 - Recommendations on incentives to Government by June 1995.
-

STRATEGY HM 7:

Research priority issues for habitat management.

ACTIONS	LEAD RESPONSIBILITY
<ul style="list-style-type: none">Determine optimal base flows for instream habitat	DPI
<ul style="list-style-type: none">Develop water quality guidelines for the protection of aquatic ecosystems	DEH, GBRMPA
<ul style="list-style-type: none">Determine effective widths of riparian zone vegetation for aquatic habitat protection for a tropical environment	DPI, DEH, LWRRDC
<ul style="list-style-type: none">Develop monitoring programs for terrestrial and aquatic habitats to assess effectiveness of strategies	DEH, DPI
<ul style="list-style-type: none">Identify future research needs of the community and promote to research and funding organisations	CCC

OUTCOMES:

- Priority research areas for habitat management addressed.

TARGETS:

- Identified projects initiated by June 1995.
 - New projects initiated within 1 year of notification to appropriate body.
-

8. IMPLEMENTATION

8.1 INTRODUCTION

The strategies detailed in the preceding sections identify the priority actions and responsibilities required to address the management of natural resources in the catchment. They clearly demonstrate that the major need for integration is between and within Government agencies, Local Authorities and the Catchment Co-ordinating Committee. The strategies indicate that these groups have a lead responsibility for more than 80% of strategy actions. This is not unexpected given their lead roles in natural resource management. Accordingly, implementation of the Catchment Management Strategy requires mechanisms to co-ordinate the existing and new responsibilities and actions of these organisations.

The Draft Management Strategy proposed a structure and roles for the operation of the Catchment Co-ordinating Committee, a Catchment Implementation Unit and the Catchment Centre. These arrangements have now been substantially revised in the light of comments received during the review process.

The preferred model for implementation of the Strategy is outlined below, detailing the mechanisms and processes proposed for co-operative and co-ordinated action by resource managers and users. It provides for:

- Formal arrangements linking management agencies to the directions identified in the Catchment Management Strategy;
- Effective co-ordination and efficient application of existing resources;
- No new agencies or levels of bureaucracy;
- Establishment of mechanisms to enhance accountability of management agencies;
- Establishment of processes for resolving future management issues;
- Open and accountable decision-making processes with a high level of stakeholder involvement.

8.2 IMPLEMENTATION ARRANGEMENTS

Implementation of the Catchment Management Strategy depends on an effective process which integrates the programs and actions of resource managers and users to address key issues (through Implementation Plans) and activities (through Focus Activities).

This process revolves around a Catchment Co-ordinating Committee and Catchment Conferences attended by lead agencies and stakeholders.

The key elements within this process are:

- Formation of an incorporated Johnstone River Catchment Management Association, the Management Committee of which would act as the permanent Catchment Co-ordinating Committee;
- Nominated lead agencies;
- Memorandum of Understanding between the Catchment Co-ordinating Committee and the nominated agencies;
- Catchment Conferences;
- Catchment Centre;
- Implementation Plans;
- Focus Activities.

The key elements, processes and outcomes of the proposed arrangements are expanded on below and presented graphically in Figure 8.1 on page 68.

8.2.1 ESTABLISHMENT OF PERMANENT CATCHMENT CO-ORDINATING COMMITTEE

The existing Catchment Co-ordinating Committee which was established to conduct the Pilot Study would be responsible for the establishment of an incorporated body to be known as the Johnstone River Catchment Management Association Incorporated.

The Management Committee of this incorporated association would become the permanent Catchment Co-ordinating Committee. It would have 16 members nominated in the manner set out in the constitution of that body. Member organisations of the incorporated body would be drawn from the following stakeholder groups:

- Beef Industry
- Canegrowers
- Commercial Fishing Industry
- Manufacturing & Processing Industries (Coast)
- Eacham Shire Council
- Recreation Interests
- Conservation Interests
- Department of Environment & Heritage (DEH)
- Dairy Industry
- Horticulture Producers
- Manufacturing & Processing Industries (Tablelands)
- Tourism & Development Associations
- Johnstone Shire Council
- Landcare Groups
- Department of Primary Industries (DPI)
- Wet Tropics Management Authority (WTMA)

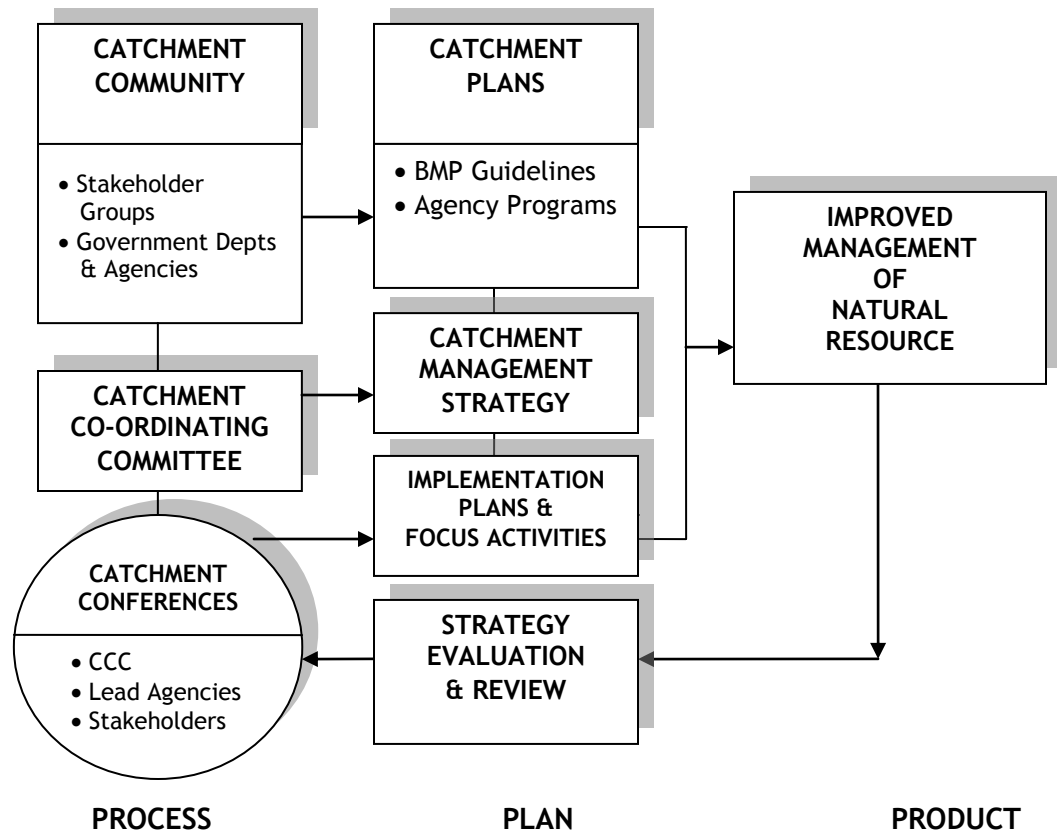
It is recommended that the Catchment Co-ordinating Committee's area of influence be expanded beyond the Pilot Study Area to include the adjacent coastal streams of Moresby River, Liverpool and Maria Creeks to the south of the Johnstone River. Membership of the Association would be available to stakeholder groups across this expanded area.

Effectively, the whole of the Johnstone Shire would then be covered by the Association and would link with existing catchment groups in the Russell-Mulgrave catchment to the north and the Tully-Murray to the south. The expanded area is shown in Figure 8.2 on page 69.

The Catchment Co-ordinating Committee would meet as required to conduct its business and convene Catchment Conferences involving lead natural resource management agencies and stakeholder groups. The Conferences would review progress in the implementation of the Catchment Management Strategy and recommend actions accordingly.

FIGURE 8.1

Implementation of ICM in the Johnstone River Catchment



8.2.2 MEMORANDUM OF UNDERSTANDING

It is proposed that a Memorandum of Understanding be developed and agreed to by the Catchment Co-ordinating Committee and the nominated lead agencies. This would clearly define the roles and responsibilities of the parties to the Agreement and form the basis of the implementation arrangements.

The Memorandum of Understanding would establish a relationship between the parties based on a co-operative and equal partnership, for the effective and efficient development of policies and provision of facilities and services for the implementation and review of the Johnstone River Catchment Management Strategy in partnership with the community.

The current Committee should take a pivotal role in developing the Draft Memorandum of Understanding.

The following is offered as a basis for initial development:

- Bi-Annual Catchment Conferences would be convened by the Catchment Co-ordinating Committee and provide a forum for the community to review progress with Strategy Implementation and recommend changes as necessary.
- The agencies involved would accept that, while they have specific areas of responsibility, they are not an “island unto themselves” but have a wider responsibility to interact with the other agencies and to integrate their actions in a “whole of Government” approach towards effective and efficient implementation.
- Lead Agency representatives involved in Strategy Implementation would be expected to develop strong and frequent professional contacts with each other and keep each other fully informed on aspects of their programs and operational plans which may impact on the management of the natural resources of the catchment and the implementation of the Catchment Strategy.

(MAP FIGURE 8.2)

- Agencies would agree to provide detailed briefings to the Catchment Co-ordinating Committee and, where issues demanded, to the Catchment Conference on programs (in place and planned) and actions addressing natural resource management and implementation of the Catchment Management Strategy.
- It would be agreed that where an agency clearly has the administrative responsibility for an issue, that responsibility is acknowledge and respected, and also acted upon by that agency, or a lead agency nominated by the Catchment Conference.
- Where two or more agencies have a responsibility to act under legislation, on a matter of natural resource management, the nominated lead agencies then come to a decision on which agency should take the lead role and advise the Catchment Co-ordinating Committee on how the decision will be implemented. The decision would however remain a joint one, which all agencies would be expected to accept and support.
- Time limits should be placed on referral agencies for provision of responses to the lead agency.
- The Catchment Co-ordinating Committee would remain independent, and able to express its own views in forums of its own choice.

8.2.3 LEAD AGENCIES IN NATURAL RESOURCE MANAGEMENT

The nominated Lead Agencies, with their broad program areas and suggested representatives are:

DEPARTMENT OF PRIMARY INDUSTRIES

Land use/management, water resources management, riverine management, fisheries management, research and extension in agricultural production

Representative: Regional Manager, Natural Resource Management Program

DEPARTMENT OF ENVIORNMENT AND HERITAGE

Water quality, National Parks management, habitat management, coastal management

Representative: Regional Director

WET TROPICS MANAGEMENT AUTHORITY

Management of the Wet Tropics World Heritage Area

Representative: Executive Director

LOCAL AUTHORITIES (JOHNSTONE, EACHAM SHIRES)

Land use planning, water supply, waste management, sewerage treatment, local environmental management

Representatives: General Managers/Chief Executive Officer

RIVER IMPROVEMENT TRUST/RIVER MANAGEMENT TRUST

River and stream management, riparian zone management

Representative: Chairman

Other representatives could be drawn on a needs basis from:

- Department of Housing, Local Government and Planning;
- Department of Transport;
- Department of Lands;
- Great Barrier Reef Marine Park Authority;
- Other agencies as required.

8.2.4 BI-ANNUAL CATCHMENT CONFERENCES

Close co-ordination between the Catchment Co-ordinating Committee (integrating the community view) and key Government Departments (to achieve integrated management) is central to the successful implementation of ICM and the Catchment Strategy.

The Catchment Conference would be attended by Lead Agency representatives with power to act under existing legislation, and would provide a formal mechanism with which the key government agencies, Local Government and Statutory Organisations with responsibilities within the catchment can integrate their management actions.

It is proposed that the Catchment Conference be held twice-yearly to achieve the following:

- To develop and review the Implementation Plans and Activities in the key issue areas of the Strategy, based on a 3 to 5 year planning horizon;
- To identify the key Focus Activities for the next year;
- To review the Catchment Management Strategy, and to nominate sources of information, expertise and assistance for this purpose;
- To monitor and review progress in priority research and development projects and identify and promote emerging research needs.

At these Conferences, each agency would provide a detailed briefing on its activities in management of the land, water and biological resources of the catchment, including:

- Development of operational plans which address the strategies and actions in the Catchment Management Strategy;
- Demonstrating, before operational plans are finalised, how they will be implemented to achieve Catchment Management Strategy objectives;
- Demonstrating inter-agency co-operation in relation to:
 - Meeting natural resource and Catchment Management Strategy needs;
 - Efficient and effective co-ordination of actions and resources.

The benefits which would flow from this process would be as follows:

- All agencies would be fully briefed on the actions of others;
- Identify areas of duplication or deficiency which could be addressed by the agencies or the Catchment Co-ordinating Committee;
- Provide agencies with an opportunity to obtain feedback from the community (represented on the Catchment Co-ordinating Committee) on their plans and programs;
- Provide the opportunity for the Catchment Co-ordinating Committee to fulfil its roles with regard to offering advice to agencies, helping set priorities and monitoring the performance of management;
- Enable agencies and the Catchment Co-ordinating Committee to identify common objectives and priorities.

It would also be a function of the Catchment Conference to undertake a review of research projects in the catchment including:

- Monitoring of progress;
- Updating priorities and recommending new areas of research that might be required;
- Incorporation of results in the Catchment Management Strategy and Best Management Practice Guidelines;
- Effective promotion of research outcomes.

To be effective, the Conferences would need to be held so as to best take advantage of the Agencies' Budget Planning Cycle and for the timing of application for funding open to the Catchment Co-ordinating Committee (eg National Landcare Program, ICM Project Funding). Timing of the Conferences would need to be confirmed with the agencies and could be specified in the Memorandum of Understanding.

8.2.5 ROLES AND FUNCTIONS

The Catchment Co-ordinating Committee would:

- Promote the adoption of the Catchment Management Strategy, reviewing and amending strategies as required;
- Receive briefings from key Government Departments, Local Government and Statutory Organisations, operating with the catchment, on their programs, expenditures and research priorities;
- Offer advice and assist in formulating priorities for these agencies and establish overall policy for the management of the catchment within the context of the Catchment Management Strategy;
- Provide the Government of the day, by way of a direct link with the Minister for Primary Industries, with a community view of Integrated Catchment Management and progress in Strategy implementation;
- Keep the catchment community fully and promptly informed on decisions and subsequent actions arising from those decisions;
- Develop and implement a program of public information on ICM for the catchment community;
- Offer its services as an "honest broker" to bring together parties in dispute which might arise in the implementation of ICM;
- Promote the interests of shareholders (people of the catchment) and monitor the performance of management (lead agencies).

Lead Agency Representatives would:

- Adopt a "management team" approach to implement the Catchment Management Strategy through the Implementation Plans and Focus Activities developed by the Catchment Conference;
- Provide detailed briefings to the Catchment Co-ordinating Committee and the other participants at the Catchment Conference, on the programs, plans and activities of their agencies as they impact on the management of the land, water and biological resources of the catchment;
- Implement operational plans which address the strategies and actions in the Catchment Management Strategy in association with the Catchment Co-ordinating Committee;
- Monitor operational plans to ensure consistency with Strategy objectives;
- Develop and implement mechanisms for inter-agency co-operation in relation to:
 - Meeting natural resource and Catchment Management Strategy needs;
 - Efficient and effective service delivery to the community and clients.
- Provide effective participation on Technical Working Groups through provision of resources, expertise and information.

The Catchment Centre would:

- Act as the Secretariat for the Catchment Co-ordinating Committee and the Bi-Annual Catchment Conferences;
- Be staffed by a Co-ordinator funded by Government and appointed jointly by the Government and the Catchment Co-ordinating Committee;
- Provide an independent facility for community and stakeholder contact to address issues where agency responsibilities are unclear;
- Through its operations on a day to day basis, identify emerging implementation needs from a community and stakeholder perspective;
- Distribute information and publicity materials on matters which have been identified as important to implementation of the Catchment Management Strategy;
- Establish close and regular contacts with all media outlets in the catchment to enable the public information program developed by the Catchment Co-ordinating Committee to be implemented;
- Establish close working relationships with all key industry, Local Government and relevant community organisations and individual stakeholders in the catchment;
- Facilitate and support implementation of the Catchment Management Strategy through Industry and Community group projects and activities.

8.3 STRATEGY IMPLEMENTATION

Strategy implementation will be achieved largely by and through Departmental and Agency programs. Two main mechanisms are proposed:

Implementation Plans for Key Issue Areas.

- These will have a three to five year horizon to enable co-ordination of Government Department and Agency programs and will be developed and reviewed at the Bi-Annual Catchment Conferences.

Focus Activities.

- These will require co-ordinated effort to address priority issues and produce short term outcomes with the following 12 months, with review and rescheduling of activities annually.

Priority areas for the development of Implementation Plans for the four Key Issue Areas are outlined below.

8.3.1 LAND MANAGEMENT

Current programs and arrangements are seen as suitable and effective for most needs. Through Local Authority Planning and Property Management Planning, most needs can be addressed. It as to be recognised, however, that adequate resources need to be directed to these activities to achieve the desired outcomes.

Localised “site disturbances” continue to be the major aspect which is not adequately covered by current arrangements.

The Implementation Plan for Land Management has four elements:

- Local Authority Planning;
 - Provision of resource information, interpretation and assistance to allow Local Authorities to undertake a wider role in resource and environmental management;
- Participation and assistance in the development and promotion of industry and user-group Best Management Practice Guidelines;

-
- Participation by rural land users in the development of Property Management Plans;
 - Managing localised catchment disturbances through:
 - Identifying and characterizing disturbance type, frequency, duration, impact, severity, and requiring either -
 - * Land, water and vegetation management plans, or
 - * Compliance with relevant Best Management Practice Guidelines.

8.3.2 WATER MANAGEMENT

The primary need is for an overall catchment based Water Management Plan covering the areas of:

- Water Availability and Allocation; and
- Water Quality.

The Plan would provide a strategic framework for management of the resource at the sub-catchment, local and individual user level, thereby avoiding the potential for conflicts between resource users which can result from the present incremental management approach.

Emphasis should be given firstly to management of water as a natural resource and the full range of potential functions, values and uses this implies, before it is made available as a commodity.

The Water Availability and Allocation Plan should provide for management for rational resource use rather than regulation after problems have arisen. This will require:

- Conjunctive management of surface and groundwater;
- Assessment of resource availability;
- Development of policies for the determination and management of consumptive and environmental allocations;
- Development of strategies for resource management to be initiated by predetermined conditions of resource availability.

It is likely that additional resources will be required for the development and initial implementation phases of this management system, however this should be offset by the subsequent reduction in the regulatory functions associated with the current water resource management arrangements.

Water Quality should focus on:

- Development of relevant water quality objectives, based on identified environmental values;
- Determination of appropriate water quality guidelines to meet the above objectives, relevant to the catchment environment;
- Achievement of water quality objectives through the application of the guidelines and the pro-active actions of catchment users.

Development and implementation of the Water Management Plan should involve a high level of community, stakeholder and user group participation.

8.3.3 RIVERINE MANAGEMENT

The primary need is for a “whole of river system” management arrangement and plan to be developed. This should be achieved through:

- Review of existing management role and arrangements of the Johnstone Shire River Improvement Trust;
- Preparation of a Riverine Management Plan for the catchment.

The existing requirement for River Improvement Trusts to develop river management plans is noted, as is the current need for such plans to be available and acted on now.

Important issues which should be addressed in a Riverine Management Plan include:

- Mechanisms which ensure rivers and streams are managed as dynamic systems;
- Priority must be given to a river’s biological as well as physical features, functions and needs;
- Appropriate institutional and administrative arrangements to cater for these broader management functions;
- An integrated approvals process to manage Riverine activities;
- Determination of funding arrangements based on the “beneficiary pays” principle and identification of funding sources;
- Incentives/arrangements to encourage landholders to participate in effective management of the riparian zone.

8.3.4 HABITAT MANAGEMENT

The major emphasis must be on maintaining and improving the habitat quality and values of the whole catchment, while recognising that special conservation needs are to be met by the National Parks, World Heritage Area and other protected areas.

A whole landscape/catchment approach to habitat management is required, and will provide opportunities for participation by all sectors of the community. A significant boost to the Community Nature Conservation Program of the Department of Environment and Heritage is seen as an appropriate first step in this direction.

A sensitive approach to the coordination of existing community and agency revegetation schemes is also seen as a priority. Such coordination should ensure the continued integrity of community groups while developing a strategic approach, based on habitat and riparian zone condition and need.

Habitat quality needs to be established and used as a valid indicator of overall catchment condition.

Immediate attention is required for the following:

- The riparian zone of the two rivers, and key streams throughout the catchment;
- Linking of habitats to assist isolated areas;
- Preservation of remaining wetlands and rehabilitation of other wetland and associated watercourse areas, including rationalisation of artificial control structures.

8.3.5 FOCUS ACTIVITIES

While it is recognised that the outcomes of agency programs may take 3 - 5 years to achieve through their Implementation Plans, there is need for activities to meet the more immediate needs of catchment users for particular issues identified in the Catchment Management Strategy.

To assist Agency programs to meet the needs of catchment users and catchment resources, Focus Activities should be developed each year. These will provide:

- The coordinated focus required to keep major agency programs directly relevant to the community;
- A capacity to meaningfully address high priority emergent needs without adversely affecting on-going programs;
- Opportunities for stakeholder and community groups to actively participate in the achievement of Strategy outcomes.

Focus Activities should be reviewed on an annual basis and may require recurrent attention.

For the first year of Strategy implementation, the following issues should be addressed under these Focus Activities:

- Combined agency, community group and landholder activities resulting in improved management of riparian zone. This can be addressed through the current Catchment Co-ordinating Committee ICM-funded strategic revegetation project and will involve CRRP, WTTPS, TREAT, DEH (CNC), Local Authorities and RIT;
- Identification and classification of all remaining wetlands and development of agreed mechanisms to protect key areas;
- Provision of resource information and assistance to Local Authorities to assist in the development of planning policies and development criteria for water quality and riparian zone management;
- Identification of factors contributing to channel instability in the South Johnstone River near South Johnstone, and the development of cost effect strategies to manage this reach of the River;
- An effective community information program as part of the Water Quality component of the Water Management Plan, especially with respect to:
 - DEAP water quality monitoring results and outcomes;
 - Development of a catchment WATERWATCH program focusing on urban and point sources of contamination.

8.4 FUNDING FOR IMPLEMENTATION

As mentioned above, the Strategy will be implemented primarily through the integrated delivery of lead agency programs aligned to meet the needs and priorities of the catchment community, as indicated by the Catchment Management Strategy.

As such, it is not envisaged that any substantial new programs need to be funded to meet Strategy outcomes.

This is not to say that there are no implications for the agencies to far as additional resources are required, however, it has not been possible in the course of the Pilot Study to identify or quantify all the additional resources required for implementation of the Strategy as proposed. A detailed assessment of the resource implications for agency programs will be a key agenda item for the initial Catchment Conference.

Areas which have been identified where additional funding is likely to be required include:

- Development of the Water Availability and Allocation Plan (DPI - short term);
- Management of National Parks (DEH - recurrent);
- Community Nature Conservation Program (DEH - recurrent).

Where appropriate, it is recommended that agencies seek to maximize access to external funds available through National and State programs, such as the National Landcare Program (NLP), Landcare and Environment Action Program (LEAP) and others, particularly for short term projects (up to 3 years) aimed at achieving Strategy outcomes through Implementation Plans and Focus Activities. Opportunities for funding priority research and development projects through the various Industry Research and Development Corporations and the Land and Water Resources Research and Development Corporation (LWRRDC) will be encouraged and supported by the Catchment Co-ordinating Committee.

The Catchment Co-ordinating Committee will play an increasing role in recommending funding for agency and community projects. The Catchment Co-ordinating Committee will develop Project Proposal Plans based on key activities needed to implement the Catchment Management Strategy.

Based on the Project Proposal Plans, the Catchment Co-ordinating Committee would encourage and prioritise project submissions for both State (eg ICM project grants) and Federal (eg NLP) funding.

The Project Proposal Plans should include:

- Background and key issues identified in the Catchment Management Strategy;
- Current issues requiring action;
- Desired outcomes of projects;
- Requirements for community involvement;
- Prioritised list of projects.

8.5 PRIORITY OUTCOMES

While the strategies detailed in Sections 4 - 7 above propose targets for achieving some of the significant milestones for implementation, it is considered desirable to identify and summarise the priority outcomes which the Strategy should deliver in the short to medium term. This will assist management agencies and other responsible organisations to assess the levels of commitment which will be required and to enable them to negotiate and/or reallocate the necessary resources to these priority areas.

Priority outcomes are listed below for each of the Key Issues Areas and for the Implementation Arrangements. Indicative targets have also been proposed, however, it is recognised that these will be subject to negotiation and confirmation with the relevant agencies through the Catchment Conference process.

Land Management

- Provision of resource information and interpretation to assist Local Authorities in their development of Planning Schemes and policies which incorporate wider natural resource management objectives. Priorities for water resources, riverine management and aquatic habitat management.
Lead responsibility - DPI, DEH
Target - From July 1994
- Development of Best Management Practice Guidelines and Property Management Planning programs for major agricultural industries.
Lead responsibility - DPI, BSES, Industry Organisations
Target - June 1995

Water Management

- Development of a Water Availability and Allocation Plan.
Lead responsibility - DPI
Target - December 1996
- Development of a Water Quality Management Plan.
Lead responsibility - DEH
Target - December 1996
- Establishment of a community education and awareness program on Water Quality.
Lead responsibility - CCC, DEH, DPI, Local Authorities
Target - June 1995

Riverine Management

- Review of existing river management arrangements.
Lead responsibility - DPI, RIT
Target - June 1996
- Development of a Riverine Management Plan
Lead responsibility - RIT/RMT
Target - December 1995
- Development of a strategic revegetation plan for the rivers of the catchment
Lead responsibility - DPI, DEH, RIT/RMT, Local Authorities, CCC
Target - June 1996
- Development of strategic river management works to address channel instability in the South Johnstone River.
Lead responsibility - RIT/RMT, DPI, CCC
Target - December 1995

Habitat Management

- Address identified issues (weed invasion, feral animals, sources of erosion) through effective management of National Parks and other protected areas.
Lead responsibility - DEH, WTMA
Target - from December 1995
- Development and adoption of mechanisms for the retention and preservation of key wetlands and aquatic habitats in the lower catchment.
Lead responsibility - DPI, DEH, Local Authorities
Target - December 1995
- Effective management of riparian zones throughout the catchment
Lead responsibility - DPI, DEH, RIT/RMT, Local Authorities, Landholders
Target - from June 1996

Implementation Arrangements

- Establishment of the Johnstone River Catchment Management Association Incorporated and appointment of the permanent Catchment Co-ordinating Committee.
Lead responsibility - CCC
Target - December 1994
- Development of the Memorandum of Understanding between the Catchment Co-ordinating Committee and the Lead Agencies and agreement from all parties on its adoption.
Lead responsibility - CCC
Target - June 1995
- Initiate the Catchment Conference Process
Lead responsibility - CCC
Target - June 1995

8.6 REGIONAL LINKAGES

Since the commencement of the Johnstone River Catchment Pilot Study early in 1991, strong interest in the Integrated Catchment Management (ICM) concept has been generated throughout the Wet Tropics region of North Queensland.

As a result, Catchment Co-ordinating Committees have been established in the Herbert, Tully-Murray and Russell-Mulgrave catchments over the past two years. With the formation of a further group in the Barron catchment likely in the near future, essentially all of the agricultural catchments in the Wet Tropics region will have embraced the ICM philosophy.

In addition, a number of other significant regional planning and management initiatives have commenced over this period, including the Far North Queensland Regional Planning Advisory Committee, Cairns Regional Tourism Strategy, Wet Tropics Management Plan and the Great Barrier Reef Strategic Plan.

In addition to its primary functions with the Johnstone River Catchment, the Catchment Co-ordinating Committee should develop and maintain strong links with these and other initiatives influencing natural resource management within the region. The Committee's role in this arena should be to:

- Promote a co-ordinated approach to natural resource management across the Wet Tropics Region;
- Identify common natural resource management issues across the region;
- Promote a common approach to Government, funding and research organisations to address issues of Regional significance;
- Provide co-operative support to individual Catchment Co-ordinating Committees through the sharing of experience, expertise and resources;
- Encourage industry and stakeholder organisations to adopt common approaches to address Regional issues, eg Floodplain Management Guidelines;
- Promote effective representation for ICM on Regional forums such as Regional Planning Advisory Committee (RPAC), Regional Organisation of Councils (ROC) and the North Queensland River Improvement Trusts Association, and other Regional initiatives relevant to natural resource management.
- Promote and participate in Regional ICM Forums on natural resource management issues of Regional significance (eg Wetlands Forum, scheduled for late 1994).

The Catchment Co-ordinating Committee should also ensure that it maintains its strong links with the State Catchment Management Co-ordinating Committee and Government at policy level to ensure that Regional issues are given due consideration in the policy development process.

LIST OF ABBREVIATIONS

AGENCIES	Government Departments and Instrumentalities
AIMS	Australian Institute of Marine Science
BSES	Bureau of Sugar Experiment Stations
CCC	Catchment Co-ordinating Committee
CNC	Community Nature Conservation
CRRP	Community Rainforest Reforestation Program
DBIRD	Department of Business, Industry and Regional Development
DEAP	Downstream Effects of Agricultural Practices Study
DEH	Department of Environment and Heritage
DHLGP	Department of Housing, Local Government and Planning
DOL	Department of Lands
DOT	Department of Transport
DPI	Department of Primary Industries
GA	Greening Australia
GBRMPA	Great Barrier Reef Marine Park Authority
ICM	Integrated Catchment Management
LOCAL AUTHORITIES	Johnstone Shire Council & Eacham Shire Council
LWRRDC	Land and Water Resources Research & Development Corp ⁿ
MILLS	Sugar Mills
NQAPJB	Northern Queensland Afforestation Program Joint Board
NRM	Natural Resource Management
NUTBAT	Nutrient Balances and Transport Research Project
QFS	Queensland Fire Service
RIT	Johnstone Shire River Improvement Trust
RMT	Johnstone River Management Trust (proposed)
R & D CORP	Research and Development Corporation
TAG	Technical Advisory Group
TREAT	Trees for the Evelyn and Atherton Tablelands
WQWG	Water Quality Working Group (proposed)
WTMA	Wet Tropics Management Authority
WTTPS	Wet Tropics Tree Planting Scheme