LAURA-NORMANBY CATCHMENT MANAGEMENT STRATEGY

C. Howley and K. Stephan, Environmental Consultants

November 2005

ACKNOWLEDGEMENTS

Many people have been involved in the production of this report. Thank you first of all to the members of the community who have completed surveys and discussed local issues with the Project Officers (Cathy Waldron and Ian Adcock). The local knowledge and concerns of the community have provided the content and direction for this report, and the strategies to address local issues have been directly chosen by the community members. The final report producers, Christina Howley and Kim Stephan (Howley & Stephan Environmental Consultants), would also like to thank the following persons, all of whom been extremely helpful in providing information regarding resources and concerns within the Catchment: Jamie Molyneuax (CYWAFAP); Graeme Elmes; Sam Dibella, Andrew Hartwig and Barry Lyons (QPWS); Geoff Mills, Graeme Herbert, Anthony McLoughlin and Stephen Parker (DNR&M); Miles Furnas (AIMS); Stuart Hyland and John Russell (DPI&F); Peter Thompson (CYPDA); Victor Stephanson (Traditional Knowledge Recording Project) and John Farrington (Quinkan & Regional Cultural Centre). Thank you also to Michael Stephan for his generous assistance with technical matters and to Jean Stephan for editing. Finally, thank you to the members of the Laura-Normanby Catchment Management Group.

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ACRONYMS

AIMS	Australian Institute of Marine Science
ANZECC	Australia New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia New Zealand
CRC	Cooperative Research Centre
CSC	Cook Shire Council
CYP	Cape York Peninsula
CYPDA	Cape York Peninsula Development Association
CYPLUS	Cape York Peninsula Land Use Strategy
CYPNRM	Cape York Peninsula Natural Resource Management
CYRAG	Cape York
CYWAFAP	Cape York Weeds and Feral Animals Program
DNR&M	Qld Department of Natural Resources & Mines
DOGIT	Deed of Grant in Trust
DOCS	QLD Department of Communities
DPI&F	QLD Department of Primary Industries & Fisheries
EPA	Environmental Protection Agency
LNCMG	Laura Normanby Catchment Management Group
mg/L	milligrams/Litre
NFACP	National Feral Animal Control Program
NHT	Natural Heritage Trust
NRM	Natural Resource Management
PCB	Princess Charlotte Bay
Pers.comm.	personal communication
QPWS	QLD Parks and Wildlife Service
RFS	Rural Fire Service
TKRP	Traditional Knowledge Recording Project
µS/cm	microSiemen/centimetre

EXECUTIVE SUMMARY

The Catchment of the Laura and Normanby Rivers covers approximately 1,517,300 hectares or 586,080 km^2, spanning the central base of Cape York Peninsula. The Laura-Normanby Catchment area covers a vast and relatively undeveloped area encompassing extensive riverine and wetland systems, one of Queenland's largest conservation areas (Lakefield National Park), numerous sacred aboriginal sites, good cattle country, and productive agricultural lands. The Laura-Normanby Catchment Management Strategy was initiated by the Laura-Normanby Catchment Management Group in 2002 utilising funding from the Department of the Environment, Natural Heritage Trust (NHT1). This Strategy documents the knowledge and concerns of the local landholders, resource managers and traditional owners who are most affected by Cape York management decisions. Stakeholder surveys were conducted to identify and prioritise issues and management actions required to address natural resource management in the Catchment. The top priority issues, according to the majority of surveyed stakeholders, are: water quality and quantity, weeds, conservation of biodiversity, grazing impacts and feral animals. Other priority issues identified included fire management, the preservation of Cultural Heritage, management of commercial and recreational fishing and the increasing tourist and recreational use of the Catchment.

Most members of the community would like to see more funding go towards the on-ground works that are needed for natural resource management. Support (financial and other) is needed to control weed infestations, to provide and maintain fencing along stream banks to keep out cattle and feral animals, to identify and protect critical habitat for the diverse range of aquatic and terrestrial fauna of the catchment area, to map groundwater resources for irrigation and stockwatering, and to coordinate burning regimes across the Catchment. Additional infrastructure is required to support the growing tourism and recreation industry and the use of proper engineering design and sediment controls must be enforced during any earthworks conducted in the highly erodible soils within the Catchment. The Laura-Normanby Catchment Management Strategy has identified these and other priority actions to which natural resource funding should now be directed.

Implementation of the Strategies identified in this Plan will require cooperation among the various segments of the Catchment community, including QPWS, traditional owners, graziers, the agricultural industry, and the Cook Shire Council. The knowledge of the local community will be critical to the identification of specific locations requiring action and government support and coordination will be necessary to see these actions through. By working together, members of the community can significantly contribute towards improving the productivity and sustainability of the various industries within the Catchment AND towards ensuring the protection of local natural resources.

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE OF THE PLAN

The Laura-Normanby Catchment Area covers a vast and relatively undeveloped area with extensive riverine and wetland systems, one of Queensland's largest conservation areas (Lakefield National Park), numerous sacred aboriginal sites, good cattle country and rich agricultural lands. The majority of residents and landholders in the Catchment recognise the unique attributes of the area and the need to protect and preserve these attributes for the future. Most are working hard to develop the land in a sustainable manner. Yet as many people in the wider community are placing a greater emphasis on retaining wilderness in undeveloped areas, the decisions regarding land use and management are being increasingly made with little input from those who are impacted by the decisions. This plan, having taken into account the extensive community consultations that have been conducted, documents the knowledge and concerns of the local landholders, resource managers, and traditional owners who are most affected by Cape York management decisions. It is intended to provide direction for the prioritisation of resource management issues and the specific actions needed to address these issues.

1.2 LAURA-NORMANBY CATCHMENT AREA

The Catchment of the Laura and Normanby Rivers covers approximately 1,517,300 hectares or 586,080 km^2, spanning the central base of Cape York Peninsula (Figure 1). The Laura-Normanby Catchment lies between Latitude 14º 15` to the north and 16º 15` in the south, and Longitude 143º 45` to the west and 145º 20` to the east. The East and West Normanby, Kennedy, and the Deighton River systems all join the Laura River. Together, these Catchments form the Laura-Normanby Catchment. From its beginnings in the Windsor Tableland, the water flow in the basin is generally north through grazing, farming and DOGIT land and Lakefield National Park, into the Coral Sea at Princess Charlotte Bay.

CATCHMENT DEFINED

A catchment (or watershed) is the whole of a land surface area that discharges run off to a common drainage point. A catchment area provides a robust unit for natural resource management. Water movement across the total catchment area of a river system affects ecological systems. As well as causing the land forming processes of erosion and deposition, the movement of water through a catchment is often the prime mode of pollution transportation.

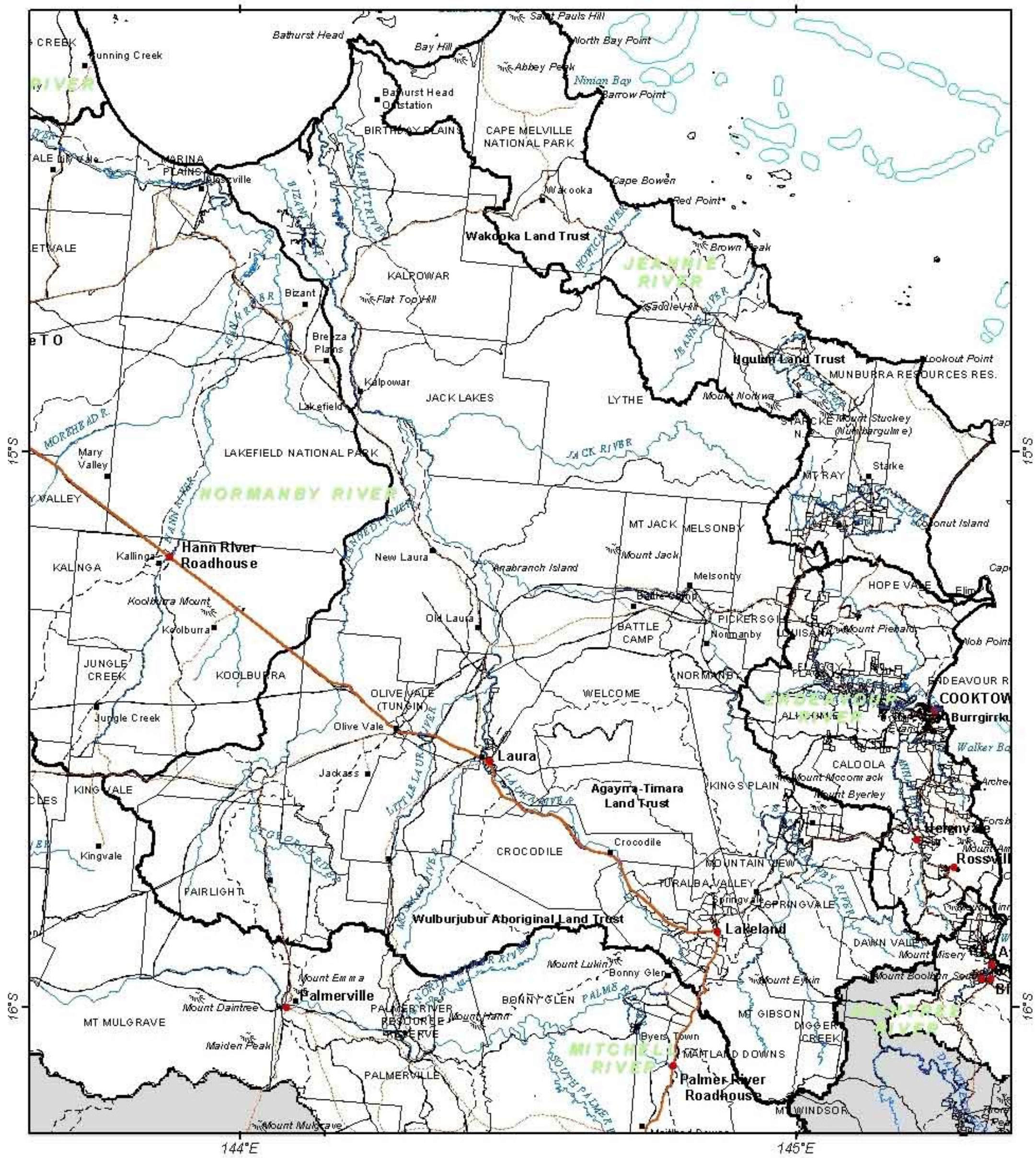

Figure 1: Laura-Normanby Catchment Map

1.3 IDENTIFIED ATTRIBUTES OF THE CATCHMENT

Numerous natural attributes have been identified for the region, which is classed as a large, dry catchment that is closest to pre-1850 condition in Queensland. There is a good supply of underground water and extensive wetlands and marine plains in the north. Upland areas contain escarpment country of sandstone, basalt and granite that rival those found in the Kimberley region of Western Australia. The rich basalt soils of the Lakeland Downs area in the south east of the Catchment provide good agricultural land. There are significant cultural heritage sites, including a vast network of indigenous rock art sites. The region also contains non-indigenous cultural heritage sites, such as remains of the railway infrastructure and the Old Laura Homestead. The Catchment is classed as good cattle country away from the hills and escarpments.

Due to its lack of development and industry, the Catchment has retained a feeling of remote wilderness. Many areas are valued for their recreational fishing and camping spots, both within and outside of, Lakefield National Park. Endemic species in the Catchment area include the Foxtail Palm, Gibson's Rock Wallaby, Golden Shouldered Parrot and the Star and Crimson Finches. Princess Charlotte Bay, where the Normanby River discharges, contains one of the largest tidal wetlands systems on Cape York Peninsula, with meandering rivers cutting through extensive salt pans and major mangrove communities (Danaher, 1995). Extensive seagrass meadows fringe the southeastern shore at Princess Charlotte Bay. Dolphins, turtles, and dugongs are common in the Bay. Fish, crabs, and prawns abound in the estuary regions.

All of these aspects of the Catchment contribute to the necessity for a plan to protect and manage the unique natural heritage of the area.

1.4 LAURA-NORMANBY CATCHMENT MANAGEMENT GROUP

In 1998 a steering committee was formed with the vision of a cooperative approach for the sustainable management of natural resources and maintenance of biodiversity in the Catchment. The primary interest of the group has been to create a balanced approach to the use of Catchment resources. The membership of the Group reflects the diverse interests of the community. Cook Shire Council as the local government body, grazing, grain growing, horticulture, tourism, small mining and an embryonic aquaculture industry are represented.

The LNCMG provides a round-table forum to discuss and exchange ideas and information. Early discussions within the LNCMG developed 4 specific objectives. These are:

- Fostering coordination and corporation between landholders, community action groups and Government Agencies in the management of water, land, vegetation and related biological resources.
- Identifying and prioritising interrelated land and water resource issues in the Catchment. Identifying solutions and agreeing on actions through public and Government participation.
- Promoting the planned and sustainable economic growth of catchment areas in the Laura-Normanby river system.
- Establish balanced ecosystems within our Catchment, to maintain the productivity and diversity of the natural resources upon which we all depend.

1.5 LAURA-NORMANBY CATCHMENT MANAGEMENT STRATEGY

The Laura-Normanby Catchment Management Strategy was initiated by the LNCMG in 2002 with funding from the Department of the Environment, Natural Heritage Trust (NHT1). A Project Officer (Cathy Waldron) was appointed by the LNCMG to conduct community consultations. A survey was sent to all the known stakeholders within the Catchment area, including private landholders, traditional owners and land managers. The Project Officer then spent six months meeting with the stakeholders and discussing the Catchment issues. The general topics that were identified as priority issues (as ranked by the community) are:

Priority Catchment Issues Identified During Community Consultations

Rank:	Issue:
1	Water quality and quantity [surface and groundwater]
2	Weeds
3	Nature Conservation / Biodiversity
3	Grazing
4	Feral Animals [inc, cattle, horses]
4	Use of fire
4	Fishing [commercial / recreation]
4	Tourism and recreation [camp sites / rubbish]
5	Cultural Heritage
5	Land degradation [erosion / salinity susceptibility]
6	Clearing
6	Aquatic habitat
7	Agriculture / horticulture
8	Mining
9	Aquaculture

In March 2003, discussion papers and surveys on each of the topics were sent out to the members of the community in order to further define the issues and to identify the most appropriate objectives and strategies to manage these issues. The Objectives and Strategies included in each section of this report were chosen by those who responded to the survey, and were compiled by the LNCMG Project Officer (Ian Adcock). Mr. Adcock was also responsible for beginning the writing of this report, including the History of the Catchment (Section 1.7) and the Climate and Rainfall Section.

In the final stages of the Strategy's production (June/July 2005), local consultants (Kim Stephan and Christina Howley) were contracted to complete the final report. Their contributions included conducting an in-depth assessment of the priority issues identified by the community and compiling additional information relating to the major industries within the Catchment. The Cultural Heritage section was written by John Farrington of the Quinkan & Regional Cultural Centre.

Implementation of the strategies outlined in this plan will require significant cooperation among government agencies and local landowners, as well as communication and coordination across the Catchment. The landholders' knowledge and assistance is critical to the identification of problem spots and to the implementation of the actions required to address these issues. Government support will be necessary for activities such as property planning, fencing and maintenance, burning and feral weed and animal control. Some sources of financial support and landcare advice for landholders and community groups are listed in Appendix A.

1.6 HISTORY OF THE CATCHMENT (Written by Ian Adcock)

PRE-EUROPEAN HISTORY

The Laura-Normanby river system, like the rest of Australia, has a long history of human settlement. For many thousands of years, Aboriginal peoples have relied on the resources of the Catchment for food, shelter and medicines. Aboriginal inhabitation of the region has been estimated at up to 40,000 years (based on Carbon-14 dating of rock art) but this habitation has not always been passive and without influence. Fire and other management tools have actively shaped the surrounding landscape and influenced the resource base on which the indigenous population depended. Available resources influenced local cultures and continue to do so today.

EUROPEAN HISTORY

Grazing and mining activities dominated the early European history of the Catchment, with agriculture rising in prominence since about the 1970's. This was followed by small acreage farming with horticulture including coffee, bananas and sugar cane on a trial basis. Tourism is also becoming increasingly important economically.

GOLD RUSH

Massive changes for Aborigines began with the discovery of gold along the Palmer River in the 1870's. Lured by the promise of rich rewards, in the first three years, 15,000 Europeans and 20,000 Chinese chased the alluvial and reef gold found in the Palmer, the upper reaches of the Normanby and the Hodgkinson Gold Fields. Soon other entrepreneurs realised there were profits to be made in servicing the mining industry and cattle were brought in to supply meat for a high price in the goldfields. These new activities began the displacement of the earlier inhabitants. Fighting and strife often followed and a poor relationship developed between the communities. While the Palmer River gold lasted more than a decade, much of the wealth generated was spirited away from the region.

The Queensland Government attempted to service the Palmer region by building a railway line from Cooktown to Maytown. The first sod was turned on the 4th April 1884. The Laura section was completed in October 1888 and so the town of Laura came into being. A bridge was built over the Laura River, tested by a steam loco and approved. The estimate to complete the line to Maytown was £609,000. It was there at Laura that the Government decided to terminate the line due to financial difficulties. Steam locomotives ceased to use the line in 1930 and were replaced by Railmotors. The line was eventually closed down in 1962.

GRAZING

The birth of the grazing industry began with the Palmer River gold rush. Meat was required to feed the miners and the early properties taken up include "Butcher's Hill" in 1877, and "Olive Vale" and "Laura" in 1881. As these were closest to the route taken by the miners from Cooktown to the Palmer River gold fields and much of the land is classed as good grazing country, they quickly became viable enterprises. Until 1970 when the roads south had improved and cattle could be transported by truck, the majority of stock was driven south to Mareeba via Laura and the Byerstown Range or east to Cooktown to be shipped to the port of

Cairns. Even though the gold rush was in decline by 1883, the grazing industry was well established throughout the Catchment and with approximately one million hectares of leasehold land for 'grazing purposes' in the Catchment, has remained the dominant land use.

AGRICULTURE

The village of Lakeland Downs came into being at the beginning of the 1970's, based on a dream by Mr. Clive Foyster. With the establishment of large-scale agriculture following the clearing of trees from the basalt soils, crops were exported from a deep-water, man-made port at Archer Point. However, the enterprise was under-resourced and failed. With a change of ownership and the introduction of finance and a land buy scheme, today, Lakeland's farming, grazing and horticulture enterprises all prosper around a well-established town. A diversity of crops such as sorghum, maize, coffee, hay, navy beans, bananas, sugar cane, pawpaws, some organics, and peanuts have all been tried and tested over the years.

TOURISM AND FISHING

More recent forms of resource use and economic activity have come from the seasonal tourist trade. Holidaymakers driving 4x4 vehicles, make their way up the Peninsula to enjoy the experience of our remote area. They are invited to visit the National Park, fish, take in the Indigenous Rock Art, sample the fresh fruit and locally grown coffee. With the development of tourism, there is increasing pressure being placed on those areas of the Catchment that offer remote camping and fishing sites. As the numbers increase, there will be added pressure to find more and new areas to satisfy this latest industry.

RECENT LAND TENURE/ POPULATION

Data provided by the Queensland Department of Natural Resources & Mines (DNR&M) indicates that current land tenure in the Catchment area is primarily Leasehold Land administered by the DNR&M (approximately 987,225 hectares, or 66%), and National Park, which covers approximately 18% of the Catchment. Freehold Land (including Native Title) covers 169,562 hectares (11%), while 51,022 hectares (3%) is Unallocated State Land and 17,693 hectares (1%) is Reserve. An additional 1,583 hectares is held by the DNR&M as timber reserve and 225 hectares is forest reserve managed by the EPA (QLD DNR&M). Of the leasehold lands, 54% is held by the Pastoral Holding, 35% is Permit to Occupy, 6% is Grazing Permit Perpetual Lease, 5% is Occupational Lease and less than 1% each is Freeholding Lease, Special Lease and Special Lease Freehold Purchase. Figure 2 shows land tenure within the Catchment as of 2003.

The major population centres within the Laura-Normanby Catchment area are Lakeland Downs and Laura, both of which have less than 100 residents (Hans Looser, pers. comm., 2005). The current resident population for the entire Catchment area is less than 500.

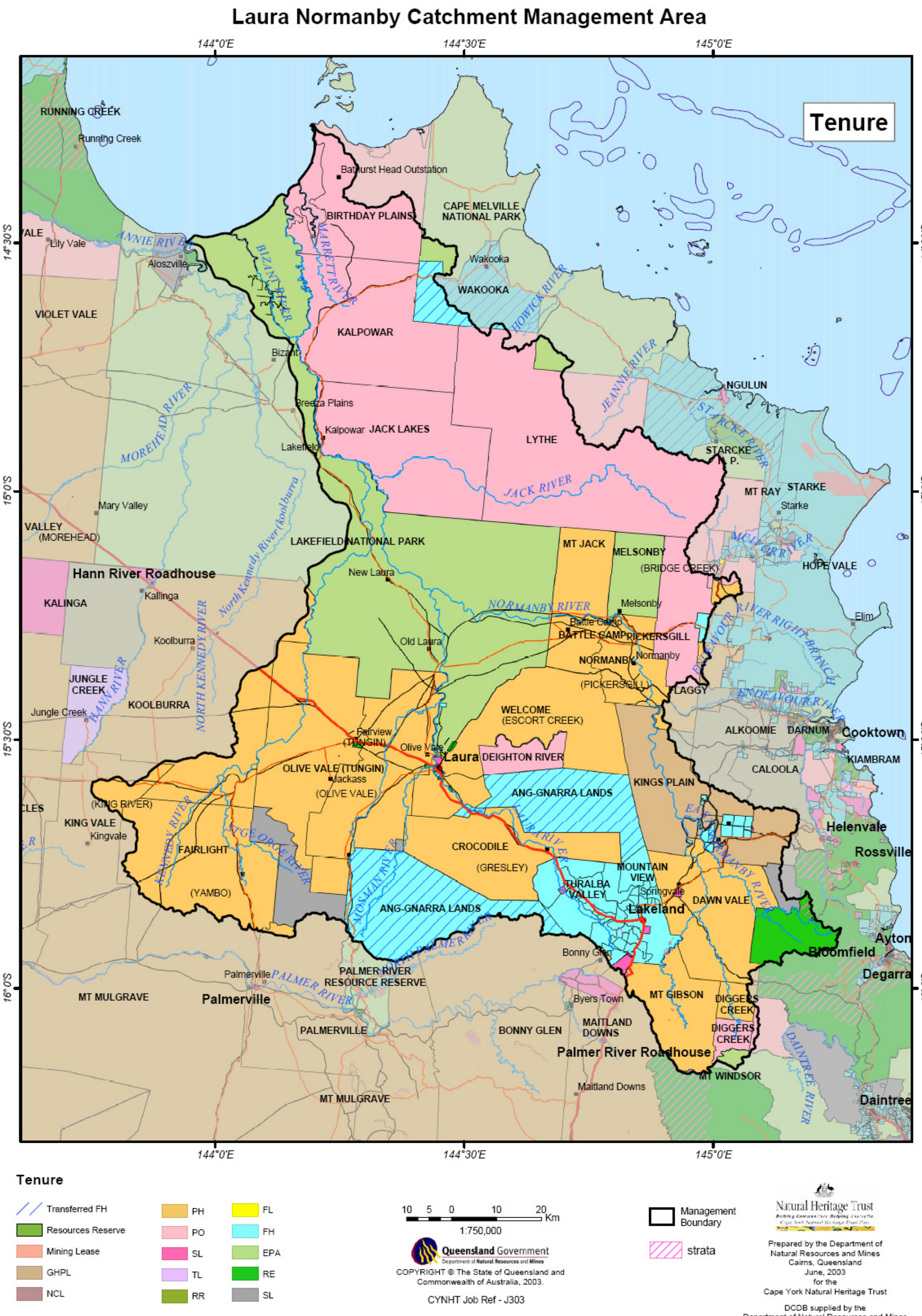

Figure 2: Land Tenure Map

1.7 BIOPHYSICAL ENVIRONMENT

CLIMATE AND RAINFALL

The Catchment has a defined 'wet' and 'dry' season with 95% of its annual rainfall occurring between the months of November and April. Mean annual rainfall varies from 600mm to 1400 mm across the Catchment with the higher falls occurring in the east and south. Rainfall is typically cyclonic or from thunderstorms during the wet season with any dry season rainfall usually of orographic (mountain) origin. Cyclones can be experienced during the wet season. The northern and central area of the Catchment experience drought during the dry season and this is reflected in the vegetation of the region.

Temperatures vary little over the Catchment during the year. Maximum temperatures of around 36° C are found in the wet season months of October through to April with the minimum being, on average, about 19° C. During the dry season, the temperatures range from 30° C in June to a minimum of 14° C in July. Humidity is around 80% during the wet season months and can drop down to as low as 56% for the remainder of the year. Evaporation rates will exceed rainfall between April and September, with rainfall exceeding evaporation only during the months of January and February.

TOPOGRAPHY and HYDROLOGY

The majority of the Laura-Normanby Catchment area is of relatively low relief and gently slopes towards Princess Charlotte Bay. Topography in the upland areas ranges from undulating rises to steep hills, with deeply dissected sandstone plateaus and intervening plains, and steep mountain ranges composed of metamorphic rocks to the south. The lowlands of the Basin include large alluvial plains and extensive areas of residual sands derived from the sandstones.

The Laura and Normanby Rivers originate in the mountains in the east and south of the Catchment area and flow to the northwest and north, discharging into the Coral Sea at Princess Charlotte Bay. Major tributaries to these rivers include the East and West Normanby Rivers and the Jack River to the southeast and east, and the Mosman, George and Kennedy Rivers in the south and southwest. Drainage from the mountain ranges across the southern Catchment is rapid, causing wide-spread flooding at the river's mouth. Annual flood waters feed extensive lagoon and wetlands systems in the lower Catchment area. Severe storm activity in the south causes surface water run off and high turbidity during the summer months. From June to November many sections of the Catchment's streams are dry and small water holes from springs represent most of the permanent water.

Figure 3: Catchment Relief Map

GEOLOGY

The central and northern plains of the Catchment area are underlain by a layer up to 70 metres thick of Cainozoic era deposits, including Tertiary period sediments (clayey silty sandstones and claystones, with some rounded quartz gravels) and Quaternary period alluvial deposits (grey silty clay, sand and gravel, and orange and white residual sands). Surface sands and gravels associated with the river systems are usually less than 10 m thick and are generally fairly coarse in the south, becoming siltier towards the northern onshore margins (Horn et al, 1995). The coastal plains at Princess Charlotte Bay are comprised of Quaternary period marine deposits including limestone, salt pans, beach sands and pumice (The 1:250,000 Cape Melville Geological Series, Sheet SD/55-9 (Geological Survey of QLD, Second Edition, 1983) and 1:250,000 Cooktown Geological Series, Sheet SD 55-9 (Geological Survey of QLD, First Edition, 1966).

Underlying these Cainozoic era alluvial and marine deposits are the Mesozoic era sedimentary rocks of the Rolling Downs Group, Gilbert River Formation (formerly named the Battlecamp Formation), and the Dalrymple Sandstone. These primarily sandstone formations are exposed across the hills and mountain ranges in the eastern and southerly regions of the Catchment area. Underlying the Mesozoic sedimentary rocks, and exposed in the mountains of the southern Catchment area, are the Paleozoic era Hodgkinson Formation metamorphic rocks (greywacke, slate, some conglomerate and metavolcanics), and intrusive Permian period granites. During the Tertiary period, volcanic basalt flowed to the surface from vents in the Hodgkinson Formation rocks. The McLean basalt, located in the Lakeland Downs area, covers approximately 300 km^2 and is composed of olivine basalt and gravels (Horn et al, 1995).

The geological maps indicate that there are a number of faults located within the Catchment area. The major fault in the region is the north-south orientated Palmerville fault located along the western margin of the Catchment area (Bain and Draper, 1997).

HYDROGEOLOGY

The Laura-Normanby Catchment area overlies two regional groundwater basins: The Laura Basin, which underlies the majority of the Catchment area, and the Hodgkinson Basin. The Laura Basin is an artesian basin (where groundwater is under pressure, and flows upwards in bores) comprised primarily of Mesozoic era sandstone formations. The Basin extends from the southern margin of the Catchment area to the edge of the continental shelf north of Princess Charlotte Bay and has a thickness of up to 1 kilometre (Bain and Draper, 1997). The Laura Basin overlies and is bounded to the south and east by the Paleozoic era Hodgkinson Basin (Passmore, 1978).

The principal groundwater aquifers in the Laura Basin are the Gilbert River Formation and Dalrymple Sandstone. There are also water resources in the overlying Cainozoic sediments. Groundwater in the Laura Basin flows generally to the north. Recharge by infiltration of rainfall into the outcropping sandstone aquifers occurs mainly along the elevated southern and eastern margins of the Basin (Bain and Draper, 1997). Natural discharge occurs at permanent and semi-permanent springs. Numerous springs have been identified in the Quinkan region (surrounding Laura) and at Lakefield National Park. Spring flow also maintains perennial or near continuous flow to the little Laura and the Normanby Rivers.

The fractured rock aquifers of the Hodgkinson Basin underly the southern portion of the Laura-Normanby Catchment area and include the McLean basalt that occurs in the Lakeland region. These fractured rock aquifers of the Hodgkinson formation and McLean basalt provide an important supply of groundwater for domestic and stockwatering purposes, through a number of low yielding bores. The fractured rock aquifers of the Hodgkinson Basin principally recharge vertically and therefore the groundwater supplies are closely dependent on rainfall (Horn et al, 1995).

Figure 4 shows the general geology of the Catchment.

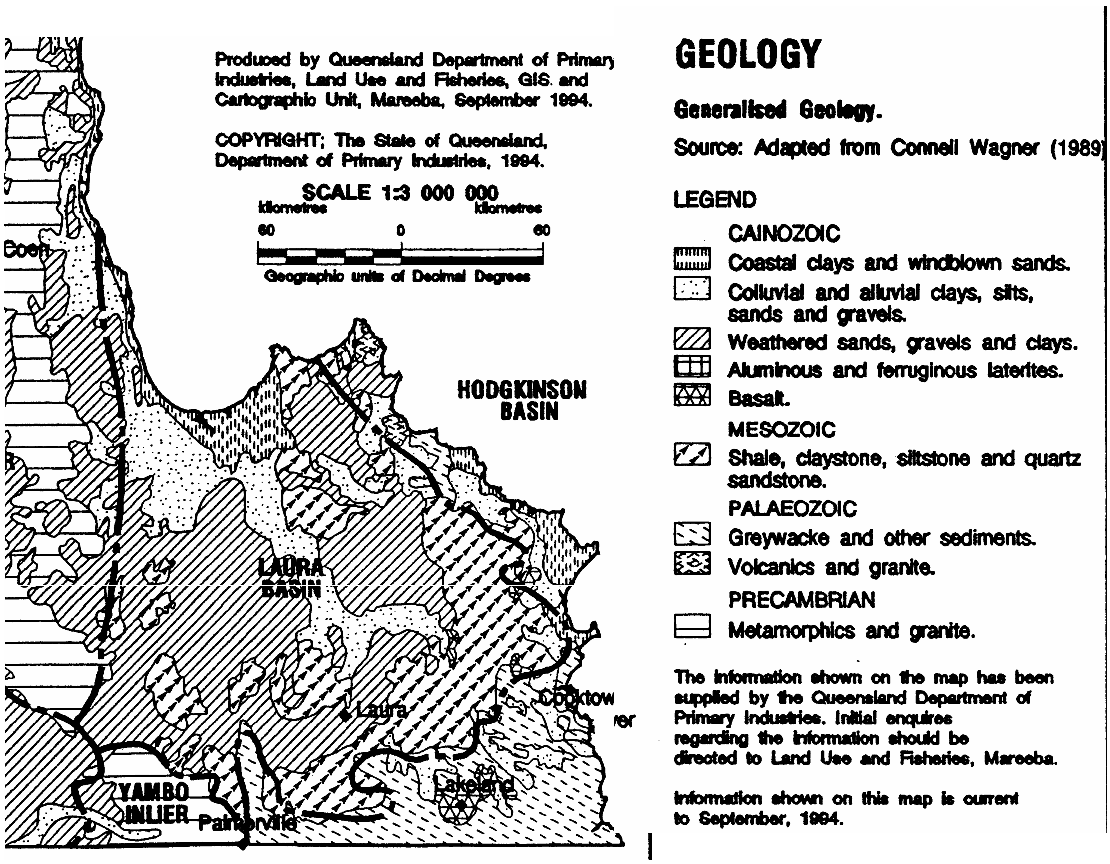

Figure 4: Catchment Geology (adapted from Biggs et al, 1994).

SOILS

A wide variety of soil types occur within the Catchment. Along the coast and inland from Princess Charlotte Bay, soils are dominated by moderately deep (0.5 m - 1.0 m) and farther inland, very deep (1.5 m - 5.0 m) saline clays. The Laura basin generally consists of shallow (0.25 m - 0.5 m) rocky sandy soils derived from sandstone and red and yellow silty soils and massive sands (1.0 m - 1.5 m deep) in the lower plains. Soils in the Hodgkinson Basin region (southern Catchment area) are comprised primarily of sodic and non sodic yellow and grey soils, and red and brown structured clay soils derived from volcanic basalt in the Lakeland Downs area. The basaltic soils support a wide range of agricultural enterprises (Horn et al, 1995).

Pockets of sodic yellow or grey soils (Gibson) occur along the Laura River between Lakeland and Laura and in the vicinty of the Normanby River near Battlecamp. Red soils (Victor) found in the vicinity of the town of Laura and along the Laura River are generally 1 m to 3 m deep and overlie significant salt depositions. Deep acid to alkaline yellow soils (Greenant) occur along the alluvial plains of the East and West Normanby Rivers, along the Laura River north of Laura, and along the Normanby River to the north and west of Battlecamp.

Soils in the Catchment area are generally associated with high levels of natural erosion and low nutrient levels. Significantly accelerated rates of erosion have been observed in association with roads constructed through Victor, Greenant, and Gibson soils. A moderate risk of development of secondary salinity is associated with Gibson and Victor soils. Low nutrient levels in sandy soils are a major restriction to grazing and agriculture (Biggs and Philip, 1995).

2.0 CULTURAL HERITAGE

Author: John Farrington – Manager, Quinkan & Regional Cultural Centre.

INTRODUCTION

The objective of this section is to provide a broad outline of the significance of the Laura Normanby Catchment area of Cape York Peninsula in regards to preserving and protecting one of the world's top ten Rock Art sites, as well as to identify of a diverse cross-section of European heritage that has existed for over 125 years. Cultural tourism, and in particular the Rock Art, is capable of developing and supporting a sustainable industry that provides public education, economic opportunities and positive assistance to environmental and land-use planning and implementation processes. This chapter does not attempt to detail or explain style, technique or content of the Rock Art sites of the Laura-Normanby Catchment Area. Nor does it attempt to provide any additional information of both traditional and recent cultural heritage in other areas of Cape York Peninsula.

TRADITIONAL CULTURAL HERITAGE

The ancient landscape defined as Quinkan Country extends from Sandy Creek, the Palmer and the Little Laura Rivers, the Laura Valley and north by north-east to Princess Charlotte Bay. It is primarily sandstone over the south-east edge of the Laura basin area and formed millions of years ago. Then the region was a shallow sea that over time filled with layers of sediment. Following later periods the sediment layers (i.e. soft sandstone) slowly up-lifted as a result of tectonic plate movement. This up-lifting exposed the landscape to weathering and erosion that shaped and sculptured the landscape into the escarpments, rocky outcrop hills, and the river valleys that are seen today.

Human occupation in the region has been documented and is believed to be 40,000 years before present. Aboriginal society was highly sophisticated with complex social laws that determined how individuals related to each other. In addition the various groups of Aboriginal people lived and used the natural resources located in their regions and engaged in trading with neighbouring groups / communities. Trading was highly mobile and apart from resources used & traded, also served social and ceremonial obligations. This has formed a substantial volume of cultural heritage knowledge (& associated value) that is indeed worthy of preservation, which continues today.

Regarding the people's languages of the region, the author acknowledges the work of Emeritus Professor Bruce Rigsby for the following information. It is believed that there were 30 languages spoken throughout Cape York Peninsula before European settlement. With the geographical focus of this article being the Laura Valley Region, it is generally acknowledged that there are 4 languages traditionally associated with this region. These are Guugu Yimithirr, Kaka Yalanji, Kuku Thaypan and Uw Olkolo. In the northerly regions, the Aboriginal people of the Port Stewart / Princess Charlotte Bay region belong to the Lamalama tribe, duly named from one of their languages.

As part of spirituality and cultural practices, Aboriginal people have always taken the natural environment (hereafter referred to as Country) very seriously. A succinct illustration is the near pristine nature of most sites and the fact they have survived (largely) intact for a period of at least 27,000 years. In addition, as mentioned above, Mushroom Rock archaeological evidence indicates human occupation at the site to be 40,000 years.

The Rock Art of the Laura-Normanby Catchment Area has been well researched and documented. The work of researchers such as Percy Tresize, Mike Morwood and Noelene Cole, to name but a few, are indicative of a large body of research available. Other instances of significant Rock Art sites within the Catchment include Split Rock, the Quinkan Galleries and the Galleries of the Deighton River area (east of Laura) and the various sites at Jowalbinna (west of Laura).

This collective of artwork is widely accepted as being amongst the oldest formal recording of human interaction and their relationship with the natural (& spiritual) environment.

There is substantial recognition and value regarding this remarkable resource. Firstly the oral history associated with the paintings and their context has been preserved and maintained to a considerable extent. Secondly, Quinkan Rock Art has been included on the Australian National Heritage Estate. Thirdly, at an international level the Rock Art within this Area is recognized as being within the top ten sites in the world. To illustrate, the UNESCO International Committee on Rock Art has stated that the rock art found in the Laura region is one of the most significant rock art sites in the world. Fourthly, the strong international awareness through the considerable number of web sites listed under various search engines and European visitors asking at the Quinkan and Regional Cultural Centre to visit specific Rock Art sites by name. Fifthly, some authorities (e.g. N. Cole, 2003) have suggested that the Rock Art of the Region is worthy of World Heritage Listing.

The artwork/paintings of the Laura-Normanby region were not static but have changed with artists developing their own style. As portrayed in the Quinkan & Regional Cultural Centre, there are distinct styles of art work that have evolved over an extended period of time. Another significant factor in the artwork is the portrayal of pre- and post- contact with European occupation of the land in the Area.

Furthermore, the paintings and engravings are a pictorial record of ancestral spirits and through them the laws, socialization, spirituality and cultural practices that form the essence of Aboriginal life and identity and connection to Country. As Dr. George Musgrave stated in the introduction (page 1) of the *Our Country Our Art Our Quinkans* book, "The pictures and paintings of the past are our link with the present. All things work together: the land, the law, the culture the heritage".

Interest in cultural tourism continues to expand both domestically and internationally. Australia is unique in having 3 of the world's top 10 rock art sites distributed across the northern part of the mainland. In this Region, visitors to the Quinkan and Cultural Centre regularly comment that part of their decision to visit Cape York has been to experience (or learn more of) the culture of Aboriginal people, either through visiting Rock Art sites, attending the Laura Dance Festival or to purchase particular arts & crafts. Furthermore, since the opening of the Centre, it has and will continue to facilitate present and future demand to fulfil such experiences.

What is also significant is the region's rock art is among the oldest art sites in the world and the link between original artists, their culture and their descendants has continued directly to this present time. The Rock Art provides at the very least a pictorial record of Aboriginal integration with the Australian landscape for a period of at least 27,000 years (in this

Region). In other parts of Australia (in particular the Northern Territory) rock art and cultural heritage has been recognized and developed as a corner-stone of the tourism industry.

Cultural tourism is also used as a mechanism of educating and passing on cultural knowledge. This is evident from examples quoted above and overseas in Balinese cultural preservation & education in a country governed by Indonesia and their own distinct culture.

EUROPEAN HERITAGE

Another unique feature of the Rock Art of the Laura-Normanby is the recording of aspects of European culture & heritage. This feature is not believed to be present at many other significant rock art sites both within Australia and internationally. Specific examples include paintings of horses and mounted troopers as well as skirmishes with the Native Police.

In addition to the pictorial recording of aspects of initial introduction of European culture, the Laura-Normanby Catchment Area contains a diverse amount of European heritage in a period of approx 140 years. Specific examples include:

- The Palmer River Gold mining sites
- Historic towns such as Maytown, Laura & Cooktown
- The legacy of the Chinese Miners
- Battlecamp Road
- The Maytown to Laura Coach Road
- The Cooktown to Laura Railway
- The Overland telegraph line
- Fairview (& other) telegraph office(s)
- Pastoral Stations and Homesteads.

However there has been a considerable loss of European cultural heritage sites through abandonment of rural structures (e.g. Cobb & Co transfer stations), redundancy of technology (e.g. steam trains) and population movements as well as loss of cultural landscapes through changing rural/commercial/industrial patterns as evidenced in townships such as Maytown, Laura & Cooktown. This was particularly relevant during the decades of the 1950s through to the 1970s.

There remains considerable awareness of aspects of the Area's diverse European heritage. To again cite feedback from visitors to the Quinkan & Regional Centre, queries are often received regarding Maytown and the Palmer River Goldfields and regular questioning in regard to access and restoration to these significant European cultural sites.

With increased availability and access to knowledge, a strong foundation exists regarding the further development of this aspect of cultural tourism in the Area. A considerable impediment however is road access and a lack of other infrastructure (e.g. designated camping area and toilet facilities).

EMERGING INTEREST, DEMAND & ISSUES

As one of the two last remaining wilderness areas on the Australian mainland, interest in Cape York, and in particular the Laura-Normanby Catchment area, will continue to expand. Visitors to the Quinkan and Regional Cultural Centre (with both organized and independent groups) have indicated they are now actively seeking experiences away from the coastal areas of the mainland. This trend has also been substantiated through discussions with other Tourists Centres in north-west Queensland. It could therefore be argued that in addition to the natural environment of the region, cultural tourism is a strong inducement for people to travel to Cape York Peninsula (both domestically and internationally) and capable of making a positive contribution to the economic sustainability of the region.

Visitor numbers to this region are expected to increase at an accelerated rate with the sealing of the road between the Normanby and Annan Rivers (expected completion date of December 2005). Also impacting this Area will be the sealing of the Lakeland Downs to Laura section of the Cape York Development Road. Planning for this increased demand requires due consideration in order to control and adequately monitor visitation and its impacts.

Uncontrolled development and re-active management pose a direct threat to the physical environment and the pictorial imagery of rock art sites as well as other identified sites and areas previously identified. Specific threats can include graffiti, vandalism, gun-shot damage, looting, forgery as well as damage from dust and touching and alterations to the surface of the rock art sites. At Split Rock direct evidence can be observed by the contrast of the Rock Art on the Eastern side that has been subject to dust from road traffic as well as from rising dust from human feet in close proximity to the rock art walls compared to the Western side where such activities have been minimal. Also evident are small amounts of graffiti at different locations.

In addition to the issues listed above, increased visitor number and demands will escalate the existing problems of the Area. Listed below is a very brief list of these current problems.

- The lack of a job-ready employment pool of workers.
- Logistical problems with not having a registered training provider to deliver training program in Laura to increase the current skills & opportunities for the local Community/Communities.
- The lack of accommodation for potential new workers that would be based in Laura.
- Severe lack of suitable accommodation choices for visitors wanting to stay in Laura overnight or longer.
- A cultural heritage management plan needs to be implemented in regard to preservation, protection and access to the rock art sites of the region.
- Increased and more effective public awareness of safety and health issues when travelling throughout the entire Cape York Peninsula region.
- Regular consultation with vested interest groups and government agencies particularly regarding infrastructure requirements and funding arrangements.

Success and growth of cultural tourism is also highly dependant upon quality infrastructure and in particular road and communication technology as well as consideration of Aboriginal people and their communities. Recent funding being made available for the planning and installation of toilet facilities along the Cape York Development Road is a positive measure of such support. As with other vested interests on Cape York, protection, preservation and maintenance of the diverse landscapes and eco-systems are critical to the use and development of the resources of Cape York Peninsula. It is important to remember that the rights of the Aboriginal people of Cape York have been recognized and protected both through the Courts and through legislation. Specific examples include the Mabo and Wick decisions of the High Court (1993 & 1996), the Aboriginal & Torres Strait Islands Land Act 1991 (Qld) and the Native Title Act 1993.

The universal acknowledgement of the value and importance of the region's cultural heritage is succinct evidence of recognizing the need to incorporate the role of values and practices in land use management, for educational purposes and environmental appreciation of Cape York Peninsula. Specific areas or issues include land tenure, land use management, access agreements and all industry development. Sustainable natural resource management needs to recognize the strong Traditional and European heritage value of the region that forms the essence of the identity of Cape York Peninsula.

Table 1 on the following page may provide a relevant tool regarding the "fit" of cultural tourism and its role in the management of the natural resources of Cape York Peninsula.

TABLE 1: LAURA-NORMANBY CATCHMENT AREA
CULTURAL HERITAGE STRATEGIES & RECOMMENDED ACTIONS
GOAL: To preserve past cultural sites and history, and maintain present living cultures for the future.

	STRATEGY Determined By Stakeholder Survey	Recommended Actions For Implementation of Strategy	Cape York Regional Plan Management Actions Proposed By The Community
CH1	Prepare educational material and programs on the history and heritage sites of the Laura-Normanby Catchment.	-Consult with relevant local historical societies, research local & state libraries. Engage a Researcher to collate and interpret data for publication purposes.	-"Develop programs for cultural and historical recognition and respect of the diverse range of values." -"Enhance natural resource management and cultural heritage modules in school curricula."
CH2	Develop and maintain a register of all the cultural heritage sites within the Laura-Normanby Catchment.	-Provide funding to complete the Cultural Heritage Management Plan in consultation with the Quinkan & Regional Cultural Centre.	-"Identification and management of non-indigenous sites of significance such as early exploration sites; WW2 sites; early European settlements."
CH3	Develop and implement management plans for protecting significant cultural heritage sites within the Catchment.	(Refer CH2 above)	"Develop and implement appropriate protection of cultural and heritage sites." -"Establish and undertake fencing and weather protection projects for priority sites."
CH4	Develop and implement protocols on consultation practices and participation with Aboriginal communities regarding any Aboriginal cultural sites.	-Consult and engage relevant Land Council and Ang Gnarra Aboriginal Corporation to consult and advise. Auspicing organization to be determined.	"Greater cooperation facilitated through roundtable forums between health, education, and natural resource management service providers to develop integrated natural resource management programs."
CH5	Encourage the maintenance of appropriate traditional practices and their incorporation into the broad scale resource management programs.	(Refer CH2 and CH4 above)	"Identify appropriate potential 'Caring for Country' mentors." -"Develop protocols to ensure understanding (of relationship with land and sea) incorporated into all aspects of land and sea management."
CH6	Resource a systematic program of data collection, analysis and communication of the cultural heritage in the Laura-Normanby Catchment.	(Refer CH1 & CH2 above)	"Traditional Knowledge Projects developed and where existing, extended to identify principles of caring for country and mechanisms for application of knowledge to diverse range of activities."
CH7	Involve all land managers in the management of sites of cultural significance.	-Auspicing Agent/Organization to be determined.	"Promote regional, sub-regional and local level cross-sectoral collaboration and coordination."

3.0 MAJOR INDUSTRIES WITHIN THE CATCHMENT

3.1 AGRICULTURE

Banana Farm in the Lakeland Region

Agriculture and horticulture within the Catchment are mainly limited to the upper reaches of the Laura River and to a lesser extent the Normanby. This is due to the geographical distribution of soil types and the reliability of the water supply. The rich basaltic soils in the Lakeland area support a wide range of crops, including:

Peanuts	Navy Beans	Maize
Sorghum	Bananas	Mangoes
Coffee	Paw-paws	Farm forestry

Top quality crops of sugar cane and hemp were grown on a trial basis. However, the transport costs to the closest mill and the price of sugar, and similar issues with hemp, made these crops economically unviable.

The reliable water supply to farms in the Lakeland Downs area comes from large private dams, replenished during the wet season, which allow irrigation to be carried out during the dry part of the year. Groundwater is becoming increasingly relied upon for irrigation as greater areas of land are going into production. One resident estimates that there is enough suitable land available to double the amount of agricultural industry in the Lakeland region (Graeme Elmes, pers. comm., 2005). The expansion of the industry is made possible due to the improvement of the road to Lakeland and the upgrading of irrigation systems allowing for more efficient use of water. The crops that are likely to expand include bananas, watermelon, and seed crops such as sorghum and corn. The seed crops have a high market value and may provide an important source of income to local farmers. They also have high water requirements and depend upon adequate surface water and groundwater supplies through the dry season.

Intensive cropping can impact the surrounding environment and downstream waterways in several ways. Land clearing for agriculture can increase erosion and reduce wildlife habitat.

It can cause changes to catchment hydrology through water extraction, changes in vegetation cover and the addition of irrigation water. Potential exists for serious impact upon water quality in local streams from poor management of farm chemicals and fertilisers.

Loss of topsoil and soil nutrient declines have not been identified as major concerns associated with agriculture in the Catchment area. These issues have been managed in the Lakeland area through the use of contoured paddocks and efficient irrigation systems. The contoured paddocks reduce surface water runoff, which results in minimal loss of soil and more efficient use of water and fertilisers. Overhead irrigation with centre pivot has replaced traveling irrigators and lateral irrigation. Previously large volumes of water were wasted due to drift caused by the prevailing southeast tradewinds. The spray nozzle on the centre pivot system can be lowered to avoid loss of water to drift. The current centre pivot irrigation system has reduced the volume of water required for irrigation by half (Elmes, pers. comm., 2005). This system is in use at most farms throughout Lakeland. Banana farms are irrigated using efficient computer controlled trickle irrigation systems. These systems monitor the exact volumes of irrigation water and fertilisers supplied to the plants.

Some concern has been expressed by resource managers and Lakeland landowners over the increasing reliance on groundwater for irrigation. The fractured rock aquifers of the region are dependent on rainfall to be replenished and the total available groundwater resources are unknown. Over-extraction and/or lack of rainfall could result in the depletion of groundwater resources, leaving inadequate supplies to support the planted crops or for domestic use.

Because agriculture occurs across the headwaters of the Laura River, impacts in that region have the potential to affect the whole Catchment. Fertilisers, pesticides and herbicides can be transported via groundwater and surface water runoff into local streams, where they may impact upon aquatic habitats downstream. Aerial applications of chemicals can also result in contamination of water supplies and soils outside the intended spray area. There is no evidence of agricultural chemicals impacting surface water or groundwater quality in the region but there is also no known monitoring for agricultural chemicals in groundwater or surface water in the Lakeland region. Previous monitoring projects have detected high nutrients in the Laura River, although it is unclear whether this data is reliable. High nutrient levels could be associated with the use of fertilisers, cattle, town septic systems, or natural seasonal fluctuations.

The use of efficient irrigation systems and contouring in Lakeland will reduce surface water and sediment runoff and potential impacts upon water quality. However, careful monitoring of chemical use and water quality are recommended, particularly as the agricultural industry expands. The property planning process should aim to avoid or minimize impacts on neighbouring lands and natural resources and endeavour to develop sustainable production methods. Decision-making on issues affecting land use within the Catchment needs to be based on adequate mapping of water resources and assessment of land capability. In particular, future subdivision of land must ensure that the land resource is not diminished by the creation of unviable holdings that may impact on the future productivity of good quality agricultural land.

TABLE 2: LAURA-NORMANBY CATCHMENT AREA
AGRICULTURE and HORTICULTURE STRATEGIES & RECOMMENDED ACTIONS
Goal: A sustainable and economically viable agriculture industry

	STRATEGY Determined By Stakeholder Survey	**Recommended Actions For Implementation of Strategy**	**Cape York Regional Plan Management Actions Proposed By The Community**
AHA1	Encourage and support training in Agriculture and Horticulture skills.		
AHA2	Promote the sustainable and efficient use of natural resources within the Agriculture and Horticultural industries.		"Support cropping and horticulture industry to continue and improve ecologically sustainable practices."
AHA3	Involve the community in natural resource monitoring programs.	Monitoring of water quality downstream from Lakeland should be conducted to ensure that agricultural chemicals are used efficiently and sustainably.	
AHA4	Compile agriculture and horticulture suitability information for landholders in the Laura-Normanby Catchment Area.	Land use within the Catchment needs to be based on adequate mapping of water resources and assessment of land capability.	
AHA5	Provide links and support to land holders with agriculture, horticulture development projects.		
AHA6	Support and encourage Property Management Plans within the industries.		
AHA7	Develop links with Landcare Groups and the Annan-Endeavour Catchment Group.		

3.2 GRAZING

Cattle Station Outside of Lakeland

Grazing is the most extensive land use in the Catchment. Properties tend to be large (grazing leases average around 600 square miles in size), with low intensity management applied. Cattle density is estimated to be approximately 1 per square kilometer across the Catchment (Ian Adcock, pers. comm., 2005). The major issues faced by the local cattle industry include transport and infrastructure limitations and distance to major markets. The construction of the Byerstown Range Road and further development of the Cooktown Development Road to bitumen standard is helping to provide year round access. However, until the Peninsula Development Road standard is improved upon, movement of stock to the exporting port of Weipa from the Southern Peninsula area will not be an option.

The environmental impacts of grazing in the Laura-Normanby Catchment are considered to be minimal in comparison to other grazing regions due to the relatively low cattle numbers. However, degradation of water quality around waterholes frequented by cattle has been identified by stakeholders as a significant issue of concern. Although the numbers of cattle across the Catchment are low, the congregation of cattle around waterholes leads to high impacts in these areas. Cattle are attracted to virtually all permanent waters in the Catchment, even within the Lakefield National Park. Loss of riparian vegetation and erosion of stream banks occur in areas where cattle have access to the stream. A decline in ground cover due to grazing and soil compaction from hooves can also lead to accelerated erosion. Road and track networks to service the industry can also lead to erosion problems. Fencing off rivers and supplying an alternative source of stockwater may be necessary in some areas.

Due to the low nutrient levels in soils in the Laura-Normanby Catchment, the land will only sustain low density grazing. This means that income per hectare is comparatively low. In many cases the landholders have at least 100 years of data on their properties and can see what management practices need to be changed but cannot afford to implement changes. Landholders and industry groups are now looking for incentives and discounts from the Government and supply companies to enable them to become more economically viable, to compete with landholders in areas of higher yield and to make the changes to farming practices that will make properties more environmentally sustainable.

A group of producers in the Georgetown district has begun processes to improve cattle management and property planning. With the assistance of Beef Production staff from the Queensland Department Primary Industries, they are documenting land types, management requirements, cattle management regimes and issues affecting their property management. Known as a Local Consensus Data Group, this is an excellent vehicle to pool insight and understanding for those producers who are thoughtfully planning their property management. This interaction and group planning could also provide a strong basis for integrated catchment planning in the Laura-Normanby.

TABLE 3: LAURA-NORMANBY CATCHMENT AREA
GRAZING STRATEGIES & RECOMMENDED ACTIONS

GOAL: A sustainable grazing industry integrating environmental, economic and cultural values

	STRATEGY **Determined By Stakeholder Survey**	**Recommended Actions** **For Implementation of Strategy**	**Cape York Regional Plan** **Management Actions Proposed** **By The Community**
GM1	Promote a greater understanding of pasture and rangeland ecology.		
GM2	Identify indicators of sustainability and develop monitoring programs.		
GM3	Identify and promote best management practices.	-Provide information about grazing impacts and their causes to graziers. -Government and community support for the development of Property Management Plans for grazing properties.	-"Native pastures maintained by appropriate combinations of moderate stocking rates, fire and spell grazing." -"Emphasis on improved liveweight gain over increased stocking rates." -"Promote new technologies deemed to be both ecologically sustainable and economically viable."
GM4	Encourage and promote the Local Consensus Data group process and "Future Profit" as management planning tools.		
GM5	Assess land suitability for grazing in the Laura-Normanby Catchment.		"Seasonal stocking rates are consistent with land condition and long-term carrying capacity of each land title."
GM6	Develop improved systems for sharing resources and information between stakeholders groups.		

3.3 TOURISM AND RECREATION

Many areas of the Laura-Normanby Catchment are used for Tourism and Recreation. The Laura-Normanby River system provides a wide range of camping and fishing locations for both visitors and local residents. All overland travellers to Cape York must cross the Catchment boundary at some point. Popular tourist destinations include Lakefield National Park and the aboriginal rock art, found in the vicinity of Laura. Many graziers and other landholders are also gaining income diversification from tourism services such as Farm Stay or Tour Guiding. As the road from Mareeba to Cooktown improves, visitors to local destinations will continue to increase and additional infrastructure will be required to support the tourist industry. Consideration must be given to the way tourism and recreational use of the Catchment will develop.

From the mouth of the Normanby River in Princess Charlotte Bay to the ranges of the Great Divide, the Catchment is already under increasing pressure from recreational activities. The attraction to remote wilderness means that tourists and recreationalists will consistently extend the boundaries of their activities, opening new areas to impacts and management needs. With GPS and modern four-wheel drives, the only restriction to access is often weather. Camping and other recreational activities often occur on land that is not designated or supported for tourism and recreational use. Where the appropriate infrastructure is not in place, such as effluent free toilets, rubbish bins, and fire pits, the impact to the environment is increased. New tracks can lead to erosion issues and weeds can be spread into new areas.

One of the major issues regarding tourism in the area is the minimal economic benefit that is gained from much of the four-wheel drive traffic. Many campers bring their own supplies with them and put little back into the local economy. Infrastructure must be provided to support this traffic, despite the lack of economic returns from this investment in infrastructure.

Lakefield National Park, which occupies 18% of the Catchment area, is a popular camping destination for both tourists and locals. The park was established in 1979 and had previously been utilized for cattle grazing. Numbers of visitors to the Lakefield region have significantly increased since the establishment of the park (Barry Lyons, pers.comm., 2005). In 2004, there were 2,343 camping registrations, with each registration generally representing between one to six persons and some registrations representing up to 28 (QPWS, IA Parks Self Registration Report). The Cook Shire Council traffic counter located at New Laura registered approximately 9,700 vehicles for the year of 2004. (The traffic counter registers vehicles passing in both directions, so it does not represent the total number of cars visiting the park.) The number of QPWS camping registrations prior to 2004 was not available, however traffic counter data indicates that vehicle numbers did not significantly increase between 1994 and 2004 (CSC Traffic Figures, provided by Graeme Burton).

Rock art and cultural heritage in the Catchment, and particularly within the Laura or Quinkan region, offers a unique tourism product and important employment opportunity for the Laura region's indigenous population. The rock art of the Quinkan region is of equal significance to that found in the Kimberley or Kakadu regions. There are currently several rock art tours available. The art at Split Rock can be visited as a self-guided tour or with a tour guide. Other sites, such as Mushroom Rock and Giant Horse, are only available to visitors with a local indigenous guide. In 2004, the Quinkan & Regional Cultural Centre at Laura was opened in order to enhance the value of the rock art visitor's experience and provide long-term tourism opportunities for the community. Through the Centre, members of the local community are working to expand the number of sites and tours available. However, a number of issues, including land tenure and the delivery of appropriate training must be addressed. (John Farrington, pers.comm., 2005).

According to the manager of the Quinkan Centre, a crucial factor for the development of sustainable tourism in the Laura area will be the completion and implementation of a Cultural Heritage Management Plan. A Draft Plan has been released, but due to the large number of stakeholders, final production and implementation of the Plan is likely to take a considerable amount of time and will require further government assistance. The Cultural Heritage Management Plan will need to have workable links with the Cape York Natural Resource Management Plan and the Cape York Tourism Development Plan (John Farrington, pers.comm., 2005).

MANAGEMENT ISSUES

Not everyone who lives and works in the Laura-Normanby Catchment wants the area thought of as wilderness. New legislation, such as the Vegetation Management and Other Legislation Amendment Bill 2004 (Qld), will seriously limit the opportunities for some landowners to expand existing industries such as agriculture and grazing. It is therefore likely that landowners will be increasingly looking towards tourism for business opportunities. This expansion of the tourism industry could also impact upon natural resources, particularly if the appropriate infrastructure does not exist.

In May, 2005, the Queensland government announced that it has allocated $500,000 in new initiative funding for a Cape York Tourism Development Action Plan. So far, little information is available about the production of the Plan. For the plan to be relevant or successfully implemented, it is imperative that all sectors of the community be involved with the planning process. The Plan will need to address the growing infrastructure requirements in the Catchment area, as well as the necessity for appropriate training and assistance with business planning and management.

TABLE 4: LAURA-NORMANBY CATCHMENT AREA
TOURISM AND RECREATION STRATEGIES & RECOMMENDED ACTIONS

Goal: To develop a sustainable tourism and recreation industry, whilst maintaining the natural integrity of the Catchment.

	STRATEGY Determined By Stakeholder Survey	Recommended Actions For Implementation of Strategy	Cape York Regional Plan Management Actions Proposed By The Community
TR1	Tourism and recreational fishing is maintained at an ecologically sustainable level within the Catchment.	Recreational resources are identified and mapped and a management plan is developed for each area.	"Promote ecologically sustainable and culturally appropriate tourism that benefits local communities."
TR2	Encourage low impact recreational activities in the Catchment.		"Develop protocols for tourist operators (local community work together with tourist operators)."
TR3	Improve tourist information services through the Catchment.		"Develop orientation and interpretation materials for self-drive tourists."
TR4	Provide suitable facilities at established Recreational sites to meet visitors needs yet protect the sites.	Identify roads and other areas where infrastructure needs do not meet the growing tourism industry.	-"Identify for treatment high risk sites where tourist/camping facilities are impacting on water quality." -"Support improvements to visitor facilities that reduce environmental impacts (e.g. toilets and waste facilities)."
TR5	Implement a Catchment wide management plan for problems specific to recreational areas	Determine where infrastructure needs to be improved or access to critical areas should be limited via camping permits or road closures.	"Develop stronger permitting and compliance systems for when other methods don't work."

TABLE 4 (Cont.)			
	STRATEGY Determined By Stakeholder Survey	**Recommended Actions For Implementation of Strategy**	**Cape York Regional Plan Management Actions Proposed By The Community**
TR6	Encourage the development of a stakeholder advisory committee to steer future direction for tourism and recreation within the Catchment.	The Cape York Tourism Development Action Plan must be produced with full participation by all relevant sectors of the Catchment.	"Work with local community to develop a comprehensive and well-promoted natural and cultural tourism strategy."
TR7	Provide training and support for the development of appropriate tourism related businesses.	-Provide financial assistance for the development of tourism related businesses, particularly where landholders are financially impacted by the Vegetation Management Amendment Bill (Qld Bills, 2005). -Ensure that the appropriate training and business planning advice is available for members of the Catchment involved in tourism related businesses.	"The Catchment to be marketed and recognised as a desirable visitor destination."
TR8	Liaise and support Queensland Fisheries Service and Sunfish who manage recreational fishing.		

3.4 FISHERIES

Recreational Fishers on the Normanby River (Source: B. Lyons, QPWS)

The Laura-Normanby River system is a haven for recreational fisherman and the estuary supports a small commercial fishing industry. The aquatic habitats of the rivers support a diverse range of fish and crustaceans. There is a variety of wetlands associated with the Normanby River and these include mangroves, saltmarsh and claypans as well as seasonally inundated brackish-water wetlands. These wetlands form important fisheries' nursery areas. Target fisheries species include barramundi, grunter, mangrove jack, salmon, shark and mud crab. There is a commercial net fishery and a recreational line fishery for barramundi in the estuary of the Normanby River. The freshwater habitats of the Normanby River also support an important recreational line fishery.

In the past, Princess Charlotte Bay, where the Normanby discharges, has supported a prolific commercial fishing industry, with up to 50 prawn trawlers and 20 to 30 net fishers operating within the Bay in the 1970's and 80's. Princess Charlotte Bay is now zoned as a Special Management Area under the Great Barrier Reef Marine Park zoning regulations. No trawling is allowed within the bay and only a limited number (4) of net fishing permits have been issued. The Special Management Area does not include the river itself and there are no special restrictions on commercial fishing within the tidal reaches of the Normanby. There are currently 6 net fishers and 3 - 4 commercial mud crabbers working within the estuary (Ian McCollum, pers. comm., 2005).

There are no restrictions on the number of recreational fishers in the Normanby and there is no reliable catch data available for the recreational harvest from the River system. The only survey of recreational catch was conducted from 1986 - 1991 by Qld DPI&F. Anglers in the national park were asked by park rangers to fill out a voluntary catch card prior to departing. The results of the survey indicated that the recreational barramundi catch in the park ranged from 4.4 to 9.4 tonnes per annum and the average angler caught 1.26 barramundi per visit. The catch rate for anglers participating in the study steadily increased between 1986 - 1991 (Russell and Hales, 1993).

Apart from the harvest by local residents, increasing numbers of Queensland and interstate travellers visit Lakefield National Park each year. A trip into the National Park usually involves some recreational fishing. Although many visit during the winter months to catch barramundi, this is not the optimum time to catch this species.

QPWS rangers have seen no evidence of reduced fish populations in Lakefield National Park, despite the increase in visitor numbers. In fact, they believe that barramundi numbers have increased significantly since the national park was established in 1979. At that time, barramundi fishing usually resulted in a high catch of catfish- often 15 to 20 catfish per barramundi. Crocodile hunting ceased around 1974 and since then estuarine crocodile numbers in the Normanby have notably increased. It is believed that the increase of crocodiles feeding in the area has decreased the catfish population, which has allowed the barramundi population to thrive, bringing the ecosystem back into a more natural balance (Barry Lyons, pers.comm., 2005).

In order to protect this natural balance, there are some who would like to see the bag limit for barramundi in Princess Charlotte Bay and all of the streams of the Laura Basin, including the National Park, reduced from 5 to 2. In their submission for the Draft Rezoning and Management Proposals for Princess Charlotte Bay, the Endeavour Sportfishing Association states that; "We are particularly concerned with the "fill the freezer" mentality of many visiting anglers… The ongoing and increasing effect of this pressure is likely to be detrimental to both the local ecosystems and the future condition of the fishery. A possession limit of 2 would see a significant drop in overall numbers, but still allow visitors to keep a reasonable feed of fish."

The Endeavour Sportfishing Association has also proposed banning the use of set lines and stainless steel hooks in Lakefield National Park. The use of set lines is believed to cause significant mortality to non-target species such as freshwater turtles, waterbirds, and crocodiles. Stainless steel hooks, due to their long life span, do not disintegrate but are left dangling in the mouths of fish and can seriously harm the fish.

TABLE 5: LAURA-NORMANBY CATCHMENT AREA
FISHERIES STRATEGIES & RECOMMENDED ACTIONS

Goal: The continuation of a productive fisheries industry maintained through educated management decisions and a healthy catchment.

	STRATEGY Determined By Stakeholder Survey	Recommended Actions For Implementation of Strategy	Cape York Regional Plan Management Actions Proposed By The Community
F1	Promote education on aquatic and marine ecosystems and species breeding requirements.		
F2	Improve our knowledge base of the fishery's capabilities and potentials.	-Identify important breeding habitats in fisheries' resources. -Identify potential threats to fisheries' resources in the Catchment.	"Systematically survey fish and macroinvertebrate diversity and community structure throughout all major systems which were not adequately covered in CYPLUS."
F3	Collate and utilise information on Aboriginal traditional use and knowledge of fisheries.		
F4	Develop and implement a standard riparian zone protection and management plan.		-"Provide support (including through grants) to landholders to undertake measures to reduce impacts on and threats to riparian and aquatic habitats." -"Include management goals and monitoring methods specific to wetland and riparian management in Property Management Plans."
F5	Encourage links between recreational fishers and scientific research.	-Monitor recreational fish catch within the national park. Repeat the 1993 QDPI voluntary catch card survey for anglers visiting the park. -Determine if the bag limit for barramundi should be reduced based on a thorough evaluation of recreational fish catch data. -Ban the use of set lines and stainless steel hooks within Lakefield National Park and potentially the entire Catchment area.	

3.5 MINING

Historically, most mining ventures in the Laura-Normanby Catchment have focused on gold. Alluvial gold was discovered in the West Normanby River around 1876 (Denaro and Ewers, 1995). The Brothers deposit on the West Normanby River has been a major contributor for the approximately 18kg of gold recorded for the West Normanby River Area.

Mining is not currently a major industry in the Laura-Normanby Catchment. There are noticeably very few mines present in the Laura-Normanby Catchment compared with surrounding areas on Cape York (see Figure 5). Most of those recorded with the Department of Natural Resources and Mines are abandoned gold mines. Other abandoned mines include arsenic, sapphire, copper and gemstone mines (DNR& M website, 2005). The principal areas of operation are the upper reaches of the Normanby and Laura Rivers.

A large part of the catchment is classified as 'sterile'. This means that mining tenure over the land is excluded under the Mineral Resources Act, 1989 (Paul O' Sullivan, pers.comm, 2005). The majority of sterile land in the Catchment is within Lakefield National Park. All National Parks are excluded from mining unless a mining lease was present before the National Park was gazetted.

Reconnaissance sampling in the 1980's indicated that high grades of alluvial gold and significant platinum and palladium contents occur in the Laura River (Denaro and Ewers, 1995). An underground coking coal resource exists at Bathurst Range. A feasibility study has been undertaken to produce a mine plan for the production and export of this high grade coking coal (Denaro and Ewers, 1995).

There are at least two gold mines in the catchment that have been actively operating for the last 15-20 years (Graeme Elmes, pers. comm., 2005). Like all mining leases these mines must have an Environmental Management Plan (EMOS) before a mining lease is issued. This plan outlines a set of conditions regarding the impact, limitations and rehabilitation of the mining venture. Once a lease is issued and the mine is actively operating, inspectors from the EPA inspect the mine a few times a year to check that it meets the water quality, tailings and quarry guidelines.

As regulations tighten on other aspects of land use (such as agriculture), mining may become more of an economical option for some landholders.

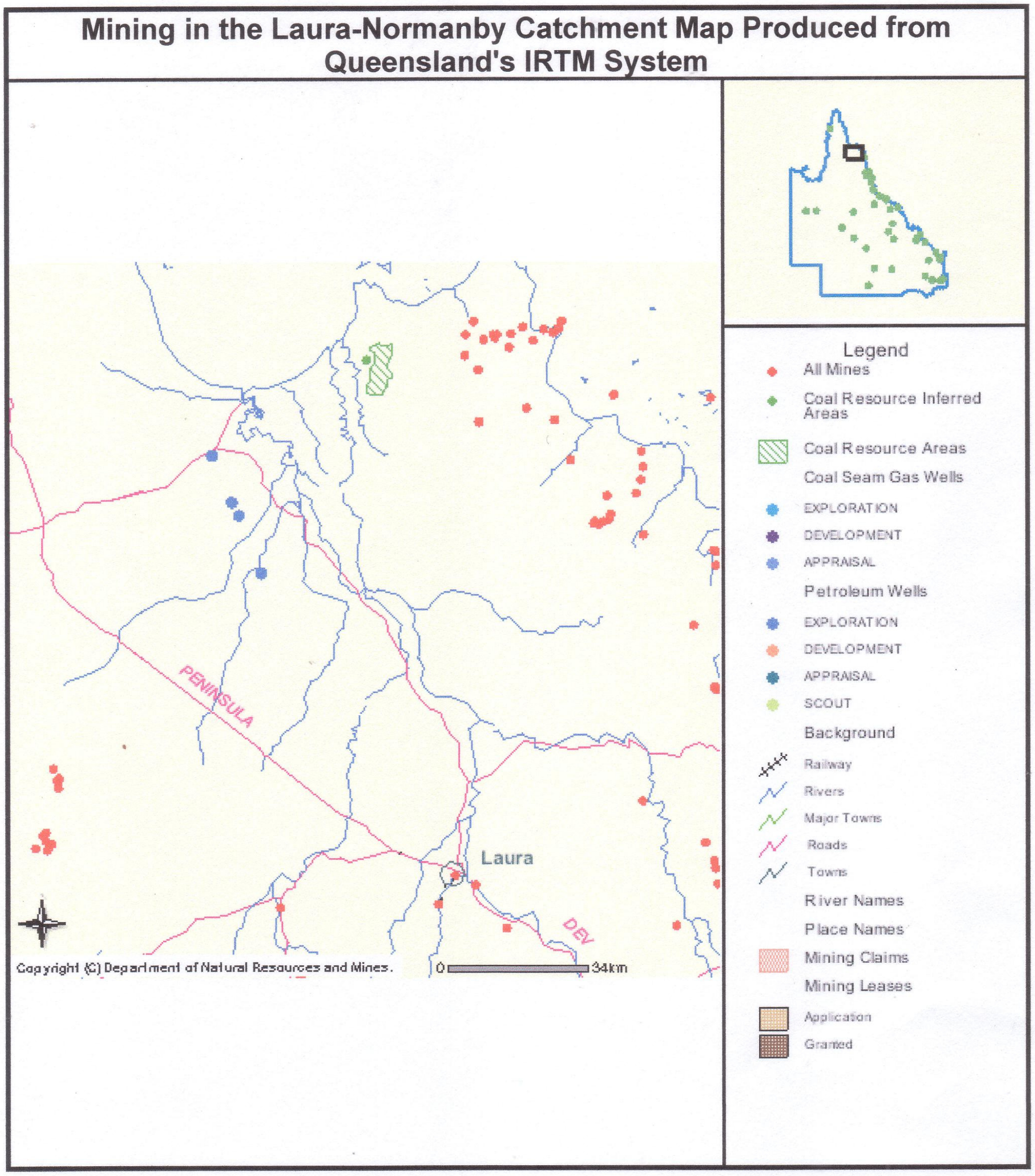

Figure 5: Catchment Mining Lease Locations

(Source: www.webgis.nrm.qld.gov.au/servlet/com.esri.esrimap 12/10/2005)

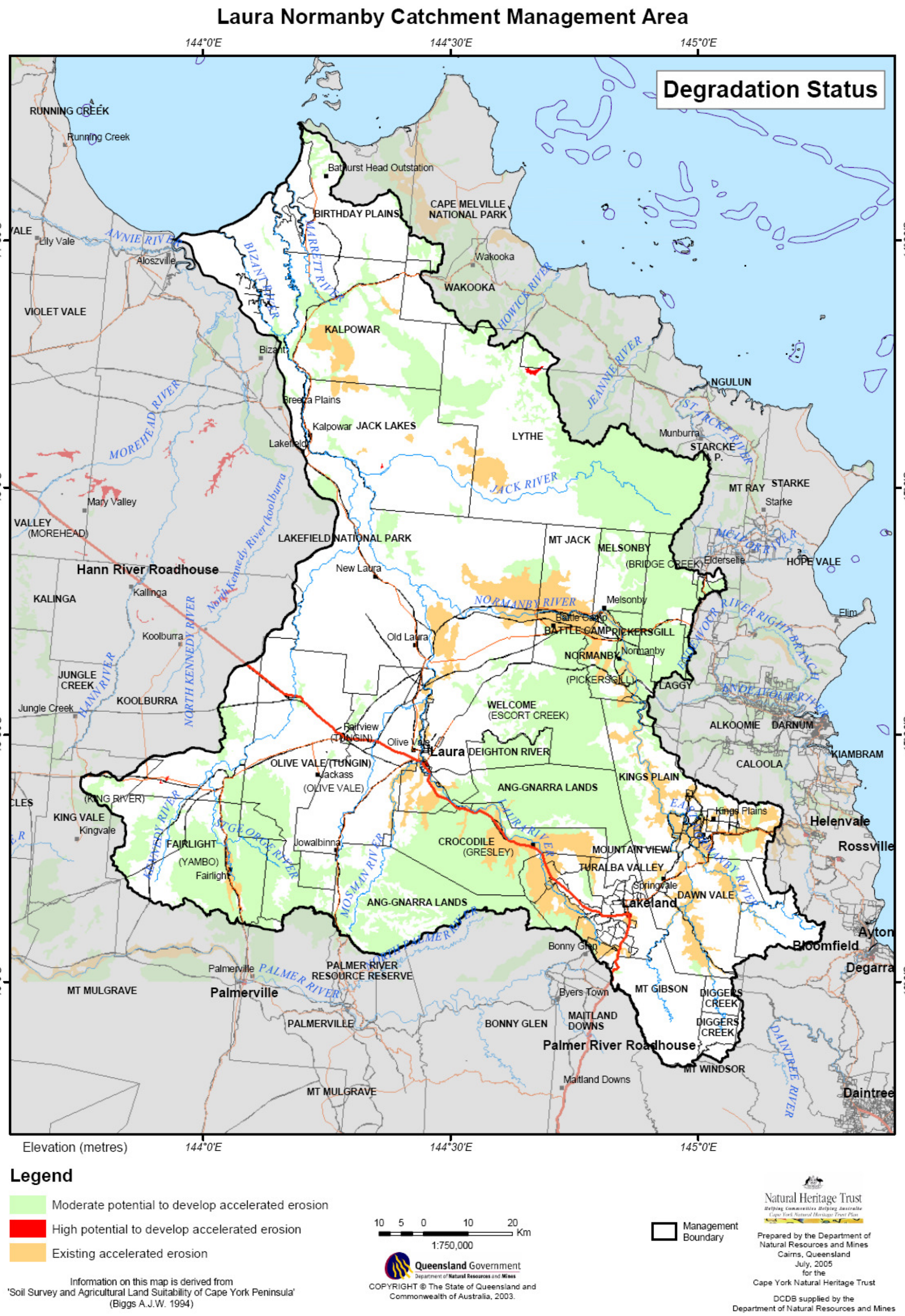

Figure 11: Existing and Potential Erosion Areas

SALINITY

The Laura-Normanby Catchment area has both naturally saline soils and landscapes that are susceptible to secondary salinisation. Secondary salinisation refers to soil salinity caused by human activities such as tree clearing or excessive irrigation. Tree clearing, or the flooding of soils with irrigation waters, can cause groundwater levels to rise, carrying salts from saline groundwater or subsurface soils to the surface. Salinity in soils can impede plant growth and can reduce the stability and permeability of soils, leading to increased erosion.

Naturally saline soils and sediments occur in the coastal plains of Princess Charlotte Bay and soils associated with the Rolling Downs Group and Hodgkinson Formation in the southern and eastern margins of the Catchment area. Naturally saline soils associated with these formations include the Victor and Gibson soil types, which are found intermittently along the Laura and Normanby Rivers. There is a moderate potential for secondary salinity issues to occur in regions where Victor and Gibson soils are found (Biggs and Philip, 1995).

The link between the soils of the Hodgkinson formation and secondary salinity has been seen at the Mareeba Dimbulah Irrigation Area, where highly saline groundwater is rising rapidly as a result of excessive irrigation (Biggs, 1995). Rising salinity can render soils unsuitable for agricultural and other uses. Irrigation within the Laura-Normanby Catchment area is primarily limited to the Lakeland Downs region, where the rapidly draining basaltic soils are not considered to be susceptible to secondary salinity. Salinisation is unlikely to be an issue so long as agricultural activities are limited to these soils. Any future expansion of agriculture into the surrounding Hodgkinson formation soils would increase the potential for secondary salinity issues to develop.

Figure 12 shows the areas with naturally saline soils and potential secondary salinisation issues.

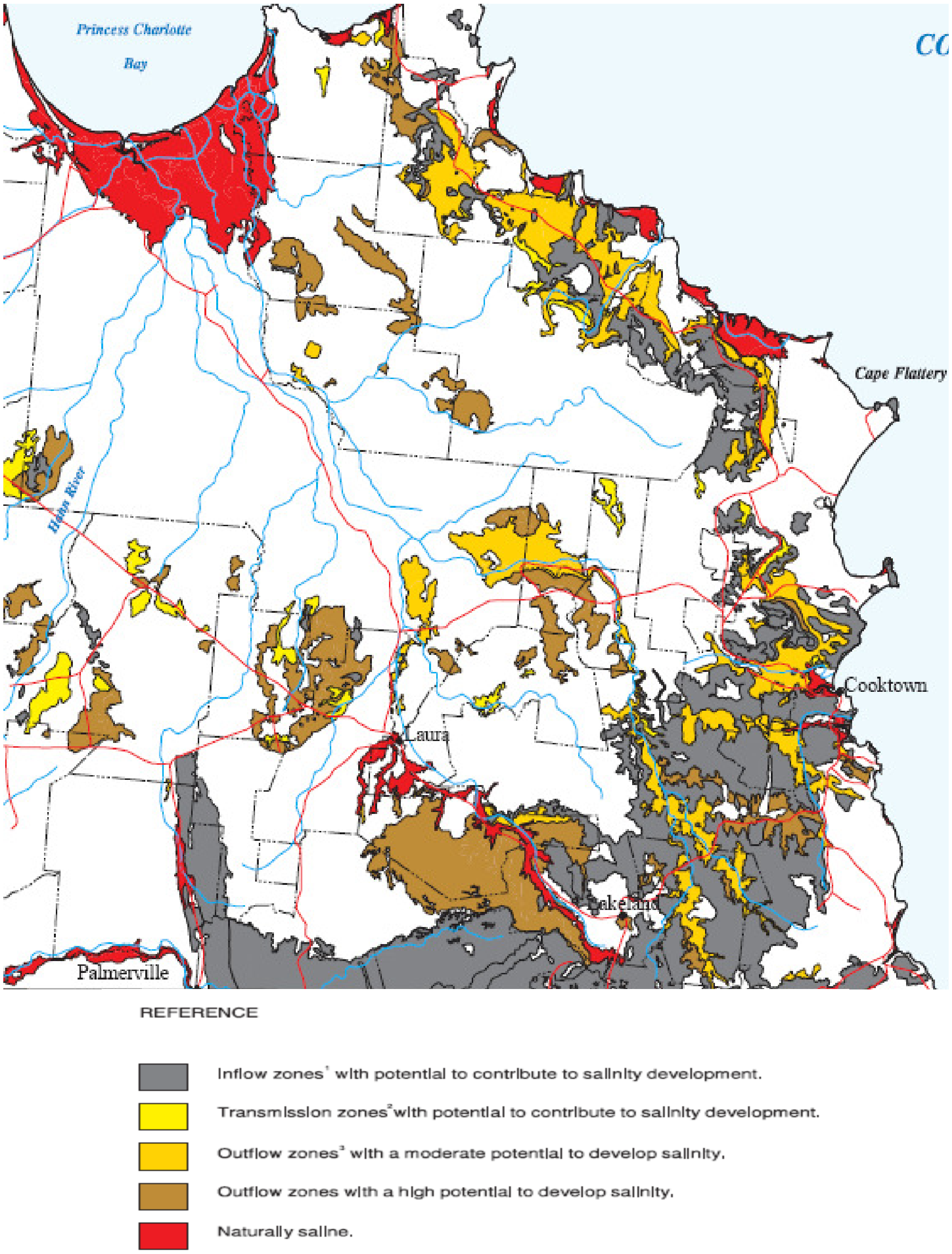

Figure 12: Laura- Normanby Catchment Salinity Hazard Map

Source:

Soil Survey and Agricultural Land Suitability Assessment

A.J.W. Biggs & S.R. Philip, 1994

Queensland Department of Primary Industries

This map was compiled using information sourced from NR02, and additional data gathered by C.M. Hill, P.R. Wilson and A.D. Stallman (QDPI). It is not a comprehensive statement on salinity hazard, being based on reconnaissance survey information only, involving air photo interpretation and ground observations of the order of one observation per 82 km^2. The map does not indicate that salinity will definitely occur in these areas, but rather that a potential exists, and further investigation is required.

MANAGEMENT RECOMMENDATIONS

Any earthworks conducted within the Catchment need to take into account the local soil type and the inherent erodibility of some soils. Road construction should include proper cross or side drainage structures that do not allow for the concentration of large volumes of water into a few vulnerable points. Surface water and sediment runoff should be managed both during and after construction works. Significant erosion areas should be identified and addressed through engineering controls.

Drainage control improvements on the Lakeland - Laura Road

The primary recommendations for salinity management in relation to the Laura-Normanby Catchment are the utilisation of tree clearing regulations and proper management of irrigation, including the removal of excess water (Biggs, 1995). Tree clearing is not considered to have been a major issue in the Catchment previously and the Vegetation Management and Other Legislation Amendment Bill (Qld, 2005) will prevent broadscale clearing of remnant vegetation in the future. Although this legislation has been opposed by many Cape York landholders, the clearing of any vegetation does need to be carefully managed, particularly in erosion prone or saline soils and on hillslopes. Future agricultural expansion and irrigation practices must also consider the soil salinity potential of the Hodgkinson formation.

TABLE 11: LAURA-NORMANBY CATCHMENT AREA
LAND DEGRADATION STRATEGIES & RECOMMENDED ACTIONS

GOAL: To arrest land degradation in the Catchment area through the improvement of land use planning and management practices

	STRATEGY Determined By Stakeholder Survey	Recommended Actions For Implementation of Strategy	Cape York Regional Plan Management Actions Proposed By The Community
LD1	Prepare educational material highlighting the causes and consequences of land degradation.		"By 2006, assess the impacts to human health and environmental impacts (including downstream effects) of unsealed roads on the Peninsula."
LD2	Identify and promote best management practices in catchment resource management.	Significant erosion areas should be identified and addressed through engineering controls. Future earthworks conducted within the Catchment need to take into account the local soil type and the inherent erodibility of some soils.	"Compare current and historical evidence of erosion, identify priority problem sites and develop a management and remediation strategy."
LD3	Encourage land managers to monitor newly cleared land and earthworks.	Land managers should monitor earthworks conducted in the Catchment to ensure that best management practices are implemented to minimise soil erosion during and after earthworks.	
LD4	Develop the ability to make land management planning decisions based on assessment of land suitability and capability.	Future agricultural expansion and irrigation practices must consider the soil salinity potential of the Hodgkinson formation.	"Restrict vehicle access in some areas, and rationalise track numbers in priority areas."
LD5	Support and encourage land managers to increase their skills and share their knowledge of natural resource management.		
LD6	Support management practices, training and information that addresses land degradation and sustainable production.		

4.5 FIRE MANAGEMENT

Fire in the Laura-Normanby Catchment has been a significant part of the Catchment's history and will continue to occur whether lit naturally, accidentally or deliberately. The vegetation patterns of eucalyptus forest and woodland vegetation types are susceptible and adapted to fire and some flora depend on fire for germination. Fire also plays a vital role in land management within the Catchment, although there are contradictory opinions on the best methods of fire management.

The deliberate or accidental starting of wildfires is a common problem in the Laura-Normanby Catchment. This issue must be addressed by raising the awareness of all stakeholders and visitors of fire prevention methods, the danger of wildfires, and the impact of wildfires on the environment. Ensuring that firebreaks are in place across the Catchment is the best protection against the spread of wildfires. Due to the prevalence of accidental or deliberately lit fires, QPWS rangers state that they have no choice but to do proactive burning to reduce the threat of wildfires (Andrew Hartwig, pers. comm., 2005).

Fire is considered by many to be a valuable tool for resource management. Burning is used by QPWS rangers as a means of maintaining the balance between grasslands and woodlands and is considered to be the most effective method of controlling weeds such as rubber vine. Pastoralists utilise fire to promote productive pasture growth. Traditional indigenous burning is also conducted as a means of managing resources. Controlled burning can be used to reduce fuel loads and to create fire breaks, thus reducing the intensity and potential damage done by wild fires. Landholders can also use fire to encourage better pasture growth or to remove rank grass. Some grasses, such as bladey grass, have to be burnt on a regular basis to be useful for cattle grazing. Other grasses should not be burnt on a regular basis, or not at all, provided that, with local experience, a stocking rate can be maintained so as to achieve the correct balance between feed volume and stock numbers.

The frequency and timing of controlled burning are two of the most important factors to be considered in fire management. Some fire research indicates that it is not the intensity but the frequency of fires that is most likely to impact wildlife. According to some resource managers, burning every two to five years is necessary to avoid the intense wild fires that can be destructive to vegetation and wildlife. Burning early in the year, after the first wet season rains, is used by some graziers to promote pasture growth, and has been used traditionally to attract wildlife for hunting purposes. "Storm" or wet season burning is used in the National Park to create firebreaks for controlled burning later in the year. However, there is some belief that continued early burning and overstocking in some areas, has lead to sucker growth and a thickening of vegetation in the Catchment area. Regrowth from early burning can also attract cattle and feral animals into the national park (Andrew Hartwig, pers. comm., 2005).

Different ecosystems require different fire management regimes. In general, small burns conducted year round on a rotational basis, so that the same area is not burnt each year, are considered to be the best management practice (Andrew Hartwig, pers. comm., 2005). This type of burning can help to maintain the age class structure for flora and fauna and one year's burning can create a firebreak for burning in adjacent areas the next year. Unfortunately, this method of burning is not always possible due to the time and costs of conducting controlled burning.

Aerial ignition is a valuable tool in preventative burning strategies. This low intensity burning is normally carried out during the day to self extinguish during the night, leaving burnt strips for firebreaks. Major roadways are targeted to lessen the possibility of tourists' visits causing wild fires. Aerial burning can be carried out very economically covering extensive distances in a short time. For example, three hours aerial burning would take five days of ground burning and at a much cheaper cost (based on aircraft costs $360 per hour approx). Property owners are subsidised if they are members of a registered Rural Fire Brigade.

One of the most useful advances in fire management is fire mapping via satellite, such as that conducted by the CRC Tropical Savannahs. The website, www.firenorth.com.au, presents satellite imagery showing where any fires are burning in Qld, Northern Territory, and Western Australia. By viewing the fire maps at this site, land managers can see where current fires are burning on their own land and surrounding areas, as well as what areas have been burnt in previous years. This information can be used to coordinate burning over large areas and across boundaries, to ensure the same lands are not burnt consecutively and to assess the success of firebreaks and other fire management practices.

The Cape York Peninsula Development Association (CYPDA) has previously organised annual fire management meetings for the Laura-Normanby Catchment area in order to coordinate burning within the Catchment. Coordination of burning among neighbouring properties is necessary to create firebreaks to stop the spread of wildfires across the Catchment area. However, the choice of when and if to burn is up to each property owner. In some cases, graziers choose not to burn at all during dry years in order to save what little grass exists. This increases the risk of wild fire and can also lead to cattle moving onto adjacent properties (such as Lakefield National Park) where early burns have been conducted.

Under the *Queensland Fire and Rescue Authority Act 1990,* fire on a property is deemed the owner's responsibility to control, contain and extinguish. The Rural Fire Service (RFS), formed under the *Queensland Fire and Rescue Authority Act 1990,* provides volunteers with equipment, training, research and fire safety programs. Permits for controlled burning must be obtained from the regional Fire Warden, appointed by the RFS.

Research into both the traditional use of fire by indigenous Australians and the best fire management practices for current land use is ongoing. Traditional burning practices are being documented and demonstrated as part of the Traditional Knowledge Recording Project (TKRP). The northwestern corner of the National Park, an area under Native Title claim, is one of the traditional burning demonstration areas. Aboriginal elders from this area are monitoring the effects of traditional burning in comparison to the methods used on neighbouring lands. They believe that there is a lack of understanding of the complexity of traditional burning methods in the area and that their knowledge and experience in the use of burning for resource management has largely been ignored (Victor Stephenson, pers. comm., 2005). As part of the TKRP, a massive database of traditional burning methods is being developed, and much of the information will be available by the end of 2005 at www.TKRP.com.

Communication between the various landholders within the Catchment is critical for successful land management. Through a cooperative approach to developing and implementing burning regimes, fire can be used for conservation, hazard reduction and to maximise pasture productivity. These differing values and land uses do not have to be mutually exclusive. A sharing of knowledge between all landowners, including graziers, QPWS and traditional owners is necessary for the best management practices to be identified and implemented across the Catchment.

Coordination of burning practices needs to be conducted by landowners and/or the Rural Fire Service members. Most landowners do not have the time to set aside for meetings and planning; however, management of burning on a catchment scale does need to occur. Landowners should plan a schedule for coordinated burning. The joint planning should include a local schedule for proactive controlled burning, as well as a plan for how to react to uncontrolled wild fires. Training and resources need to be available to all landowners so that landowners can identify and implement the most effective burning practices for their properties.

TABLE 12: LAURA-NORMANBY CATCHMENT AREA
FIRE MANAGEMENT STRATEGIES & RECOMMENDED ACTIONS
Goal: A cooperative and educated approach to best fire management practices.

	STRATEGY Determined By Stakeholder Survey	Recommended Actions For Implementation of Strategy	Cape York Regional Plan Management Actions Proposed By The Community
FM1	Promote education of community and visitors in fire prevention methods and the danger of wild fires.	Prepare fire prevention and education pamphlets.	
FM2	Promote landholder awareness and implementation of best management practices for burning.		-"Prepare a Cape York Peninsula Fire Management Strategy, consistent with the Northern Australia Fire Management Strategy." -"Provide input on fire regime requirements into the development of recovery plans for threatened species and communities." -"Support the implementation of appropriate fire regimes for the maintenance of regional ecosystems (including riparian vegetation)."
FM3	Investigate the impacts of fire in land degradation issues.		
FM4	Continue to compile information on best management practices specific to the varying vegetation types and landuses within the Catchment.	Support the maintenance of grassland communities through best practice fire management.	-"Collate information on the fire regimes and broad management requirements for the maintenance of regional ecosystems." -"Collect information on indigenous burning and incorporate into management plans as appropriate." -"Continue funding and support for Cape York Peninsula Sustainable Fire Management Project."
FM5	Provide support for vegetation mapping and controlled burning as part of property management planning.		-"Promote the use of fire as a property management tool, e.g. for control of woody weeds." -"Support all stakeholders with the development of management plans by providing input on fire regime requirements for the maintenance of regional ecosystems."

TABLE 12 (Cont.)			
	STRATEGY Determined By Stakeholder Survey	**Recommended Actions For Implementation of Strategy**	**Cape York Regional Plan Management Actions Proposed By The Community**
FM6	Encourage further liaison between the Rural Fire Service, landmanagers, property owners and the indigenous community.	-Encourage better communication, a sharing of knowledge, and coordination of burning techniques across the Catchment. -Engage a local coordinator to set up a local burning schedule and organise training and access to other resources for landowners.	

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APPENDIX A

LANDCARE GRANTS AND OTHER SUPPORT FOR LANDHOLDERS

Landcare Grants and other support for landholders

Compiled by the Peninsula Pastoralist Landcare Committee

Introduction

This information has been collated by the Peninsula Pastoralist Landcare Committee (PPLC) for land managers on Cape York Peninsula. The information presented is as provided by the grant organization and in providing this information the PPLC is not necessarily promoting any scheme, just making the information available for the consideration of individual landholders. This information sheet will be regularly updated by the PPLC. Please contact the Landcare Facilitator (Wendy Seabrook) for more information on these and other grants (40695046 or wendy.seabrook@bigpond.com)

Grants landholders can apply for themselves

Australian Government Envirofund

The Australian Government Envirofund is the local action component of the Australian Government's $3 billion Natural Heritage Trust. It helps communities undertake local projects aimed at conserving biodiversity and promoting sustainable resource use.

Community groups and individuals can apply for grants of up to $30,000 (GST inclusive) to carry out on-ground and other actions to target local problems. Grants of up to $50,000 (GST inclusive) will be considered where the magnitude, complexity or public benefit of the project is such that additional funding would be beneficial.

Exact timing of the Envirofund Round, which will have $20 million on offer, has to be decided but it is likely to be in the September/October 2005 with a closing date in February 2006.

Envirofund Hotline on 1800 303 863. www.nht.gov.au/envirofund

Cultural Heritage Projects Program

Organisation: ENVIRONMENT AUSTRALIA
Program: CULTURAL HERITAGE PROJECTS PROGRAM (CHPP)
Address: Heritage Assistance and Projects Section, Australian and World Heritage Group
PO Box 787, Canberra, ACT 2601
Telephone: 1800 653 004 or (02) 6274 1111
Email: chpp@ea.gov.au or haps@ea.gov.au
Internet Address: http://www.environment.gov.au/heritage/general/grants.html

The program supports the conservation of places of cultural significance – built and indigenous heritage. Funding will predominantly be for on-ground works. Available: $10 000 to $250000
Open to private owners, not-for-profit organisations and local government authorities
Deadline: April each year.

Other Incentives/Assistance available to landholders

Green Reserve

Organisation: AUSTRALIAN CONSERVATION VOLUNTEERS
Program: GREEN RESERVE
Contact: Kay Sheehan or Mark Dwyer
Telephone: 40320844
Internet Address: www.conservationvolunteers.com.au

This program, and 'Better Earth' below, is run by Conservation Volunteers Australia, Australia's largest practical conservation organisation managing more than 2000 conservation projects across Australia each year. Green Reserve is a conservation program for volunteers over the age of 35 years, who are in receipt of the full Newstart allowance. The commitment is for 30 hours per fortnight (two days per week). Project has to have a community benefit, however this does not exclude work on private property if it is a landcare approved project. Participants may receive training in first aid, OH&S and project related technical skills.

Better Earth

Organisation: AUSTRALIAN CONSERVATION VOLUNTEERS
Program: GREEN RESERVE
Contact: Kay Sheehan or Mark Dwyer
Telephone: 40320844
Internet Address: www.conservationvolunteers.com.au

Conservation Volunteers Australia can assist your landcare project by involving the community in managed teams of volunteers. Better Earth projects usually run for five days Monday to Friday, and also on weekends. A program can be developed to achieve your landcare priorities.

Conservation Volunteers Australia provides:	Project Partner provides:
Team Leader to manage the volunteers	Project planning and preparation
Recruitment of volunteers	Materials required
Conservation Volunteers Australia vehicle	All specialised tools and safety equipment
Administrative support and insurance coverage	Accommodation
Hand tools and First Aid equipment	
Food for the volunteers	

Conservation Volunteers Australia is a not-for-profit organisation. This is not a free program but the volunteers pay to take part and CVA can access corporate funding to help cover costs for the teams.

Environmental Management Systems Incentives Program

The EMS Incentives Program encourages the adoption of sustainable management practices through a cash reimbursement for activities associated with the development and implementation of an Environmental Management System (EMS). The program provides a cash reimbursement of 50% of costs up to $3,000 to eligible primary producers. Therefore if you spend $5,000 you will get $2,500 back or if you spend $6,000 you will get $3,000. However, if you spend $10,000 you will only get $3,000 back!

Who is eligible for the EMS Incentives Program?

- **The applicant must be an Australian resident, or be a business registered in Australia;**
- **The applicant must be a primary producer as defined by the Australian Taxation Office;**
- **The applicant must have the authority to represent the primary production enterprise;**
- **The primary production enterprise must have a taxable income of less than $45 000; and**
- **There must be a plan in place for the primary production enterprise that documents essential EMS elements and is consistent with existing Catchment/Regional plans. It is not necessary to have a certified EMS in place.**

While this scheme is primarily for EMS, advice to PPLC from the Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF) has indicated that there is flexibility in what Centrelink see as 'environmental plans'. We have been told that properties with Property Plans, Weed and Pest Plans, undertaking the $avannah Plan (GLM+ program), or similar planning programs can apply for funding through this incentive scheme. However the landholder will be still required to show that the planning work is consistent with existing Natural Resource Regional Plans, catchment plans and local council plans. Landcare staff can help you with this section of your application.

Here's some examples of the activities the Incentives Program will pay for:

- **obtaining professional advice to help develop an EMS, including assessment of environmental impacts and biodiversity, mapping of salinity, environmental monitoring, assessment of water quality, surface and groundwater flow;**
- **establishing trees and shrubs for salinity control, to stabilize or prevent erosion and as windbreaks;**
- **fencing to exclude stock or vermin; establish or protect native vegetation and wildlife habitat; protect remnant vegetation; or to separate land classes; and**
- **eradication/extermination of weeds or pests that are detrimental to the land.**

For further information www.daff.gov.au and www.centrelink.gov.au. Both sites use the search option to find -EMS Incentives Program. Phone free call: 1800 050 585

Wildlife Refuges

A nature refuge is a voluntary conservation agreement between a landholder and the Queensland Government that leads to the establishment of a nature refuge. A nature refuge is a category of protected area under the Nature Conservation Act 1992.

Each agreement is tailored to suit the management needs of the particular area and the needs of the landholder. In most cases, the agreement allows for the ecologically sustainable use of natural resources to continue. A nature refuge can cover part or all of a property protecting wildlife and wildlife habitat and emphasising the conservation of biodiversity as an important part of property management.

More than 95 landholders across Queensland manage nature refuges on their properties, protecting rare and threatened ecosystems, plants and animals, while maintaining and enhancing property enterprises as diverse as grazing, cropping, horticulture and ecotourism. If you think your property has outstanding value for native plants and animals, you might consider negotiating a conservation agreement to create a nature refuge and further contribute to the conservation and protection of Queensland's biodiversity.

For more information: www.epa.qld.gov.au/nature_conservation/nature_refuges

Financial incentives for nature refuges

1. **Transfer duty reimbursement**

Purchasers of land who enter into a Conservation Agreement with the Environmental Protection Agency (EPA) to protect its conservation values are eligible for a reimbursement of the transfer duty paid on the purchase of the land.

Eligibility:

- **Land must be purchased on or after 1 July 2003;**
- **The land must include vegetation, plants or animals that are considered by the EPA to be of a high conservation value. Potential buyers are urged to consult with their local EPA office for advice on the conservation values of the land;**
- **The landholder must enter into negotiations with the EPA to establish a Conservation Agreement with the EPA to create a Nature Refuge over part of or all of the land within 12 months of the purchase;**

Once the Conservation Agreement is finalised, the EPA will reimburse the landholder for the transfer duty paid on the purchase, or on a pro rata basis if the Conservation Agreement is over part of the land.

Contact: Nature Refuge Project Officer Environmental Protection Agency Ph. (07) 3225 1740 Office of State Revenue http://www.osr.qld.gov.au/taxes/duties/transfer.htm

2. **Land tax reimbursement**

Landholders who are liable too pay land tax on properties who enter into Conservation Agreements with the Environmental Protection Agency (EPA) are eligible for a reimbursement of land tax payable on land subject to the agreements.

Eligibility:

- **Landholder must fulfil the criteria to pay land tax;**
- **The land must include vegetation, plants or animals that are considered by the EPA to be of a high conservation value. Landholders are urged to consult with their local EPA office for advice on the conservation values of the land;**
- **The landholder must enter into a Conservation Agreement with the EPA to create a Nature Refuge over part of or all of the land.**

Once the Conservation Agreement is finalised, the EPA will reimburse the landholder for the land tax payable on the property, or on a pro rata basis if the Conservation Agreement is over part of the land. Also, if after the 30 June, a landholder enters into a Conservation Agreement in respect of land on which land tax has been paid for that year, the landowner will be eligible for a reimbursement of land tax on a pro rata basis for the period from the date the Conservation Agreement is finalised to the end of that financial year. Contact: Nature Refuge Project Officer Environmental Protection Agency Ph. (07) 3225 1740 Kevin Vinter - Land Tax Branch Office of State Revenue Ph. (07) 3227 6014

http://www.osr.qld.gov.au/taxes/land/index.htm

Conservation Covenants

What is a conservation covenant?

A conservation covenant is a voluntary agreement between a landowner and an authorised body to help the landowner protect and manage the environment on their property. It is usually registered on the title of the land and can apply to all or part of a property. Although there are exceptions, it is usually permanent. The terms of the agreement are negotiated between the landowner and the covenant provider and may only be changed with the agreement of both parties.

<u>Protecting natural and cultural values</u>

Conservation covenants are designed to protect the natural values of an area such as its native vegetation, wetlands, wildlife and related habitat, and areas of cultural significance. They can also include areas that have been rehabilitated. Covenants are not about stopping the use of an area, but ensuring that any use is compatible with the natural values to be looked after. A management plan would typically be prepared by, or in consultation with, the landowner, setting out practical strategies to make sure the natural values are protected. For example, the plan may include details of how weeds and pest animals are to be managed, or how and when controlled burning may occur.

<u>Assistance</u>

In entering into a conservation covenant, landowners may be able to access assistance such as:

- **specialist technical advice, e.g. mapping vegetation and**
- **fauna surveys;**
- **assistance with management costs;**
- **tax deductions;**
- **rate relief; and**
- **reimbursement for establishment costs.**

<u>Technical Advice</u>

The amount of technical advice and assistance available to landowners varies between covenanting scheme providers. Please contact the provider in your State for details (see the organisations listed at the back). Some schemes have budgets to assist with management costs (such as fencing), while others may have arrangements with volunteer and other groups to assist with on-ground works such as revegetation or pest control. Some State and local governments offer rebates on council rates to landowners who enter into conservation covenants. Other forms of financial assistance, such as those provided by the Queensland Vegetation Incentives Program, can include payments for entering into a conservation covenant and/or payments to cover management costs.

Tax arrangements

In some cases, tax concessions may be available to landowners entering into a perpetual conservation covenant. These concessions include:

1. An income tax deduction for any decrease in land value as a result of entering into a conservation covenant,

providing that:

- **the covenant is entered into on or after 1 July 2002;**
- **the land is owned (not leased);**
- **no money, property or other material benefit is received**
- **for entering into the covenant;**
- **the decrease in the market value of the land is over**
- **$5,000, or the land was acquired not more than**
- **12 months before entering into the covenant; and**
- **the covenanting organisation is eligible*.**

2. Special treatment of capital gains tax where a conservation covenant is entered into, and the landowner receives money or property for doing so. This treatment ensures a comparable treatment with landowners who sell part of their land.

A factsheet on tax arrangements for conservation can be found on the Australian Government Department of the Environment and Heritage website at http://www.deh.gov.au/ land/publications/covenants/index.html or obtained by phoning the Community Information Unit on 1800 803 722.

The Australian Taxation Office also has information on conservation covenant concessions on their website at http://ato.gov.au/nonprofit/content/19507.htm. For information on Conservation Covenants in Queensland contact either your local DNRM or EPA office for more information.

Land for Wildlife

Land for Wildlife is a voluntary, non-binding program which encourages and supports landholders to provide habitat for native plants and animals on their property. It is a free, voluntary program, and landholders can leave at any time. The program offers landholders a variety of benefits which include: free advice and assistance on managing wildlife habitat with other land uses , recognition and support for your contribution to nature conservation in Queensland , opportunities to share ideas and experiences through the Land for Wildlife network and publications.

The program is designed for any landholder who has natural areas of vegetation like rangelands, vegetation along watercourses, or shelter belts. All types of small and large properties are eligible for Land for Wildlife status, such as farms, bush blocks, parks, school grounds – even golf courses and cemeteries. Land can be government owned or owned by individuals, organisations, and community groups.

Landholders can also get together with a group of neighbours and join Land for Wildlife to conserve habitat for a particular species of native animal, or to manage natural vegetation across properties or catchments.
How to apply

Once your property is registered with Land for Wildlife, you will receive an attractive sign and certificate to recognise your efforts. You will also receive professional information, support and advice on conserving native plants and animals, as well as solutions to environmental and wildlife management problems.

For more information, contact: Katherine Sinclair-Smith, Land for Wildlife Coordinator, (07) 4921 4820, email: ksinclairsmith@qld.greeningaustralia.org.au

Loans for Landcare

Concessional loans for landcare activities are available through the Primary Industries Productivity Enhancement Scheme (PIPES). QRAA administers the scheme with the assistance of the Department of Natural Resources and Mines (NR&M) and the Department of Primary Industries and Fisheries (DPI&F).

Activities eligible for loans

- Reclaimation of degraded areas
- Water supplies and irrigation
- Pest, plant and animal control
- Vegetation management
- Machinery that is to be used exclusively for landcare purposes
- Soil erosion control
- Salinity prevention and control
- Effluent management

Eligibility criteria

The approval of a PIPES loan for landcare is not subject to a means test. Applicants must have sound prospects for commercial viability in the long term and normally derive their major source of income from the enterprise. They should be in full-time working occupation of the enterprise as owner operator or as part of a small family company or partnership.

Terms and conditions

Landcare Loans are provided at concessional rates of interest with no additional fees or charges associated with the loan. Current interest rates can be obtained by phoning QRAA on Freecall 1800 623 946 or by visiting their website www.qraa.qld.gov.au.

Loans are provided for the total cost of a project (less labour provided by the property owner). The maximum loan available is $100 000 per annum, up to a cumulative total of $300 000. Loans are available for a maximum of 20 years.
For further information contact the local office of the Department of Natural Resources and Mines or QRAA on Freecall 1800 623 946. Information is also available on the QRAA website at www.qraa.qld.gov.au.

Grants for community groups and landholders

While individual landholders can not apply for these funds directly, the PPLC can put applications in on behalf of landholders. Joint applications which involve neighbouring properties are likely to be more successful and projects which can demonstrate benefits to the community as a whole in relation to environmental improvements.

Community Natural Resource Awareness Activity Grants

The Community Natural Resource Awareness Activity Grants are offered to Landcare, and other community natural resource management (NRM) groups to develop small, innovative and creative promotional projects in partnership with community, school, youth or business groups, and / or local government.

These grants are intended to take an entertainment, educational or cultural approach to strengthening the community's awareness and involvement in sustainable NRM in Queensland.

In 2005 grants were up to $2,500. Next round late 2005. For more information phone 07 3239 3860 or www.nrm.qld.gov.au/community

Australian Water Fund Communities Program

$200 million will be available over the next 5 years for Community Water Grants funding of up to $50,000 to save and protect water resources through practical on-the-ground work.

What sorts of projects will Community Water Grants fund?
It will be important that projects: are community orientated and have public benefits; involve practical on-ground works to save or protect water resources; and comply with relevant planning, health and environmental regulations and or guidelines. In relation to landcare there will be funds for Surface and Groundwater Health. These are projects that improve surface or groundwater health, such as erosion control, creek and riverbank repair, or cleaning up a local creek or wetland, and projects that reduce pollution in rivers, groundwater or coastal areas.
Grant recipients may include community groups, schools, local government, Catchment Management Authorities and non-government organisations.

The first open call for grant applications is expected in June 2005. Grants will be assessed on a nationally competitive basis.

Further information will be made available on the Australian Government Natural Resource Management web site (www.nrm.gov.au) as it becomes available. Further queries can be directed to cwg@deh.gov.au or free call 1800 780 730.

Communityhelp Grants

These grants, provided by NRMA support community organisations that help reduce risk in the areas of crime and injury prevention, emergency rescue services, and the environment, Community and not-for-profit organizations can apply for grants of up to $5,000. For more information email Daniel.Musson@iag.com.au

Gambling Community Benefit Fund

Gambling Community Benefit Fund aims to develop, strengthen and enhance the capacity of community organisations to provide community services and activities through one-off grants. A maximum of $30,000 usually applies. Applications close 30 June 2005. For more information Ph 1800 633 619 or 3247 4284 or email gcbf@treasury.qld.gov.au

Junior Landcare Grants Program

These small grants offered by Landcare Australia and Mitre 10 aim to provide funds for schools and youth groups across Australia wishing to participate in environmental projects that encourage ownership through involvement. Applications close around May and further information is available from www.landcareaustralia.com.au or 1800 151 105.

Threatened Species Network Community Grants

The TSN Community Grants have been established to support and inspire community work to recover threatened species and ecological communities. The grants aim to provide seed funding to assist community groups to take on long term responsibility for conservation and recovery of populations of nationally threatened species and ecological communities. Applications are invited from incorporated community groups for funding of up to $50,000 for projects to conserve nationally threatened species and ecological communities. Further information is available by phoning 1800 032 551, email tsngrants@wwf.org.au or online at www.wwf.org.au. Applications close midyear.

Bundaberg Rum Bush Fund

Landcare and other community groups, tackling water quality projects, are invited to apply for a Bundaberg Rum Bush Fund grant (between $1,000 - $5,000). Landcare Australia and Bundaberg Rum will assess proposals, based on environmental and community merits, and allocate grants each year.

Funding timetable 2004 - 05:

- **31 October 2004 - Applications for Murray Catchment grants close;**
- **31 March 2005 - Applications for national small grants close.**

Grant applications must address water quality issues within the local area. This may be within a river, lake, stream, creek, or as part of the wider catchment. (Please see Grant Guidelines for further information on how to apply for a Bundaberg Rum Bush Fund grant.)

For more information www.landcareaustralia.com.au

BHPBilliton Community Support Program

Contact: Community Programs Co-ordinator, BHP Billiton Community Trust, GPO Box 86A
MELBOURNE VIC 3001, Telephone: (03) 9609 3770, Fax: (03) 9609 3244, Email: Melinda.buckland@BHPBilliton.com, Internet Address: www.bhpbilliton.com

Funding for a wide cross-section of community organisations conducting programs and providing services including environmental programs directed towards sustainable development and the conservation of native flora and fauna. $20 000 - $150 000
Eligibility: See website
Deadline: 1 March, 1 August, 1 November

Myer Foundation

Contact: Executive Officer
Address: 44th Floor 55 Collins St, Melbourne, VIC 3000, Telephone: (03) 9207 3040, Fax: (03) 9207 3070, Email: enquiries@myerfoundation.org.au, Internet Address: www.myerfoundation.org.au

To fund initiatives in community welfare, environment (see below) and the arts etc. with an emphasis on innovation and social development
$ Available: No upper limit
Eligibility: Incorporated/non-profit and indigenous organisations
Deadline: 14 July
Must show:

- **Evidence of Incorporation as a not-for-profit body**
- **Income Tax Exempt Charity ("ITEC")- please supply copy of the ATO notification letter**
- **Evidence of Deductible Gift Recipient (if applicable) - please supply copy of the ATO notification letter**

Natural Environment

The Myer Foundation will support work that provides solutions to **environmental problems in Northern Australia.** This region includes **Cape York Peninsula**. Priority will be given to projects that include cultural, social and economic links that provide long term solutions

G4 Fund

The G4 Fund supports dynamic community-based projects in the priority areas of **Environmental education**. Please note that "youth" is defined as those in the 12 to 25 year age bracket. The G4 Fund makes grants of up to $25,000

Need Further information?

This fact sheet will be updated regularly when more incentives become available. If you want any advice or assistance with applying for these grants contact:

Wendy Seabrook
Landcare Facilitator
PO Box 3 Cooktown
Q 4895
Ph 07 40695046
Fax 07 40696997
Mobile 0428 695957
Email wendy.seabrook@bigpond.com

APPENDIX B

QLD DEPT OF NATURAL RESOURCES & MINES
SURFACE WATER QUALITY DATA
FOR LAURA-NORMANBY CATCHMENT AREA

Water Quality Summary by Site

***** ** STATION: 105102A Laura_R Coalseam Ck**

Variable	Count	Minimum	10 Percent	Median	90 Percent	Maximum	Mean	Std Dev	Start date	End date
100.00 Stream Water Level (m)	35	1.08	1.574	1.97	3.312	999.99	87.52	283.46	05/12/1971	06/06/1996
140.00 Stream Discharge (Cumecs)	31	0	0	0.118	3.83	42.4	2.397	7.71096	05/12/1971	06/06/1996
630.00 Dist. below Water Surface	64	0.1	0.1	0.1	0.285	0.3	0.159	0.06932	05/12/1971	12/05/2004
2010.00 Conductivity @ 25C (uS/cm)	34	68	99.4	233	847	930	371.73	294.267	05/12/1971	06/06/1996
2010.50 Conductivity @ 25C (uS/cm)	48	63	115.3	441	948	1188	488.1875	329.99862	20/08/1981	12/05/2004
2030.00 Turbidity (NTU)	19	1	1	10	76	514	46.06842	116.74712	09/03/1981	06/06/1996
2030.50 Turbidity (NTU)	28	2	2.7	5	43.2	585	41.10714	119.91242	31/05/1995	12/05/2004
2051.00 Colour True (Hazen units)	27	5	5	15	34	70	18.22222	14.74484	09/03/1981	06/06/1996
2065.50 Air Temperature ()	22	21.1	25.42	30.4	35.95	38.7	30.45909	4.55335	14/10/1994	12/05/2004
2080.50 Water Temperature	63	19	23.34	27.8	32.9	36	27.96984	3.55013	05/12/1971	12/05/2004
2100.00 pH (pH units)	34	6.7	7.1	7.775	8.2	8.65	7.68088	0.48218	05/12/1971	06/06/1996
2100.50 pH (pH units)	30	6.7	7.1	8.05	8.3	8.5	7.84333	0.49178	19/02/1993	12/05/2004
2113.00 Total Alkalinity as CaCO3 (mg/L)	34	12	26.6	65.295	278.8	314	119.71765	103.74814	05/12/1971	06/06/1996
2123.00 Hydroxide as OH (mg/L)	14	0	0	0.01	0.047	0.1	0.01929	0.02814	05/12/1971	06/06/1996
2124.00 Carbonate as CO3 (mg/L)	27	0	0.006	0.3	2.86	9.9	1.36963	2.20419	12/08/1975	06/06/1996
2125.00 Bicarbonate as HCO3 (mg/L)	34	14.5	32.61	79.22	334.9	379	144.16618	124.07868	05/12/1971	06/06/1996
2132.00 Hardness as CaCO3 (mg/L)	34	13	25.2	57.895	269.4	321	110.18735	97.30414	05/12/1971	06/06/1996
2141.00 Hydrogen as H (mg/L)	16	0	0	0	0	0	0	0	05/12/1971	06/06/1996
2169.00 Total Diss. Solids (mg/L)	34	36	56.6	127.485	457	510	203.01	158.54949	05/12/1971	06/06/1996
2170.00 Total Diss. Ions (mg/L)	34	34.9	63.42	149.215	614.03	670	264.76412	218.26461	05/12/1971	06/06/1996
2172.00 Total Suspended Solids	33	1	4	10	110.6	505	44.66667	101.17796	17/06/1973	06/06/1996
2302.00 Calcium as Ca soluble (mg/L)	34	1.7	3.55	8.75	26.45	35.5	12.86176	9.5055	05/12/1971	06/06/1996
2311.00 Chloride as Cl (mg/L)	34	5.1	11.44	28.985	110	140	47.81706	40.37788	05/12/1971	06/06/1996
2322.00 Magnesium as Mg soluble (mg/L)	34	1.9	3.22	9.1	51.7	56.6	19.00882	18.22335	05/12/1971	06/06/1996
2331.00 Nitrate as NO3(mg/L)	15	0.1	0.206	0.8	3.28	3.82	1.404	1.29589	26/05/1980	06/06/1996
2336.00 Kjeldahl Nitrogen (mg/L)	4	0.333	-	-	-	2.591	1.05888	1.05177	14/10/1994	06/06/1996
2351.50 Oxygen (Dissolved) (mg/L)	25	2.1	4	6.8	7.76	9	6.404	1.67593	31/05/1995	12/05/2004
2363.00 Total Phosphorus as P (mg/L)	4	0.0041	-	-	-	0.3187	0.08988	0.15299	14/10/1994	06/06/1996
2381.00 Potassium as K (mg/L)	33	0.5	1.42	2.6	4.48	9.8	2.92121	1.67365	17/06/1973	06/06/1996
2391.00 Sodium as Na (mg/L)	34	5.1	10.65	22.75	74.7	145	34.91471	30.50092	05/12/1971	06/06/1996
2401.00 Sulphate as SO4 (mg/L)	17	0.2	0.636	2	6.28	9.98	2.78647	2.60213	26/05/1980	06/06/1996
2502.00 Aluminium as Al soluble (mg/L)	8	0	-	-	-	0.31	0.07125	0.09848	01/06/1990	06/06/1996
2524.00 Arsenic as As - total (µg/L)	1	0	-	-	-	0	0	0	20/08/1980	20/08/1980
2551.00 Boron as B (mg/L)	18	0	0	0.03	0.072	0.1	0.03167	0.02936	17/06/1973	06/06/1996
2622.00 Copper as Cu soluble mg/L	11	0.01	0.01	0.03	0.06	0.07	0.03273	0.02149	08/02/1990	06/06/1996
2641.00 Fluoride as F (mg/L)	22	0	0.03	0.12	0.435	0.63	0.17955	0.16238	05/12/1971	06/06/1996
2682.00 Iron as Fe soluble (mg/L)	19	0	0.02	0.1	0.672	4.1	0.36474	0.92971	17/06/1973	06/06/1996
2712.00 Manganese as Mn soluble (mg/L)	5	0	-	-	-	0.02	0.008	0.01095	23/08/1993	06/06/1996
2762.00 Silica as SiO2 soluble (mg/L)	31	1	5	11.8	27	29	13.17419	7.38205	17/06/1973	06/06/1996
2822.00 Zinc as Zn soluble (mg/L)	10	0	0.009	0.01	0.02	0.02	0.013	0.00675	08/02/1990	06/06/1996

***** ** STATION: 105101A Battle Camp**

Variable	Count	Minimum	10 Percent	Median	90 Percent	Maximum	Mean	Std Dev	Sdate	Edate
100.00 Stream Water Level (m)	60	0.73	1.943	2.23	4.33	7.4	2.67777	1.24311	06/11/1971	28/04/2004
140.00 Stream Discharge (Cumecs)	53	0	0.0162	0.585	14.3896	198	9.95083	31.44643	06/11/1971	05/06/1996
630.00 Dist. below Water Surface	98	0	0.1	0.1	0.3	0.3	0.15255	0.07611	06/11/1971	28/04/2004
2010.00 Conductivity @ 25C (uS/cm)	56	58	75.6	142.5	242	335	153.78571	65.93778	06/11/1971	28/04/2004
2010.50 Conductivity @ 25C (uS/cm)	51	63.1	90	159	245	409	168.28235	66.89437	26/08/1981	28/04/2004
2030.00 Turbidity (NTU)	32	0.9	2	7.35	80	257	33.26563	53.16813	14/12/1984	28/04/2004
2030.50 Turbidity (NTU)	34	3	6	10	69.9	253	29.52941	47.96036	31/05/1995	28/04/2004
2051.00 Colour True (Hazen units)	33	5	5	16	40	77	20.78788	18.46408	01/09/1983	28/04/2004
2065.50 Air Temperature ()	25	22.8	25.72	28.5	33.36	34.4	28.704	2.88422	03/10/1995	28/04/2004
2080.50 Water Temperature	84	16	23	26.4	30.41	34	26.63333	3.22376	26/08/1972	28/04/2004
2100.00 pH (pH units)	56	6.52	6.85	7.4	7.85	8.7	7.37018	0.39752	06/11/1971	28/04/2004
2100.50 pH (pH units)	36	6.5	6.9	7.2	7.55	7.9	7.24083	0.27552	17/02/1993	28/04/2004
2113.00 Total Alkalinity as CaCO3 (mg/L)	55	8	15.124	33.6	66.012	116	38.56382	22.86934	06/11/1971	28/04/2004
2123.00 Hydroxide as OH (mg/L)	34	0	0	0	0.01	0.09	0.00382	0.01557	06/11/1971	28/04/2004
2124.00 Carbonate as CO3 (mg/L)	43	0	0	0.04	0.2	0.8	0.09116	0.14838	06/11/1971	28/04/2004
2125.00 Bicarbonate as HCO3 (mg/L)	55	9.7	18.638	40.9	80.162	140	46.97527	27.75065	06/11/1971	28/04/2004
2132.00 Hardness as CaCO3 (mg/L)	55	8.82	13.4	32	61.074	109	34.74945	20.42494	06/11/1971	28/04/2004
2141.00 Hydrogen as H (mg/L)	34	0	0	0	0	0.2	0.00588	0.0343	06/11/1971	28/04/2004
2169.00 Total Diss. Solids (mg/L)	55	39	49.2	84	134.8	190	92.198	35.96197	06/11/1971	28/04/2004
2170.00 Total Diss. Ions (mg/L)	55	36.5	49.86	89.7	163.364	243.9	101.65345	47.77473	06/11/1971	28/04/2004
2172.00 Total Suspended Solids	52	2	5	10	84	316	37.39231	61.54134	10/10/1973	28/04/2004
2302.00 Calcium as Ca soluble (mg/L)	55	1.16	2	5.2	12	32	6.39691	5.17069	06/11/1971	28/04/2004
2311.00 Chloride as Cl (mg/L)	55	8.5	13.604	22.3	36.698	50	24.37509	9.84	06/11/1971	28/04/2004
2322.00 Magnesium as Mg soluble (mg/L)	55	1.4	1.94	4.5	7.12	10.9	4.56255	2.12506	06/11/1971	28/04/2004
2331.00 Nitrate as NO3(mg/L)	21	0	0	0.5	0.9	1.24	0.45	0.36007	17/12/1976	28/04/2004
2336.00 Kjeldahl Nitrogen (mg/L)	3	0.1289	-	-	-	0.325	0.23397	0.0988	31/05/1995	05/06/1996
2337.00 Total Nitrogen (mg/L)	5	0.1306	-	-	-	0.4796	0.3453	0.13698	19/07/1998	28/04/2004
2351.50 Oxygen (Dissolved) (mg/L)	30	0.5	3.06	6.5	8.21	8.5	6.16167	2.0139	31/05/1995	28/04/2004
2363.00 Total Phosphorus as P (mg/L)	8	0.0079	-	-	-	0.0765	0.03406	0.02381	31/05/1995	28/04/2004
2381.00 Potassium as K (mg/L)	52	0.3	1	1.4	2.3	2.9	1.52519	0.56847	10/10/1973	28/04/2004
2391.00 Sodium as Na (mg/L)	55	7.4	9.91	15.8	26.2	32	16.83018	6.41779	06/11/1971	28/04/2004
2401.00 Sulphate as SO4 (mg/L)	26	0	0.25	1.135	5	5.8	1.75885	1.68424	24/05/1975	28/04/2004
2502.00 Aluminium as Al soluble (mg/L)	18	0	0	0.025	0.203	0.57	0.08944	0.15543	04/08/1986	28/04/2004
2551.00 Boron as B (mg/L)	23	0	0	0.02	0.072	0.11	0.02609	0.0313	14/12/1984	28/04/2004
2622.00 Copper as Cu soluble mg/L	17	0	0.006	0.01	0.044	0.06	0.01882	0.01691	04/08/1986	28/04/2004
2641.00 Fluoride as F (mg/L)	40	0.01	0.03	0.1	0.196	0.6	0.11975	0.12559	06/11/1971	28/04/2004
2682.00 Iron as Fe soluble (mg/L)	31	0	0.01	0.11	0.49	1.42	0.25226	0.32855	10/10/1973	28/04/2004
2712.00 Manganese as Mn soluble (mg/L)	13	0	0	0	0.018	0.28	0.02538	0.07677	14/12/1984	28/04/2004
2762.00 Silica as SiO2 soluble (mg/L)	52	5.8	10.91	15	21.9	55	16.53942	8.1105	10/10/1973	28/04/2004
2822.00 Zinc as Zn soluble (mg/L)	16	0	0	0.01	0.055	0.07	0.01938	0.02144	04/08/1986	28/04/2004

***** ** STATION: 105105A E Normanby_R Dev Rd**

Variable	Count	Minimum	10 Percent	Median	90 Percent	Maximum	Mean	Std Dev	Sdate	Edate
100.00 Stream Water Level (m)	63	0.29	1.28	1.42	2.73	5.2	1.68857	0.84861	22/08/1972	17/10/2001
140.00 Stream Discharge (Cumecs)	57	0	0.0496	0.443	26.5444	135.368	9.25898	24.43012	22/08/1972	04/06/1996
630.00 Dist. below Water Surface	98	0.1	0.1	0.1	0.3	0.3	0.15051	0.07269	22/08/1972	27/04/2004
2010.00 Conductivity @ 25C (uS/cm)	61	46	60	85	130	225	91.23934	30.61478	22/08/1972	17/10/2001
2010.50 Conductivity @ 25C (uS/cm)	47	32	77	93	175.2	305	111.2	51.90238	25/05/1981	27/04/2004
2030.00 Turbidity (NTU)	38	0.5	1	5.7	100	100	28.23158	39.48658	03/03/1981	17/10/20
2030.50 Turbidity (NTU)	34	2	3	5	13.8	148	14.17647	33.30708	13/10/1994	27/04/2004
2051.00 Colour True (Hazen units)	32	0	5	20	49	70	24.53125	19.02797	03/03/1981	17/10/2001
2065.50 Air Temperature ()	26	23.9	27.25	29.95	34.55	37	30.46923	2.98138	13/10/1994	27/04/2004
2080.50 Water Temperature	78	17	21.35	24	30	32.3	24.94615	3.4773	22/08/1972	27/04/2004
2100.00 pH (pH units)	61	5.7	6.7	7.1	7.7	8.1	7.12115	0.50483	22/08/1972	17/10/2001
2100.50 pH (pH units)	34	6.6	6.73	7.015	7.47	7.6	7.06441	0.25969	31/05/1993	27/04/2004
2113.00 Total Alkalinity as CaCO3 (mg/L)	59	6	8.8	16	30.4	46.11	18.3861	9.05326	22/08/1972	17/10/2001
2123.00 Hydroxide as OH (mg/L)	26	0	0	0	0	0.01	0.00077	0.00272	22/08/1972	17/10/2001
2124.00 Carbonate as CO3 (mg/L)	31	0	0	0	0.1	0.3	0.03677	0.0667	08/10/1973	17/10/2001
2125.00 Bicarbonate as HCO3 (mg/L)	59	7.9	11.32	19.5	36.6	56.17	22.43441	10.90015	22/08/1972	17/10/2001
2132.00 Hardness as CaCO3 (mg/L)	59	4	6.8	13.3	26.4	47.22	15.31949	8.42749	22/08/1972	17/10/2001
2141.00 Hydrogen as H (mg/L)	28	0	0	0	0	0.1	0.00357	0.0189	22/08/1972	17/10/2001
2169.00 Total Diss. Solids (mg/L)	59	28	33	57	79	129.73	59.27508	20.01401	22/08/1972	17/10/2001
2170.00 Total Diss. Ions (mg/L)	59	26.4	31.2	50.8	77.7	138.18	55.97593	21.74933	22/08/1972	17/10/2001
2172.00 Total Suspended Solids	56	0	2.5	10	235	700	73.975	157.39229	13/06/1973	17/10/2001
2302.00 Calcium as Ca soluble (mg/L)	59	0.6	0.98	1.8	4	6.4	2.17288	1.29386	22/08/1972	17/10/2001
2311.00 Chloride as Cl (mg/L)	59	6	9.48	14.69	22	40.68	15.3639	5.63046	22/08/1972	17/10/2001
2322.00 Magnesium as Mg soluble (mg/L)	59	0.5	0.98	2.2	4	7.6	2.42034	1.31671	22/08/1972	17/10/2001
2331.00 Nitrate as NO3(mg/L)	23	0	0	0.5	1.8	9	1.04696	2.02662	01/04/1977	17/10/2001
2336.00 Kjeldahl Nitrogen (mg/L)	4	0.2387	-	-	-	0.4006	0.32108	0.08607	13/10/1994	04/06/1996
2337.00 Total Nitrogen (mg/L)	4	0.0851	-	-	-	0.3474	0.18485	0.11747	20/07/1998	17/10/2001
2351.50 Oxygen (Dissolved) (mg/L)	31	0.1	4.1	6.6	8.4	8.6	6.15645	2.14929	13/10/1994	27/04/2004
2363.00 Total Phosphorus as P (mg/L)	8	0.0049	-	-	-	0.0297	0.01565	0.00825	13/10/1994	17/10/2001
2381.00 Potassium as K (mg/L)	57	0.5	1	1.2	2.1	3.7	1.45439	0.60091	13/06/1973	17/10/2001
2391.00 Sodium as Na (mg/L)	59	5.6	6.68	10.5	15.4	25.2	11.14068	3.62245	22/08/1972	17/10/2001
2401.00 Sulphate as SO4 (mg/L)	21	0.4	0.4	1	3	5	1.59429	1.40244	01/04/1977	17/10/2001
2502.00 Aluminium as Al soluble (mg/L)	15	0	0	0.01	0.166	0.62	0.078	0.16081	05/08/1986	17/10/2001
2524.00 Arsenic as As - total (Micrograms/Litre)	1	0	-	-	-	0	0	0	20/01/1989	20/01/1989
2551.00 Boron as B (mg/L)	24	0	0	0.02	0.03	0.04	0.01542	0.01179	13/06/1973	17/10/2001
2622.00 Copper as Cu soluble mg/L	15	0	0	0.01	0.03	0.04	0.01533	0.01187	05/08/1986	17/10/2001
2641.00 Fluoride as F (mg/L)	35	0.01	0.02	0.1	0.142	0.57	0.09943	0.10743	22/08/1972	17/10/2001
2682.00 Iron as Fe soluble (mg/L)	44	0.01	0.073	0.265	0.814	1.9	0.36682	0.35867	13/06/1973	17/10/2001
2712.00 Manganese as Mn soluble (mg/L)	14	0	0	0.01	0.017	0.04	0.00857	0.01099	03/03/1986	17/10/2001
2762.00 Silica as SiO2 soluble (mg/L)	58	0	7	16	21	44	15.82586	7.09115	13/06/1973	17/10/2001
2822.00 Zinc as Zn soluble (mg/L)	14	0	0	0.01	0.027	0.04	0.01286	0.01139	05/08/1986	17/10/2001

***** ** STATION: 105106A Mt Sellheim**

Variable	Count	Minimum	10 Percent	Median	90 Percent	Maximum	Mean	Std Dev	Sdate	Edate
100.00 Stream Water Level (m)	30	1.05	1.433	1.64	2.528	999.99	68.24633	253.27626	13/06/1973	27/11/1998
140.00 Stream Discharge (Cumecs)	30	0	0	0.3055	3.0088	19.577	1.6379	3.91355	13/06/1973	04/09/2001
630.00 Dist. below Water Surface	39	0.1	0.1	0.1	0.3	0.3	0.14103	0.07152	13/06/1973	04/09/2001
2010.00 Conductivity @ 25C (uS/cm)	30	74	85.9	142.5	250	293	160.1	62.75972	13/06/1973	27/11/1998
2010.50 Conductivity @ 25C (uS/cm)	14	66	82.1	139.5	210.8	265	142.42857	57.2279	25/05/1981	04/09/2001
2030.00 Turbidity (NTU)	16	2	2	13.5	100	100	36.5125	41.8988	03/03/1981	27/11/1998
2030.50 Turbidity (NTU)	3	4	-	-	-	27	11.66667	13.27906	16/07/1998	04/09/2001
2051.00 Colour True (Hazen units)	12	5	5	9.5	55.4	70	22.5	23.485	03/03/1981	27/11/1998
2065.50 Air Temperature ()	3	26	-	-	-	37.9	32.73333	6.10273	16/07/1998	04/09/2001
2080.50 Water Temperature	30	20	22.96	28	31.1	32	27.10667	3.45652	13/06/1973	04/09/2001
2100.00 pH (pH units)	30	6.5	7.09	7.4	7.91	8.7	7.47767	0.43203	13/06/1973	27/11/1998
2100.50 pH (pH units)	2	7.1	-	-	-	7.7	7.4	0.42426	27/11/1998	04/09/2001
2113.00 Total Alkalinity as CaCO3 (mg/L)	30	11	22	43	68.546	94	44.87267	19.52516	13/06/1973	27/11/1998
2123.00 Hydroxide as OH (mg/L)	15	0	0	0	0	0.01	0.00067	0.00258	13/06/1973	27/11/1998
2124.00 Carbonate as CO3 (mg/L)	20	0	0	0.1	0.43	1.1	0.1905	0.26996	08/10/1973	27/11/1998
2125.00 Bicarbonate as HCO3 (mg/L)	30	14	27	52.35	83.6	114	54.46733	23.6171	13/06/1973	27/11/1998
2132.00 Hardness as CaCO3 (mg/L)	30	9	19.6	34	59.342	71	36.131	16.2784	13/06/1973	27/11/1998
2141.00 Hydrogen as H (mg/L)	16	0	0	0	0.05	0.2	0.01875	0.05439	13/06/1973	27/11/1998
2169.00 Total Diss. Solids (mg/L)	30	51	57.8	95	141.7	171	98.41667	33.51169	13/06/1973	27/11/1998
2170.00 Total Diss. Ions (mg/L)	30	41.8	58.65	100.25	169.01	209	108.91833	44.06378	13/06/1973	27/11/1998
2172.00 Total Suspended Solids	26	3	5	10	156.5	775	80.34615	193.22669	13/06/1973	27/11/1998
2302.00 Calcium as Ca soluble (mg/L)	30	1.2	3.27	5.35	10.2	12	6.30667	2.97761	13/06/1973	27/11/1998
2311.00 Chloride as Cl (mg/L)	30	8.6	10.84	19	35	46	21.84767	9.7358	13/06/1973	27/11/1998
2322.00 Magnesium as Mg soluble (mg/L)	30	1.4	2.64	4.8	7.91	10	4.93667	2.22036	13/06/1973	27/11/1998
2331.00 Nitrate as NO3(mg/L)	8	0.1	-	-	-	1.9	0.78625	0.59375	16/12/1976	27/11/1998
2337.00 Total Nitrogen (mg/L)	2	0.283	-	-	-	0.647	0.465	0.25739	16/07/1998	27/11/1998
2351.50 Oxygen (Dissolved) (mg/L)	3	6.8	-	-	-	7.4	7.2	0.34641	16/07/1998	04/09/2001
2363.00 Total Phosphorus as P (mg/L)	2	0.025	-	-	-	0.0967	0.06085	0.0507	16/07/1998	27/11/1998
2381.00 Potassium as K (mg/L)	30	0.9	1	1.35	3.2	4.2	1.74333	0.86967	13/06/1973	27/11/1998
2391.00 Sodium as Na (mg/L)	30	7.6	9.88	15.75	27.1	33	17.81	7.25118	13/06/1973	27/11/1998
2401.00 Sulphate as SO4 (mg/L)	10	1	1.828	3	5.3	8	3.502	2.02913	07/04/1976	27/11/1998
2502.00 Aluminium as Al soluble (mg/L)	3	0	-	-	-	0.13	0.06	0.06557	06/12/1983	27/11/1998
2551.00 Boron as B (mg/L)	8	0.01	-	-	-	0.1	0.0425	0.03655	13/06/1973	27/11/1998
2622.00 Copper as Cu soluble mg/L	2	0.01	-	-	-	0.01	0.01	0	16/07/1998	27/11/1998
2641.00 Fluoride as F (mg/L)	25	0.05	0.1	0.1	0.188	0.4	0.1244	0.0664	13/06/1973	27/11/1998
2682.00 Iron as Fe soluble (mg/L)	16	0.01	0.025	0.21	2.15	3	0.62	0.99335	13/06/1973	27/11/1998
2712.00 Manganese as Mn soluble (mg/L)	5	0.01	-	-	-	0.05	0.022	0.01643	31/08/1983	27/11/1998
2762.00 Silica as SiO2 soluble (mg/L)	30	6	11.63	16.8	26	30	17.57667	5.41159	13/06/1973	27/11/1998
2822.00 Zinc as Zn soluble (mg/L)	3	0	-	-	-	0.02	0.01333	0.01155	06/12/1983	27/11/1998

***** ** STATION: 1051010 KALPOWER CROSSING**

	Count	Minimum	10 Percent	Median	90 Percent	Maximum	Mean	Std Dev	Sdate	Edate
100.00 Stream Water Level (m)	3	999.99	-	-	-	999.99	999.99	0	05/10/1995	17/12/1997
140.00 Stream Discharge (Cumecs)	11	0	0	1.228	2.5	2.504	0.96064	1.01053	15/10/1994	17/12/1997
630.00 Dist. below Water Surface	11	0.15	0.15	0.2	0.3	0.3	0.23636	0.0636	15/10/1994	17/12/1997
2010.00 Conductivity @ 25C (uS/cm)	6	120	-	-	-	165	137.83333	16.11728	15/10/1994	17/12/1997
2010.50 Conductivity @ 25C (uS/cm)	6	121	-	-	-	162.4	140.23333	15.07603	15/10/1994	17/12/1997
2030.00 Turbidity (NTU)	6	0.7	-	-	-	4	2.06667	1.37937	15/10/1994	17/12/199
2030.50 Turbidity (NTU)	6	2	-	-	-	10	5.69667	3.41761	15/10/1994	17/12/1997
2051.00 Colour True (Hazen units)	6	5	-	-	-	47	28.16667	19.13548	15/10/1994	17/12/1997
2065.50 Air Temperature ()	5	22.1	-	-	-	27	24.84	1.94499	15/10/1994	26/06/1997
2080.00 Water Temperature	1	26	-	-	-	26	26	0	15/10/1994	15/10/1994
2080.50 Water Temperature	5	24.9	-	-	-	31	27.34	2.386	02/06/1995	17/12/1997
2100.00 pH (pH units)	6	6.96	-	-	-	7.45	7.19333	0.1919	15/10/1994	17/12/1997
2100.50 pH (pH units)	6	6.8	-	-	-	7.8	7.23333	0.36148	15/10/1994	17/12/1997
2113.00 Total Alkalinity as CaCO3 (mg/L)	6	14	-	-	-	30.5	22.705	7.31022	15/10/1994	17/12/1997
2123.00 Hydroxide as OH (mg/L)	6	0	-	-	-	0	0	0	15/10/1994	17/12/1997
2124.00 Carbonate as CO3 (mg/L)	6	0	-	-	-	0.04	0.015	0.01975	15/10/1994	17/12/1997
2125.00 Bicarbonate as HCO3 (mg/L)	6	16.5	-	-	-	37	27.46167	9.05048	15/10/1994	17/12/1997
2132.00 Hardness as CaCO3 (mg/L)	6	19.5	-	-	-	29.72	23.15667	4.39897	15/10/1994	17/12/1997
2141.00 Hydrogen as H (mg/L)	6	0	-	-	-	0	0	0	15/10/1994	17/12/1997
2169.00 Total Diss. Solids (mg/L)	6	68	-	-	-	88.88	76.03667	8.41878	15/10/1994	17/12/1997
2170.00 Total Diss. Ions (mg/L)	6	66	-	-	-	95.31	79.54167	11.20684	15/10/1994	17/12/1997
2172.00 Total Suspended Solids	6	3	-	-	-	10	7.66667	2.87518	15/10/1994	17/12/1997
2302.00 Calcium as Ca soluble (mg/L)	6	2.4	-	-	-	4	3.1	0.75631	15/10/1994	17/12/1997
2311.00 Chloride as Cl (mg/L)	6	22.5	-	-	-	29.67	26.07833	2.51845	15/10/1994	17/12/1997
2322.00 Magnesium as Mg soluble (mg/L)	6	3.2	-	-	-	4.8	3.75	0.6253	15/10/1994	17/12/1997
2331.00 Nitrate as NO3(mg/L)	6	0	-	-	-	1.17	0.445	0.43145	15/10/1994	17/12/1997
2336.00 Kjeldahl Nitrogen (mg/L)	6	0.129	-	-	-	0.312	0.23283	0.06965	15/10/1994	17/12/1997
2351.50 Oxygen (Dissolved) (mg/L)	6	5.3	-	-	-	7.48	6.51333	0.80117	15/10/1994	17/12/1997
2363.00 Total Phosphorus as P (mg/L)	6	0.003	-	-	-	0.0136	0.00992	0.00411	15/10/1994	17/12/1997
2381.00 Potassium as K (mg/L)	6	1.1	-	-	-	1.6	1.33333	0.20656	15/10/1994	17/12/1997
2391.00 Sodium as Na (mg/L)	6	15	-	-	-	19.6	17.06667	1.60955	15/10/1994	17/12/1997
2401.00 Sulphate as SO4 (mg/L)	6	0	-	-	-	2	1.165	0.93303	15/10/1994	17/12/1997
2502.00 Aluminium as Al soluble (mg/L)	6	0	-	-	-	0.19	0.05667	0.06976	15/10/1994	17/12/1997
2551.00 Boron as B (mg/L)	6	0	-	-	-	0.1	0.05	0.05477	15/10/1994	17/12/1997
2622.00 Copper as Cu soluble mg/L	6	0	-	-	-	0.05	0.03	0.0228	15/10/1994	17/12/1997
2641.00 Fluoride as F (mg/L)	6	0	-	-	-	0.2	0.07667	0.07394	15/10/1994	17/12/1997
2682.00 Iron as Fe soluble (mg/L)	6	0	-	-	-	1	0.42	0.45625	15/10/1994	17/12/1997
2712.00 Manganese as Mn soluble (mg/L)	6	0	-	-	-	0.02	0.01	0.01095	15/10/1994	17/12/1997
2762.00 Silica as SiO2 soluble (mg/L)	6	7	-	-	-	13.2	10.26667	2.07429	15/10/1994	17/12/1997
2822.00 Zinc as Zn soluble (mg/L)	6	0	-	-	-	0.02	0.01167	0.00983	15/10/1994	17/12/1997

APPENDIX C

CAPE YORK PENINSULA NATURAL RESOURCE
MANAGEMENT PLAN,
CAPE YORK PENINSULA PEST SPECIES

6.2 Asset Categories

The planning process identified eight categories of natural resource management assets for Cape York Peninsula. These are listed in Table 7 (along with the Code Letter used to denote each asset throughout the document):

Table 7: Asset categories and codes

ASSET	CODE
community capacity	C
cultural heritage	H
natural heritage	N
land country	L
water	W
sea country	S
biodiversity	B
Ecologically sustainable development	D

It is important to note that there is much overlap between these assets. For the sake of readability the discussion of some issues such as pest plants and fire management have been dealt with primarily under a single asset.

In reality these issues affect many of the other assets as well. For example fire management is discussed mainly under the heading of Land Country, but cross-references are made under other headings such as Biodiversity where fire management is equally important.

This is important to consider when discussing achievable management actions as those actions that have benefit across a range of assets may represent greater value for money. For example, pest plants and animals impact on all aspects of natural resource management and are considered the major threat to a number of the identified assets. Consequently pest plant and animal management is identified as a high priority.

6.3 Threats to Assets

A range of threats to the region's natural resource assets are recognised in this Plan. They were identified from literature reviews and a range of workshops, scientific review and discussions.

Table 8 provides a summary of the main identified threats. The top thirteen issues are listed in a preliminary priority order as identified during the consultation process.

Table 8: Summary of main identified threats and links to targets

IDENTIFIED THREAT	ASSET THREATENED*							
	C	H	N	L	W	S	B	D
Pest species (plants and animals)	•	•	•	L2 & L4	•	•	B2	•
Economic capacity of the region to undertake natural resource management activities (including social capacity)	C1	•	•	•	•	•	•	•
Ineffective institutional arrangements (including short term planning cycles, damage to community goodwill, coordination of decision making, enforcement of regulations)	C2	•	•	•	•	•	•	•
Inappropriate fire regimes		•	•	L3	•		•	•
Loss of Indigenous knowledge and failure to incorporate existing knowledge into natural resource management (lack of knowledge of how to engage with community especially Indigenous community in cooperative management)	•	H1,2, 4,5&6	•	•	•	•	B1	•
Unmanaged visitation		H5	•	•	•	•	•	D1
Inappropriately Managed Grazing Activities (eg erosion and loss of biodiversity)		•	•	L2 & L4	W6		B4	•
Loss of management skills and experience in the region.	C1	•	•	L3	•	•	B2	•
Over harvesting of threatened species.			•			S1,2,3 ,4&5	•	•
Human population issues (increasing population and decentralisation)	•		•	•	•	•	•	•
Lack of knowledge of ecosystems			•	L1	•	•	B1	•
Climate Change		•	•	•	•	•	•	•
Riparian Degradation		•	•	•	W3 &4		•	•
New Developments (including alienation of land and subdivision followed by real estate and tourism development large scales – pastoral lease to freehold to subdivision and incremental development)			•	•	•		•	D1
Exploration Permits and Practices for Minerals		•	•	•	•		•	
Mining		•	•	L4	•		•	D1
Inappropriate Use of Groundwater			•		W1		•	•
Marine Debris (including oil spills)			•			S1	•	•
Infrastructure Development		•	•	•	•		•	D1
Lack of security of land tenure	C2		•					•
Lack of land use planning		•	•	•	•		•	D1
Future possible land clearing and industrial scale logging		•	•	•	•		•	•
Irrigation impacts			•	•	•		•	D1
Lack of awareness of global, national and regional heritage (both natural and cultural) values of the region (including a perception that Cape York Peninsula is protected).	•	H1	N1& 2	•	W6	•	B1, 2	•
Lack of agreed value systems	•		•					
Lack of information sharing (difficulty of communications eg phones, radio, newspapers)	•	•	•	•	•	•	•	•
Risk of patronage politics in place of addressing priority threats to natural resource assets.	C1	•	•	•	•	•	•	•
Biosecurity (the risk of introduction of exotic diseases and pests)	•	•	•	L4	•	S4	•	•
Acquired properties lying dormant with little management practices								•
Poor road standards and design on PDR causing environmental damage through land degradation and pollution	•	•	•	•	•	•	•	•
The loss of local knowledge	•	•	•	•	•	•	•	•
Potential for unsustainable water extraction / dams & weirs			•		•		•	•

* The Asset Codes explained in Table 3 are also used in this table. While it is clear that most of the threats listed in this table apply to more than one asset category, this table shows the primary asset class where the particular threat is discussed in Chapter 7. Where the code letter is followed by a number in the body of the table, this refers to the relevant Aspirational Target detailed in Chapter 7. For example, L2 refers to the Land Country Aspirational Target Number 2.

APPENDIX D

MAJOR PEST SPECIES OF CAPE YORK PENINSULA

Major pests of Cape York Peninsula

(Those causing significant economic, environmental or social impact)
(Cook Shire Council, 2004)

Common Name	Species Name
Antelope – Indian blackbuck	*Antilope cervicapra*
Brumbies (Feral horses) Wandering or domestic horses	*Equus caballus*
Feral cattle	*Bos.spp*
Feral/wandering cats	*Felis catus*
Feral pigs	*Sus scrofa*
Rabbits	*Oryctolagus cuniculus*
Rusa deer	*Cervus timorensis*
Dingoes	*Canis familiaris dingo*
Wild dogs Uncontrolled/mangy domestic dogs	*Canis familiaris*

Problem animals of Cape York Peninsula

Common Name	Species Name
Black and white cockatoos	*Calyptorrhynchus banksii, Cacatua galerita*
Wallabies	*Various species*

APPENDIX E

LAKEFIELD NATIONAL PARK
RARE & THREATENED SPECIES LIST

Visitor Information

QUEENSLAND PARKS AND WILDLIFE SERVICE

Lakefield
National Park

Species List

Habitat

- F Freshwater
- R Riverine forest
- S Schlerophyll forest
- E Estuarine

Status

- M Migratory
- O Occasional
- R Resident

Species	Habitat	Status	Species	Habitat	Status
Emu	SG	R	Black-shouldered Kite	SR	R
Great Crested Grebe	F	O	Pacific Baza	ER	O
Australian Grebe	F	R	Black Kite	SR	R
Australian Pelican	F	O	Square-tailed Kite	SR	R
Darter	F	R	Black-breasted Buzzard	SR	R
Great Cormorant	F	R	Brahminy Kite	SR	R
Pied Cormorant	F	R	Whistling Kite	SR	R
Little Black Cormorant	F	R	Brown Goshawk	SR	R
Little Pied Cormorant	F	R	Collared Sparrowhawk	SR	R
Great-billed Heron	F	R	Grey Goshawk	R	RO
Pacific Heron	EF	R	Red Goshawk	R	RO
White-faced Heron	EF	R	White Bellied Sea-eagle	RE	R
Pied Heron	F	R	Wedge-tailed Eagle	GS	O
Cattle Egret	F	R	Little Eagle	GS	R
Great Egret	F	R	Spotted Harrier	SR	R
Little Egret	F	R	Marsh Harrier	ER	R
Intermediate Egret	F	R	Black Falcon	SR	R
Eastern Reef Egret	F	R	Peregrine Falcon	SR	R
Striated Heron	EF	R	Australian Hobby	SR	R
Rufous Night Heron	R	R	Brown Falcon	SR	R
Little Bittern	F	O	Australian Kestrel	SR	R
Black Bittern	EF	R	Australian Brush Turkey	R	R
Black-necked Stork (Jabiru)	SGEF	R	Brown Quail	SG	R
Glossy Ibis	F	R	King Quail	SG	R
Sacred Ibis	F	R	Painted Button-quail	SG	R
Straw-necked Ibis	F	R	Red-cheated Button-quail	SG	R
Royal Spoonbill	F	R	Buff-banded Rail	EF	R
Yellow-billed Spoonbill	F	O	Purple Swamphen	F	O
Magpie Goose	F	M	Black-tailed Native-hen	EF	R
Wandering Whistling-Duck	F	R	Eurasian Coot	EF	R
Plumbed Whistling-Duck	F	R	Brolga	FGS	R
Black Swan	F	O	Sarus Crane	FGS	R
Rajah Shelduck	F	R	Australian Bustard	SG	R
Pacific Black Duck	F	R	Comb-crested Jacana	F	R
Grey Teal	F	O	Bush Thick-knee	GS	R
Pink-eared Duck	F	R	Beach Thick-knee	EF	R
Hardhead	F	R	Pied Oystercatcher	EF	R
Maned Duck	F	R	Masked Lapwing	ESF	R
Cotton Pygmy-Goose	F	O	Red-kneed Dotterel	FR	R
Green Pygmy-Goose	F	R	Oriental Plover	ESF	R
Osprey	E	R	Red-capped Plover	FRG	R

Species	Habitat	Status	Species	Habitat	Status
Black-fronted Plover	FE	R	Forest Kingisher	FR	R
Black-winged Stilt	EF	R	Red-backed Kingfisher	FR	O
Eastern Curlew	GS	MR	Sacred Kingfisher	FR	R
Wood Sandpiper	EF	MR	Buff-breasted Paradise Kingfisher	R	O
Whimbrel	GS	MR	Rainbow Bee-eater	RS	R
Little Curlew	GS	MR	Dollarbird	S	M
Common Sandpiper	EF	MR	Singing Bushlark	S	R
Marsh Sandpiper	E	MO	Welcome Swallow	S	R
Lathams Snipe	EFR	O	Tree Martin	S	R
Bar-tailed Godwit	FG	MO	Fairy Martin	S	R
Sharp-tailed Sandpiper	EF	M	Richards Pipit	S	R
Curlew Sandpiper	EF	M	Black-faced Cuckoo-shrike	S	R
Oriental Pratincole	EG	M	White-bellied Cuckoo-shrike	GS	R
Australian Pratincole	EG	M	Yellow-eyed Cuckoo-shrike	GS	O
Silver Gull	E	R	Cicadabird	GS	R
Whiskered Tern	FE	R	Lemon-bellied Flycatcher	S	R
White-winged Tern	FE	R	Jacky Winter	S	R
Gull-billed Tern	FE	R	White-browed Robin	S	R
Casplan Tern	FE	R	Grey Whistler	S	R
Torresian Imperial Pigeon	SR	M	Rufous Whistler	S	R
Peaceful Dove	S	R	Little Shrike-thrush	S	R
Diamond Dove	S	R	Grey Shrike-thrush	S	R
Bar-shouldered Dove	S	R	Spectacled Monarch	S	O
Emerald Dove	S	R	Broad-billed Flycatcher	FS	R
Common Bronzewing	S	R	Leaden Flycatcher	FS	R
Squatter Pigeon	S	R	Satin Flycatcher	FS	R
Red-tailed Black-Cockatoo	RS	R	Shining Flycatcher	FS	R
Galah	S	R	Restless Flycatcher	S	R
Little Corella	EF	R	Rufous Fantail	S	O
Sulphur-crested Cockatoo	SR	R	Grey Fantail	S	O
Rainbow Lorikeet	SR	R	Northern Fantail	S	O
Scaly-breasted Lorikeet	RS	O	Willie Wagtail	S	R
Varied Lorikeet	RS	O	Grey-crowned Babbler	S	R
Red-winged Parrot	RS	R	Golden-headed Cisticola	S	O
Pale-headed Rosella	GS	R	Rufous Songlark	S	R
Oriental Cuckoo	S	R	Glamorous Reed-Warbler	S	O
Pallid Cuckoo	S	R	Variegated Fairy-wren	FS	R
Fan-tailed Cuckoo	S	O	Red-backed Fairy-wren	FS	R
Brush Cuckoo	S	R	Tropical Scrubwren	FS	R
Black-eared Cuckoo	S	R	Weebill	S	R
Horsefield Bronze Cuckoo	S	R	Large-billed Gerygone	RFE	R
Little Bronze Cuckoo	S	R	Fairy Gerygone	RFE	R
Common Koel	FS	M	White-throated Gerygone	RFE	R
Channel-billed Cuckoo	FS	M	Brown Treecreeper	S	R
Pheasant Coucal	S	R	Helmeted Friarbird	RS	R
Southern Boobook	S	R	Silver-crowned Friarbird	S	R
Barking Owl	S	R	Noisy Friarbird	S	R
Barn Owl	S	R	Little Friarbird	S	R
Tawny Frogmouth	GS	R	Blue-faced Honeyeater	FS	R
Papuan Frogmouth	GS	R	Yellow Spotted Honeyeater	FS	R
Australian Owlet Nightjar	FS	R	Varied Honeyeater	FS	R
Spotted Nightjar	FS	R	White-gaped Honeyeater	FS	R
Large-tailed Nightjar	FS	R	Yellow Honeyeater	FS	R
Fork-tailed Swift	FS	R	Yellow-tinted Honeyeater	FS	R
Azure Kingfisher	FS	R	Black-chinned Honeyeater	FS	R
Little Kingfisher	SR	R	White-throated Honeyeater	FS	R
Laughing Kookaburra	S	R	Brown Honeyeater	FS	R
Blue-winged Kookaburra	S	R	White-streaked Honeyeater	FS	R

Species	Habitat	Status	Species	Habitat	Status
Brown-backed Honeyeater	FS	R	Nutmeg Mannikin	FG	R
Bar-breasted Honeyeater	FS	R	Metallic Starling	R	R
Rufous-banded Honeyeater	FS	R	Yellow Oriole	R	R
Rufous-throated Honeyeater	FS	R	Olive-backed Oriole	R	R
Banded Honeyeater	FS	R	Figbird	SR	R
Dusky Honeyeater	FS	R	Spangled Drongo	R	R
Red-headed Honeyeater	FS	R	Great Bowerbird	SR	R
Yellow-bellied Sunbird	FS	R	Spotted Catbird	R	O
Mistletoe Bird	FS	R	Apostle Bird	S	R
Red-browed Pardalote	SF	R	Australian Magpie-lark	S	R
Striated Pardalote	SF	R	White-breasted Woodswallow	FR	R
Silvereye	SF	R	Masked Woodswallow	FS	R
House Sparrow	S	R	Little Woodswallow	FS	R
Red-browed Firetail	SF	R	Black Butcherbird	FS	O
Star Finch	FG	R	Black-backed Butcherbird	FS	O
Crimson Finch	FG	R	Pied Butcherbird	FS	R
Double-barred Finch	FG	R	Australian Magpie	S	R
Masked Finch	FG	R	Pied Currawong	S	R
Black-throated Finch	FG	R	Torresian Crow	S	R
Chestnut-breasted Mannikin	FG	R			

APPENDIX F

RARE AND/OR THREATENED PLANTS OF THE NORMANBY RIVER CATCHMENT

Rare and/or Threatened Plants of the Normanby River Catchment (Courtesy of John Clarkson, QLD DPI&F, July 2005)

Acanthaceae	X	Rhaphidospora cavernarum (F.Muell.) R.M.Barker
Alismataceae	R	Astonia australiensis (Aston) S.W.L.Jacobs
Boraginaceae	V	Carmona retusa (Vahl) Masam.
Caesalpiniaceae	R	Caesalpinia hymenocarpa (Prain) Hattink
Campanulaceae	R	Lobelia douglasiana F.M.Bailey
Cucurbitaceae	E	Muellerargia timorensis Cogn.
Dilleniaceae	R	Hibbertia cymosa S.T.Reynolds
	R	Hibbertia echiifolia R.Br. ex Benth.
Euphorbiaceae	V	Chamaesyce carissoides (F.M.Bailey) D.C.Hassall ex P.I.Forst. & R.J.F.Hend.
Fabaceae	R	Tephrosia savannicola Domin
Lamiaceae	X	Teucrium ajugaceum F.M.Bailey & F.Muell. ex F.M.Bailey
Menispermaceae	R	Tiliacora australiana Forman
Mimosaceae	R	Acacia albizioides Pedley
	R	Acacia armitii F.Muell. ex Maiden
	R	Albizia retusa Benth. subsp. retusa
Myrtaceae	R	Acmenosperma pringlei B.Hyland
	R	Austromyrtus lucida (Gaertn.) L.S.Sm.
	R	Austromyrtus sp. (McIlwraith Range B.P.Hyland 11148)
	R	Homoranthus tropicus Byrnes
	R	Syzygium rubrimolle B.Hyland
Orchidaceae	V	Dendrobium phalaenopsis Fitzg.
Phormiaceae	R	Dianella incollata R.J.F.Hend.
Poaceae	E	Coix gasteenii B.K.Simon
	V	Ectrosia blakei C.E.Hubb.
	R	Lepturus xerophilus Domin
Polygalaceae	R	Polygala pycnophylla Domin
Rubiaceae	R	Gardenia rupicola Puttock
Simaroubaceae	V	Quassia sp. (Kennedy River J.R.Clarkson 5645)
Sterculiaceae	R	Brachychiton grandiflorus Guymer
	R	Brachychiton vitifolius (F.M.Bailey) Guymer
	R	Brachychiton vitifolius (F.M.Bailey) Guymer
	R	Stylidium trichopodum F.Muell.
Thymelaeaceae	V	Jedda multicaulis J.R.Clarkson

APPENDIX G

LIST OF FINFISH SPECIES
FROM RESEARCH NETTING SURVEYS
IN THE NORMANBY RIVER ESTUARY

List of Finfish Species From Research Netting Surveys in the Normanby River Estuary

This list of fish species is compiled from results of netting surveys in the estuarine reaches of the Normanby River and adjacent foreshores completed during 2003-2004 as part of Coastal Fisheries Resource Monitoring supported by the Reef Research Centre and QDPI&F (Northern Fisheries Centre).

Family	Species	Common Name
Carcharhinidae	Carcharhinus dussumieri	Whitecheek Shark
Carcharhinidae	Carcharhinus leucas	Bull Shark
Carcharhinidae	Carcharhinus amboinensis	Java Shark
Carcharhinidae	Carcharhinus cautus	Nervous Shark
Carcharhinidae	Carcharhinus tilstoni	Australian Blacktip Shark
Carcharhinidae	Carcharhinus limbatus	Common Blacktip Shark
Carcharhinidae	Galaeocerda cuvier	Tiger Shark
Carcharhinidae	Rhizoprionodon acutus	Milk Shark
Carcharhinidae	Rhizoprionodon taylori	Australian Sharpnose Shark
Dasyatidae	Dasyatis sp.	Stingray unidentified
Pristidae	Pristis zijsron	Green Sawfish
Pristidae	Pristis microdon	Freshwater Sawfish
Rhinobatidae	Rhinobatus typus	Giant Shovelnose Ray
Rhinopteridae	Rhinoptera neglecta	Australian Cownose Ray
Rhynchobatidae	Rhynchobatus australiae	White-spotted Guitarfish
Sphyrnidae	Sphyrna lewini	Scalloped Hammerhead Shark
Albulidae	Albula neoguinaica	Bonefish
Ariidae	Arius thalassinus	Giant Salmon Catfish
Ariidae	Arius sp.	Catfish
Ariidae	Arius macrocephalus	Pointed-Nosed Salmon Catfish
Ariidae	Arius graeffei	Lesser Salmon Catfish
Belonidae	Tylosurus crocodilus	Crocodile Longtom
Carangidae	Alectus indicus	Diamond Trevally
Carangidae	Atule mate	Scad
Carangidae	Carangoides fulvoguttatus	Turrum
Carangidae	Caranx tille	Tille Trevally
Carangidae	Caranx ignobilis	Giant Trevally
Carangidae	Parastromateus niger	Black Pomfret
Carangidae	Pseudocaranx dentex	Silver Trevally
Carangidae	Scomberoides commersonnianus	White Queenfish
Carangidae	Scomberoides tala	Barred Queenfish
Carangidae	Scomberoides tol	Needleskin Queenfish
Centropomidae	Lates calcarifer	Barramundi
Chanidae	Chanos chanos	Milkfish
Chirocentridae	Chirocentrus dorab	Wolf Herring
Clupeidae	Anodontostoma chacunda	Mud Herring
Clupeidae	Herklotsichthys castelnaui	Herring
Clupeidae	Nematolosa come	Bony Bream (Marine)
Clupeidae	Nematolosa erebi	Bony Bream (Freshwater)
Cynoglossidae	Paraplagusia sp.	Tongue Sole
Drepanidae	Drepane punctata	Sickle Fish
Elopidae	Elops hawaiiensis	Giant Herring
Engraulidae	Thryssa hamiltoni	Hamilton's Anchovy
Gerreidae	Gerres sp.	Siver Biddy (unidentified)

Family	Species	Common Name
Gerreidae	Gerres filamentosus	Long finned Silver Biddy
Haemulidae	Plectorhinchus gibbosus	Mowong
Haemulidae	Pomadasys kaaken	Banded Grunter
Lutjanidae	Lutjanus argentimaculatus	Mangrove Jack
Megalopidae	Megalops cyprinoides	Tarpon
Mugilidae	Liza subviridis	Flat Tail mullet
Mugilidae	Liza vaigiensis	Diamond Scale Mullet
Mugilidae	Mugil cephalus	Sea Mullet
Mugilidae	Valamugil seheli	Blue tail mullet
Mugilidae	Valamugil buchanani	Buchanans Mullet
Plotosidae	Tandanus tandanus	Freshwater Eel-Tailed Catfish
Polynemidae	Eleutheronema tetradactylum	Blue Threadfin
Polynemidae	Polydactylus macrochir/sheridani	King Salmon
Pristigasteridae	Pellona ditchela	Ditchelee
Scatophagidae	Scatophagus argus	Spotted Butterfish
Scatophagidae	Selenotoca multifasciata	Striped Butterfish
Sciaenidae	Nibia soldada	Silver Jew
Sciaenidae	Protonibea diacanthus	Black Jew
Scombridae	Thunnus tonngol	Northern Bluefin Tuna
Sparidae	Acanthopagrus berda	Pikey Bream
Toxotidae	Toxotes chatareus	Spotted Archer Fish
Toxotidae	Toxotes jaculatrix	Banded Archer Fish

N.B. Rendahls Catfish (*Porochilus rendahli)* is also known from the Normanby complex (Abrahams et al., 1995).