

Burdekin Shire Rivers  
Improvement Trust



 Queensland Government  
Natural Resources and Mines



DARWIN SHIRE COUNCIL

  
Natural Heritage Trust  
MURRAY COMMUNITY FISHING SOCIETY  
A Commonwealth Government Initiative

# Volume 2 Appendices

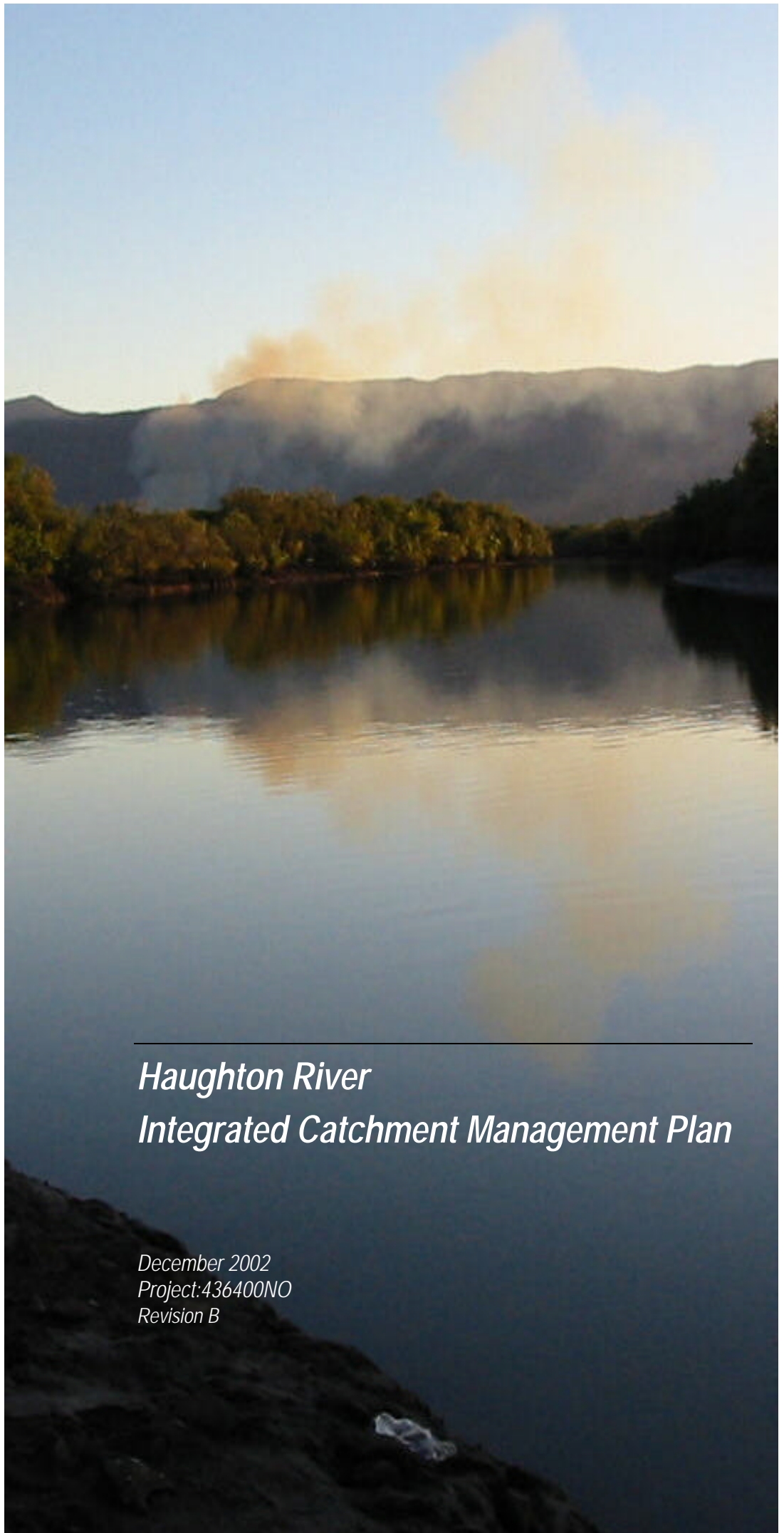
Prepared by:

**Connell Wagner**

ABN 54 005 139 873  
1<sup>st</sup> Flr Mackay Corporate Centre  
(PO Box 1060)  
Mackay Queensland 4740  
Australia  
Telephone +61 7 4951 3500  
Facsimile +61 7 4951 3865  
E-mail [cwmky@conwag.com](mailto:cwmky@conwag.com)

## *Haughton River Integrated Catchment Management Plan*

December 2002  
Project:436400NO  
Revision B





DOCUMENT CONTROL SHEET

ABN 54 005 139 873

1<sup>st</sup> Floor Mackay Corporate Centre  
 Cnr Gregory and Victoria Streets  
 PO Box 1060  
 Mackay QLD 4740, Australia  
 Telephone : (07) 4951 3500  
 Facsimile : (07) 4951 3865  
 E-mail: cwmky@conwag.com

**CLIENT:** Houghton River Integrated Catchment Steering Committee  
**PROJECT NAME:** Houghton River Integrated Catchment Management Plan  
**PROJECT NUMBER:** 436400NO  
**DOCUMENT NAME:** Integrated Catchment Management Plan Volume 2 Appendices

Rev No.	Status	Date	Prepared By		Verified By		Approved By	
			Name	Initials	Name	Initials	Name	Initials
A	Draft for Comment	12/11/2002	John Gunn Neil Proposch	JG 	Trinity Graham Stephen Ung	TG SJU	Peter McIntyre	
B	For Issue	23/12/2002	John Gunn		Neil Proposch		Peter McIntyre	



Section

---

**Appendix A**

Glossary and Abbreviations

**Appendix B**

Bibliography

**Appendix C**

Stakeholder List

**Appendix D**

Current Planning Processes and Studies

**Appendix E**

Potentially Relevant Legislation

**Appendix F**

Issue Categories From Regional & Sub-Regional Strategies

**Appendix G**

Issues By Issue Areas/Strategy Categories From Regional And Sub Regional Strategies

**Appendix H**

Issues Identified In Other Regional Planning Processes

**Appendix I**

Issues Identified During the Haughton River ICMP Planning Processes

**Appendix J**

Summary and Ranking of Relevant Issues

**Appendix K**

Regional Ecosystems

**Appendix L**

Regional Ecosystems In Protected Areas

**Appendix M**

Regional Ecosystems And Conservation Status Classification

**Appendix N**

Regional Visions and Objectives

**Appendix O**

ANZECC Indicators for State of the Environment Reporting

**Appendix P**

Water Quality Targets

**Appendix Q**

Projects, Programs And Research Initiatives Relevant To The Haughton

**Appendix R**

Statistical Information Relevant To The Haughton River Catchment

**Appendix S**

Indigenous Involvement Facilitation

## Preface

This document is the Appendices to the *Integrated Catchment Management Plan for the Haughton River Catchment* in North Queensland. It should be read in conjunction with *Volume 1 (ICMP)* and the *Haughton River Catchment Overview Report*, Connell Wagner, September 2002.

If you have any comments, please contact:

**John Gunn**

Project Natural Resources Manager  
Earth Environmental  
Phone: 0413 019 359  
earth@mackay.net.au

or

**Neil Proposch**

Project Leader  
**Connell Wagner**

Phone: (07) 4951 3500  
Fax: (07) 4951 3865  
proposcn@conwag.com

# *Appendix A*

---

## *Glossary and Abbreviations*

## *Glossary and Abbreviations*

- ❑ ICMP Integrated Catchment Management Plan
- ❑ ICM Integrated Catchment Management
- ❑ NAP National Action Plan for Salinity & Water Quality
- ❑ NHT National Heritage Trust (2 means the second round of funding)
- ❑ HRICSC Haughton River Integrated Catchment Steering Committee
- ❑ HRCCC Haughton River Catchment Coordinating Committee
- ❑ EPA Queensland Environmental Protection Agency
- ❑ BSRIT Burdekin Shire Rivers Improvement Trust
- ❑ TCC Townsville City Council
- ❑ COT City of Thuringowa
- ❑ DSC Dalrymple Shire Council
- ❑ BSC Burdekin Shire Council
- ❑ SMG Stakeholders Meeting at Giru.
- ❑ BDTG Burdekin Dry Tropics Group / Board
- ❑ HESROC (North Qld Health and Environment) Regional Organisation of Councils

# *Appendix B*

---

## *Bibliography*

## Bibliography

- 1 Canegrowers 2002, Industry Overview, Queensland Cane Growers Organisation Ltd, Brisbane, at [www.canegrowers.com.au/overview.htm](http://www.canegrowers.com.au/overview.htm)
- 2 Chudleigh, P. 2002, 'Australian production costs of sugar as background to policy development' Appendix E in *Report of the Independent Assessment of the Sugar Industry*, Department Agriculture, Fisheries and Forestry-Australia, Canberra
- 3 Great Barrier Reef Marine Park Authority 2001, *Great Barrier Reef Catchment Water Quality Action Plan*, Great Barrier Reef Marine Park Authority, Townsville
- 4 Gunn, J. 2002, *Haughton River Integrated Catchment Management Plan Draft Catchment Overview Report*, Connell Wagner, Mackay
- 5 Haynes, D. (ed) 2001, *Great Barrier Reef Water Quality: Current Issues*, Great Barrier Reef Marine Park Authority, Townsville
- 6 Hildebrand, C. 2002, *Report of the Independent Assessment of the Sugar Industry*, Department Agriculture, Fisheries and Forestry-Australia, Canberra ([www.affa.gov.au/sugar](http://www.affa.gov.au/sugar))
- 7 Roth, C., Lawson, G., and Cavanagh, D. 2001, *Burdekin Catchment Condition Study Phase 1-Draft August 2002*, CSIRO Land and Water, Townsville
- 8 Strahan, R 1998, *Farm size guidelines for horticultural cropping in north Queensland*, Department of Natural Resources, Queensland
- 9 State of the Environment Reporting. ANZECC 2001
- 10 SKM report, 1998 (TBA)



# *Appendix C*

---

## *Stakeholder List*

## Stakeholder List

List of stakeholders identified and contacted to be involved in the development of the Haughton River ICMP.

- 1 AgForce
- 2 Australian Centre for Tropical Freshwater Research (ACTFR)
- 3 Burdekin-Bowen Integrated Floodplain Management Advisory Council (BBIFMAC)
- 4 BSES
- 5 Burdekin Dry Tropics Group/Board (BDTG)
- 6 Burdekin Irrigation Area Irrigators Committee
- 7 Burdekin Shire Council
- 8 Burdekin Shire Rivers Improvement Trust
- 9 Canegrowers
- 10 CSIRO
- 11 CSR Sugar Invicta Mill
- 12 Dalrymple Shire Council
- 13 Department of Defence
- 14 Department of Local Government and Planning
- 15 Department of Main Roads
- 16 Department of Natural Resources and Mines
- 17 Department of Primary Industries
- 18 Environmental Protection Agency
- 19 Ergon Energy
- 20 GBRMPA
- 21 Giru Public Meeting participants (33)
- 22 Gudjuda Reference Group
- 23 Indigenous groups-other
- 24 Lower Burdekin Landcare Association
- 25 Mingela Public Meeting participants (10)
- 26 NaREF
- 27 North Queensland Conservation Council
- 28 North Queensland Water Board
- 29 Powerlink
- 30 Qld Fruit and Vegetable Growers
- 31 Qld Parks and Wildlife Service
- 32 Queensland Rail
- 33 Sunfish
- 34 Sunwater
- 35 Thuringowa City Council
- 36 Townsville City Council
- 37 Townsville Thuringowa Landcare Association
- 38 Upper Haughton Landcare Group
- 39 Waterwatch at Conservation Volunteers Australia
- 40 Wetlands and Grasslands Foundation
- 41 Wildlife Preservation Society
- 42 Woodstock Public Meeting participants (22)

# *Appendix D*

---

## *Current Planning Processes and Studies*

## Current Planning Processes and Studies

Strategies, guidelines and plans in process relevant to the Haughton River ICMP.

- Commonwealth
  - Great Barrier Reef Catchment Water Quality Action Plan
  - Great Barrier Reef rezoning
  - Reef Water Quality Protection Plan
- Regional and sub regional community based natural resource management plans
  - Burdekin Dry Tropics Regional Strategy
  - Burdekin-Bowen Floodplain Sub-Region Strategy
  - A Community Plan for Natural Resource Management in Townsville-Thuringowa
  - Burdekin Rangelands Sub-regional Strategy
- State government regional plans and processes
  - Burdekin Water Resource Plan
  - Regional Vegetation Management Planning
  - Coastal Management Planning
  - Road Corridor Assessment Plan
  - Leasehold lands management plan
- State Planning Policies
  - State Coastal Management Plan
  - State Vegetation Management Plan
  - Good quality agricultural land
  - Extractive industries
  - Acid sulphate soils
- Local government regional and shire strategies and plans
  - Townsville-Thuringowa Strategy Plan: Framework for Managing Growth and Development
  - Townsville City Council Planning to Protect Biodiversity
  - Townsville Ecotourism Strategy
  - City and Shire Pest Management Plans
  - Draft Revegetation Strategy for the Townsville City Council Region
- Local government planning schemes both existing and in preparation under the Integrated Planning Act
  - Burdekin Shire Planning Scheme
  - Dalrymple Shire Planning Scheme
  - Thuringowa City Planning Scheme
  - Townsville City Plan
- Industry specific strategies and guidelines
  - Canegrowers Code of Practice
  - Farmcare-Qld Fruit and Vegetable Growers
  - Grazing
- Local and 'property' plans
  - Bowling Green Bay RAMSAR Wetlands Management Plan
  - Bowling Green Bay National Park Management Plan
  - Horseshoe Lagoon Draft Management Plan
  - Land and Water Management Plans
  - Property Vegetation Management Plans

# *Appendix E*

---

## *Potentially Relevant Legislation*

## ***Potentially Relevant Legislation***

List of potentially relevant Queensland legislation.

- River Improvement Trust Act 1940 (formerly Burdekin River Trust Act 1940)
- Sewerage and Water Supply Act 1949
- Forestry Act 1959
- Industrial Development Act 1963
- Beach Protection Act 1968
- State Development and Public Works Organization Act 1971
- Marine Parks Act 1982
- Rural Lands Protection Act 1985
- Soil Conservation Act 1986
- Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987
- Chemical Usage (Agricultural and Veterinary) Control Act 1988
- Recreation Areas Management Act 1988
- Mineral Resources Act 1989
- Fire and Rescue Authority Act 1990
- Aboriginal Land Act 1991
- Queensland Heritage Act 1992
- Nature Conservation Act 1992
- Local Government Act 1993
- Native Title (Queensland) Act 1993
- Transport Infrastructure Act 1994
- Fisheries Act 1994
- Environmental Protection Act 1994
- Agricultural and Veterinary Chemicals (Queensland) Act 1994
- Land Act 1994
- Electricity Act 1994
- Coastal Protection and Management Act 1995
- Integrated Planning Act 1997
- Sugar Industry Act 1999
- Vegetation Management Act 1999
- Water Act 2000
- Land Protection (Pest and Stock Route Management) Act 2002

(Source: *Table 2-Chronological table of current Queensland Acts-Issue 21 (2002)* at [www.legislation.qld.gov.au](http://www.legislation.qld.gov.au))

### **List of potentially relevant Commonwealth legislation**

- Australian Heritage Commission Act 1975
- Great Barrier Reef Marine Park Authority Act
- Environment Protection and Biodiversity Conservation Act 1999

## Main Points of Key Legislation

### Integrated Planning Act 1997 (IPA)

The primary purpose of the act "is to seek to achieve ecological sustainability" (p.28) through coordinating and managing planning and development at local regional and State levels. One of the main concepts associated with the IPA is the integration of all the processes associated with development applications. Various processes associated with development that may have required separate applications for permits or licenses have been combined in The Integrated Development Application System (IDAS) in an effort to more effectively assess and process development applications.

This act replaces the Local Government (Planning and Environment) Act 1994 as the main piece of legislation controlling development on non-government land in Queensland. Development control is achieved through the authority vested in local government planning schemes by the act. The IPA requires all local governments in Queensland to prepare an IPA compliant planning scheme by March 2003. Until a new scheme is prepared and approved the existing planning schemes remain in force as transitional planning schemes.

The assessment statuses of some forms of development are defined in the IPA in Schedule 8. Where the assessment status is not defined in Schedule 8 it is a function of the planning scheme to identify self-assessable and assessable development. All other development not defined as self-assessable or assessable is considered exempt development. Exempt development under IPA is roughly equivalent to development not requiring Council consent under the previous legislation.

Codes are required to assess certain forms of development against and these codes can be a function of another form of legislation or process e.g. the State Policy on Clearing on Freehold Land under the Vegetation Management Act.

IPA also defines requirements for the making of State Planning Policies.

### Water Act 2000

The Water Act 2000 replaces the Water Resources Act 1989. The Water Act has assumed most of the functions of the Water Resources Act with some of these functions now integrated with the IPA.

One of the main objectives of the act was to provide a legislative base for water resource plans. Water resource plans have been prepared for some parts of Queensland in an attempt to ensure the sustainable use of the state's water resources. These plans specify allowable water allocations in a designated area, and can include conditions relating to harvesting overland flow water.

Rights to water are defined in general terms in sections 19 and 20 of the act. All rights to water are vested in the State (s 19) with certain exceptions (s 20). Water may be taken without a water entitlement

- in an emergency for public purposes and firefighting (dwellings)
- by landowners adjoining watercourses, lakes and springs for domestic purposes and watering stock
- by landowners who collected water in dams from overland flow for domestic purposes and watering stock
- by any person from watercourses, lakes and springs for camping purposes and watering travelling stock; and
- "a person may take or interfere with overland flow water and subartesian water for any purpose unless there is a moratorium notice or a water resource plan that limits or alters the water that may be taken or interfered with" (p.39).

While the act allows for taking and interfering with overland flow water a planning scheme may require Council approval to be obtained for any 'operational works' where there will be a substantial alteration of the natural surface of the land. This may include dams, contour banks, drainage ditches and other earthworks associated with water harvesting and storage, and drainage operations.

Apart from the exceptions listed above approval is required for taking water, or interfering with water flows. Approvals come in the form of water licences (s 206) and water permits (s 237). If a water resource plan is in place then decisions on the grant of a licence or permit must be in accord with the plan. The most significant difference between the licence and permit is that a water licence is 'attached' to a parcel of land while a water permit is granted for a specified activity not necessarily associated with a particular property e.g. water for road construction works. Water licences and permits are obtained from the Department of Natural Resources and Mines.

Other approvals required under the act include; riverine protection permits, which can be issued for destroying vegetation, excavating, or placing, fill in a watercourse, lake or spring (s 266), and allocation of quarry material (s 280). Riverine protection permits can be obtained directly from the Department of Natural Resources and Mines while extracting quarry material from waterways requires a development application under IPA.

The relationship of the Water Act to the IPA is defined in sections 966 to 971. This generally relates to development applications under IPA, which require assessment under the Water Act including for;

- operational work for taking or interfering with water
- removal of quarry material and;
- operational work that is construction and maintenance of referable dams

A 'referable' dam is defined by the act in sections 481 to 483. In broad terms a referable dam is greater than 8 metres in height. Referable dams require development application approval under IPA, and acceptance of a 'failure impact assessment' by the Department of Natural Resources and Mines. Non-referable dams may also require development approval under a planning scheme depending on the definitions used in the scheme.

In general, existing applications, licences and permits applied for, or granted, under the Water Resources Act will be honoured under the Water Act (s 1048).

#### Vegetation Management Act 1999

This act is a relatively new piece of legislation, which has created a deal of confusion and angst among Queensland landowners. As with the Water Act and the IPA, the purpose of the act is aimed at achieving sustainability. The act, in the simplest sense, defines what native vegetation can and cannot be cleared on freehold land. The act is administered by the Department of Natural Resources and Mines (DNRM).

The Environmental Protection Agency (EPA), through the Queensland Herbarium, has determined the extent of regional ecosystems and their conservation status. The EPA has prepared regional ecosystem maps and these are used as the principle tool in determining the conservation status of regional ecosystems for the purposes of assessment. The maps are at the 1:100,000 scale and as such they may not delineate small patches, and narrow strips of remnant vegetation. There will also be errors in ecosystem classification as the majority of the work has been carried out using remote sensing. The maps however are the best available data and are defined by the act as the principle reference. If discrepancies are noted between the regional ecosystem maps and on ground observations a DNRM Vegetation Management Officer will decide the matter.

The act operates in conjunction with the IPA, which defines the clearing of most native vegetation on freehold land as 'assessable development' requiring development approval. Exceptions, not requiring development approval, are listed at item 3A, in Schedule 8 of the IPA.



The Department of Natural Resources and Mines is responsible for assessment of development applications with regard to clearing of native vegetation. In a region where a Regional Vegetation Management Plan exists, the code contained in the plan is used to assess the application. Where a Regional Vegetation Management Plan has not been prepared the 'Code for the clearing of vegetation' (Appendix 2) of the *State Policy for Vegetation Management on Freehold Land* (Queensland Government 2000) is used to assess the application.

The purposes of the code are listed as:

1. The protection of remnant endangered regional ecosystems
2. The protection of vegetation in areas of high nature conservation value
3. The maintenance of biodiversity
4. The maintenance of ecological processes
5. The prevention of land degradation; and
6. The maintenance of the sustainable productive potential and use of agricultural land (Queensland Government 2000, p.7)

The purposes of the code are achieved through certain measures, which are the basis for the criteria used when assessing an application to clear vegetation. For example, "Purpose 1 is achieved by not clearing in any remnant endangered regional ecosystem" (Queensland Government 2000, p.7) while "Purpose 3 is achieved by: not clearing in any remnant regional ecosystem to the extent of causing a change to its conservation status" and "not reducing the total extent of remnant vegetation in a bioregion to less than 30% of its pre-clearing extent" (Queensland Government 2000, p.8).

Other purposes are achieved by meeting performance requirements listed in the code. Acceptable solutions to meet the performance requirements are also listed. These include retaining vegetation along each side of a watercourse, to protect watercourses and adjacent habitat, as part of the requirements to maintain ecological processes (Purpose 4) and prevent land degradation (Purpose 5).

In general terms clearing of remnant vegetation will not be allowed;

- in any remnant endangered regional ecosystem
- in any remnant regional ecosystem to the extent of causing a change to its conservation status
- within 25 metres of the each bank of a creek or waterway
- within 50 metres of significant wetlands, lakes or springs
- where clearing may result in mass movement or soil erosion (slopes >8-18%, depending on soil erodibility)
- in areas where salinity or waterlogging is likely to be increased as a result
- where acid sulphate soils will be disturbed
- where land is not capable of sustainable use, (information extracted and interpreted from Queensland Government 2000, pp.7-11)

There are exceptions to the restrictions above including where "the clearing is essential for establishing a necessary fence, road or other built infrastructure and no other suitable alternative site exists" (Queensland Government 2000, p.7). The Code for clearing of vegetation is included as Appendix 3.

As previously mentioned not all clearing requires development approval. The exceptions are listed at item 3A, in Schedule 8 of the IPA. These are included as Appendix 4. A summary of the relevant exceptions is listed below.

- Clearing vegetation necessary to build a single residence and reasonable associated structures
- Clearing for essential management purposes including:
  - establishing and maintaining firebreaks
  - maintaining existing infrastructure e.g. fences, roads and sheds
  - maintaining existing gardens and orchards
  - preventing harm to people or property
- Clearing for routine management purposes in areas not mapped as endangered regional ecosystems or declared areas including:
  - establishing a necessary fence, road or other built infrastructure
  - supplying fodder for stock in drought conditions
  - re-clearing re-growth vegetation
- Clearing in a non-urban area as a natural and ordinary consequence of an approved development if the development area is less than 5 hectares and the area is not mapped as an endangered regional ecosystems or a declared area.
- Operational work associated with the use of a property for forestry purposes other than the initial clearing of native vegetation to establish a plantation.

*(Note: Declared areas are areas declared by the Minister under the act as being of high conservation value, or vulnerable to land degradation. A Regional Vegetation Management Plan may also declare areas as being of high conservation value, or vulnerable to land degradation. Certain restrictions apply with regard to declared areas)*

#### Nature Conservation Act 1992

Under the Nature Conservation Act 1992 (Qld) wildlife species (plant and animal) are prescribed and listed in a number of conservation categories i.e. presumed extinct, endangered, vulnerable, rare, common, international or prohibited. 'Protected wildlife' is a plant or animal in all conservation categories except 'international' and 'prohibited'.

The act provides for the management of 'protected areas', 'protected animals' and 'protected plants'. Protected animals are the property of the State and cannot be taken, used or kept without a permit or under the application of a conservation plan. Protected plants are the property of the State unless they occur on 'private land' i.e. freehold or leasehold.

### Environmental Protection Act 1994

The act asserts that all persons have a general environmental duty not to cause environmental harm, and to report any harm that does occur.

The act defines environmentally relevant activities (ERAs) and provides for the issue of licences to carry out various works as well as the nature of Environmental Impact Statements that may be required for ERAs.

The provisions for contaminated land are also included in this Act.

### Fisheries Act 1994

The Act regulates activities that occur with regard to fisheries and fishing with particular emphasis on tidal and marine areas. A licence is required to remove, damage or destroy marine plants, including mangroves and sea grass beds.

### Coastal Protection and Management Act 1995

The main objects of the Act are:

- to provide for the protection, conservation, rehabilitation and management of the coast, including its resources and biological diversity;
- have regard to the goal, core objectives and guiding principles of the National Strategy for Ecologically Sustainable Development in the use of the Coastal zone; and
- provide, in conjunction with other legislation, a coordinated and integrated management and administrative framework for the ecologically sustainable development of the coastal zone.

An approval process for proposed works within control districts will be outlined in the Coastal Protection and Management Regulations. At present, an approval process is required for proposed works in erosion prone areas under the Beach Protection Act.

### State Coastal Management Plan

The State Coastal Management Plan describes how the coastal zone is to be managed. It is a statutory instrument under section 29 of the Coastal Protection and Management Act 1995 and has the effect of a State planning policy under the Integrated Planning Act 1997. As a State planning policy, local government as assessment managers must have regard to the State Coastal Plan when undertaking relevant development assessment under the IDAS.

### State Planning Policy for Acid Sulphate Soils

The Policy states that proposed works below 5m AHD may impact on acid sulphate soils and that an investigation into the presence of acid sulphate soils is required. An adequate management plan to mitigate any impacts of soil disturbance resulting from development proposals is required to be prepared prior to works commencing.

### State Planning Policy for Good Quality Agricultural Land

The policy proposes the retention of good quality agricultural land in planning and development processes. The policy can be overridden in development assessment processes if the public interest is served by using good quality agricultural land for another purpose.

Land Protection (Pest and Stock Route Management) Act 2002

This is the primary act for the control of pest species in Queensland. It defines the type of plants and animals that are considered pest species and the level of control in relation to each declared pest.

CommonwealthEnvironment Protection and Biodiversity Conservation Act 1999

This Act establishes a Commonwealth environmental assessment and approval system that will operate in addition to State systems. Approval is required under the Act for matters that will have or are likely to have a significant impact on environmental matter of national significance.

Under the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999 (EPBC), Part 3, Division 1, Subdivision C, prior approval is required for any actions that are likely to result in a significant impact on:

- A - World Heritage [areas]
- B - Wetlands of international importance
- C - A listed threatened species or community
- D - Listed migratory species
- E - Protection of the environment from nuclear actions
- F - Marine environment
- G - Additional matters of national environmental significance

Approval is not required if a bilateral agreement is in operation with respect to the proposed action (as described in Part 4, Division 1) or the proposed action is covered by a Ministerial declaration (as described in Part 4, Division 2).

If the project proponent considers that an action may have a significant impact on any of the environmental features listed above the proposal must be referred to the Minister for a decision to be made as to whether approval of the action is required (part 7, Division 1).

If the Minister decides, on the information provided, that the proposed action is a 'controlled action' then the method of assessing the proposal must be decided (Part 8, Division 3, Subdivision B). The impacts of a proposed controlled action may be in the form of;

- a) an accredited assessment process
- b) an assessment on preliminary documentation
- c) a public environment report
- d) an environmental impact statement
- e) a public inquiry

Great Barrier Reef Marine Park Act (Cth) 1975

The Great Barrier Reef Marine Park Act (Cth) 1975 provides for the establishment, management, care and development of a marine park within the GBR region. Under the Act, the Great Barrier Reef Marine Park Authority (GBRMPA) is charged with these obligations.

One of the functions of the Authority is to furnish information and advice to the Minister in respect of matters relating to the Marine Park, including matters relating to the use or management of an area, which would or might affect the Marine Park (Sections 7(1)(ca) and 7(1A)).

# *Appendix F*

---

*Issue Categories From Regional & Sub-Regional Strategies*

## Issue Categories From Regional & Sub-Regional Strategies

Table F-1 Issue Areas/Strategy Categories From Regional And Sub Regional Strategies

BDTG		TTLC	
1	Catchment Management and Awareness	1	Coordinated management-catchment approach
2	Water Management and Quality	2	Land, vegetation and wildlife
3	Vegetation Management	3	Water, wetlands and waterways
4	Habitat and Biodiversity Protection	4	Coastal and marine environments
5	Pest Management	5	Environmental quality
6	Soil Conservation	6	Community involvement and education
7	Coastal and Marine Area Management		
8	Social and Economic Issues		
BBIFMAC		BRIG	
1.	Water Management	1.	Land management for sustainable production
	1.1. Groundwater		1.1. Sustainable resource management in the grazing industry
	1.2. Irrigation		1.2. Sustainable management of other land uses
	1.3. Surface water management	2.	Land management for maintenance of biodiversity
	1.4. Drainage/flooding		2.1. Management of the region's biodiversity
2.	Nature Conservation		2.2. Community awareness of biodiversity
	2.1. Fish habitat	3.	Management of water resources
	2.2. Wetlands		3.1. Management of wetlands and aquatic environments
	2.3. Environmental weeds		3.2. Water allocation and management
	2.4. Remnant vegetation	4.	Social and economic factors
	2.5. Revegetation		4.1. Community involvement in NRM
	2.6. BRIA		4.2. Economic issues impacting on NRM
	2.7. Wildlife		
	2.8. Feral animals		
3.	Sustainable Land Use and Development		
	3.1. Sustainable development		
	3.2. Production sustainability		
	3.3. On farm practices		

- **BDTG** = Burdekin Dry Tropics Group Inc., *Burdekin Dry Tropics Regional Strategy for Community Based Natural Resource Management*, Natural Heritage Trust and Department of Natural Resources and Mines
- **BBIFMAC** = Burdekin-Bowen Integrated Floodplain Advisory Committee September 2000, *A Community Based Natural Resource Management Strategy for the Burdekin-Bowen Floodplain Sub-Region*, Burdekin-Bowen Integrated Floodplain Advisory Committee
- **TTLC** = Townsville-Thuringowa Landcare Association Inc. December 2001, *A Community Plan for Natural Resource Management in Townsville-Thuringowa*, Townsville-Thuringowa Landcare Association Inc.
- **BRIG** = Herbert, S. and Rickert, A., *Burdekin Rangelands Subregional Strategy*, Qld DPI

## *Appendix G*

---

*Issues By Issue Areas/Strategy Categories From Regional And Sub  
Regional Strategies*

## Issues By Issue Areas/Strategy Categories From Regional And Sub Regional Strategies

(Note: Numbers in brackets refer to categorisation in the **Issues Summary table-Appendix J**)

Table G-1 - Burdekin Dry Tropics Group (BDTG)

<p><b>1. Catchment Management and Awareness</b></p> <ul style="list-style-type: none"> <li>• Regional approach difficult due to size of region (NA)</li> <li>• Access to information/no coordinated centre (34)</li> <li>• Incomplete information sets (33)</li> </ul>	<p><b>2. Water Management and Quality</b></p> <ul style="list-style-type: none"> <li>• Sediment loads (22)</li> <li>• Nutrient loads (22)</li> <li>• Rising groundwater levels (20)</li> <li>• Aquatic weed infestations (18)</li> </ul>
<p><b>3. Vegetation Management</b></p> <ul style="list-style-type: none"> <li>• Woody weeds in native habitat (18)</li> <li>• Grazing pressure (7)</li> <li>• Clearing for development (16) (1)</li> <li>• Dryland salinity (15)</li> <li>• Fire regime alteration (6)</li> </ul>	<p><b>4. Habitat and Biodiversity Protection</b></p> <ul style="list-style-type: none"> <li>• Lack of protection outside conservation estates (29)</li> <li>• Fragmentation/loss of connectivity (28)</li> <li>• Lack of buffer provisions re intensive land use (30) (13)</li> </ul>
<p><b>5. Pest Management</b></p> <ul style="list-style-type: none"> <li>• Feral pigs (17)</li> <li>• Woody weeds (18)</li> <li>• Aquatic weeds (18)</li> <li>• New weeds (18)</li> </ul>	<p><b>6. Soil Conservation</b></p> <ul style="list-style-type: none"> <li>• Fragile soils (16)</li> <li>• Vegetation removal (28)</li> <li>• Disturbance (15)</li> <li>• Salinity (15)</li> </ul>
<p><b>7. Coastal and Marine Area Management</b></p> <ul style="list-style-type: none"> <li>• Unregulated access (5)</li> <li>• Inappropriate development (2)</li> <li>• Fragility of dune systems (5)</li> <li>• Discontinuity between terrestrial and marine management (34)</li> </ul>	<p><b>8. Social and Economic Issues</b></p> <ul style="list-style-type: none"> <li>• Rural population decline (36)</li> <li>• Variability in structure of primary industry (34)</li> <li>• Urban community apathy (32)</li> <li>• Awareness (33)</li> <li>• Under resourced community participants (37)</li> </ul>



Table G-2 - BBIFMAC

1. Water Management	
<ul style="list-style-type: none"> <li>• Groundwater (20)</li> <li>• Sea water intrusion on coastal aquifers (21)</li> <li>• Lack of sub regional management coordination (34)</li> <li>• Lack of knowledge of response to irrigation practices (33)</li> <li>• Altered recharge characteristics from changes in flow regime after Burdkein Falls Dam (27) (26)</li> <li>• Urban water quality decline (22)</li> <li>• Irrigation (27)</li> <li>• Water use efficiency, practice and methods (27)</li> <li>• Off farm impacts of tail water and drainage (27)</li> <li>• Effects on soils from poor quality water and rising groundwater (15)</li> </ul>	<ul style="list-style-type: none"> <li>• Crop health from recycled tail and drain water (27) (31) (35)</li> <li>• Water pricing (27)</li> <li>• Surface water management (27)</li> <li>• WRP process (27)</li> <li>• Impacts on wetlands (28) (31)</li> <li>• Irrigation tail water in natural systems (31) (35)</li> <li>• Turbidity of Burdekin Falls Dam water inputs (27) (22)</li> <li>• Limited monitoring coverage (19)</li> <li>• Drainage/flooding (25) (27)</li> <li>• Sanding of waterways (26)</li> <li>• Increase in stream vegetation due to altered flow regime (26)</li> <li>• Altered surface flow hydraulics especially post BRIA (27) (8) (35)</li> <li>• Bank stability from riparian vegetation loss (26) (28)</li> </ul>
2. Nature Conservation	
<ul style="list-style-type: none"> <li>• Weed impacts – Typha, floating aquatic, ponded pasture, pasture grasses (18)</li> <li>• Need for coordinated planning and integrated approach based on catchments and existing strategies and plans (11)</li> <li>• Water quality impacts-suspended solids, nutrients, pesticides, salts (22)</li> <li>• Information gaps including mapping (33)</li> <li>• Fish passage barriers (23)</li> <li>• Riparian area vegetation loss (28)</li> </ul>	<ul style="list-style-type: none"> <li>• Excessive removal of native vegetation in intensive development areas e.g. BRIA Clarification of roles in conservation efforts (28) (5) (2) (35)</li> <li>• Awareness of vegetation roles in the landscape (33)</li> <li>• Impacts from changes in hydrology/groundwater (27)</li> <li>• Habitat loss and fragmentation (28)</li> <li>• Feral animals-pigs, cats and potential exotic fish (17)</li> </ul>
3. Sustainable Land Use and Development	
<ul style="list-style-type: none"> <li>• Relationship between land use suitability and development (2) (5)</li> <li>• Pre-development planning processes including cane assignment-level and scale of assessment (2)</li> <li>• Property planning (11)</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable industry size-limitations to exceed (38)</li> <li>• Water and land management practices-best practice and suitable guidelines (10)</li> <li>• Environmental requirements and legislation (13)</li> </ul>

Table G-3 - TTLC

<b>1. Coordinated management-catchment approach</b>
<ul style="list-style-type: none"> <li>• Lack of natural resource management based on natural resource units (11)</li> <li>• Insufficient commitment to a coordinated process (34) (32)</li> <li>• Community awareness levels (33)</li> </ul>
<b>2. Land, vegetation and wildlife</b>
<ul style="list-style-type: none"> <li>• Disturbance, especially to lowland areas, from; broad-scale clearing, grazing, urban expansion, altered fire regimes, feral animals and environmental weeds (1) (6) (7) (17) (18)</li> <li>• Information gaps and dispersed information (33) (34)</li> <li>• Habitat fragmentation (28)</li> <li>• Protection of core areas (29)</li> </ul>
<b>3. Water, wetlands and waterways</b>
<ul style="list-style-type: none"> <li>• Low appreciation of environmental value of wetlands (33)</li> <li>• Lack of formal protection of some wetland types (29)</li> <li>• Threatening processes for wetlands including; reclamation, clearing, weeds and pest animals, changes to hydrology and drainage patterns, reduced water quality, littering, unmanaged access, inappropriate fire regimes and use conflict (30) (31)</li> <li>• Degraded riparian vegetation and water quality (28) (22)</li> <li>• Modifications to banks and beds of streams (26)</li> <li>• Changes to natural drainage patterns (26) (27)</li> <li>• Artificial impoundments (23)</li> <li>• Excessive water extraction (27)</li> <li>• Weed invasion (18)</li> </ul>
<b>4. Coastal and Marine environments</b>
<ul style="list-style-type: none"> <li>• Urban and industrial expansion on the coast (1)</li> <li>• Upstream land use and management practices (31)</li> <li>• Degraded vegetation and accelerated erosion due to human activities (28) (5)</li> <li>• Acid sulphate soils (16)</li> <li>• Irresponsible fishing and recreation practices (30) (5)</li> <li>• Marine transport and facilities (3)</li> <li>• Recognition of indigenous groups' rights and traditional values (39)</li> </ul>
<b>5. Environmental quality</b>
<ul style="list-style-type: none"> <li>• High rate of waste generation (40)</li> <li>• Waste disposal methods (40)</li> <li>• Illegal disposal including littering (40)</li> <li>• Unrecognised costs of waste management (40)</li> <li>• Impacts of fossil fuel use (40)</li> <li>• Inefficient energy use (40)</li> <li>• Release of ozone depleting gases (14)</li> </ul>
<b>6. Community involvement and education</b>
<ul style="list-style-type: none"> <li>• Increased expectation of community participation in NRM (33) (37)</li> <li>• Lack of understanding of ecosystem functions and threats (33)</li> </ul>

Table G-4 - BRIG

<p><b>1. Land management for sustainable production</b></p> <ul style="list-style-type: none"> <li>• Pasture condition decline (7)</li> <li>• Soil erosion (15)</li> <li>• Woody weeds (18)</li> </ul>
<p><b>2. Land management for maintenance of biodiversity</b></p> <ul style="list-style-type: none"> <li>• Knowledge of ecological processes and threats to biodiversity including resource inventory (33)</li> <li>• Loss of vegetation and soil degradation (15) (28)</li> <li>• Impacts of over grazing (7)</li> <li>• Feral animals and pest plants (17) (18)</li> <li>• Unsustainable land use and management practices (38)</li> <li>• Practical management guidelines (33)</li> <li>• Perception that conservation is not profitable (38)</li> <li>• Impacts of external policy makers (34)</li> <li>• Level of biodiversity extension services (33) (37)</li> </ul>
<p><b>3. Management of water resources</b></p> <ul style="list-style-type: none"> <li>• Health of aquatic organisms and habitats (28)</li> <li>• Impacts of land use activities including increased incidence of run-off and levels of sediment, nutrients and chemicals (22) (31)</li> <li>• Weed invasion (18)</li> <li>• Water quality (22)</li> <li>• Water extraction and allocation (27)</li> </ul>
<p><b>4. Social and economic factors</b></p> <ul style="list-style-type: none"> <li>• Communication and interaction between stakeholders (34)</li> <li>• Perspectives on appropriate management (32)</li> <li>• Declining employment opportunities (36)</li> <li>• Availability of information and extension resources (33) (37)</li> <li>• Conflict resolution mechanisms (32)</li> <li>• Technology and infrastructure for communication (34) (37)</li> <li>• Planning process accessibility (34)</li> <li>• Polarisation of interest groups and government agencies i.e. lack of an agreed and coordinated approach to community involvement in natural resource management (34) (32)</li> <li>• Cultural differences between stakeholders and between government agencies making processes difficult to coordinate and manage (32) (34)</li> <li>• Depressed markets (10) (11)</li> <li>• Successive droughts (10) (11) (5)</li> <li>• Rising property values (36)</li> <li>• Tenure security and flexibility (2)</li> <li>• Changes in the mining industry (3)</li> <li>• Capacity to change (32)</li> <li>• Support and incentive mechanisms (38) (37)</li> <li>• Viable alternatives and diversification (2) (5)</li> </ul>

# *Appendix H*

---

## *Issues Identified In Other Regional Planning Processes*

## Issues Identified In Other Regional Planning Processes

The following tables identify and summarise the main issues raised in other planning processes in the region. If further detail is required we recommend the reader reviews the source documents. (Note: Numbers in brackets refer to categorisation in the Issues summary table-Appendix J)

Table H-1 - Burdekin Catchment Condition Study Phase 1-Draft August 2002

Natural Resource Management Issues		Prioritisation		
Water Quality	Production	Environment	Overall	
• Bedload events-instream sediment (26)	14	10	9	
• Washload events-suspended sediments (22)	6	3	2	
• Ambient water quality-normal, non-flood conditions (22)	4	1	1	
• Groundwater contamination (20)	15	16	16	
• Changes to flow regime (26) (27)	8	6	5	
<b>Salinity</b>				
• Dryland salinity (15)	2	4	6	
• Irrigation salinity (20)	3	9	12	
• Seawater intrusion (21)	9	15	15	
<b>Land Degradation</b>				
• Soil erosion (15)	1	2	3	
• Soil acidity (15)	18	18	18	
• Pasture condition (7)	5	7	8	
• Terrestrial weeds (18)	11	11	11	
• Loss of habitat (28)	12	12	10	
• Tree clearing and tree thickening (fire regime change) (28) (6)	12	12	10	
• Riparian vegetation (28) (30)	10	8	7	
• Degradation and loss of wetlands (28)	7	5	4	
• Aquatic weeds (18)	13	13	13	
• Feral animals (17)	16	14	14	
• Mining and extractive industry impacts (3) (1)	17	17	17	
	<b>Production</b>	<b>Environment</b>	<b>Overall</b>	
Ambient water quality-normal, non-flood conditions (22)	4	1	1	
Washload events-suspended sediments (22)	6	3	2	
Soil erosion (15)	1	2	3	
Degradation and loss of wetlands (28)	7	5	4	
Changes to flow regime (26) (27)	8	6	5	
Dryland salinity (15)	2	4	6	
Riparian vegetation (28) (30)	10	8	7	
Pasture condition (7)	5	7	8	
Bedload events-instream sediment ((26)	14	10	9	
Loss of habitat (28)	12	12	10	
Tree clearing and tree thickening (fire regime change) (28) (6)	12	12	10	
Terrestrial weeds (18)	11	11	11	
Irrigation salinity (20)	3	9	12	
Aquatic weeds (18)	13	13	13	
Feral animals (17)	16	14	14	
Seawater intrusion (21)	9	15	15	
Groundwater contamination (20)	15	16	16	
Mining and extractive industry impacts (3) (1)	17	17	17	
Soil acidity (15)	18	18	18	

### GBRMPA Water Quality Action Plan

“The greatest threat to the Great Barrier Reef has been identified as land-based run-off resulting from agricultural activities (cattle grazing, vegetation clearance and intensive cropping) in the catchments” (Haynes 2001, p.66).

- Causal events - land management practices resulting in accelerated erosion, vegetation clearing, excessive and/or inappropriate use of pesticides and fertilisers, and destruction of wetlands and stream bank vegetation.
- Symptoms – increase in sediment, nutrients, pesticides and heavy metals (localised) in streams, estuaries and the Great Barrier Reef Lagoon. (Marine pollutants due to shipping activities)
- Main vectors – catchment run-off, first flush events, flood plumes and accumulation in sediments.

### Burdekin Water Resource Plan – Preliminary Draft Technical Assessment Reports

The reports focus on the stream and riparian areas with limited reference to the wider catchment:

- Grazing impact on hydrology i.e. reduced infiltration = increased run off and erosion (7)
- Downstream impacts of land use (31)
- Riparian zone disturbance-clearing and vegetation loss, cane fires, exotic plant species, and uncontrolled stock access (28)
- Instream modifications-river management works, sand and gravel extraction, pump station/pool excavation, fishing, and fish stocking (23)
- Water resource developments- U/S dam/weir, dam/weir, D/S dam/weir, sand dam, pumped extraction, and supplementation/regulation (27)
- Introduction of alien species - Elevated base flows maintained by irrigation and recharge schemes have contributed to the spread and proliferation of exotic species. Hymenachne and Para grass are prevalent in the lower catchment with no annual drying to keep them under control. The situation is exacerbated by the loss of riparian vegetation. Other significant weeds include castor oil bush, noogoora burr, rubber vine, guinea grass, parkinsonia and chinee apple. Other weeds across the wider catchment include; lantana, giant rats tail grass, mesquite, prickly acacia and introduced grasses (18)
- Vertebrate pests include; pigs,cats,fox and rabbits and canetoads (17)
- Exotic fish include; mosquito fish (*Gambusia holbrooki*), sailfin molly (*Poecilia latipinna*), guppy (*P. reticulata*), and gourami (*Trichogaster trichopterus*). Tilapia (*Oreochromis mossambicus*) has been reported in the Haughton River. All are indicators of impacted reaches as they do well in degraded environments (17)
- Translocated native species also occur in the catchment, mostly large piscivorous (fish eating) predators, and are expected to impact on native fishes. (Freshwater catfish, silver perch, yellowbelly, Murray cod, sleepy cod and barramundi) (17)
- ACTFR is concerned about the effects of weeds on aquatic systems and native fish species (creating hypoxia) (18)
- Unrestricted grazing stock access to waterways appears to have significant effects on aquatic habitat and macro invertebrates (7)
- Change in flow regimes, due to water from the Burdekin Falls dam, from ephemeral to perennial has disrupted macro invertebrate communities with a key issue being turbidity (27)
- Microbial growth and dissolved oxygen concentrations are also concerns. Conditions have changed dramatically downstream of the Burdekin Falls dam, and presumably in the Haughton River. Effects are multi-factorial and interactive. Major changes in macro invertebrate ecology have resulted from these changes (22)
- Wetlands, estuary and floodplain processes and connectivity. Detrimental impacts from water resource use on fish passage and barramundi nursery quality. Artificially high lagoon water levels in distributary channels increases weed growth and associated issues. Weeds create restrictions to movement both physically and due to lower dissolved oxygen levels. Physical barriers are also an issue e.g. weirs (24) (23)
- Riparian vegetation condition is assessed as moderate to very poor for the lower Haughton River (below Glendale) and Major Creek sub catchments (28)

**Townsville-Thuringowa Strategy Plan :Framework for Managing Growth and Development**

Key issues identified in the *Townsville-Thuringowa Strategy Plan: Framework for Managing Growth and Development* are:

- Population increase of 50,000 expected to 2020 with associated infrastructure p.7
- Consultation with indigenous community needs to be improved p.8
- Household size is decreasing so more and varied dwellings are required p.9
- Maintaining landscape and aesthetic values p.9 (map p.10)
- Protection of significant areas with high conservation values outside reserves p.11
- Protection of key natural resources including good quality agricultural land (GQAL), dam catchments, groundwater, grazing land, fisheries and extractive resources p.11-13
- Maintain and strengthen diverse regional economy p. 13-15
- Management of urban growth and commercial development p.15-17
- Maintenance of architectural character and cultural heritage p.17
- Cultural and community services p.18
- Management of water demand and recycling programs p.18
- Wastewater management (catchment approach) p.18
- Solid waste management –reduction, recycling and disposal p.19
- Energy production and management p.19
- Integrated transport system approach p.20

Note – page numbers refer to the document *Townsville-Thuringowa Strategy Plan: Framework for Managing Growth and Development*.

# *Appendix I*

---

*Issues Identified During the Haughton River ICMP Planning Processes*



## Issues Identified During the Houghton River ICMP Planning Processes

This Appendix details the Houghton River catchment issues and pressures identified during the development of the ICMP in late 2002. The issues were raised at meetings, discussions and through direct correspondence to Connell Wagner.

(Note: Numbers in brackets refer to categorisation in the Issues summary table-Appendix J)

Table I-1 - Houghton Issues Identified From Stakeholders Meeting

### Land Use

Count	Issue	Participants' comments
<b>Land use change</b>		
	Industrial development (1)	
	Residential development (1)	
	Impacts of change in land use (1)	How can they be addressed in ICM
	Rural residential development (1)	
	Hobby farms (1)	
	Cane expansion (1)	
	Identifying constraints (2)	
	Assessment criteria (2)	
<b>Protection</b>		
	Community amenity (4)	Recreation/fishing/walking
	Ecotourism (4)	
<b>Impacts</b>		
	Urban areas (3)	

### Land Management

Count	Issue	Participants' comments
<b>Management practices</b>		
5	Land capability as a basis for use (5)	Giru watertable, sustainable
4	Fire management (6)	Elliott Range
3	Grazing management (7)	
2	Land levelling (8)	
2	Funding for fencing and water (9)	No monitoring or problem recognition
	Management skills and knowledge (10)	
	Management for biodiversity (11)	
	Landscape ecology in management planning (11)	
	Property planning (11)	Leasehold land strategy will require planning
	Demonstration sites for BMP (12)	
	No legal requirement for BMP (13)	
	Aerial spraying (14)	
	Road and rail spills (14)	
<b>Soils</b>		
5	Sediment (15)	Overgrazing/GBR
	Acid sulphate potential (16)	
	Sodic soils (16)	

Count	Issue	Participants' comments
	Structural change (15)	Alteration of surface levels
<b>Pests</b>		
2	Pests (17) (18)	
2	Weeds (18)	
2	Feral animals (17)	Pigs, dingoes
2	Woody weeds (18)	Lantana/Parthenium
2	Giant Rats Tail grass (18)	
	Grasses (18)	GRT/Grader
	Hymenachne (18)	
	Parasites (18)	Snake vine/Mistletoe
	Monitoring needed for planning (19)	Property scale
	Tree thickening (19)	Sign of declining conditions

**Water Management**

Count	Issue	Participants' comments
<b>Salinity</b>		
5	Rising water tables (20)	Giru
	Salt water intrusion (21)	North of Houghton/Mt Elliott Range system
	Drainage outflows (22)	
<b>Water quality</b>		
2	Sediment loads (22)	
2	Nutrients (22)	
	Heavy metals (22)	
	Majors Creek (22)	
	Impact of Burdekin River water (22)	
	Monitoring (19)	Upstream from BRIA
	Chemicals (22)	
<b>Watercourse management</b>		
5	Structures-weirs/infrastructure (23)	Fish passage, flow disruption
3	Erosion (26)	Cungulla
3	Stream clearing (24)	In stream growth
3	Flood mitigation (25)	Levee banks outflow
2	Structures-levees (25)	Still licensing requirements under the Water Act for Houghton River and Majors Creek-Mal Johnson
2	Sedimentation (26)	Loss of waterholes
2	Pest species (18)	Healey's/Ironbark system
	Flood impacts (25)	Giru/CSR mill/rail/roads
	Recreation (3)	
	Habitat (30)	
	Sand and gravel extraction (26)	
	Impacts of alterations (26)	
<b>Water use management</b>		
4	Tail water run off (27)	
3	Water use efficiency (27)	
3	Ground water use (27)	
	Town water allocation (27)	
	Supplementation (27)	
	Natural yield (27)	

## Biodiversity And Vegetation

Count	Issue	Participants' comments [facilitator's comments]
<b>Loss and degradation</b>		
4	Vegetation clearing (28)	One specific to roadside vegetation including fire and levelling of land
3	Fish habitat (28)	
2	Pressure on fisheries (28)	
	Biodiversity loss (28)	
	Habitat fragmentation (28)	Loss of fauna connectivity
	Wetland degradation (28)	Equals loss of tourism, weeds
	Loss of woodland and open savanna bird species (28)	Resulting from vegetation changes including 'cleaning' and thickening from lack of fire
	Horseshoe Lagoon –flooding (28)	
	Agricultural expansion (28)	
	Rangeland condition decline (28)	
<b>Protection</b>		
5	Wetland habitat (29)	Unique RAMSAR wetlands, aquatic
2	Vegetation remnant (29)	Long term, lowland
2	Riparian vegetation and habitat (29)	Bank stability. In stream processes
2	Key areas (29)	
	USL as conservation areas (29)	
	Biodiversity maintenance (29)	Variety/representative/connectivity/% land cover
	Habitat (29)	
<b>Management</b>		
4	Remnant vegetation (30)	
4	Wetlands (30)	Grazing as a management tool on seasonal coastal wetlands
2	Hymenachne (18)	Lagoons/channels/dams, Healeys Lagoon
2	Floating aquatic weeds (18)	
2	Biodiversity (30)	Control/management of threats e.g. feral animals
2	Pigs (17)	
	Riparian vegetation (30)	
	Regrowth (30)	
	Horseshoe Lagoon (30)	Future role?
	Chinee apple (18)	
<b>Downstream impacts</b>		
3	RAMSAR site (31)	Estuary/coast
2	Manufacturing (31)	
2	Supplementary flows (31)	Unnatural in stream growth, weed seed potential

## Information and communication, and NRM coordination

Count	Issue	Participants' comments
<b>General</b>		
	Perspectives (32)	Many individuals involved
	Attitudes (32)	How to change behaviour and process
	Learning styles (32)	Graziers
	Rural leadership (33)	
	Successional planning (32)	Family relationships
	Planning process (34)	Validity of process
	Red tape hinders remedial action (34)	Erosion control in streams
	Here and now attitude hinders long term planning and implementation (32)	
<b>Knowledge and awareness</b>		
	Wetland management (33)	
	Ecosystem processes (33)	Lack of recognition
	Groundwater (33)	Lack of appreciation of the nature of
	Landscape level biodiversity (33)	Recognition of rather than arbitrary %
	Whole of catchment (33)	Lack of appreciation
	Catchment management (33)	Education required for all
	Soil mapping (33)	Lack of soil mapping
	Interpreted planning (33)	For NRM/practical guidelines
	Economic impact examples (33)	Lack of economic impact analysis
	Alternate crops and animals (33)	
	Collation of information (33)	The main prerequisite to planning
<b>Coordination</b>		
	Inter agency (34)	Lack of inter-agency coordination
	Number of agencies (34)	Pace of decision making
	Scale (34)	Many bodies
	Land and water management (34)	Needed
	No legislative requirement to be involved in the process (34)	All landholders need to be involved for it to work
<b>Socio economic</b>		
3	Sugar industry (35)	Low price, instability, sustainability
2	Funding (37)	For NRM implementation
	Rural towns viability (36)	
	Economic benefits need to be shown for environmental action (38)	
	Judicious spending required (37)	Not just because funds are available

## Haughton issues identified from public meetings

Giru 17/9/02

## Weeds

- Healeys Lagoon
- Instream vegetation-Haughton River-Para grass, Panics and other vegetation (18) (24) (which leads to increased siltation)

## Erosion and siltation

- Silt build up in the Haughton (26)-sand extraction to overcome problems –e.g. sand island upstream of Giru bowling club
- Causes of siltation (31)-grazing pressure (7)-pigs (17) degrading areas-little contribution from the floodplain

- Roads and rail (8) on the floodplain have a significant impact on flood flow-damming and channelling
- Streambank erosion (26)-lost 15 metres of bank

#### Impacts of development

- Woodstock will make water downstream unfit for use (1) (31)

#### Social/economic

- Urban/rural divide (32)-clean water (22) is demanded in urban areas but degraded systems are 'alright' in rural areas from an urban perspective
- Asset protection-(as a result of worsening floods from silted rivers) (25) (26)
  - -implications include; increased insurance premiums, services affected (35) (36), historic studies aren't given due consideration (34) (unrest due to studies and no action), local experience should be taken more seriously when considering actions (34), Cungulla replenishment (what is the situation when considering removal of sand from the system) (26), extraction as an option for improving the situation (26), government regulations hinder the process (34), weirs have a major impact but how do we do without them? (27) (23), changed conditions mean that the issue is much more complex

#### Private input

- Access to the river for passive recreational use (4)
- Illegal sand dams reduce the overflow and create more overbank flow downstream (23)
- Hydraulics in Major Creek catchment/Serpentine Lagoon result in flow back to the Ross River catchment in some events i.e. when the Haughton system is 'full' (33)

#### The main issue at the Giru meeting;

- flooding exacerbated by silting and instream vegetation

#### The main concern;

- asset damage

#### The suggested solution;

- extraction of sand, and removal of vegetation

#### Impediments;

- government regulations and policy

#### Woodstock 18/9/02

##### Woodstock Industrial Estate

- validity of WIE report/information (33)
- potential impacts (1)
- water quality implications (20) (22)

#### ICM planning process

- Contribution of the ICMP into planning processes with a legislative base e.g. Coastal Protection and Management Act for coastal management plans (13).
- Bindal should be included not just the Gudjuda Reference Group (34).
- Integrated Planning Act is not a useful piece of legislation (32).

## Weeds (18)

Riparian weeds	Other areas	Dunes and coastal areas
• rubber vine	• bellyache bush	• lantana
• chinee apple	• snake weed	• rubber vine
• lantana	• grader grass	
• snake vine-potatoe vine	• Captain Cook bush	
General		
<ul style="list-style-type: none"> <li>• parthenium (potential)</li> <li>• ornamentals</li> <li>• instream vegetation leading to siltation, change of flow and subsequent erosion (24).</li> </ul>		

## Feral animals (17)

- pigs and rabbits, wild dogs and cats. Fish (exotics)?

## Native vegetation

- Native vegetation dieback (28).
- Native vegetation degradation and subsequent erosion (28) (26).
- Inappropriate clearing/vegetation management (30).
- Vegetation-native-growing instream especially during dry years when there is no flushing (24).

## Management coordination

- Coordination of pest management and revegetation (34).
- Management of State lands (34).
- Pest management coordination among landholders and Councils (34).
- Fire management (6).

## Stream management

- Sand instream-Major Creek-could ride a horse under the bridge once upon a time (26).
- Sand dams and other 'illegal' works associated with streams, generally associated with horticultural development and management (23).
- Levees and structures and there effects (DNRM licensing?) (25).
- Major Creek seems to be the priority area (23) (26).
- Pesticides and other chemicals? (22)

## The main issues at the Woodstock meeting (excluding Woodstock Industrial Estate);

- weeds and stream silting

## The main concern;

- loss of native vegetation and management practices leading to further erosion and change of flow

## The suggested solution;

- coordinated weed control program and stream management program

## Impediments;

- lack of participation of all necessary to make it work

Mingela 23/10/2002

Issue	Count
<b>Weeds</b>	
Weeds-associated with creeks, after droughts (18)	3
Weed growth in lower Houghton (18)	1
Chinee apple (18)	2
Lantana-covers large areas no grass can grow (18) (7)	3
Rubber vine-taking over the creeks (18) (28)	3
Spread/introduction of weed e.g. Parthenium and trespassers (18)	2
<b>Fire</b>	
Fire control needs improving-vegetation destroyed (6) (28)	1
Unseasonal fire causing erosion (6)	1
Erosion on creek banks	
<b>Water Resources</b>	
Drought in upper catchment (7)	1
Land degraded due to dry years (7)	1
Drought (7)	1
Lack of grass because of drought (7)	1
<b>Water Management</b>	
Maybe illegal damming downstream (26)	1
Water management and salinity (downstream) (27) (20)	1
Possible overuse of water downstream (27)	1
Not enough surface water available (27)	1
<b>Pests</b>	
Feral animals-pigs x2, rabbits, cats, cane toads (17)	2
Kangaroo numbers (17)	1
Dingoes/wild dogs (17)	1
All the issues are known	1

**Houghton issues identified from sub regional strategies**

- Houghton River-riparian vegetation (28), water quality (22), stream bank and bed disturbance (26), impacts on fish populations (23) and (28)
- Majors Creek-riparian vegetation, stream bank and bed disturbance, water harvesting (13)
- St Margarets Creek- localised stream bank and bed disturbance, impacts on fish populations
- Spring and Double Creeks- impacts on fish populations
- Reid River – impacts of cattle (7) on riparian vegetation and stream bank and bed condition is marked as unknown.
- Current community involvement is marked as unknown for all sub catchments (33).

(Source: *TTLIC, p.68-Wetlands and waterways issues table*)

# *Appendix J*

---

## *Summary and Ranking of Relevant Issues*



## Summary and Ranking of Relevant Issues

Table J-1 is a detailed list of the issues and concerns raised during the consultation process for the Haughton River ICMP, and those issues identified in other planning studies and processes. The issues have been given a reference number which is used in the main body of the ICMP, as well as scores based on the number of times the issue was raised and a variety of assessment of the issues from consultation and other reports. Details of the rankings and abbreviations are provided following the Table.

Table J-1 - Issues Summary

Ref #	Assoc. Issue	Issue	Where and How Often was the Issue Raised?										Score				
			SMG	GPM	WPM	MPM	WRP	TT	BB	BR	BCC	BDT	W/loc	Reg	loc	I/r	
1		Impacts of land use change-residential, industrial etc	6	0	0				0			0	0	10	5	3	6
2		Land use capability and constraint assessment	2							0	0		0	2	3	1	4
3		Impacts of existing urban and industrial areas	1						0		0	0		1	3	1	4
4		Protection of community amenity and eco tourism potential	3	0					0					5	1	2	3
5		Land capability as the basis for land use	5							0	0		0	5	3	1	4
6		Fire management	4		0	0			0			0	0	8	3	3	6
7		Grazing management and pasture condition	3	0		0	0	0	0		0	0	0	11	4	5	8
8	15, 25	Alteration of natural land contours e.g. land levelling, rail	2	0						0				4	1	2	3
9		Allocation and monitoring of NRM funds and projects	2											5	0	1	1
10		Skill level and capacity of Natural Resource managers – needs raising	1							0	0			1	2	1	3
11		Integrated NR planning and management – needed	2						0	0	0			2	3	1	4
12		Demonstration sites for Best Management Practice (BMP)	1											1	0	1	1
13	34	Lack of legislative requirements for BMP and other measures	2		0					0			0	4	2	2	4
14		Environmental contamination	2											2	0	1	1
15		Soil degradation-erosion, structure decline, etc	6			0			0	0	0	0	0	8	5	2	7
16		Soil type constraints	2						0				0	2	2	1	3
17	30	Pest animals	6	0	0	0	0	0	0	0	0	0	0	14	5	5	10
18	30	Pest plants	17	0	0	0	0	0	0	0	0	0	0	28	5	5	10
19		NR condition indicators and monitoring required	3							0				3	1	1	2
20		Groundwater quality-e.g. salinity from rising groundwater	5		0	0				0		0	0	7	3	3	6
21		Salinity from saltwater intrusion	1							0		0		1	2	1	3
22	27	Surface water quality-sediment, nutrients, chemicals, etc.	9	0	0			0	0	0	0	0	0	17	5	5	9
23		Impacts of in stream structures eg. flow alteration & fish passage	5	0	0			0	0	0				13	3	5	6

Ref #	Assoc. Issue	Issue	Where and How Often was the Issue Raised?										Score				
			SMG	GPM	WPM	MPM	WRP	TT	BB	BR	BCC	BDT	W/loc	Reg	loc	l/r	
24		Impacts of in stream vegetation e.g. flow alteration and silting	3	0	0		0							9	0	4	4
25		Flood impacts and mitigation structures	6	0	0					0				10	1	3	4
26		Erosion-sedimentation-extraction & impacts of changes on streams	7	0	0	0		0	0	0		0		15	3	5	7
27		Water use management and allocation	13	0		0	0	0	0	0	0	0		19	4	5	7
28	26	Loss and degradation of vegetation, habitat and biodiversity	16		0	0	0	0	0	0	0	0	0	24	5	5	9
29		Protection of viable habitat, vegetation and biodiversity	14					0				0	0	14	2	1	2
30	17, 18, 22, 26, 29	Management to maintain and enhance remnant vegetation, production, habitat and biodiversity e.g. control threats	14		0			0				0	0	16	3	2	5
31		Impacts from upstream sources	7	0	0		0	0	0	0				13	3	4	7
32		Different perspectives, attitudes and learning styles	5	0	0			0		0		0	0	9	3	3	6
33		Lack of information, knowledge, capacity and awareness	12	0	0	0		0	0	0	0	0	0	20	5	5	9
34	13	Coordination and communication issues	7	0	0	0		0	0	0		0	0	13	4	4	8
35		Sugar industry influence and impacts	3	0						0				5	1	2	3
36		Rural towns and community viability	1	0							0		0	3	2	1	4
37	9	Appropriate funding for NRM	3					0		0		0	0	3	3	1	4
38		Link between economic and environmental benefit for action	1							0	0			1	2	1	3
39		Acknowledgement of indigenous people's rights and values						0						1	0	0	1
40		Waste management						0						1	0	0	1

**Key**

- W/loc = SMG results plus (GPM, WPM, MPM, WRP and TT) x 2
- Reg = incidence from TT, BB, BR, BDT and BCC
- Loc = incidence from SMG, GPM, WPM, MPM, WRP and TT
- l/r = incidence from SMG, GPM, WPM, MPM, WRP, TT, BB, BR, BDT and BCC

**Abbreviations**

- SMG=Stakeholders meeting at Giru
- GPM=Giru public meeting
- WPM=Woodstock public meeting
- MPM=Mingela public meeting
- BB=Burdekin Bowen sub regional strategy
- TT=Townsville Thuringowa sub regional strategy
- BR=Burdekin Rangelands sub regional strategy
- TTS=Townsville Thuringowa Strategy
- WRP=Burdekin Water Resource Plan Technical Reports (preliminary draft)
- BCC=Burdekin Catchment Condition Study (draft)
- BDT=Burdekin Dry Tropics regional strategy

### Additional Information

Additional comments from public and stakeholder meetings (\*-stakeholders meeting) not listed in Table J-1 include:

- (8) □ Impacts of road and rail on the floodplain
- (18) □ Healeys Lagoon and Haughton River
- (21) □ Potential from WIE
- (22) \* Major Creek, and impacts of Burdekin River water transfer specified
- (23) □ Illegal structures such as sand dams, □ Major Creek a priority area
- (26) \* Cungulla specified for erosion, □ Haughton River banks, □ Major Creek a priority area
- (30) \* Horseshoe Lagoon future role?
- (31) \* Unnatural instream growth and weed seed from Burdekin supplementary flow
- (32) \* Successional planning, □ Urban/rural divide
- (33) \* Rural leadership, □ Validity of information
- (34) \* Validity of ICM planning, Red tape, □ Pest management and revegetation, and State lands

### Ranking For Main Report (Table 3.2 in the ICMP)

Ranking of issues was done by sorting the various columns in the table above in the following ways:

- lsr =sorted by loc, then by SMG, then by Reg
- lrs =sorted by loc, then by Reg, then by SMG
- rls =sorted by Reg, then by loc, then by SMG
- wl =sorted by W/loc, then by l/r
- tr =sum of lsr, lrs, rls and wl then sorted ascending

Where issues in any combination had the same score they were ranked the same and the ranking below was reduced accordingly e.g. if the two scores at issue rank 12 and 13 were the same then both issues were ranked as 12 and the following issue was ranked as 14.

Table 3.2 in the ICMP document provides a sorted list of the issues based the ranking.

# *Appendix K*

---

## *Regional Ecosystems*

## Regional Ecosystems

Table K-1 – Description of Regional Ecosystems

Regional Ecosystem Description	RE No.	Status	Area ha
<b>Brigalow Belt REs</b>			
Sporobolus virginicus grassland on marine clay plains.	11.1.1	NCAP <sup>1</sup>	358
Samphire forland on marine clay plains.	11.1.2	NCAP	533
Sedgelands on marine clay plains.	11.1.3	OC <sup>2</sup>	124
Mangrove forest/woodland on marine clay plains.	11.1.4	NCAP	2,239
Eucalyptus platyphylla-Corymbia tessellaris woodland on sandy coastal plains.	11.2.1	OC	36
Lagoons in coastal swales associated with Quaternary coastal dunes & beaches.	11.2.4	OC	36
Corymbia-Melaleuca woodland complex of beach ridges and swales.	11.2.5	OC	1,271
Eucalyptus tereticornis &/or E. camaldulensis tall woodland on alluvial plains.	11.3.4	OC	63
Melaleuca viridiflora woodland on alluvial plains.	11.3.12	NCAP	2,511
Eucalyptus tereticornis or E. camaldulensis, Casuarina cunninghamiana fringing woodland on alluvial plains.	11.3.25	NCAP	2
Areas dominated by Eucalyptus raveretiana, Melaleuca fluviatilis, Casuarina cunninghamiana +/- Nauclea orientalis	11.3.25a	NCAP	674
Areas dominated by Melaleuca leucadendra and/or M. fluviatilis, Nauclea orientalis, Pandanus tectorius, Eucalyptus tereticornis, Casuarina cunninghamiana, Lophostemon suaveolens and rainforest species	11.3.25b	NCAP	6,362
Freshwater wetlands.	11.3.27	NCAP	390
Eucalyptus crebra, Corymbia dallachiana woodland on alluvial plains.	11.3.30	NCAP	15,006
Ophiuros exaltatus, Dichanthium spp. grassland on alluvial plains.	11.3.31	NCAP	81
Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains.	11.3.35	NCAP	19,563
Microphyll vine forest ± Araucaria cunninghamii on old sedimentary rocks with varying degrees of metamorphism and folding.	11.11.5	NCAP	170
Eucalyptus persistens +/- Corymbia lamprophylla low open woodland on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Lowlands.	11.11.12	NCAP	42
Eucalyptus crebra woodland on deformed and metamorphosed sediments and interbedded volcanics; undulating plains.	11.11.15	NCAP	2,378
Woodland dominated by E. drepanophylla and/or E. platyphylla +/- vine thicket species	11.11.15b	NCAP	2,378
Eucalyptus crebra woodland on igneous rocks.	11.12.1	NCAP	2,405
Semi-evergreen vine thicket and microphyll vine forest on igneous	11.12.4	NCAP	541
Eucalyptus shirleyi woodland on igneous rocks.	11.12.8a	OC	48
Eucalyptus lamprophylla, E. shirleyi, E. exserta +/- Cochlospermum gillivraei or Eucalyptus peltata, E. drepanophylla +/- E. shirleyi +/- E. dallachiana-similar to ecosystems that occur in the Einasleigh bioregion	11.12.8b	OC	1,497
Eucalyptus platyphylla woodland on igneous rocks.	11.12.9	NCAP	1,942
	11.12.9a	NCAP	1,063
Eucalyptus crebra, Corymbia spp., E. acmenoides woodland on igneous rocks; coastal hills.	11.12.13	NCAP	61
Areas dominated by Eucalyptus acmenoides, E. drepanophylla +/- E. exserta	11.12.1 a	NCAP	2,046
Areas dominated by Forest with Eucalyptus intermedia, Casuarina torulosa, Syncarpia glomulifera and Eucalyptus acmenoides	11.12.13b	NCAP	6,055
Montane shrubland on igneous rocks; mountain tops.	11.12.18	OC	227

<sup>1</sup> NCAP = Not of Concern At Present

<sup>2</sup> OC = Of Concern

Regional Ecosystem Description	RE No.	Status	Area ha
<b>Wet Tropics REs</b>			
Notophyll vine forest dominated by blackwood ( <i>Acacia melanoxylon</i> ) on cloudy wet granite and rhyolite uplands and highlands	7.12.13	NCAP	1,449
Notophyll vine forest with rose gum ( <i>Eucalyptus grandis</i> ) emergents on cloudy wet granite and rhyolite upland ridges	7.12.14	NCAP	546
Tall open rose gum ( <i>Eucalyptus grandis</i> ) forest on cloudy moist granite and rhyolite uplands and highlands.	7.12.21	OC	79
Tall open woodland, with <i>Corymbia intermedia</i> , <i>Allocasuarina torulosa</i> and <i>Lophostemon suaveolens</i> of the moist uplands	7.12.23	OC	139
Forest red gum ( <i>Eucalyptus tereticornis</i> ) woodland on dry granite uplands and highlands.	7.12.35	NCAP	442
Deciduous microphyll vine thicket on fire protected dry granite	7.12.36	OC	142
<b>Einiasleigh Uplands REs</b>			
<i>Eucalyptus camaldulensis</i> or <i>E. tereticornis</i> woodland in channels and on alluvial flats and levees of larger watercourses +/- <i>Casuarina cunninghamiana</i> .	9.3.1	NCAP	81
<i>Eucalyptus crebra</i> and <i>Corymbia dallachiana</i> woodland on yellow earths of Tertiary plains.	9.5.3a	NCAP	10
<i>Eucalyptus</i> spp., <i>Corymbia</i> spp. and/or <i>Melaleuca</i> spp. communities on sandstone plateaus, scarps and ledges, on skeletal soils, sands and earths.	9.10.1x7	NCAP	346
	9.10.1x8	NCAP	104
	9.10.1x9	NCAP	493
<i>Eucalyptus shirleyi</i> woodland on skeletal soils on hills on folded sedimentary and metamorphic rocks.	9.11.1xb	NCAP	14
Narrow-leaved ironbark ( <i>Eucalyptus crebra</i> ) and ghost gum ( <i>Corymbia dallachiana</i> ) woodland on shallow texture contrast soils of low hills and lowlands	9.11.2a	NCAP	3,312
<i>Corymbia citriodora</i> , <i>Eucalyptus drepanophylla</i> , <i>E. acmenoides</i> and <i>E. cloeziana</i> open forest on skeletal soils on hills on sedimentary and metamorphic rocks.	9.11.4b	NCAP	9,638
<i>Eucalyptus persistens</i> woodland on shallow texture contrast soils of lowlands and low rises on folded sedimentary and metamorphic rocks.	9.11.5x10	NCAP	888
Dry vine forest and associated woodland on rock outcrop and shallow loams on limestones	9.11.8a	OC	144
Narrow-leaved ironbark ( <i>Eucalyptus crebra</i> ) and bloodwood ( <i>Corymbia</i> spp.) woodland on shallow soils of low hills and ranges	9.12.1	NCAP	5,189
	9.12.1x3	NCAP	6,852
	9.12.1x6	NCAP	46
	9.12.1x13	NCAP	17,625
	9.12.1x16	NCAP	4,918
	9.12.1x17	NCAP	385
	9.12.1x19	NCAP	867
Ironbark ( <i>Eucalyptus granitica</i> ), white mahogany ( <i>Eucalyptus acmenoides</i> ) and lemon scented gum ( <i>Corymbia citriodora</i> ) open forest on shallow soils of hills and ranges	9.12.2x7	NCAP	3,270
	9.12.2d	NCAP	4,235
Broad-leaved ironbark ( <i>Eucalyptus shirleyi</i> ) low open woodland on skeletal soils of hills and ranges	9.12.4x8	NCAP	777
Dry vine forest on igneous outcrops	9.12.8	NCAP	2,207
<b>Total area (hectares) for individual REs = 134,297 ha</b>			

Regional Ecosystem Description	RE No.	Status	Area ha
<b>REs in associations only</b>			
Corymbia spp. woodland on alluvial plains. Sandy soils.	11.3.7	NCAP	
Eucalyptus platyphylla, Corymbia spp. woodland on alluvial plains.	11.3.9	NCAP	
Eucalyptus brownii woodland on alluvial plains.	11.3.10	NCAP	
Grevillea striata on alluvial plains.	11.3.13	OC	
Woodland on alluvial plains dominated by Eucalyptus tessellaris, E. clarksoniana and E. platyphylla	11.3.35a	NCAP	
Lophostemon spp. woodland on igneous rocks; coastal hills.	11.12.14	OC	

Table K-2 – Regional Ecosystem Associations

RE association	Hectares	RE association	Hectares
11.1.1/11.1.2	343 & 29	11.3.7/ <u>11.3.9</u> /11.3.12	1,711
11.1.1/11.1.2/11.1.4	116 & 832	11.3.7/11.3.9/11.3.25/11.3.25b	111
11.1.1/ <u>11.1.3</u> /11.3.27	2,297	11.3.7/ <u>11.3.9</u> /11.3.25b	634
11.1.1/11.1.4	618	11.3.7/11.3.9/11.3.25b/11.3.27	429
11.1.1/11.3.25/11.3.27/11.3.31	996	11.3.7/11.3.25/11.3.25b	31
11.1.2/11.1.4	305 & 164	11.3.7/11.3.31	90 & 2
11.1.3/11.3.7/ <u>11.3.9</u> /11.3.25b	428	11.3.9/11.3.12/11.3.30	1,201
11.1.3/11.3.7/11.3.25b	624	11.3.10/11.3.35a	16,676
11.1.3/11.3.9/11.3.13	114	11.3.25/11.3.25b	1,410 & 55
11.1.3/ <u>11.3.25b</u>	3		
11.1.3/ <u>11.3.27</u>	81	11.12.1/ <u>11.12.4</u>	364
		11.12.4/11.12.9/ <u>11.12.13</u> /11.12.14	964
11.3.4/11.3.7/ <u>11.3.9</u> /11.3.13	278	11.12.13/11.12.14	375
11.3.4/11.3.7/ <u>11.3.9</u> /11.3.25b	90		
11.3.4/11.3.25b/ <u>11.3.35</u>	2,200	9.12.1x13/9.12.8	703
		9.11.2a/9.11.8a	2,974
<b>Total associations 28</b>		<b>Total area in associations</b>	<b>37,231</b>

The Regional Ecosystems (REs) have been sorted numerically in ascending order. Dominant REs appear first unless underlined which denotes the dominant RE in the association prior to sorting numerically. Due to sorting descending RE percentages may not be reflected in this list of associations.

Additionally where two areas appear for an association the first area is for the first RE in the association as dominant and the second area is for the second RE in the association as dominant.

Total area of all regional ecosystems and associations 171,500.

Table K-3 RE Status and Area

Individual Res	Number	Area (ha)	Area in associations (ha)
No Concern at Present (NCAP)	45	130,494	12,499
Of Concern (OC)	12	3,806	3,035
<b>Totals</b>		<b>134,300</b>	<b>15,534</b>

REs in associations only	Number	Area (ha)	Comment
No Concern at Present	4	21,679	
Of Concern	2	?	

The area of regional ecosystems in associations has been calculated on the basis of the dominant RE in an association. The area is then added to the total (column four) of the group of REs, which includes the dominant RE for those associations.

The area of REs that appear in associations only has also been calculated based on the dominant RE in the association. If there is no total it means the REs were not dominant.



# *Appendix L*

---

## *Regional Ecosystems In Protected Areas*

## Regional Ecosystems In Protected Areas.

Table L-1 Regional Ecosystems in Protected Areas

Catchment area		Protected areas in catchment		
RE number	Hectares	RE number	Hectares	%
11.1.1	358.3	11.1.1	66.6	18.58
11.1.1/11.1.2/11.1.2	333.7	11.1.1/11.1.2/11.1.2	140.0	41.97
11.1.1/11.1.2/11.1.4	80.7	11.1.1/11.1.2/11.1.4	56.8	70.43
11.1.2/11.1.1/11.1.4/11.1.2	831.5	11.1.2/11.1.1/11.1.4/11.1.2	429.6	51.67
11.1.2/11.1.2	285.4	11.1.2/11.1.2	243.1	85.18
11.1.2/11.1.2/11.1.4	116.4	11.1.2/11.1.2/11.1.4	16.2	13.88
11.1.3/11.1.1/11.3.27	2279.4	11.1.3/11.1.1/11.3.27	1088.1	47.74
11.1.3/11.3.7/11.3.25b	624.4	11.1.3/11.3.7/11.3.25b	8.8	1.41
11.1.3/11.3.9/11.3.13	114.3	11.1.3/11.3.9/11.3.13	72.8	63.74
11.1.4	2238.6	11.1.4	1473.3	65.81
11.2.5	1271.4	11.2.5	238.5	18.76
11.3.25/11.3.25b	1409.8	11.3.25/11.3.25b	12.6	0.90
11.3.25b	6361.8	11.3.25b	258.9	4.07
11.3.27	389.8	11.3.27	111.1	28.50
11.3.30	15006.0	11.3.30	0.4	0.00
11.3.35	19562.6	11.3.35	140.2	0.72
11.3.35/11.3.4/11.3.25b	2200.0	11.3.35/11.3.4/11.3.25b	439.9	19.99
11.3.9/11.3.12/11.3.30	1200.7	11.3.9/11.3.12/11.3.30	11.1	0.92
11.12.1	2405.3	11.12.1	317.3	13.19
11.12.13/11.12.14	375.4	11.12.13/11.12.14	256.4	68.31
11.12.4	540.6	11.12.4	458.1	84.74
11.12.9	1942.0	11.12.9	1558.3	80.24
11.1.1/11.1.2/11.1.2/11.1.4	35.0	11.1.1/11.1.2/11.1.2/11.1.4	35.0	100.00
11.1.1/11.1.4	618.3	11.1.1/11.1.4	617.0	99.78
11.1.2/11.1.1	17.8	11.1.2/11.1.1	17.8	100.00
11.1.2/11.1.2/11.1.1	10.9	11.1.2/11.1.2/11.1.1	10.9	100.00
11.1.4/11.1.2	163.6	11.1.4/11.1.2	162.5	99.32
11.12.13a	2045.9	11.12.13a	2045.1	99.96
11.12.18	227.1	11.12.18	226.8	99.85
7.12.13	1448.8	7.12.13	1448.8	100.00
7.12.14	546.3	7.12.14	546.3	100.00
7.12.21	79.4	7.12.21	79.4	100.00
7.12.35	441.7	7.12.35	441.7	100.00
7.12.36	142.0	7.12.36	141.5	99.677
11.1.2	247.7	11.1.2	235.9	95.26
11.2.1	35.8	11.2.1	35.0	97.85
11.12.13/11.12.9/11.12.4/11.12.14	964.0	11.12.13/11.12.9/11.12.4/11.12.14	942.5	97.77
11.12.13b	6055.2	11.12.13b	5891.1	97.29
		<i>Cleared</i>	9.0	

**Total catchment area (hectares) 72649.6**

**Total (ha) of RE area protected 20284.7 or 27.9%**

Table L-2 Regional ecosystems in protected areas

RE type	NCAP	OC
Individual	16	5
In associations only	5	4

RE type	NCAP dominant	OC dominant
Associations	10	2

# *Appendix M*

---

## *Regional Ecosystems And Conservation Status Classification*

## ***Regional Ecosystems And Conservation Status Classification***

Recent vegetation mapping has been undertaken by the Queensland Herbarium to produce the 1:100,000 series of Regional Ecosystem maps. Mapping units are defined by biogeographic regions (bioregions) Bioregions “are based on broad landscape patterns that reflect the major structural geologies and climate as well as major changes in floristic and faunistic assemblages” (Sattler and Williams 1999, p.1/4). The Haughton River catchment is part of the Brigalow Belt (North) and the Einasleigh Uplands bioregions as described by Sattler and Williams (1999). Regional ecosystems have been mapped and described for each bioregion. The regional ecosystem maps continue to be updated as more detail is added and new regional ecosystems are discovered.

The Brigalow Belt is a large bioregion and has been subdivided into 36 sub regions or provinces based on similarities in patterns associated with the geology and geomorphology of the areas. Similarly the Einasleigh Uplands have been divided into provinces. The Haughton is in the Townsville Plains province of the Brigalow Belt bioregion and the Broken River province of the Einasleigh Uplands bioregion. Parts of the Reid River and upper Haughton catchment are classified as having Einasleigh Uplands regional ecosystems. In addition there are some regional ecosystems of the Wet Tropics bioregion in the Mt Elliott section of Bowling Green Bay National Park.

The conservation status of the various regional ecosystems has been determined by estimating the previous extent of regional ecosystems and then calculating the area of remnant vegetation as a percentage of the original area.

The conservation status of a regional ecosystem is generally defined as:

- **Endangered** - if less than 10% of its original extent remains intact across the bioregion, or its distribution has contracted to less than 10% of its original range
- **Of concern (OC)** - if 10—30% remains intact
- **No concern at present (NCAP)** - if more than 30% remains intact

The condition of the regional ecosystem, the extent of its distribution and the area of its original extent further define the conservation status. Some regional ecosystems are relatively small in area or are confined to a narrow range of conditions making them more susceptible to threatening processes and therefore of a higher conservation status than would apply based purely on the remaining extent.

Endangered and of concern regional ecosystems are considered collectively, as threatened i.e. their long term viability is not assured.

# *Appendix N*

---

## *Regional Visions and Objectives*

## ***Regional Visions and Objectives***

The following are *visions and objectives* for key regional groups in the Burdekin area.

### **Visions**

#### **Burdekin Dry Tropics Group (BDTG)**

“To provide a high quality of life for current and future generations, through the maintenance of viable natural ecosystems and the development of economically sustainable production and urban systems”

#### **Burdekin Bowen Integrated Floodplain Advisory Committee (BBIFMAC)**

“To manage natural resources to ensure social well being, primary production and ecological sustainability...”

#### **Townsville Thuringowa Landcare Association (TTLC)**

“Achieving ecologically sustainable use of our land, water and biological resources” and “Protecting nature irrespective of its financial values for human populations”

#### **BRIG**

“...will be a diverse, productive, healthy region that supports a positive and prosperous community”

#### *Sources*

- **BDTG** = Burdekin Dry Tropics Group Inc., *Burdekin Dry Tropics Regional Strategy for Community Based Natural Resource Management*, Natural Heritage Trust and Department of Natural Resources and Mines
- **BBIFMAC** = Burdekin-Bowen Integrated Floodplain Advisory Committee September 2000, *A Community Based Natural Resource Management Strategy for the Burdekin-Bowen Floodplain Sub-Region*, Burdekin-Bowen Integrated Floodplain Advisory Committee
- **TTLC** = Townsville-Thuringowa Landcare Association Inc. December 2001, *A Community Plan for Natural Resource Management in Townsville-Thuringowa*, Townsville-Thuringowa Landcare Association Inc.
- **BRIG** = Herbert, S. and Rickert, A., *Burdekin Rangelands Subregional Strategy*, Qld DPI

## Objectives

### Burdekin Dry Tropics Group (BDTG)

#### Catchment Management and Awareness

- A community that is aware of and committed to “whole-of-region” sustainable natural resource management

#### Water Management and Quality

- Threats to water quality identified and mapped
- Optimum water quality restored and maintained throughout the region

#### Vegetation Management

- Effective and equitable vegetation management across the region
- A viable range of vegetation communities maintained across the region

#### Habitat and Biodiversity Protection

- A region with a protected range of healthy habitats that maintain viable native flora and fauna populations

#### Pest Management

- Effective integrated pest management throughout the region

#### Soil Conservation

- The region’s soil resources protected and rehabilitated, through best practice salinity and erosion control measures

#### Coastal and Marine Area Management

- The region’s unique marine and coastal resources protected and promoted across the region

#### Social and Economic Issues

- A viable regional community proactively managing its future

### Burdekin Bowen Integrated Floodplain Advisory Committee (BBIFMAC)

- Maintain sustainable and healthy floodplain and coastal wetlands
- Adequate allocations of water to meet agricultural, urban, industrial and environmental needs
- Maintain and improve where possible viable fish habitats
- Ensure adequate water quality and quantity for irrigation
- Reduce the potential for negative impacts of irrigation on soil resources
- Maintain or improve aquifer health
- Reduce negative impact of flooding
- Maintain physical integrity of water courses
- Minimise impacts associated with the disturbance of potential Acid Sulphate Soils
- Maintain quality of water for domestic use
- Maintain and improve remnant native vegetation
- Revegetate appropriate areas
- Promote multi functional landscape benefits of trees
- Maintain and improve viable wildlife habitats
- Practical mechanisms for pest control
- Best management practice throughout the area
- Address all natural resource and production threats
- Plan for potential impacts of sea level rise
- Ensure development is ecologically sustainable
- Responsible waste management
- Diversify
- Enhanced community well being
- Intergenerational equity
- Sound natural resource management as a base for a strong and diverse economy

**Townsville Thuringowa Landcare Association (TTLA)**

## Whole of catchment approach

- Adoption of catchment units for sustainable NRM
- Catchment based information and monitoring system
- Committed involvement from all interest groups in ICM

## Land, vegetation and wildlife

- Better understanding of natural systems and processes
- Best management practice for vegetation and habitat
- Rehabilitate degraded areas and especially those susceptible to erosion
- Strengthen [community] programs supporting sustainable rural industries

## Water, wetlands and waterways

- Ensure water quality and quantity is protected for all uses
- Protection and management of significant and representative wetlands
- Protection and repair of riparian areas
- Maintenance of environmental flows
- Reduction in harmful runoff reaching receiving waters
- Increased water use efficiency

## Coastal and Marine environments

- Encourage and support coastal planning processes
- Facilitate indigenous involvement in NRM and planning
- Protection of significant coastal and marine sites, including cultural sites
- Improved management practices, both on the coast & upstream, to reduce adverse impacts of human activities
- Increased awareness of issues associated with modification of coastal zones
- Risk management plan for acid sulphate soil disturbance
- Review of legislation to ensure adequate protection of fragile coastal zone habitats
- Responsible use of marine resources

## Environmental quality

- Pollution control through best practice
- Improved sustainability of production technologies
- Waste reduction
- Sustainable waste disposal systems
- Improved community attitude to waste generation and disposal
- Development of renewable energy sources
- Climate sensitive designing
- Transport rationalisation

## Community involvement and education

- Improved community awareness, understanding and involvement in sustainable NRM
- Improved communications between the community and other natural resource managers
- Better coordination of natural resource initiatives
- Greater involvement of industry and commercial enterprises in NRM
- Greater involvement of schools in NRM through learning activities and hands on projects
- Improved access to relevant natural resource information including guidelines and practical manuals
- Adoption of local species policy for landscaping
- Production of educational materials and programs for all sectors of the community



**BRIG**

Land management for sustainable production

- Restore and maintain productive capacity of grazing lands
- Balance of native vegetation and appropriate pasture
- Ecologically sustainable and economically viable land use and development
- Improved management and rehabilitation of mine sites

Land management for maintenance of biodiversity

- A balance between development and conservation to retain the biological diversity of the Rangelands
- Land management based on a sound knowledge base
- An informed community that is aware of, and active in maintaining, the biodiversity values of the Rangelands

Management of water resources

- Non-degraded aquatic and wetland environments, with appropriate water quality and flows maintained or improved
- Equitable and efficient water allocation and use
- Decrease in down-stream impacts through ICM

Social and economic factors

- Increased community access to and understanding of information for decision making
- Broad stakeholder involvement in NRM, planning and implementation
- Diverse and viable communities and industries
- Increased awareness of policy makers and the wider community of economic factors affecting NRM

## Discussion of Visions & Objectives & Catchment Approach

The Burdekin Dry Tropics Group recognises the importance of natural resource management based on natural management units. "Catchment management and awareness at the regional level is one of the keys to sustainable natural resource management". Natural resource management is made difficult by conceived constraints associated with arbitrary boundaries.

One of the high priority natural resource management issues for the Burdekin Dry Tropics is "Awareness and involvement of community in catchment management activities" (BDT p.10)

The overarching objective of the Burdekin Dry Tropics Group for catchment management is "A community that is aware of and committed to "whole-of-region" sustainable natural resource management" (BDT p.11).

One of the high priority key strategies of BBIFMAC is to "Establish catchment management groups for drainage basins within the sub-region" (BB p.20). The establishment of the Haughton River Catchment Coordinating Committee will see the fulfillment of one of the implementation milestones of the BBIFMAC strategy and add to a performance benchmark (BB p.41).

The Townsville Thuringowa natural resource management plan places emphasis on a catchment approach to natural resource management with the first strategy area devoted to a "Whole-of-catchment" approach which gives recognition to "the natural connection between ecosystem and landscape processes". One of the very high priority objectives of the plan is "the adoption of a framework of natural catchment units for integrated planning and sustainable management of natural resources" (TT pp.7-10).

Appendix H of the Townsville Thuringowa plan provides an example action plan for the whole of catchment approach with the 2005 target being "A sub regional framework for "whole-of-catchment" approach in planning and management, with clear regional links where relevant, is endorsed by local and state authorities and by all relevant stakeholders" (TT p. 67).

Proposed catchment management units are listed in Appendix J of the Townsville Thuringowa plan. Parts of the Haughton River catchment are included in three of the proposed catchment management units:

- 10 Reid River
- 11 Woodstock, and
- 13 Bowling Green Bay (TT p.70)

One of the issues in the Burdekin Rangelands is the "need for an integrated catchment management approach to water management in the region" with the broad objective of a "decrease in the down-stream affects of land use by utilizing Integrated Catchment Management principles" (RL p.44).

The main community based regional and sub regional natural resource management plans recognise the need for an integrated catchment management approach to achieve sustainable natural resource use. The Haughton River catchment is wholly within the Burdekin Dry Tropics Region and partly within all of the sub regions.

# *Appendix O*

---

*ANZECC Indicators for State of the Environment Reporting*

## ANZECC Indicators for State of the Environment Reporting

Table O-1 ANZECC Indicators for State of the Environment Reporting (from ANZECC 2001)

Theme/issue	Core indicator
<b>Atmosphere</b>	
Climate variability	A1 Southern Oscillation Index, A2 Daily & extreme rainfall, A3 Average max. & min. temperatures
Enhanced Greenhouse Effect	A4 Greenhouse gas atmospheric concentrations, A5 Annual greenhouse gas emissions
Stratospheric Ozone	A6 Concentration of ozone depleting substances in the atmosphere, A7 Stratospheric ozone concentration A8 Recovery and destruction of ozone depleting substances, A9 Ultra-violet radiation levels at the surface
Outdoor Air Quality	A10 to A15 Exceedences of NEPM Air Quality standards for; carbon monoxide, ozone (photochemical smog), lead, nitrogen dioxide, sulphur dioxide, particles concentrations, A16 Emission of air pollutants
<b>Biodiversity</b>	
Threatening Processes	BD1 Native vegetation clearing, BD2 Aquatic habitat destruction, BD3 Fire regimes, BD4 Introduced species, BD5 Species outbreaks
Loss of Biodiversity	BD6 Extinct, endangered and vulnerable species and ecological communities, BD7 Extent and condition of native vegetation, BD8 Extent and condition of aquatic habitats, BD9 Populations of selected species
Biodiversity Conservation Management	BD10 Terrestrial protected areas, BD11 Marine and estuarine protected areas, BD12 Recovery plans, BD 13 Area revegetated
<b>Land</b>	
Land Use and Management	L1 Changes in land use
Erosion	L2 Potential for erosion, L3 Wind erosion from high wind events
Salinity	L4 Area of rising watertables, L5 Area affected by salinity
Acidity	L6 Area affected by acidity
Contamination	L7 Exceedences of the Maximum Residual Levels in food and produce
<b>Inland Waters</b>	
Groundwater	IW1 Groundwater extraction versus availability, IW2 Exceedences of groundwater quality guidelines
Surface Water	IW3 Extent of deep-rooted vegetation cover by catchment, IW4 Surface water extraction versus availability, IW5 Environmental Flows Objectives, IW6 Discharges from point sources, IW7 Surface water salinity, IW8 Exceedences of surface water quality guidelines, IW9 Freshwater algal blooms, IW10 Waste water treatment, IW11 Waste water reuse
Aquatic habitats	IW12 Vegetated stream lengths, IW13 River health (AUSRIVAS), IW14 Extent and condition of wetlands, IW15 Estimated freshwater fish stocks
<b>Estuaries &amp; the Sea</b>	
Marine Habitat and Biological Resources	ES1 Changes in coastal use, ES2 Disturbance of marine habitat, ES3 Total seafood catch, ES4 Estimated wild fish stocks
Estuarine and Marine Water Quality	ES5 Coastal discharges, ES6 Maritime pollution incidents, ES7 Exceedences of marine and estuarine water quality guidelines, ES8 Bio-accumulated pollutants, ES9 Algal blooms in marine and estuarine environments, ES10 Waste water treatment, ES11 Disturbance of potential acid sulphate soils
Global processes	ES12 Sea level, ES13 Sea surface temperature
<b>Human Settlements</b>	
Energy	HS1 Energy use, HS2 Energy sources
Water	HS3 Exceedences of drinking water quality
Demographics	HS4 Urban green space, HS5 Residential density, HS6 Population distribution and number of people per dwelling, HS7 Visitor numbers
Transport	HS8 Public transport use, HS9 Fuel consumption per transport output
Waste	HS10 Solid waste generation and disposal
Community attitudes & actions	HS11 Community attitudes and actions

# *Appendix P*

---

## *Water Quality Targets*

## Default Water Quality Targets For Tropical Queensland From Water Quality Targets Online

Table P-1 Aquatic Ecosystem Protection-Core indicators

Aquatic system	Total Nitrogen (TN)	Total Phosphorus (TP)	Turbidity	Salinity
Estuaries	250 micro g /L	20 micro g /L	1-20 NTU - Low values: offshore, coral dominated waters; High values: estuaries	Not applicable
Inshore Marine Waters	100 micro g /L	15 micro g /L	1-20 NTU - Low values: offshore, coral dominated waters; High values: estuaries	Not applicable
Offshore Marine Waters	100 micro g /L	10 micro g /L	1-20 NTU - Low values: offshore, coral dominated waters; High values: estuaries	Not applicable
Lakes and Reservoirs	350 micro g /L for turbid lakes only; Clear lakes have lower values	10 micro g /L	2-200 NTU - Low in deep lakes; High in shallow lakes; depends on geology, often wind induced	90-900 micro S/cm - Low: NT permanent billabongs; High: WA wetlands and in summer due to evaporation
Wetlands	350 micro g /L (WA riv pools- 1200 micro g /L)	10 micro g /L (WA riv pools- 50 micro g /L)	2-200 NTU - Low in deep lakes; High in shallow lakes; depends on geology, often wind induced	90-900 micro S/cm - Low: NT permanent billabongs; High: WA wetlands and in summer due to evaporation
Upland Rivers	150 micro g /L	10 micro g /L	2-15 NTU - Low values typical of NT base flow; QLD values variable, depend on catchment changes & seasonal runoff	20-250 micro S/cm-Low values are typical of NT ephemeral streams; High values during high flow and first flush events
Lowland Rivers	Rainforest- 200 micro g /L; OTHER-300 micro g /L	10 micro g /L	2-15 NTU - Low values typical of NT base flow; QLD values variable, depend on catchment changes & seasonal runoff	20-250 micro S/cm-Low values are typical of NT ephemeral streams; High values during high flow and first flush events

Table P-2 Aquatic Ecosystem Protection-Related indicators

Aquatic system	Nitrogen - Oxides of Nitrogen (NO <sub>x</sub> )	Phosphorus - Filterable Reactive Phosphate (FRP)
Estuaries	30 micro g N /L	5 micro g P /L
Inshore Marine Waters	Coral Reef- 2 micro g N /L; OTHER- 8 micro g N/L	5 micro g P /L
Offshore Marine Waters	Coral Reef- 1 micro g N /L ;OTHER- 4 micro g N /L	Coral Reef- 2 micro g P /L; OTHER- 5 micro g P /L
Lakes and Reservoirs	NT- 5 micro g N / L; OTHER- 10 micro g N / L	5 micro g P /L
Wetlands	10 micro g N /L	5 micro g P /L (WA riv pools- 25 micro g P /L)
Upland Rivers	30 micro g N /L	5 micro g P /L
Lowland Rivers	10 micro g N /L	4 micro g P /L

Table P-3 Recreation - All Systems

	Salinity		Nitrogen		
	Sodium	Chloride	Ammonia (NH <sub>3</sub> )	Nitrate (NO <sub>3</sub> )	Nitrite (NO <sub>2</sub> )
Primary Contact	300 000 micro g/L	400 000 micro g/L	10 micro g N /L	44 300 micro g /L converted to nitrate	3 280 micro g /L converted to nitrite
Secondary Contact	300 000 micro g/L	400 000 micro g/L	10 micro g N /L	44 300 micro g /L converted to nitrate	3 280 micro g /L converted to nitrite
Aesthetics - No Contact	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Turbidity and suspended solids Colour and appearance		Turbidity	Natural Reflectance	
Primary Contact	Not Applicable		For swimming Secchi disk (200mm diameter) sighted horizontally >1.6m	Not Applicable	
Secondary Contact	Not Applicable		Not Applicable	Not Applicable	
Aesthetics - No Contact	The natural hue of water should not be changed by more than 10 points on Munsell Scale		Natural visual clarity not reduced by more than 20%	Natural reflectance not changed by more than 50%	

No default values for Phosphorous

Table P-4 Drinking Water

	Nitrogen Nitrate (NO3)	Nitrite (NO2)	Ammonia (NH3)	Turbidity	Salinity Sodium	Chloride
Health Value	50 000 µg/L as Nitrate	3 000 µg/L as Nitrite	Not specified		Not Required	Not Required
Aesthetic Value (Taste & Odour)	Not Specified	Not Specified	500 micro g/L	5 NTU	180000 µg/L	250 000 µg/L

There are no default targets for Phosphorus.

Table P-5 Aquaculture/Human Consumption Aquatic Food

	Nitrogen Nitrate (NO3)	Nitrite (NO2)	Ammonia (NH3)
Freshwater	<50 000 µg/L	<100 µg/L	<20 µg/L (pH >8.0) coldwater; <30 µg/L warm water
Marine	<100 000 µg/L	<100 µg/L	<100 µg/L
	Phosphorus Phosphates	Turbidity Suspended solids	Colour & appearance
Freshwater	<100 µg/L	<40 000 µg/L	30-40 (Pt-Co units)
Marine	<50 µg/L	<10 000 µg/L (<75 000 µg/L Brackish)	30-40 (Pt-Co units)
	Salinity		
Freshwater	<4 500 µ S/cm		
Marine	49 000 - 55 000 µS/cm (4 500 - 52 000 µS/cm Brackish)		

Table P-6 Livestock Drinking Water

	Nitrogen Nitrate (NO3)	Nitrite (NO2)
Health Value	< 400 000 micro g /L; 1 500 000 micro g /L toxic	<30 000 micro g/L
Aesthetic Value	Not Relevant	Not Relevant

Salinity-Surface & Groundwater			
	Initial Effect -no effect	Moderate Effect - reluctance to drink + scouring	Major Effect - loss of production & condition
Beef Cattle	<6 000 micro S/cm	6 000 -7 400 micro S/cm	7 400 - 15 000 micro S/cm
Dairy Cattle	<3 700 micro S/cm	3 700 - 6 000 micro S/cm	6 000 - 10 400 micro S/cm
Sheep	<7 400 micro S/cm	7 400 -15 000 micro S/cm	15 000 -19 400 micro S/cm
Horses	<6 000 micro S/cm	6 000 - 9 000 micro S/cm	9 000 - 10 400 micro S/cm
Pigs	<6 000 micro S/cm	6 000 - 9 000 micro S/cm	9 000 - 12 000 micro S/cm
Poultry	<3 000 micro S/cm	3 000 - 4 500 micro S/cm	4 500 - 6 000 micro S/cm

There are no default targets for Phosphorus or Turbidity



Table P-7 Irrigation

	Total Nitrogen (TN)	Phosphorus - Total
Long Term Targets - up to 100 years	5 000 micro g/L	50 micro g/L
Short Term Targets - up to 20 years	25 000 -125 000 micro g/L STT Note: site-specific assessment needed	800-12 000 micro g/L STT Note: site-specific assessment needed

Notes: 1. Turbidity - there are no default targets for this environmental value.

2. **Long Term Targets** - those that should allow no deterioration in 100 years of use

3. **Short Term Targets** - should allow no deterioration within 20 years of use. It is preferable to use the Long Term Targets.

Table P-8 Targets for Prevention of Foliar Injury

Prevention of foliar Injury - (Note: values are presented as mg /L)		
	Sodium	Chloride
Sensitive	<115 mg/L (Almond; Apricot; Citrus; Plum; Grape)	<175 mg/L (Almond; Apricot; Citrus; Plum; Grape)
Mod. Sensitive	115-230 mg/L (Pepper; Potato; Tomato)	175-350 mg/L (Pepper; Potato; Tomato)
Mod. Tolerant	230-460 mg/L (Barley; Maize; Cucumber; Lucerne; Safflower; Sorghum)	350-700 mg/L (Barley; Maize; Cucumber; Lucerne; Safflower; Sorghum)
Tolerant	>460 mg/L (Cauliflower; Cotton; Sugar Beet; Sunflower)	

## *Appendix Q*

---

*Projects, Programs And Research Initiatives Relevant To The  
Haughton*

## ***Projects, Programs And Research Initiatives Relevant To The Haughton***

### **NATIONAL ACTION PLAN FOR SALINITY AND WATER QUALITY**

Burdekin Dry Tropics Board - (Draft) Priority Actions Funding under the National Action Plan for Salinity and Water Quality

- A1. Development of a Framework for the Prioritisation and Delivery of Integrated Environmental, Social and Economic on-ground outcomes in the Burdekin Catchment (Pilot Bowen River sub-catchment)
- A2. Initiation of a Lower Burdekin Water Quality and Salinity Management Program
- A3. Addressing Dryland Salinity in the Belyando-Suttor sub-catchment of the Burdekin
- A4. Wetlands Assessment and Action Plan for the Burdekin Catchment
- A5. Development and Implementation of a Community and Stakeholder NRM InfoBase and Community Involvement Process for the Burdekin Dry Tropics Region
- A6. Engaging Aboriginal Traditional Owner Participation in NAPSWQ in the Burdekin Dry Tropics

### **BURDEKIN RANGELANDS REEF INITIATIVE**

The Burdekin Rangelands Reef Initiative is a whole of government initiative to enhance community involvement in sustainability issues in the greater Burdekin Catchment and surrounds. Sustainability in the context of the Burdekin Rangelands Reef Initiative incorporates a triple bottom line perspective seeking to address whole of catchment Economic, Environmental and Social sustainability issues.

Projects that promote a collaborative approach to enhancing economic, social, environmental and cultural sustainability outcomes for the Burdekin region are being sought. Projects that have regional scale impacts or can be used as pilots for future regional scale strategies are also being sought.

A primary objective of the Burdekin Rangelands Reef Initiative is to link effectively with the Burdekin Dry Tropics - National Action Plan on Salinity and Water Quality to avoid duplication of effort.

The next round of funding will be announced in March 2003 (expressions of interest).

### **NATURAL HERITAGE TRUST II**

The Natural Heritage Trust (NHT) provides funding for natural resource projects including the development of catchment management plans and implementation of their high priority components. One objective of the NHT was to unite the actions of the community, government agencies, and other natural resource managers with the aim of improving the way our natural resources are managed. The people and organisations already on the ground can best achieve this cooperative and coordinated approach to natural resource management at the local and regional levels. The NHT has been one of the main funding sources for natural resource management initiatives since 1998.

Phase two of the Natural Heritage Trust has two distinct components;

1. EnviroFund-for more localised projects with funding up to \$30,000. The 2002 funding round has closed. Applications for the 2003 funding round are expected to be called in February 2003.
2. Regional funding for strategically identified natural resource management initiatives and devolved grant type projects. Funding arrangements have not been finalized between Commonwealth and State governments at this stage (November 2002).

### **LOWER BURDEKIN INITIATIVE**

A collaboration of research providers to coordinate research activities in the lower Burdekin region with the objective of gaining better value for more through reduction of duplicated efforts and information sharing. CSIRO

### **WATERWATCH**

Community based water monitoring guided by a qualified coordinator. A number of sampling points exist within the Haughton catchment with the earliest readings commencing October 2001. The program provides useful water quality information for consideration in natural resource planning and management while increasing the capacity of community members in the field of environmental monitoring. The program is supported by Conservation Volunteers Australia and other regional stakeholders. David Reid

### **NORTHERN BRIGALOW BELT PROJECT**

An inventory of environmental values for the northern section of the Brigalow Belt bioregion carried out by the Environmental Protection Agency. The final publication will include the extent and description of wetland aggregations and other information for use in natural resource planning and management. EPA Townsville

### **GIRU FLOOD STUDY**

The study is being undertaken by the Burdekin Shire Rivers Improvement Trust to provide a snapshot of the Haughton River and adjacent floodplain with the view to developing measures to reduce the impacts of floods. Aerial photography was flown for use in the study and would be useful for riparian zone assessment and other purposes. Gary Bowtell BSC 47

### **BURDEKIN WATER RESOURCE PLAN**

The Haughton catchment is included in the area covered by the proposed draft Water Resource (Burdekin Basin) Plan (WRP). The purpose of a WRP is to provide a "framework for sustainably allocating water for domestic, agriculture, irrigation, industry, and recreational users, as well as providing flows necessary to sustain water dependent ecosystems" (Department of Natural Resources and Mines 2002a).

Technical reports are currently being prepared to provide the information necessary to enable the WRP to be drafted with the Phase 1 reports expected late this year or early in 2003. A draft WRP is expected to be available towards the end of 2003 with the final plan in place sometime in 2004. The technical reports will be useful for informing natural resource planning in the Haughton catchment.

A complex water resource model is also being prepared and will provide an indication of the relationship between the surface water and groundwater in the Haughton River catchment. Groundwater resources will not be included in the initial WRP however there are plans to include groundwater after the surface water plan is finalized. Adam West DNRM Townsville

### **ECOLOGY AND MANAGEMENT OF THE UPPER BURDEKIN RANGELANDS - THE GREEN BOOK**

This work pulls together some of the research findings and experience of a number of natural research scientists in the region. The book is set out in two sections with the second section looking at management principles linked to some of the matters raised and discussed in the first section, which is primarily a compilation of research findings. Marnie McCullough DPI Townsville 47222519

## REDUCING SEDIMENT AND NUTRIENT EXPORT FROM GRAZED LAND IN THE BURDEKIN CATCHMENT FOR SUSTAINABLE BEEF PRODUCTION

The overall objective of this project is to provide a better process understanding of grazing impacts on catchment response as the basis for refining guidelines and recommendations for improved grazing management to:

- Ensure the beef industry's long-term economic sustainability by retaining or improving the productive capacity of the soil resource base by reducing on-site water and nutrient loss
- Meet national and international standards of sustainable beef production by reducing detrimental off-site impacts due to sediment and nutrient delivery
- Enhance the beef industry's capability of modelling grazing management impacts on the soil and water resource base across a range of scales to respond to broader community concerns.

Grazing trials have been established in conjunction with runoff plots at Cardigan Station and Station Creek catchment near Mingela has been identified as being representative, in terms of land cover, grazing intensities, soil types and topography.

Station Creek has therefore been chosen as a study catchment, and detailed sediment and nutrient budget is being prepared for this catchment. When completed data will tell us the minimum cover levels required to reduce erosion from grazed paddocks, as well as the relative importance of gullying compared to hill slope erosion.

This work will help inform management practices for similar country in the upper Haughton catchment. Meat and Livestock Australia is funding and supporting this project.

### WAMBIANA GRAZING TRIALS

Long term grazing trial (running for 5 years and anticipated to last for another 5-10) testing the ability of different grazing strategies to cope with rainfall variability experienced in the Burdekin catchment. Variables being recorded are; animal production, pasture condition, soil and nutrient loss, water quality, flora and fauna diversity, tree demography and overall economic performance. Outcomes will be used to improve grazing management practices in the rangelands. Peter O'Reagan DPI Charters Towers 47546114

### RURAL WATER USE EFFICIENCY INITIATIVE

BSES is the principle proponent of this project in the area. Further information was not available at the time of printing.

### FARM RUNOFF WATER QUALITY

BSES is the principle proponent of this project in the area. Further information was not available at the time of printing.

# *Appendix R*

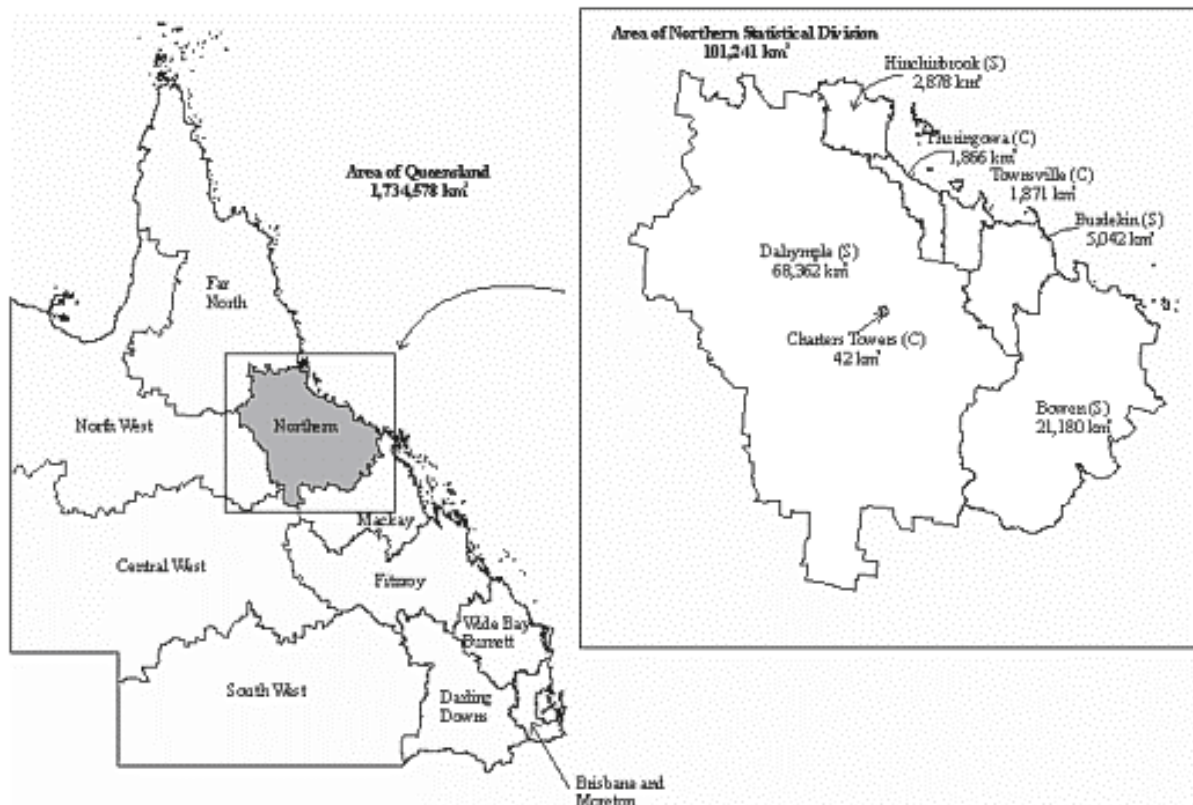
---

*Statistical Information Relevant To The Haughton River Catchment*

# Statistical Information Relevant To The Haughton River Catchment

## POPULATION AND AREA

The Northern Statistical Division is a region comprising seven local government areas (Figure 1) with a total area of 101,241 square kilometres, 5.8 per cent of the total area of the State. The region's estimated resident population at 30 June 2000 was 200,174 persons, or 5.6 per cent of the total Queensland population (3,566,357 persons). (Source: ABS)



C = City S = Shire

Figure R-1 Northern Statistical Division

Source: ABS, *Regional Population Growth, Australia (3218.0)*, regions based on Australian Standard Geographical Classification (ASGC) 2000

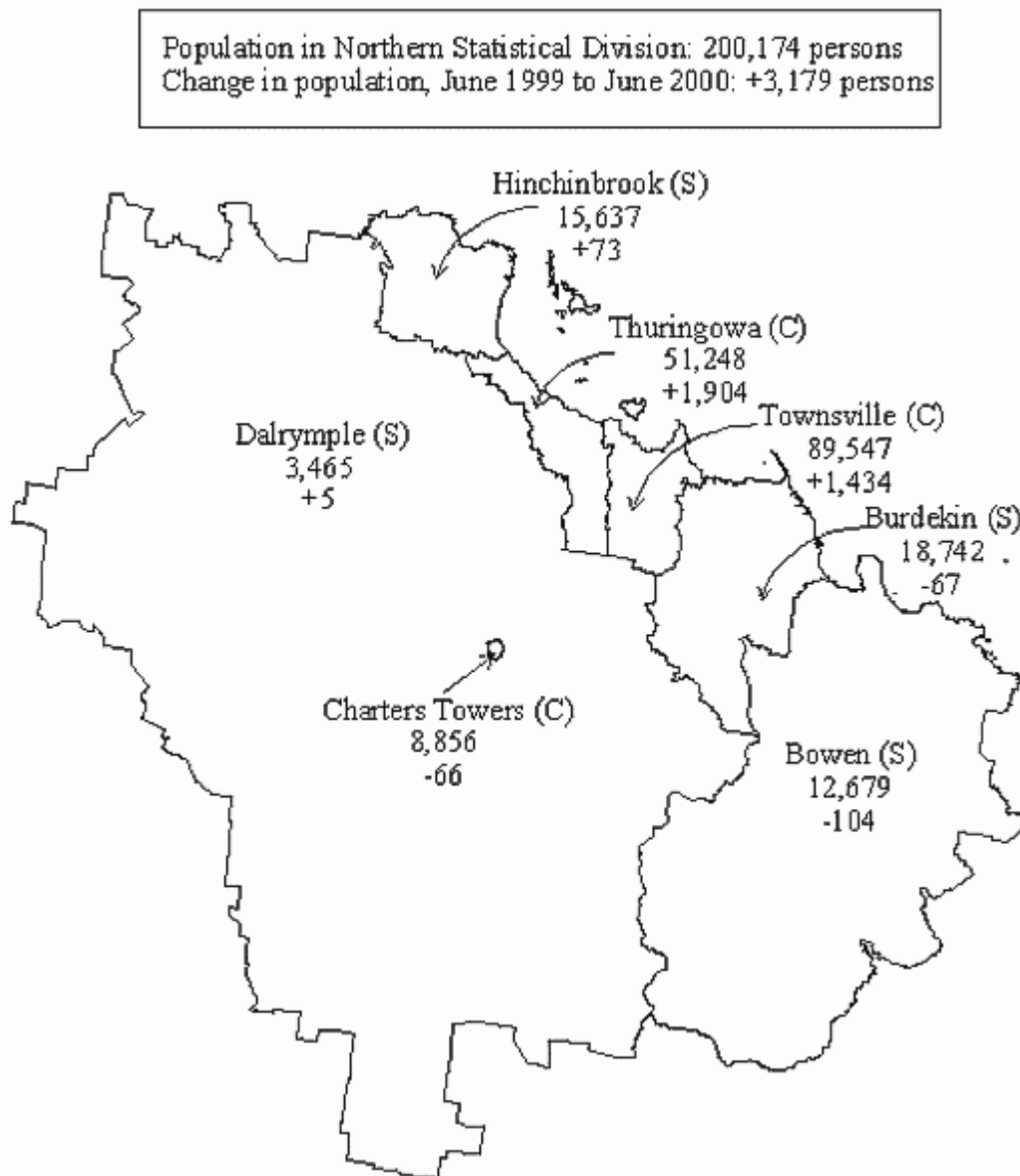


Figure R-2. Population (June 2000) and population change (June 1999 to June 2000) by local government area, Northern Statistical Division

The Northern region recorded an annual population growth rate of 1.6 per cent between June 1999 and June 2000 (Queensland 1.7 per cent), compared with average annual growth of 1.0 per cent for the five years between June 1995 and June 2000.

Table R-1 Population Data for Local Government Areas

	Population	%	Change	%
Burdekin (S)	18,742	11.50	-67	0.36
Dalrymple (S)	3,465	2.13	5	0.14
Thuringowa (C)	51,248	31.44	1,904	3.72
Townsville (C)	89,547	54.94	1,434	1.60
	<b>163,002</b>			



**North East Wet/Dry Tropics region (from National Land and Water Resource Audit)**

The horticulture industry's North-east wet/dry tropics production region includes the following growing areas: Bowen, Qld; Burdekin, Qld; Atherton Tablelands, Qld; Thuringowa, Qld.

In this region, horticulture occupies 17,589 hectares of land. This production is comprised of 9,461 hectares of annual and 8,128 hectares of perennial. There are approximately 6 882 hectares of irrigated vegetable crops (annual) and 4,805 hectares of irrigated fruit crops (perennial) in this region.

Horticulture production in this region in 1998 included:

- 193,890 tonnes of horticultural product comprising
- 159,559 tonnes of annual crops and
- 34,331 tonnes of perennial crops
- an average of 10.4 tonnes of horticulture product/hectare; and
- \$204 million dollars worth of horticultural product, 70% from annual crops and 30% from perennial crops

Production from the major crop types grown in the region is presented in the table below with average assumed values for the remainder of the region's horticultural production.

**Table R-2 Horticulture in the Region**

Crop	Area (ha)	Production (tonnes)	Value (\$M)	Production (tonnes)(ha)	Value \$ per tonne	\$ per hectare
Beans and Peas	2,200	9,300	15.3	4.23	1,645	6,954
Cucurbits	895	12,270	7.8	13.71	636	8,715
Melons	1,130	26,420	15.8	23.38	598	13,982
Peppers	700	14,480	17.0	20.69	1,174	24,285
Sweet Corn	740	3,740	1.7	5.05	455	2,297
Tomatoes	2,180	62,790	65.3	28.80	1,040	28,199
Other annuals	1,616	30,559	20.1	18.91	658	12,439
Tropical Fruit	-	22,985	38.7		1,684	
Other perennial		11,346	22.3		1,965	
All perennial	8,128	34,331	61.0	4.22	1,777	7,505

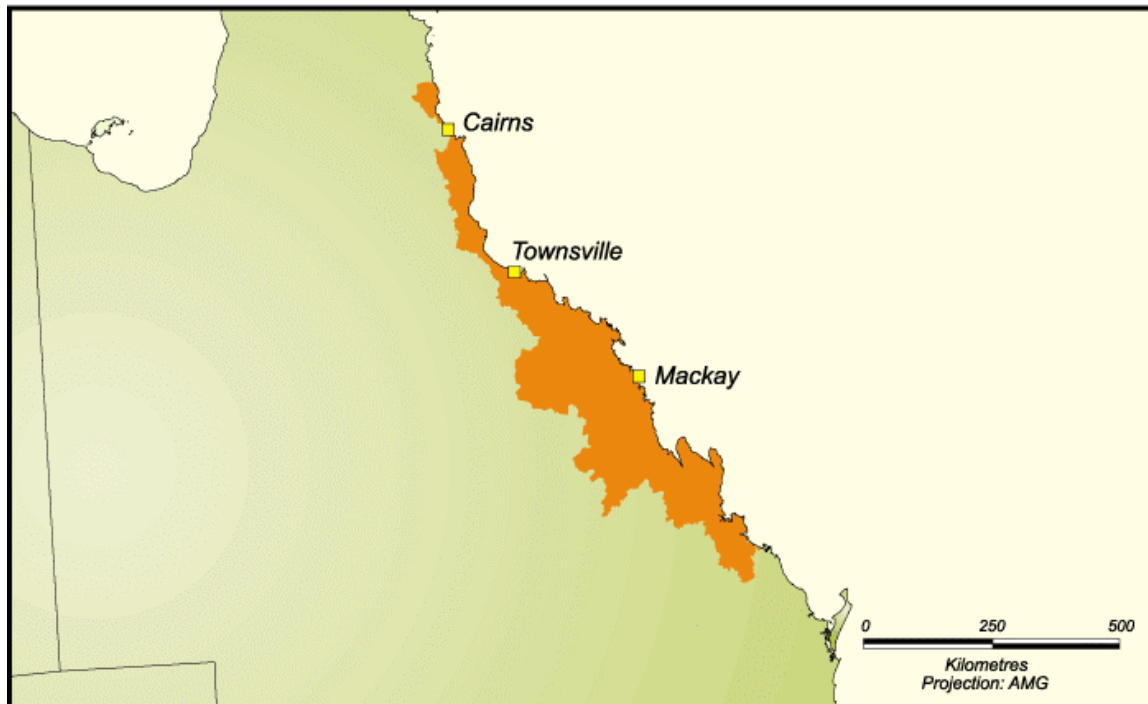
**\$14,667 average weighted (by area) value per hectare for annuals.**

(Percentages of total area (9,461 hectares) by annual crop - 23%, 9.5%, 11.9%, 7.4%, 7.8%, 23% and 17.1%).  
Unweighted average value \$10,239 per hectare

**\$7,505 average value per hectare for perennials.**

**Northern High Rainfall Zone (from National Land and Water Resource Audit)**

The beef industry's Northern High Rainfall zone stretches from Cairns to near Rockhampton. Beef cattle are grazed over 6,634,626 hectares of land, with a relatively limited number of feedlots in this region. 30% of the pasture in this region are sown or introduced, and 70% of the pasture is native or naturalised. The following maps represent the distribution of cattle within this region.



06023-13

**Figure R-3 Beef Area in the Northern High Rainfall Zone**

In 1999, the statistics on beef production in this region were:

- 1,203,760 head of grazing cattle in specialist enterprises
- 6,542,842 head of cattle in mixed or feedlot enterprises
- an average specialist producer stocking rate of 0.6 hectares/head or 1.8 head/hectare

The Northern High Rainfall zone experiences a tropical and subtropical climate, where pasture growth depends upon conservation of soil moisture from variable rainfall. The climate is described as hot humid with dominant summer rainfall.

Enterprises in this region average approximately 9,076 hectares in size and produce beef for domestic markets. In 1999, grazed land in the Northern High Rainfall Zone included:

- 1,827,295 hectares of native pastures
- 1,016,984 hectares of sown pastures
- 780 hectares of lucerne pastures.
- Beef cattle typically graze sown pastures in this region.

**Table R-3 Northern High Rainfall Zone Characteristics**

Region - Key characteristic	Industry average	Region Average
Age of owner/manager	58 years	53 years
Owner/manager education and skill:		
- Completed university/tertiary or trade	30%	23%
- Completed 5-6 years high school	22%	15%
- Completed 1-4 years high school	34%	42%

- Primary or no schooling	15%	20%
Family members working on farm	71 hr/wk	104 hr/wk
Owner manager work on farm	45 hr/wk	54 hr/wk
Number of dependent children	0.6	1.0
Farm cash income (\$)	43,954	57,198
Total farm debt - June 30 (\$)	120,487	250,237
Farm business profit (\$)	- 9 033	7 662
Total off farm income (\$)	29,858	38,527
Owner work off farm	6 hr/wk	1 hr/wk
Area operated - June 30	11,688 ha	9,076 ha
Farm ownership/ tenure:		
- Freehold	12%	59%
- Long term crown lease	85%	41%
Employment of non-family labour	9 hr/wk	20 hr/wk
Landcare membership	33%	42%
Length of group involvement	6 years	6 years

Producers in this zone work longer hours than the industry average, have a higher cash income, larger farm debt than the industry average, positive business profit, higher off-farm income, operate on more freehold land and have a higher than industry average landcare group membership levels. These combination of attributes suggest that the industry in this region has a capacity to implement change, but financial considerations will need to be taken into account due to high debt levels.

The proportion of beef farms with significant degradation problems is shown in the chart below. Weeds have been identified as the most significant of the nine ABARE (2000) surveyed degradation forms. Other main challenges identified were soil structure decline and water erosion.

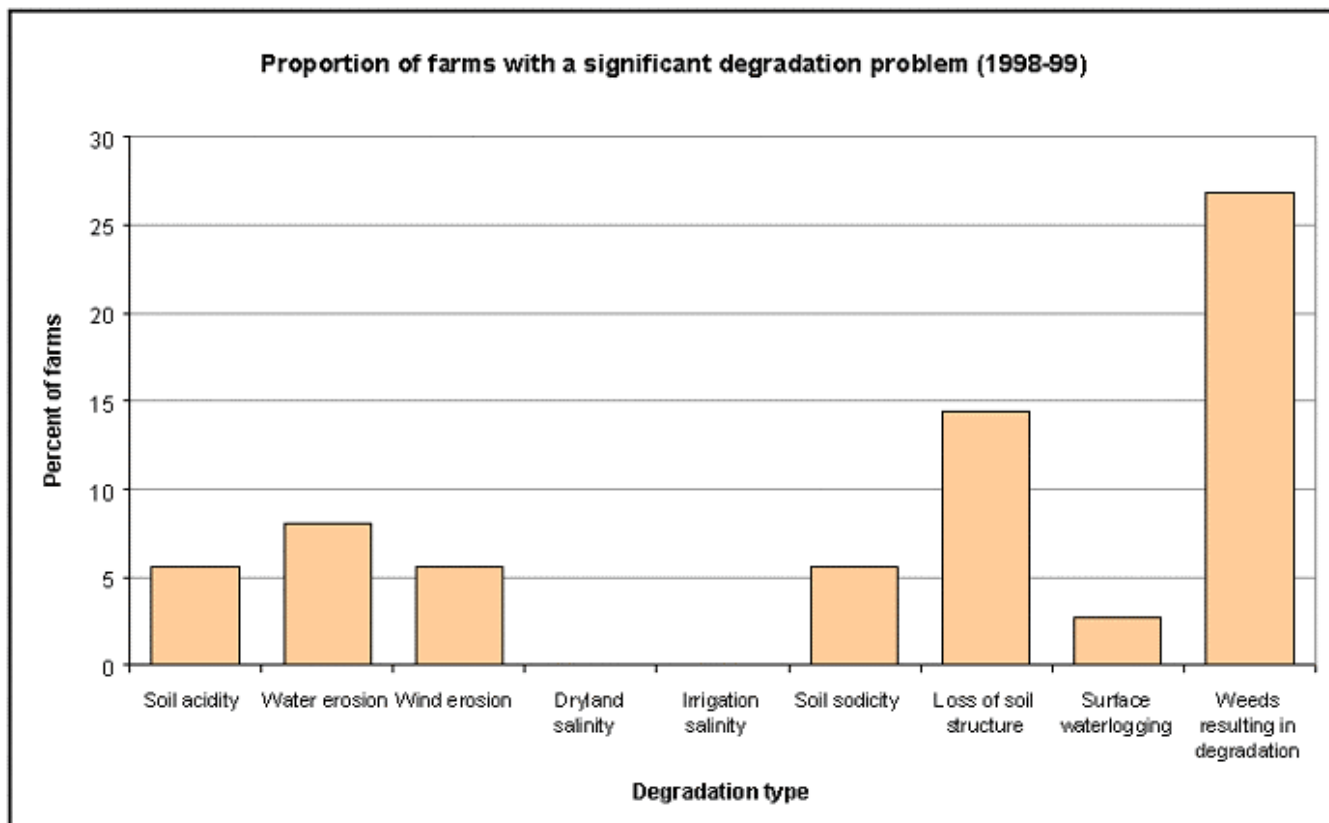


Figure R-4 Proportion of Farms with Significant Degradation

The industry is implementing management practices to meet these regional challenges. The regional adoption and the industry's assessment of the applicability of the various management practices being implemented by the beef industry are illustrated in the chart below. Numbers indicate national averages.

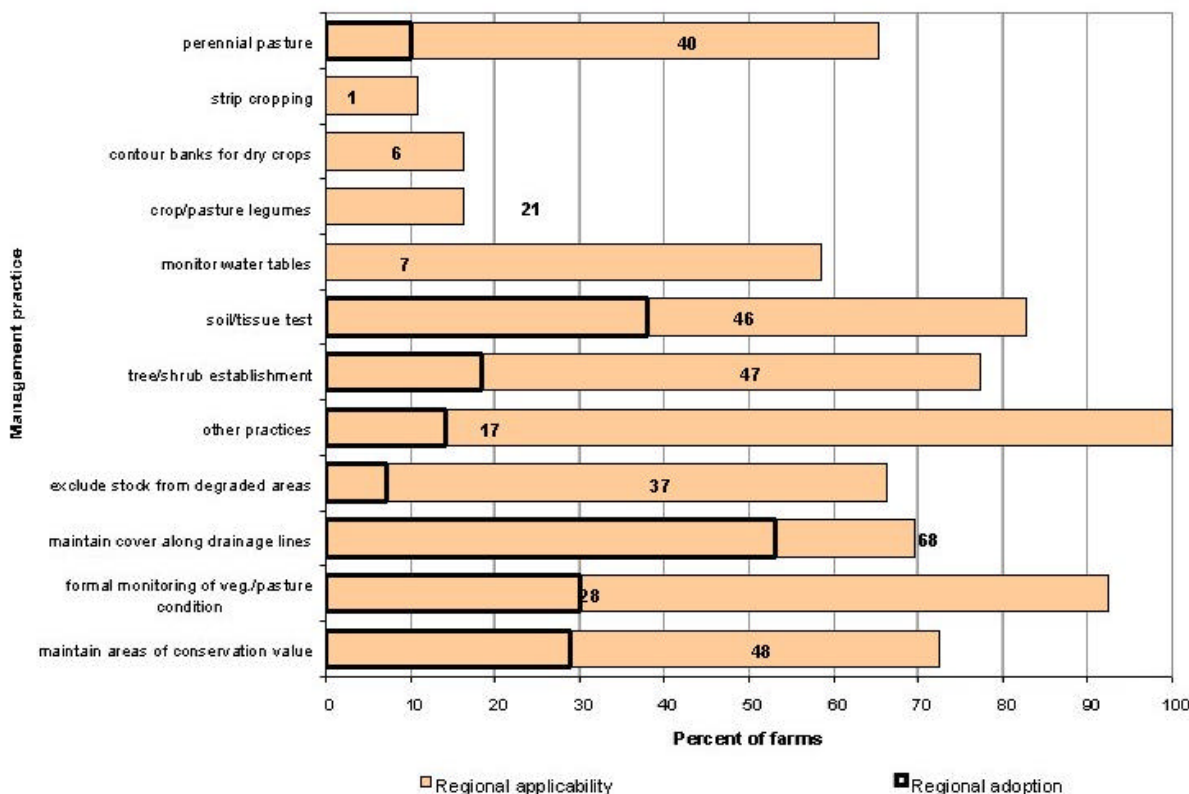


Figure R-5 Management Practice Adoption and Applicability (1998/99)

The beef grazing industry does not currently have a specific code of practice, however, some guidance is provided to farmers through codes of practice for general agriculture such as that developed by the Queensland Farmer's Federation or through the PROGRAZE program.

**Sugar Industry Data**

Some relevant sugar industry figures<sup>3</sup> for 2000-2001 include:

- Australia was the eight largest producer of sugar in the world;
- The top eight sugar producers accounted for around 66% of production;
- Australia produced around 3.7% of the worlds sugar;
- Australia produced approximately 4,900,000 tonnes of sugar for the year; and
- The Australian domestic market accounted for about 800,000 tonne of the sugar produced.

In general terms<sup>4</sup>:

- Queensland produces around 94-95% of Australia's sugar output;
- Australia exports 80-85% of its raw sugar production;
- Queensland accounts for about 98% of Australia's sugar exports;
- Approximately 66% of Queensland cane farms use some form of irrigation water;
- The Queensland cane industry accounts for 45-55% of Queensland 's irrigation water;
- Around 95% of Queensland cane farms are operated by sole proprietors or family partnerships; and

<sup>3</sup> Source: Hildebrand 2002

<sup>4</sup> Sources: www.canegrowers.com.au/overview.htm and Hildebrand 2002

- Approximately 94% of cane in Queensland is transported to mills via cane railways.

As can be seen from the information above Queensland is heavily exposed to the export market and the industry is therefore susceptible to fluctuations in the world price of raw sugar as well as currency exchange rates. The Burdekin region is insulated from climatic variations to a certain degree through its capacity to irrigate. Damage and production loss from cyclones, waterlogging, pests, disease, floods and soil degradation are all still real threats.

The dependency of the Burdekin on the sugar industry can be seen from the following figures:

- Approximate population of the Burdekin region is 18,900;
- Approximate dependency 50-60% ie. between 6,600 and 7,087 people under 15 and over 64 years of age;
- Between 12,300 and 11,813 people in the potential 'labour force' ie. 15 to 64 years old;
- Approximately 25% of the work force was employed in the agricultural sector;
- The sugar industry accounted for around 67% of the agricultural work force;
- Around 80% of farmers and farm managers were involved in sugar cane growing;
- Around 49% of agricultural workers and labourers were employed in sugar cane growing;
- The sugar manufacturing industry employed 932 people (total manufacturing around 1,243);
- The sugar manufacturing industry accounted for 74% of all manufacturing industry employment;
- Employment in the sugar industry was 2,328 people (total workforce around 8,400); and
- Unemployment was around 8% in 2000 (labour force participation not known).

This information was extracted from a social profile of the region based on 1996 Census data for the Burdekin Shire (Haberhorn, Kelson and Charalambou 2002).

# *Appendix S*

---

## *Indigenous Involvement Facilitation*

# Haughton River Integrated Catchment Management Plan

## Indigenous Stakeholder Involvement Facilitation

### August – Dec. 2002

The following is a list of actions and activities relating to consultation with indigenous stakeholders in the context of the development of the Haughton River ICMP:

- 31 July 2002-Engaged by the Burdekin Shire Rivers Improvement Trust (BSRIT) to develop a draft Integrated Catchment Management Plan for the Haughton River catchment area (map attached). Given the Gudjuda Reference Group as the indigenous stakeholder contact
- 6 August 2002-Spoke to Joe Henaway and advised about the draft plan development and advised of the stakeholders meeting to be held later in the month. He indicated he would attend with elder/s. (Invitations were sent to all stakeholders prior to the meeting)
- 26 August 2002-Francesca Serraro from the Gudjuda Reference Group rang and said that they did not have enough advance notice and they would not be able to have representation at the meeting
- 27 August 2002-stakeholders meeting at Giru
- 17 and 18 September-public meetings at Giru and Woodstock
- 7 October-talked to Francesca about the input of the Gudjuda Reference Group and emailed information
- 12 October 2002-Gudjuda Board meeting
- 16 and 17 October-no phone answer. Email to ask about the outcome of the meeting previous Saturday
- 21 October-Advised that the Board had agreed to a meeting on 17 or 18 November if costs were covered
- 22 October 2002-Met with Eddie Smallwood and Francesca – quote on meeting costs. The Gudjuda Reference Group covers the coastal plains area from Townsville to Proserpine and includes four clan groups with the Bindal and Juru being relevant for the Haughton River catchment. The Major Creek catchment is also covered but may be subject to another Bindal group from Townsville as well. To convene a meeting of the Gudjuda Board requires meeting expenses to be covered which includes transport of the 14 members from the as far as Proserpine and Bowen. Cost is approximately \$1,900 a day. Advised that the costs would have to be authorised by the BSRIT and that the budget probably wouldn't stretch to that. Advised that we would be having another stakeholder meeting in early December and hopefully representative/s would be able to attend. Advised of my intention of speaking to Melissa George
- 22 October 2002-Melissa George advised that if I sent her the relevant information she would forward it on to the appropriate Traditional Owner groups
- 23 October 2002-public meeting at Mingela
- 25 October 2002-advised Francesca that we would not be asking for a special meeting of the Gudjuda as the costs were not budgeted for and it would not be inclusive of all the Traditional Owners
- 25 October 2002-Emailed information to Melissa George
- 5 November 2002-Melissa George rang to advise she was about to send a letter to TOs and advise them that travel costs to attend the stakeholders meeting would be reimbursed. Asked if she could email me a copy of the information and list of TOs she had contacted
- 7 November 2002-letter and map to Central Queensland Land Council Aboriginal Corporation asking for contacts for Traditional Owners for the Haughton catchment
- 11 November 2002-notice of stakeholders meeting issued to all stakeholders via email and fax
- 14 November 2002-contacted by Len Johnson (Wugurukaba Aboriginal Corporation) about the stakeholders meeting and reimbursement of costs. He advised he would be attending with other members of the WAC
- 15 November 2002-advised by Greg Bruce of Townsville CC that there was some discontent with process for indigenous involvement and he would send an email with details from the TCC Indigenous Liaison Officer in that regard. Asked to contact Gail Duell at ATSIC to ensure the proper process was being followed
- 19 November 2002-contacted Gail Duell and advised her of the situation. She suggested we try and find out who Melissa George contacted. Melissa was out of the country and details could not be obtained

- 22 November-Gail forwarded a list of five groups to check on their interests in the catchment, Gudjuda Reference Group, Wugurukaba Aboriginal Corporation, Bindal Elders and Reference Group, Birria and Gudjal
- 3 December 2002-2<sup>nd</sup> stakeholders meeting at Giru. Indigenous involvement flagged as an issue
- 9 December 2002-contacted Melissa George and obtained a list of the groups she contacted prior to the 2<sup>nd</sup> stakeholders meeting (Gudjuda Reference Group, Wugurukaba Aboriginal Corporation and Bindal Elders and Reference Group)
- 9 December 2002-contacted Reggie Santo (Gudjal- Inland Land Council) and advised about the HRICMP and asked about Gudjal interests in the area. He advised that the ILC was about to meet and appoint a coordinator and I should ring back in a week or so for details on the person to contact
- 9 and 11 December 2002-Patrcik Walsh (Birria) not contactable on the number provided by ATSIC
- 11 December 2002-A hard copy of the first draft HRICM Plan posted to Gudjuda Reference Group, Wugurukaba Aboriginal Corporation and Bindal Elders and Reference Group with a letter expressing the desire to talk to representatives of each group about the HRICM planning process and their future involvement
- 16 December 2002-contacted Reggie Santo (Gudjal- Inland Land Council). They still haven't sorted out their affairs yet. Best to contact him again in the New Year. He expressed some interest as the top of the catchment is close to their land