



**CAPE YORK PENINSULA LAND USE STRATEGY  
(CYPLUS)**

**Stage 1 Overview Reports**

**THEMATIC REPORT 1 OF 3  
*NATURAL RESOURCES AND ECOLOGY***

Environment Science and Services (NQ)  
October 1995

**ENVIRONMENT**  
**SCIENCE & SERVICES (NQ)**  
**ENVIRONMENTAL MANAGERS & PLANNERS**

**CYPLUS is a joint initiative of the Queensland and Commonwealth Governments**

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## EXECUTIVE SUMMARY

### 1 Introduction

Cape York Peninsula is a diverse and important region of tropical Australia. It covers 13,720,000 hectares and has a current population of about 18,000 people.

The Cape York Peninsula Land Use Strategy (CYPLUS) was established as a joint initiative of the Queensland and Commonwealth Governments in 1992 to provide a vehicle for the establishment of regional land and land-related resource use objectives within the context of Australian and Queensland Ecologically Sustainable Development (ESD) policy. The National Strategy for Ecologically Sustainable Development sets the goal for ESD as:

*Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*

The CYPLUS process comprises three stages, namely data collection and issues identification; development of strategic principles for land and resource use; and implementation.

Stage 1 culminates in the production of three thematic reports, namely:

- Natural Resources and Ecology (*this report*).
- Land Use and Economy.
- Society and Culture.

Together with an Overview report (*Overview of Current Resources, Land Uses and Issues*), these reports effectively summarise and communicate the key findings of the Stage 1 data collection exercise and provide a sound information base for the implementation of Stage 2. The Stage 1 studies note that some additional analysis of existing data is required and that some extra data may need to be collected.

### 2 Natural resources

The natural resources of Cape York Peninsula include those biophysical attributes and processes upon which life and human settlement depend.

#### *Topography and climate*

Cape York Peninsula is of relatively low relief with level to undulating plains comprising 75% of the area. The highest land (to 800 metres) occurs in the central eastern uplands in the Coen/Iron Range area.

The area has a monsoonal climate with distinct wet and dry seasons. Sixty percent of the area experiences less than 2,100 mm of rainfall per year and only 1% greater than 2,100 mm per year. In general, the northern and eastern areas are wetter than the south and south-west.

### *Water and drainage*

The area contains 16 complete river basins of which the Mitchell is the largest in terms of catchment area and discharge. The rivers draining to the east coast are generally short and steep while those flowing to the west (and the north-flowing Normanby River) are large, high volume rivers. The broad erosional plains of both coasts offer little confinement to floods and these are exacerbated by high tides. Lagoons and wetlands are more numerous on the west coast.

On an annual basis, the supply of water is plentiful, although flows are highly seasonal. Groundwater resources are plentiful in the abundant deposits of the Carpentaria, Laura and Karumba basins. With the exception of the Annan River, the rivers are un-modified by major dams or other river works.

### *Geology and physiography*

The study area contains seven geological regions. These range from the younger (1.65 to 65 million year old) sedimentary deposits of the Karumba basin to the ancient (1,500 million year old) metamorphics of the Coen Inlier. Within these regions are found a variety of minerals of economic importance, with the most significant of these being gold, and more recently, bauxite, kaolin, and silica sand.

The study area contains ten physiographic units which can be further grouped into three broad units:

- The **depositional surfaces** (including coastal deposits).
- The **dissected Cainozoic surfaces** (including the Rolling Downs Group, Helby Beds and the Aurukun surface).
- The **hilly to mountainous areas** (the Hodgkinson Province and Coen and Yambo Inliers).

### *Soils*

One hundred and thirteen soil types have been identified and these have been grouped into seven natural landscapes or divisions on the basis of distinctions in physiography and geology, elements of vegetation, and current land use. Ten major soil types have been identified and of these the most common (covering 10% of the study area) includes the deeply-bleached gradational yellow massive soils formed on residual sands across the Peninsula from Pormpuraaw through Coen to the east coast.

Almost all of the soils of Cape York Peninsula have low levels of plant nutrients and are deficient in phosphorous and nitrogen. Many are deficient in other nutrients and trace elements and this inherent infertility limits the range of plant communities which, because of the high rainfall, could be expected to be present. Many of the soils are weakly structured and are prone to erosion when cleared.

### ***Flora***

Thirty broad vegetation groups have been recorded on Cape York Peninsula. These have been amalgamated into six main groups dominated by eucalypt woodlands (64% of the total area). Other key groups are melaleuca woodlands (14.2%), grasslands (6.1%), rainforest (5.6%), and heathlands (3.3%).

A total of 3,338 plant species have been recorded of which the grass family contains the greatest number of species. Exotics account for 7.4% of species and rare and threatened plants for 11.4%.

Fourteen species of seagrass have been identified from the Torres Strait and east coast of Cape York Peninsula while extensive mangrove wetlands, containing 36 mangrove species, occur along both coasts of the Peninsula. Compared to the rest of Australia, there is a high diversity of marine vegetation on Cape York Peninsula.

### ***Fauna***

There are 509 species of terrestrial vertebrates including one quarter of Australia's frogs, one quarter of its reptiles, one half of its birds and one third of its mammals. Compared with the rest of Australia, Cape York Peninsula has a particularly diverse land fauna as a result of the broad range of habitat types, and the presence of pre-Holocene species from Asia and Papua New Guinea.

The main habitat types are woodlands, rainforest, riparian forests, permanent waterholes and swamps, and boulder mountains and cliffs.

Aquatic species include 73 species of freshwater fish and a further 15 species which spend part of their life cycle in fresh water. A rich and diverse fish and crustacean fauna is found in the offshore waters and many of these are of commercial significance.

## **3 Conservation values of natural resources**

The natural resources of the CYPLUS area have values which are important both in a cultural and natural heritage context. Cultural values of natural resources relate to traditional indigenous subsistence activities and the complex spiritual and ceremonial aspects of what to indigenous peoples comprise an inter-related ecological, mythological and cultural knowledge system.

The natural heritage values of the CYPLUS area include scientific and conservation values of both landforms and biological systems, as well as social/spiritual values associated with the natural landscape and wilderness. These values also include family associations with land uses such as pastoralism.

It is only in the interplay of cultural and natural heritage values of the landscape that the full conservation value of an area on the Peninsula can be understood.

A total of 126 geological or landform sites were identified using the criteria developed for the Register of the National Estate. Of these, four are of international significance, 14 are of national significance, and the remaining 108 of regional conservation significance. These sites are distributed over the length and breadth of the study area and include coastal dunefields, deltas, mountain boulder landscapes, wetlands, bauxite cliffs, and a range of other scarps, outcrops, faults and fossil localities.

A total of 40 separate analyses of biological and wilderness values were undertaken and from these 36 areas of conservation significance were identified. These areas cover 82% of the study area and include the massive Holroyd Wilderness Area which occupies 12% of the Peninsula. The analysis showed that features of conservation value are not restricted to or concentrated within any particular area but are generally widespread and occur over much of Cape York Peninsula. This analysis led the Australian Heritage Commission to determine that Cape York Peninsula is one of Australia's key conservation areas.

Its dunefields and deltaic fan deposits are amongst the best developed in the world, while the biogeographic and evolutionary relationships of the plants and animals to the biota of New Guinea provides important insights into evolutionary processes. In a national context, Cape York Peninsula is a key area for wilderness, heathland, rainforest, riparian and wetland conservation. It also contains some of Australia's highest concentrations of rare and threatened species as well as restricted endemics, and is rich in invertebrates, freshwater fish, mangroves, seagrass, and orchids.

#### **4    *Ecological threats***

In some areas the natural resources and conservation values of the CYPLUS area are under threat from the ecological threat of weeds, pest animals and fire. These threats are not restricted to particular tenures or land uses.

Weeds are unwanted plants which have been introduced from other areas of the world and which pose a threat to the integrity of ecosystems and native plant species. Of the 35 species of weeds which have been identified throughout most ecosystem types on Cape York Peninsula, ten are considered to be of major importance with rubber vine being the most serious. This plant has invaded 80% of the Mitchell River catchment, Coleman River and the Lakefield National Park.

Pond apple, which already infests wetlands and river systems in the Cairns region, is likely to become one of the worst environmental weed species in the future.

**Pest animals** are animals which have been introduced from other countries and which have become a nuisance in their adopted country in terms of their adverse impact on natural systems and economic activities. The main pest species, in diminishing order of importance, are feral pigs, dingos and feral dogs, feral horses and feral cats. Of these, the feral pig constitutes the most serious threat, with an estimated population of one to two million, mostly in the south-west of the Peninsula below Weipa and in the Lakefield National Park.

**Fire** in the form of wildfires caused by lightning is a natural force in Cape York Peninsula. Man-made fires in the form of managed burns have extended the influence of fire over millennia and have had an effect on the mosaic of vegetation now present. The interruption of this well-established fire regime has the potential to alter the balance of rainforest, woodlands and grasslands, depending on the timing and frequency of burns. Unwanted fires also result from either accidental or deliberate activities of tourists and travellers.

While fire is important in maintaining habitat diversity, it can also destroy habitat and kill animals, and lead to soil erosion.

## **5 Key policy issues**

A number of key policy issues were raised during Stage 1 from the Land Use Program studies and from agency and community consultation. The yardstick for issues identification was the set of principles underpinning Ecologically Sustainable Development.

The key issue is seen to be the protection of natural values in terms of biodiversity and ecological processes. These values require protection both within protected areas (predominantly National Parks and reserves under fisheries legislation) and on other land. Within protected areas, the issues are largely related to improved administration and management, while outside these areas two options are possible. The first is the expansion of the protected area network (and proposals for this expansion have been identified), while the second and most commonly referred to solution is that involving multiple-objective management on land with other tenures and uses so that natural values can be protected.

The management of ecological threats (plant and animal pests and fire) also requires attention across all tenures and land uses.

## **6 Information gaps**

Information gaps have been identified from the Natural Resource Analysis Program (NRAP), the Land Use Program (LUP), and from a critical analysis of the Stage 1 reports during the preparation of the theme reports.



Key gaps in either the data, or the understanding which could flow from the analysis of such data, are in the following areas:

- **Natural ecosystems** - point data on fish, insect, plant and terrestrial vertebrate fauna from various locations within the study area, as well as information on the functioning of ecosystems including fire and its management.
- **Occurrence and impact of weed and animal pests** - distributional data collected using a more rational methodology than the current property-by-property assessment where only absence or presence is recorded.
- **Interaction of indigenous people with ecosystems** - an understanding of the role of indigenous management in shaping the present natural ecosystems and possible applications in the management of protected areas, in multiple-use reserves and management areas, and on leasehold lands.

# 1 INTRODUCTION

## 1.1 Background

Cape York Peninsula is a diverse and important region of tropical Australia (see **Figure 1**). It covers approximately 13,720,000 hectares and has a current population of about 18,000 people. In particular, Cape York Peninsula is:

- Culturally important as the traditional homelands of Aboriginal people and Torres Strait Islanders who live there or associate with the region. It is also of cultural significance and home to many non-indigenous people.
- Ecologically important with some of the few tropical environments in the world that remain essentially unaffected by industrialised society.
- Economically important for its mining, fishing, tourism and pastoral industries. Its natural resources are also essential to the maintenance of a subsistence economy which makes an important contribution to the economy and quality of life of many residents.

The Cape York Peninsula Land Use Strategy (CYPLUS) was established as a joint initiative of the Queensland and Commonwealth Governments in 1992 to provide a vehicle for the establishment of regional land and land-related resource use objectives within the context of Australian and Queensland Ecologically Sustainable Development policy. Preparation of the Strategy consists of a program incorporating three stages:

- **Stage 1**, which incorporates data collection, issues identification, and analysis of opportunities and constraints for existing and future land use.
- **Stage 2**, which will involve the development of strategic directions for land and resource use which will be in the form of principles, broad policies and mechanisms for their implementation which will be recommended for government approval.
- **Stage 3**, which will be the Strategy implementation phase.

The program is now near the end of Stage 1. Stage 1 has involved the production of individual reports under the Natural Resource Analysis Program (NRAP) and the Land Use Program (LUP). Stage 1 culminates in the production of four summary reports, incorporating three thematic reports and an overview report, that integrate the information gathered to date. These will effectively summarise and communicate the main findings of Stage 1 and provide a sound information base for the implementation of Stage 2. The *Terms of Reference* for this project are included in **Appendix A**.

The three thematic reports consist of:

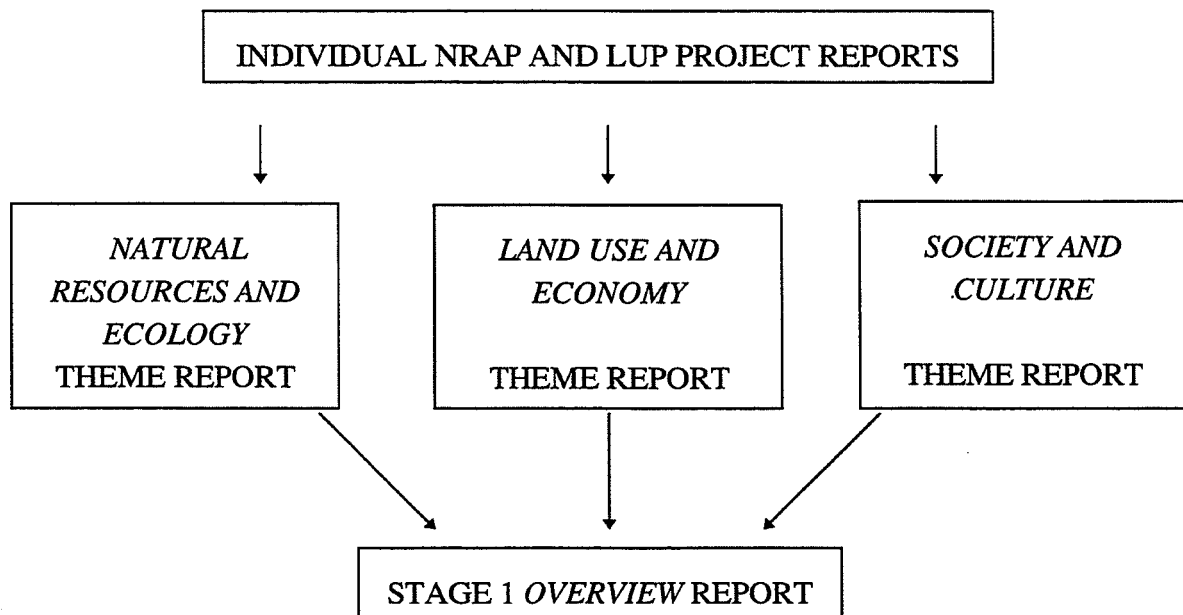
- **Natural Resources and Ecology** of Cape York Peninsula (*this report*).
- **Land Use and Economy** of Cape York Peninsula.
- **Society and Culture** of Cape York Peninsula.

Together, these provide a regional overview of:

- Current land and resource uses.
- Land and resource use potential.
- Population and social structure.
- Constraints evident from existing information and trends which could limit certain uses.

The key elements of the above reports are consolidated and integrated into a fourth report (**Overview of Current Resources, Land Uses and Issues**) which provides an overview of ecologically sustainable land and resource use issues, broad land and resource use potential and the types of opportunities which might present scope for positive action in the short term. The abbreviated tables of contents from the four reports are included in **Appendix B**, and the overall Stage 1 report structure is shown below.

#### Report structure of Stage 1 of CYPLUS



## 1.2 Study area

The CYPLUS project covers both land and resources use, including water resources up to the three mile limit (see **Figure 1**). The area covered is Cape York Peninsula from the Cook Shire boundary, the Wujal Wujal Community, the Mitchell River and the Nassau River (Teatree Creek) in the south to Cape York including Thursday Island, Horn Island and other islands of the Prince of Wales group of islands in the north. It does not include other Torres Strait islands, nor the Great Barrier Reef and the Gulf of Carpentaria beyond the three mile limit.

This study area covers a nominal 13,720,000 hectares. It should be noted that some of the Stage 1 studies quoted in this report refer to slightly different areas due to variations in the data sets used. In this report the terms *study area*, *Cape York Peninsula* and *the Peninsula* refer to the CYPLUS study area.

## 1.3 Information base

As part of Stage 1, a large amount of information has been gathered on the natural, economic and social resources of Cape York Peninsula. Given the relatively short period of time available for data gathering and the large area of Cape York Peninsula, it was not expected that the data collection could be absolutely comprehensive. As is common with most survey work, many of the studies have collected data at a series of point locations which have been subsequently used to infer general trends across Cape York Peninsula. None the less, the resultant information base represents a very valuable foundation for land use planning in Stage 2.

A summary of the Stage 1 programs which provided these data is provided in **Appendix C**.

## 1.4 Role of Ecologically Sustainable Development in CYPLUS

The Cape York Peninsula Land Use Strategy will be a framework for making decisions about use and management of natural resources on Cape York Peninsula in ways that will facilitate Ecologically Sustainable Development (ESD). A summary of the role of Ecologically Sustainable Development in CYPLUS is provided in **Appendix D**. Where relevant, the principles of ESD are described in the thematic reports with respect to resource use and management.

### 1.5 Purpose of this report

The purpose of this report (**Natural Resources and Ecology**) is to present an integrated overview of natural resources and ecological issues on Cape York Peninsula. This report looks at:

- Natural resources and their conservation values, including:
  - the physical and geological environment
  - flora and fauna
  - an integrated assessment of Cape York Peninsula for areas of high conservation value.
- Ecological threats to the conservation values of the natural resources.
- Key policy issues related to the protection, use and management of these resources.
- Gaps in the available information which may impede the development of policy.

Readers of this report should be aware that:

- It is a compilation of studies done by others and has not involved original research or data collection.
- It presents information and research findings only and does not include recommendations regarding resource allocation, land use or management.

### 1.6 The Study Team

This report has been prepared by Environment Science and Services (NQ) with the assistance of a number of specialist advisers. The study team composition and key roles are as set out below.

Name	Organisation	Role
Dr Bruce Wannan	Environment Science and Services (NQ)	Project manager; natural resources; management issues
Mr David Rivett	Environment Science and Services (NQ)	Project director; natural resources; management issues
Dr David Pitts	Environment Science and Services	Natural resources; management issues
Mr Dermot Smyth	D Smyth and C Bahrddt	Cultural ecology

### 1.7 Reference to Stage 1 studies

As detailed above, this report is based on studies mostly undertaken as part of Stage 1 of the CYPLUS process. In the text, these studies are cited by numbers from 2 to 63 in brackets, e.g. (25). The titles and authors for all studies are identified in **Appendix C**.

## 2 NATURAL RESOURCES

### 2.1 Introduction

This chapter describes the natural resources of the study area which are the topography, climate, water, geology, soils, flora and fauna. The conservation values of these resources are described in **Chapter 3**.

### 2.2 Topography and climate

Cape York Peninsula is of comparatively low relief with level to undulating plains comprising around 75% of the total area (see **Figure 2**). The highest relief is found in the Coen/Iron Range areas (800 metres above sea level) and south of Laura around Mt Lukin. The Great Divide initially runs to the west of Laura, and then upwards to Coen and along the eastern coast. The central western Cape York Peninsula is dominated by extensive alluvial plains, tidal flats and estuaries of the Archer, Holroyd and Edward Rivers.

Cape York Peninsula has a monsoonal climate with very distinct wet and dry seasons. The mean annual rainfall distributions illustrated on **Figure 3** show that:

- Approximately 60% of Cape York Peninsula has an average rainfall of less than 1,100 mm per year.
- Less than 1% has an average rainfall of more than 2,100 mm per year.
- Northern and eastern areas of Cape York Peninsula receive higher rainfall than do southern and south-western areas.

Approximately 80% of the average annual rainfall falls during the four months from December to March (30). Despite the fact that Cape York Peninsula has one of the most reliable rainfall regimes in Queensland, periodic droughts do occur.

Mean maximum summer temperatures vary from 32°C in the north and east to 37°C in the south-west of the study area (see **Figure 4**). A similar pattern is shown by mean winter maximums which vary from 24°C to 32°C (60). Maximum temperatures can exceed 40°C and minimums lower than 10°C can occur. Generally, the highest temperatures occur in November. Temperatures below 5°C are rare, with most occurrences being in the Palmerville region.

### 2.3 Water and drainage

The CYPLUS study area contains 16 complete river basins and sections of two further river basins (see **Figure 5**). Characteristics of these river basins and streams are contained in **Table 1**.

**Table 1: River Basins on Cape York Peninsula**

Name	Catchment Area (km <sup>2</sup> )	Mean Annual Discharge <sup>1</sup> (ML x 10 <sup>3</sup> )	Mean Annual Runoff <sup>2</sup> (mm)
<b>Catchments draining to the east coast</b>			
Jacky Jacky Creek	2,770	1,926	695
Olive/Pascoe	4,360	4,248	976
Lockhart	2,825	1,631	575
Stewart	2,795	1,162	416
Normanby	24,605	5,954	242
Jeannie	3,755	2,417	644
Endeavour	2,200	1,783	810
Daintree <sup>3</sup>	2,125	3,560	1,675
<b>Catchments draining to the west coast</b>			
Mitchell <sup>3</sup>	71,795	11,998	167
Coleman	13,080	4,197	321
Holroyd	10,425	3,856	370
Archer	13,595	4,828	355
Watson	4,715	3,556	754
Embley	4,715	3,185	676
Wenlock	7,575	3,373	445
Dulcie	6,655	3,576	537
Jardine	3,265	2,189	671

Source: (30, 60).

#### KEY

- 1: The duration of individual stream records varies.
- 2: This column provides an indication of catchment response to rainfall. The units of millimetres are equivalent to megalitres per square kilometre.
- 3: Partly within CYPLUS study area.

The following points can be noted from the information in the table above:

- The Mitchell River has the highest mean annual discharge of the rivers on Cape York Peninsula, and has the highest volume of discharge of any river in Queensland (60).
- The Mitchell River has the largest catchment of the rivers on Cape York Peninsula.
- The rivers draining to the east coast tend to have higher levels of runoff than the rivers draining to the west coast.

Most of the large seasonal rivers flow east or west with only the Normanby River (including the Kennedy River) and a substantial part of the Jardine River flowing northwards. Most have extensive flood plains in their lower reaches. River flow is usually intermittent with only the Jardine and Wenlock (west flowing) and Pascoe and some smaller rivers (east flowing) being perennial.

East coast rivers and streams are all relatively short with small catchments because of the proximity of the mountain ranges and contain few permanent lagoons. West coast rivers start on the plateau country of the Great Divide and flow through large erosional flood plains (30). Except for the Wenlock and Jardine Rivers, these rivers flow intermittently.

On an annual basis, the supply of water is plentiful - the Mitchell River for example has the highest mean annual discharge of any river in Queensland and in terms of volume discharged is one of the largest river systems in Australia. However, the nature of the supply is highly seasonal with widespread flooding during summer months (the "wet") and relatively arid conditions during winter months ("the dry").

The broad flat erosional plains provide little flood confinement. Floods are exacerbated by the high tides that occur in the Gulf of Carpentaria, and these tides can inundate many of the western coastal saltpans up to 80 kilometres inland. Flow rates can vary from no flow to floods of a large magnitude and these regimes may vary significantly within different sections of the same river.

In the west, wetlands occur in the major watercourses, lagoons, outflow channels and south-western drainage basins. The number and size of these wetlands tend to increase towards the coast. Eastern wetlands are extensive but with fewer lagoons. Large and reliable groundwater resources are associated with the sedimentary rocks of Carpentaria, Laura and Karumba Basins (30).

Riparian vegetation is well developed along most of the major water bodies and gallery forests are common along all rivers except the Edward River (47).

With the exception of the Annan River, the rivers are unmodified by dams or other river works.

Groundwater resources are plentiful in the sedimentary deposits of the Carpentaria, Laura and Annan Rivers (60).



## 2.4 Geology and Physiography

### 2.4.1 Geology

The study area is covered by seven geological regions (19) as shown on **Figure 6** and described in **Table 2**. These are the:

- **Coen Inlier and Yambo Inlier.** Together these form part of an exposed north-south trending ridge and contain the oldest rocks in the region.
- **Hodgkinson Province,** which occurs in the south-eastern part of the study area.
- **Cape York-Oriomo Inlier,** which encompasses the islands of the Torres Strait and the mainland near Cape York.
- **The Carpentaria Basin and the Laura Basin,** which cover most of the study area. These may have been more extensive than the areas shown on **Figure 6**, covering the older Coen and Yambo Inliers and the Hodgkinson Province with a veneer of sediment ranging in origin and size from coarse terrestrial to fine marine materials. The basins have since been partially eroded to expose the underlying rocks.
- **Karumba Basin,** which is superimposed on the Carpentaria Basin and which hosts economically important bauxite and kaolin deposits.

**Table 2: Geological characteristics of Cape York Peninsula**

Region	Rock Type	Age (million years)	Mineral/resource
Coen Inlier Yambo Inlier	Metamorphic Granite Sediments, volcanics, granite	1,500 400 285	Gold, tin, tungsten, base metals, iron, manganese, heavy minerals, coal
Hodgkinson Basin	Meta-sedimentary Sediments, volcanics, Granite	500-360 290 290-250	Gold, tin, tungsten, base metals, antimony, coal, limestone
Cape York - Oriomo Inlier	Volcanic, granite	295	Gold, tin, tungsten, base metals
Carpentaria Basin Laura Basin	Sedimentary	210-65	Coal, heavy minerals, silica sand, gold, groundwater and maybe petroleum
Karumba Basin	Sedimentary	65-1.65	Bauxite, kaolin, silica sand, heavy minerals, groundwater

Source: (19, 43)

The economic values of the geological resources are described in the *Land Use and Economy* theme report.

### 2.4.2 Physiography

The physiography of the CYPLUS area has been classified (60) as containing ten generalised physiographic units which have been determined on the basis of geology, relief, soils, and vegetation (**Figure 7**). These are:

- **Near-coastal plains** - depositional landforms along most of the west coast and around Princess Charlotte Bay.
- **Dunefields** - depositional and erosional surfaces along much of the east coast and particularly Shelburne Bay and Cape Flattery.
- **Subcoastal fans and alluvial plains** - depositional and erosional surfaces associated with the lower reaches of the major rivers draining into the Gulf of Carpentaria and Princess Charlotte Bay.
- **Inland fans and alluvial plains** - old and stable depositional surfaces in the floodplains of the larger western rivers.
- **Undulating plateaux of the Northern Peninsula** - erosional plains with varied amounts of erosional stripping where bauxite is present (Weipa) and near the Jardine River.
- **Gently undulating plains of the Central Western Peninsula** - gently undulating erosional plains with shallow drainage depressions and prominent swampy areas, lying between the extensive plains of the north central Peninsula and the alluvial plains of the coast.
- **Plains of the Northern Central Peninsula** - extensive undulating erosional plains between Coen and Weipa formed on marine sediments with higher remnants of a laterised surface. These plains are incised by a number of rivers which have formed newer depositional surfaces.
- **Central Eastern uplands** - metamorphic and granitic rock surfaces with occasional sandstone plateaux and which form the highest parts of Cape York Peninsula on a north-south axis through Coen.
- **South-east uplands** - erosional upland surfaces west and north-west of Cooktown and which have been strongly dissected to form hilly lands with mesas and steep scarps.
- **Sandstone plateau** - erosional upland surfaces containing mountains on volcanic and sedimentary bases west and north-west of Cooktown and extending as far west as Laura.

In general terms, (39) the CYPLUS area contains three groups of physiographic units:

- The **depositional surfaces** (including coastal deposits).
- The **dissected Cainozoic surfaces** (including the Rolling Downs Group, Helby Beds and the Aurukun surface).
- The **hilly to mountainous areas** (the Hodgkinson Province and Coen and Yambo Inliers).

## 2.5 Soils

One hundred and thirteen soil types have been identified for the region (39). While the resultant map is too detailed for inclusion in this report, a regional perspective that was produced (39) by grouping these soil types into seven large natural divisions (landscapes) is provided on **Figure 8**. These landscapes, which are based on distinctions in physiography and geology, elements of vegetation, and current land use, (39) are described below:

- **Heathlands**, which:
  - dominates the northern quarter of the Peninsula
  - consists mainly of soils derived from sandstone that are vegetated with heaths and Darwin stringybark (*Eucalyptus tetrodonta*) woodlands
  - contains gradational sandy yellow soils and deep bleached soils on footslopes and sandy depressions
  - consists of soils that are generally characterised by infertility, poor drainage and restricted moisture supply.
- **Batavia**, which:
  - occupies the central western part of the Peninsula
  - consists mainly of clay soils on an eroded landscape
  - contains deep gradational red massive soils and deep gradational yellow massive soils
  - contains bauxite on the Weipa plateau
  - consists of some fertile soils and some soils that are characterised by low fertility, poor drainage, and potential for salinity risk.
- **Lockhart River**, which:
  - occupies the central eastern part of the Peninsula, i.e. the high rainfall areas in the vicinity of Iron Range
  - consists of greatly varying soil types (clay soils dominate the hillslopes under closed forest)
  - contains a large range of rock types and landforms
  - consists of soils that are generally characterised by poor drainage, poor fertility, high slope and rock content, and flooding susceptibility.
- **Ebagoola**, which:
  - occupies the central/south-eastern part of the Peninsula
  - encompasses a range of geologies and soils associated with eastern edge of Coen Inlier
  - contains soils formed from acid igneous and metamorphic rocks, alluvia and sandstone remnants
  - consists of some fertile soils and some soils that are characterised by shallow depth, rockiness, high slope, and poor fertility.

- **Edward River**, which:
  - occupies the central/south-western part of the Peninsula between Aurukun and the Mitchell River
  - contains large areas of sandy soils, significant alluvial soils, coastline saline clays
  - consists of some fertile soils and some soils that are characterised by poor drainage.
- **Mitchell**, which:
  - occurs in the south-western corner of Cape York Peninsula and in a small area adjacent to Princess Charlotte Bay
  - contains heavy textured cracking and non-cracking soils on flood plains, beach ridges, coastal saline clays
  - consists of generally fertile soils, some of which are prone to flooding.
- **Hodgkinson**, which:
  - dominates the south-eastern corner of Cape York Peninsula
  - contains shallow rocky soils, sandstone and metamorphic-derived soils, some alluvial soils
  - consists of soils that are generally characterised by high slope, rockiness, being prone to flooding, and poor fertility.

There are four main areas not covered by these seven landscapes:

- North of the **Heathlands** landscape (i.e. Bamaga and Prince of Wales).
- The Laura Basin.
- North-west of Lockhart River.
- West of Coen.

A total of eight major soil types have been identified for the Peninsula (39). Of these, the *Clark* type which is found in the Ebagoola and Edward River landscapes across the Peninsula from Pormpuraaw and through Coen to the east coast is the most extensive (10% of the CYPLUS area). This type comprises deeply bleached gradational yellow massive soils formed on residual sands.

Although it is difficult to generalise, almost all of the soils of Cape York Peninsula have low levels of plant nutrients and are deficient in phosphorous and nitrogen. Many are deficient in other nutrients and trace elements and this inherent infertility limits the range of plant communities which, because of the high rainfall, could be expected to be present. Many of the soils are weakly structured and are prone to erosion when cleared.

The economic values of the soil resources for agriculture, aquaculture and mining are described in the *Land Use and Economy* theme report.

## 2.6 Biological resources

### 2.6.1 Flora

Thirty Broad Vegetation Groups have been recorded on Cape York Peninsula (37). These are based on floristics (i.e. species present), structural formation and locality. They can be amalgamated to produce six groups that are mapped on **Figure 9**. The areas of these amalgamated groups are listed in **Table 3**.

**Table 3: Extent of amalgamated Broad Vegetation Groups**

Amalgamated Broad Vegetation Groups	Area (hectares)	% of Total Area
Eucalypt dominated woodlands, open-woodlands and open forests	8,541,700	64%
Melaleuca dominated low open-woodlands, low woodlands and tall shrublands	1,901,300	14.2%
Grasslands and sparse open-woodlands	811,100	6.1%
Closed forest (rainforest)	748,100	5.6%
Heathlands	446,100	3.3%
Other communities (including littoral vegetation and wetland areas)	905,600	6.8%
<b>TOTAL</b>	<b>13,353,900</b>	<b>100%</b>

Source: (37)

Field collecting and analysis of existing herbarium data (37) has produced a list of 3,338 species of flowering plants, conifers and ferns. Five families account for nearly 30% of the total species recorded. These are, in decreasing number of species, the Poaceae (grasses), Cyperaceae (sedges), Fabaceae (peas), Myrtaceae (eucalypts) and Orchidaceae (orchids). There are 247 exotic species (7.4% of the total flora) and 379 species that are listed by the Queensland Herbarium as rare or threatened (11.4% of the total flora).

Fourteen species of seagrass (5) have been identified from the Torres Strait and east coast of Cape York Peninsula. They are found in sheltered bays, coastal inlets and behind continental islands and fringing reefs. The major seagrass beds are located in shallow waters off the eastern coastline of Cape York Peninsula. There are 36 species of mangroves which occur along both coasts of the Peninsula.

### 2.6.2 Fauna

There are 509 terrestrial vertebrate species recorded from the area (40) comprising:

- 32 frog species (one quarter of Australia's frog species).
- 103 reptile species (one quarter of Australia's reptile species).
- 301 bird species (one half of Australia's bird species).
- 73 mammal species (one third of Australia's mammals).

Compared to the rest of Australia (40), Cape York Peninsula has a particularly diverse land fauna which is the result of:

- The broad range of habitat types.
- The presence of south-east Asian and Papua New Guinean species which were able to enter Australia via Cape York Peninsula during periods of reduced sea levels.

The major land habitat types found on Cape York Peninsula are woodlands, rainforests, riparian forests, permanent waterholes and swamps, and boulder mountains and cliffs (40). An analysis of terrestrial vertebrate species habitats suggests that:

- The greatest proportion of species are associated with woodland habitat which occupies over 80% of the Peninsula.
- Overall species numbers recorded from minor habitats (grasslands, heathlands, mangroves and rainforest) are high considering the relatively small areas of these habitats.
- The number of species using rainforest as a core habitat (i.e. the habitat without which the species would disappear) is relatively high, thus emphasising the concentration of biodiversity within this habitat.

Surveys of fish fauna (47) in major river systems have identified 73 species of freshwater fish and 15 species which spend part of their life cycle in freshwater. The following areas were found to provide habitats for uncommon fish species:

- The Olive River.
- The Claudie and Lockhart Rivers.
- The east coast dunefield lakes.
- The Wenlock River.
- The Mitchell and Jardine Rivers.

A rich and diverse fish and crustacean fauna is found in marine and estuarine waters off the coastline of Cape York Peninsula. This includes species of commercial significance such as:

- Tiger and banana prawns.
- Barramundi, threadfin salmon, mackerel, grunter, shark, coral trout and red throat emperor.
- Mud crabs.

The condition of biological communities on Cape York Peninsula is generally good with many habitats remaining largely unaffected by modern human pressures (40). As a result, there are no species that are known to have become extinct. However, many vertebrate populations are low which possibly reflects low soil fertility over much of the Peninsula (40).

The Australian Heritage Commission report (5) notes that there are 85 vertebrate species which are listed as rare or threatened (i.e. presumed extinct, endangered or vulnerable) on the schedules of Queensland's *Nature Conservation Act 1992* and/or the Commonwealth's *Endangered Species Protection Act 1992* (see **Table 4**).

**Table 4: Conservation status of vertebrate fauna**

Conservation Status	Number of species
Presumed extinct	Nil
Endangered	11
Vulnerable	16
Rare	58
<b>Total</b>	<b>85</b>

Source: (5)

## **2.7 Regional analysis of natural resources**

In describing the natural resources of the study area, researchers have attempted to recognise patterns at a sub-regional level. A number of researchers have defined regional divisions using a variety of shared features. In addition to the regional divisions based on physiography, geology and soils, outlined above, there are two other regionalisations which have been reported in Stage 1 that have used a selection of natural parameters. These were:

- An **environmental regionalisation** (48), which used a selection of 28 physical attributes, related to climate, terrain and lithology, to define five sub-regions (see **Figure 10**). This analysis showed that, of all the physical parameters used in determining the boundaries of the sub-regions, geology provided the strongest influence, followed by terrain and climate.
- A **biogeographic regionalisation** (4), which was based on geology, terrain, soil, climate, flora and fauna (**Figure 11**). This regionalisation shows that Cape York Peninsula includes parts of four biogeographic regions:
  - Cape York Peninsula (all).
  - Gulf Plains (part).
  - Einasleigh Uplands (part).
  - Wet Tropics (part).

The main value of these regionalisations will be the benchmarks that they provide for comparison with regional divisions based on other attributes. This issue is discussed in more detail in the *Overview of Current Resources, Land Uses and Issues* summary report.

### 3 CONSERVATION VALUES OF NATURAL RESOURCES

#### 3.1 Introduction

The association of a value with a resource is always undertaken through a cultural or social filter. As a consequence of the need to consider resource values in terms of the three themes (nature, land use, society), there is necessarily a degree of overlap and sometimes inconsistency between their treatments. The values described in this report comprise those derived from a scientific, conservation and social or spiritual perspective. Those values which have more of an economic or land use basis (e.g. for mining, forestry, agriculture) are described in the *Land Use and Economy* theme report, while values of a spiritual and community nature are described in the *Society and Culture* theme report.

It is important that the indigenous values of the natural resources be recognised alongside the non-indigenous values that are identified for these resources, so that there is recognition of the cultural filters being applied in each case. For example, there are Aboriginal and Torres Strait Islander (cultural) conservation values ascribed to the landscape, flora and fauna of Cape York Peninsula (described in **Section 3.2**). And indeed there are non-indigenous (cultural) scientific/conservation values ascribed to the landscape, flora and fauna of Cape York Peninsula (described in **Section 3.3**). This is also the case for land use values and social values. It is important that there is a recognition that the resources of Cape York Peninsula can be considered through at least two main cultural filters or value systems: indigenous and non-indigenous.

Therefore, the conservation values of the natural resources are described from an indigenous and non-indigenous perspective in this chapter. The economic and social values of these resources are respectively described in the theme reports: *Land Use and Economy* and *Society and Culture*.

Following a description of indigenous conservation values in **Section 3.2**, the non-indigenous conservation values and the significance of these values are described in **Sections 3.3.1 - 3.3.3** in three categories:

- Conservation values of the physical resources (i.e. topography, climate, drainage, geology and soil).
- Conservation values of the biological resources (i.e. various aspects of flora and fauna).
- Conservation values of the wilderness resources (i.e. a landscape value associated with environmental remoteness and naturalness).



A collation of these values is provided (**Section 3.3.5**) to give an overall assessment of the conservation significance of Cape York Peninsula. The current representativeness of National Parks and the identification of priority areas for nature conservation are discussed in the *Land Use and Economy* theme report. A total of 21 priority areas for nature conservation (mostly terrestrial) have been identified based on:

- Rarity and extent of vegetation community (i.e. mapping unit).
- Biogeographic context.
- Current and future land use options (e.g. potential threats).
- Occurrence of rare or threatened plant species.
- Terrestrial fauna habitat data.
- Rare or threatened fauna species.
- Wetlands habitats.
- Wetland fauna.

### **3.2 Indigenous conservation values**

The natural resources of Cape York Peninsula have conservation values for the Aboriginal and Torres Strait Islander peoples of the region. In addition to supplying a sustainable subsistence economy over thousands of years, these resources and ecosystems are part of belief systems which explain the origins of landscapes, plants, animals and people, and the kinship connections between them.

The habitats of Cape York Peninsula are part of ancient owned and managed Aboriginal and Torres Strait Islander domains. In a country whose indigenous inhabitants have been in occupation for over 40,000 years, and whose current coastline and climatic regime is less than 6,000 years old, it is clear that Aboriginal people have been an integral part of the contemporary environments of the Peninsula since these environments became established in their current form.

Despite drastic changes to Aboriginal and Torres Strait Islander cultures over the last 150 years, much traditional ecological, mythological and cultural knowledge remains. This includes indigenous knowledge of landforms, species, habitats, seasons, food processing and medicines. The indigenous values of the natural resources of Cape York Peninsula therefore include a wide range of values related to the peoples' material and spiritual life. This dimension is an integral part of the consideration of the values of the natural resources and ecosystems described below.

### 3.3 *Non-indigenous conservation values*

#### 3.3.1 Introduction

This section describes the conservation values of the natural resources of Cape York Peninsula without regard to existing tenure or land use. While much detail has been collected in the Stage 1 reports on specific attributes used in determining conservation significance, a discussion of the role and significance of these attributes to their ecosystems is, in general, lacking.

The economic and land use values of these resources are described in **Chapter 3** of the *Land Use and Economy* theme report.

#### 3.3.2 Conservation value of physical resources

The geological and landform resources described in the previous chapter have conservation values which are significant at regional, national and international levels and these are described below. The conservation significance of geological or landform features has been assessed against the criteria adopted in compiling the Register of the National Estate (6).

The criteria used for assessment are that the area or feature:

- Criterion A1:** Contains important evidence or products of past climate, geological or landform processes.
- Criterion A2:** Is important to the maintenance of existing geological or landform processes.
- Criterion A3:** Is particularly diverse or rich in geological or landform features.
- Criterion B1:** Contains uncommon or rare geological or landform features.
- Criterion C1:** Is an important research, education or benchmark site.
- Criterion D1:** Is a particularly good example of a type of geological or landform feature or exhibits characteristics of a class of features.

A total of 126 sites were identified as having regional or greater conservation significance. Four of these were regarded as having **international** conservation significance:

- Cape Bedford-Cape Flattery Dunefield.
- Shelburne Bay Dunefield.
- Newcastle Bay Dunefield.
- Mitchell River Delta.

Fourteen of the sites were recognised as having **national** conservation significance:

- Indian Head-Cape Bedford Hodgkinson Formation exposures.
- Palmerville fault system.
- Mitchell Palmer limestone belt.
- Cape Melville-Black Mountain boulder landscapes.
- Princess Charlotte Bay chenier ridges.
- Archer-Holroyd Rivers area.
- Holroyd-Edward Rivers area.
- Jardine National Park and swamps.
- Pennefather Port Musgrave area.
- Pera Head.
- Weipa bauxite cliffs.
- Weipa shell mounds.
- Orford Point.
- Glen Garland swamps.

These four international and 14 nationally significant sites are shown on **Figure 12**.

The remaining 108 areas were assessed as having **regional** conservation significance. These were: Coen River Migmatite exposures, Coen Inlier shear zones, 3 sites of major tor and boulder exposures, Cape Grenville volcanics, Silver Plains nephelinite, Cannibal Creek granite deformation, Wenlock River Ferricrete exposures, Holroyd scarp, Merapah scarp, Great Escarpment river captures (3 sites), Archer Bend flood plains, Kimba Plateau, MacDonald-Skardon River, 69 type sections and type localities, and 22 fossil localities. In **Section 3.3.5** these data are collated, together with the results of the biological assessment from **Section 3.3.3**, to provide an assessment of the overall conservation value of Cape York Peninsula.

### **3.3.3 Conservation values of the biological resources**

#### **a) Introduction**

The Australian Heritage Commission (in association with the Environmental Resources Information Network) undertook a study (5) looking into areas of conservation value. This assessment was undertaken primarily to address areas of regional and national significance. Where appropriate the international and local significance of the areas has been addressed briefly to provide further context to the assessment.

The aim of the project was to assess the natural resource information available against the criteria for listing places on the Register of the National Estate.

The criteria used for assessment are that the natural or cultural feature has significance because of:

- Criterion A:** Its importance in the course, or pattern, of Australia's natural or cultural history.
- Criterion B:** Its possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.
- Criterion C:** Its potential to yield information that will contribute to an understanding of Australia's natural or cultural history.
- Criterion D:** Its importance in demonstrating the principal characteristics of:
  - a class of Australia's natural or cultural places
  - a class of Australia's natural or cultural environments.
- Criterion E:** Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.
- Criterion F:** Its importance in demonstrating a high degree of creative or technical achievement at a particular period.
- Criterion G:** Its strong or special associations with a particular community or cultural group for social, cultural or spiritual reasons.
- Criterion H:** Its special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.

The study was undertaken (5) using data gathered from the Natural Resource Assessment Program and the Land Use Program. In total, 40 separate analyses of natural conservation values were undertaken and the results presented as maps. The assessment of conservation values and their significance was undertaken in three ways using:

- **Broad-scale modelling** to identify areas of significance, in the following categories:
  - rare, uncommon or restricted vegetation communities
  - areas of vegetation community richness
  - vegetation communities exhibiting the principal characteristics of their class
  - areas of terrestrial fauna richness.
- **A thematic approach** to identify areas of significance, in the following categories:
  - wetland areas of significance
  - areas significant for marine vegetation
  - rainforest areas of significance
  - areas significant for maintaining seabird and shorebird populations
  - sand dune or sand mass areas of significance on Eastern Cape York Peninsula

- areas significant for species richness
- areas of significance for butterflies
- significant riparian environments.
- **Species-specific** or point-location based information, in the following categories:
  - areas of biogeographic and evolutionary significance
  - areas of significance for rare and threatened plant and animal species
  - areas of significance for their contribution to research or as type localities.

These 15 analyses are described in sub-sections b) to p) below.

**b) *Rare, uncommon or restricted vegetation communities***

In a national context there are a number of broad-scale community types that are naturally restricted or diminished and so can be considered nationally rare or uncommon (5). In some instances, Cape York Peninsula has a good representation of these communities (see **Figure 13**). These are:

- Closed forest or rainforest communities. About one fifth of Australian rainforest is found on Cape York Peninsula.
- Heath communities. These communities on Cape York Peninsula are among the largest in Australia.

In a regional perspective, there are a number of vegetation communities that cover a small area or occur in a few places on Cape York Peninsula. The analysis determined those vegetation communities which were either rare or uncommon on a regional scale. The assessment considered either the relative mapped area of the community across Cape York Peninsula or the number of discrete mapped occurrences of that community.

Determination of rare communities and uncommon communities was undertaken at two mapping scales, one using Broad Vegetation Groups and another using the 201 Vegetation Classes (37). Analysis at two scales tested the sensitivity of the analysis to scale. Rare communities and uncommon communities covering greater than 30% of the identified polygons at either the Broad Vegetation Group (see **Figure 14**) or 201 Class level (see **Figure 15**) were considered to be areas of conservation significance.

The analysis determined that the following areas are of particularly high significance:

- The mid-Peninsula rainforests.
- The far north eastern rainforests.
- The Starcke-Cape Melville-Lakeland area.
- The Torres Strait islands.
- The coastal communities:
  - along the south-west coast
  - in the Princess Charlotte Bay area
  - in the Vrilya area.

c) *Areas of vegetation community richness*

The *Vegetation Survey* (37) provided the base data set for this analysis. The analysis was undertaken at both the 6 and 10 minute grid cell levels to test the sensitivity of the analysis. **Figures 16 and 17** together illustrate that essentially the same areas are identified independent of the scale of analysis. Either of these analyses provides a broad landscape-scale interpretation of the vegetation community richness. The areas of particular value from this analysis are:

- Iron Range.
- McIlwraith Range.
- Pascoe area.
- Shelburne Bay area.
- Lockerbie area.
- Vrilya areas.
- Melville-Starcke coast.
- East of Lakefield National Park.
- The Rokeby area in the central Peninsula.
- The Kimba Plateau.

d) *Vegetation communities exhibiting the principal characteristics of their class*

The best examples of a particular vegetation class were identified from the *Vegetation Survey* (37). Information on biophysical naturalness (from wilderness quality) was also used to provide an indication of condition and integrity. The assumptions on which this analysis was based are that:

- Larger areas of a vegetation community provide the best examples of that community.
- Areas that have suffered least from non-natural disturbance are the best examples.
- The distribution pattern of the vegetation community is an integral part of the vegetation class characteristics.

To determine examples of each vegetation class which exhibit the best condition and integrity of the class, three indicators were used:

- Wilderness quality.
- Biophysical naturalness.
- The size of each mapped vegetation unit.

The areas containing the best examples of the vegetation classes on Cape York Peninsula are shown on **Figure 18**.

This method of selecting areas representative of vegetation classes is directed toward selecting those which best exhibit the principal characteristics of the vegetation class. Using the Natural Wilderness Inventory information, it was possible to model those areas with relatively high condition and integrity and which are also among the larger mapped areas. The areas identified indicate those areas on Cape York Peninsula which

best represent each vegetation class, or when considered collectively, the suite of vegetation classes.

*e) Areas of terrestrial fauna richness*

As part of the *Terrestrial Vertebrate Survey* (40), an analysis of faunal diversity across Cape York Peninsula was undertaken. The numbers of faunal records and search effort for each of the 514 ten minute grid cells were compared within the study area. This analysis identified 18 grid cells with a comparatively high species diversity index (see **Figure 19**). These cells occur at:

- Somerset.
- Port Musgrave.
- Inland from Weipa.
- Iron Range.
- Coen-McIlwraith Range.
- Aurukun.
- Edward River.
- The mouth of the Mitchell River.
- The base of Prince Charlotte Bay.
- Cooktown and the Wet Tropics area.

The *Terrestrial Vertebrate Survey* (40) also provided information on frog, reptile, bird and mammal richness and revealed that the McIlwraith Range area is a core area of mammal and bird diversity on Cape York Peninsula.

At a local scale, the strips of forest along rivers provide a more lush environment than the surrounding dry woodlands and usually contain both rainforest and sclerophyll trees of the open forests and woodlands. As a result, the faunal assemblages of the riparian strips are more diverse than the woodlands that they cross (40).

*f) Wetland areas of significance*

The wetlands of Cape York Peninsula are amongst the largest, richest and most diverse in Australia. Many are amongst the best examples of their type in Australia, while vast coastal and sub-coastal wetlands of the mid west coast are of national importance to waterbird populations (46).

The *Wetland Fauna Survey* (46) described the types and locations of wetlands that occur on Cape York Peninsula and identified wetland complexes of conservation value.

Broadly delineated areas of significant wetlands on the Peninsula have been identified by applying the following criteria:

- It is an area which contained a relatively high diversity of wetland types.
- It is particularly rich in a particular wetland type(s).
- It is a particularly good example of its type.
- It is an important waterbird habitat.

A total of 14 areas were identified as being of national significance (shown on **Figure 20**). These are:

- Newcastle Bay.
- Jardine Complex.
- Northern Lakes.
- Northern Sand Ridges.
- Port Musgrave-Albatross Bay Area.
- Central North Sinkholes.
- Archer River-Holroyd River Coastal-Subcoastal Area.
- Archer Bend Area.
- Mitchell-Nassau Area.
- Shelburne Bay-Cape Grenville-Olive River Area.
- Cape Flattery-Cape Bedford Dune Systems.
- Lloyd Bay.
- Princess Charlotte Bay.
- Lakefield Region.

The following wetlands were identified as being regionally significant (**Figure 20**):

- North-west Hinterland.
- Silver Plains and North.
- Starcke Coast.

**g) *Areas significant for marine vegetation***

The mangrove and seagrass communities of Cape York Peninsula are floristically amongst the richest in the world, with 36 mangrove species and 14 seagrass species recorded from the Torres Strait and Cape York Peninsula. The ecological significance of mangrove and seagrass communities makes all the areas important. It is, however, possible to determine those areas that are of particular note. Sixteen mangrove areas within the study area have been identified (44) as being of significant conservation value on the basis of:

- Size.
- Diversity of/or specific habitat features.
- Diversity of/or specific marine fauna and flora.
- Existing or potential fishing ground.
- Level of existing and future disturbances.
- Unique features.



- Protected species.

The following mangrove areas were identified (44) as being of significant conservation value:

- Existing Fish Habitat Reserves (Princess Charlotte Bay, Silver Plains, Temple Bay, Escape River, Nassau River).
- Mangrove areas with important fish habitat values (44) in the areas of:
  - Starcke Region
  - Lockhart River Delta
  - Margaret Bay
  - Jardine River
  - Crab Island
  - Doughboy River/MacDonald River/Jackson River
  - Wenlock River
  - Kirke River
  - Holroyd/Kendall Rivers
  - Edward River
  - Melaman Plain.

Three seagrass areas of significant conservation value were also identified (5) at:

- Weymouth Bay.
- Margaret Bay.
- Flinders Island/ Bathurst Bay.

The locations of these mangrove and seagrass areas are shown on **Figure 21**.

#### ***h) Rainforest areas of significance***

Rainforests in Australia are restricted and are recognised as areas of significance, particularly for species richness, presence of rare, endangered or restricted species and Gondwanic associations. The importance of the rainforest communities on Cape York Peninsula resulted in a detailed thematic study which was incorporated into the *Vegetation Survey* (37) database.

Some 20% of the national extent of rainforest occurs on the Peninsula (**Figure 22**). The majority of this is little disturbed, if at all. These factors contribute to all rainforest areas identified on Cape York Peninsula being of national conservation significance (5).

#### ***i) Areas significant for maintaining seabird and shorebird populations***

The northern Great Barrier Reef area contains many islands that support breeding and roosting seabird populations. Some of these populations are amongst the largest in Queensland and a few are amongst the largest nationally. The northern Great Barrier Reef area, together with Horn Island, is of international significance for seven shorebird species and of national significance for a further three (5).

Major **seabird** breeding sites that occur within or in close vicinity to the study area were identified using previous studies and the Department of Environment and Heritage's (DEH) fauna database. These sites are Cholmondeley Islet, Wallace Islet, Saunders Islet, Magra Islet, North Bird Island, Piper Group, Quoin Island, Chapman Island, Sherrard Island, Fife Island, Pelican Island, Stainer Island, Stapleton Islet, Combe Islet, Eagle Island and Rocky Islets. Major seabird roosting and feeding sites are Tern Island, Douglas Islet, Jardine Islet, Bushy Islet, Three Islands (Island A), Sinclair Island and Crab Island. The islands of significance to **seabirds** are shown on **Figure 23**.

In addition to those islands mentioned above, the following are of minor or local significance as **seabird** breeding areas: Little Boydong Cay, Sunday Island, Kay Islet, Pipon Island, Ingram/Beenley Island and the Howick Group.

The coastline of Cape York Peninsula is also important for a number of **shorebird** species as resting or feeding points on their migration, or for nesting sites. Many of these species, or their habitat, are included in the China Australia Migratory Bird Agreement (CAMBA) or the Japan Australia Migratory Bird Agreement (JAMBA). The significant species are the Beach stone-curlew, Mongolian plover, Pacific golden plover, Ruddy turnstone, Grey-tailed tattler, Pied oystercatcher, Sooty oyster catcher, Whimbrel, and Torresian imperial pigeon.

*j) Sand dune or sand mass areas of significance on Eastern Cape York Peninsula*

There are three main dunefields identified as being of exceptional significance (5):

- Newcastle Bay and the Jardine Catchment.
- Olive River - Shelburne Bay.
- Cape Bedford- Cape Flattery.

These areas are shown on **Figure 24**.

The primary significance of these dune systems and their associated lakes generally relates to:

- Their ability to provide indications of the geomorphological development of tropical dune systems.
- The importance of the lakes with respect to endemic, restricted and rare fauna and flora.
- The associated richness of landforms and biological features of the areas.
- Their ability to contribute to the understanding of the Quaternary development of the tropical region.

The **Newcastle Bay** dunefield comprises three small dune areas. Of particular note is the northern extent of the dunefield, where large parabolic dunes have probably been stopped from spreading further by the infilling of Newcastle Bay by river sediments,

thereby creating a less energetic environment and allowing the formation of a sequence of beach ridges in front of the parabolic dunes.

The **Olive River - Shelburne Bay** dunefield occurs predominantly on a sand plain of Quaternary age east of the Mesozoic sandstones that form the McHenry Uplands. The sand plain consists of low undulating terrain dissected by well-developed east-flowing streams. The Olive River - Shelburne Bay area is of particular note for its wilderness quality, the extensive nature of the dune areas, and the diversity of lakes and dune types in the region.

The **Cape Bedford - Cape Flattery** dunefields contain a range of depositional and erosional landforms based on the interaction of sand-wind-water-rain-vegetation. The extent of the active parabolic dunes in the Cape Bedford-Cape Flattery area is of international significance.

*k) Areas significant for richness*

The **orchid** diversity of the McIlwraith and Iron Range areas has long been considered a feature of conservation significance. The information on orchids that has been collected as part of the CYPLUS program confirms this significance, with the orchid diversity being most outstanding at the genus level. Sixty-two genera of orchids have been recorded from Cape York Peninsula compared to :

- 20 known from the Darwin - Arnhem - Gulf area of the Northern Territory.
- No more than 13 which occur north of 20° S in Western Australia.
- 45 genera in NSW.
- 23 genera in Victoria.
- 84 genera for the whole of Queensland.

Australia as a whole has an **orchid** diversity that is high in a global context, only being exceeded by that of southern Africa. The areas of greatest orchid diversity on Cape York Peninsula (**Figure 25**) correspond to areas containing large patches of rainforest. These are:

- The McIlwraith Range.
- Iron Range.
- Lockerbie Scrub.
- The forests of the Wet Tropics.

The Wenlock River contains the richest known **freshwater fish fauna** of any river in Australia (47). The number of species known from the northern rivers of Cape York Peninsula compares favourably with those known from the intensively studied Alligator River region, and tropical Asian and African rivers. The fish diversity of the Olive River is exceptionally high for an Australian river of its size. Areas of significance for fish on Cape York Peninsula are shown on **Figure 42**.

While there has been no systematic survey of **invertebrate** diversity across Cape York Peninsula, several areas have been identified as being particularly diverse for certain groups of invertebrates:

- The Iron Range area (lauxanid flies, drosophilid flies, butterflies, ants).
- The McIlwraith Range area (butterflies, moths).
- The rainforests in the Mt Webb - Hopevale region (lauxanid flies).

The McIlwraith Range is also considered to be a core area for invertebrate diversity in Australia (5).

#### *l) Areas of significance for butterflies*

There are 223 species of butterflies on Cape York Peninsula and this represents about 57% of all Australian species. Locations of very high value for butterfly conservation are shown in **Figure 26** and include:

- Lockerbie Scrub.
- Heathlands Area, including the Shelburne Bay dunefields and lakes and the Olive River.
- Iron Range Area, which is a critical location for butterfly diversity.
- Mt White, Coen.
- Vine thicket communities (riparian and other isolated pockets throughout Cape York Peninsula).
- Rocky River area, Silver Plains, McIlwraith Range.
- Lakefield National Park.
- Sandstone outcrops in the Laura area.
- Isabella Falls area, north-west of Cooktown.
- Mangrove communities along the Endeavour River.
- Mangrove and fringing Melaleuca communities on the south side of the Annan River.
- Jardine River rainforests.

#### *m) Significant riparian environments*

The major river systems on the Peninsula tend to run east-west. The rivers are usually fringed by strips of closed forest which are much lushier than the dry woodlands found away from the water courses. The forests act as corridors for dispersal for many species including the Spotted cuscus, White-tailed rat, frugivorous birds, and the Palm cockatoo. The riparian corridors allow movement between the extensive rainforests on the east coast and the smaller sand ridge rainforests on the west coast.

The riparian forests of greatest conservation significance are those along the major rivers, namely the Archer-Coen and the Wenlock River systems (40). In the south-east of the study area, the Normanby River provides a corridor that links the rainforests of the Wet Tropics with the rainforests of the central Peninsula. For many species this area provides an important linking corridor.

The riparian corridors are also important dry season refuge areas for woodland species whose populations may be substantially reduced through a combination of heat and drought. The riparian vegetation may also be the highest feature on a floodplain and therefore be of importance as a refuge habitat during times of flooding (40). Significant riparian corridors are shown on **Figure 27**.

*n) Areas of biogeographic and evolutionary significance*

A number of biogeographic attributes of Cape York Peninsula illustrate important components of the evolutionary history of the region. These include:

- Species with Gondwanic affinity.
- Intrusive Indo-Malay element.
- Extra-continental endemic species.
- Extra-continental plant species.
- Endemic species.
- Disjunct species.

These are further discussed below.

Within the CYPLUS study area there are at least 104 plant species that belong to the relict **Gondwanic element** (5). Vegetation classes on Cape York Peninsula that are important habitats for Gondwanic plants include:

- The complex mesophyll vine forest of the Wet Tropics region.
- Notophyll vine forest of the mid-Peninsula rainforests.
- The semi-deciduous mesophyll vine forest of the Claudie and Normanby Rivers.

The distribution of these are shown on **Figure 28**.

Much of the **intrusive Indo-Malay element** is concentrated in the Australian rainforests (5). There are at least 103 plant taxa occurring on Cape York Peninsula which are considered to belong to the intrusive element. In addition to the mid-Peninsula rainforests and Lockerbie Scrub, the beach rainforests of the east coast contain a richness in intrusive species. In total, five vegetation classes stand out as being particularly rich in intrusive species, when compared to all other vegetation classes on Cape York Peninsula. These are, in decreasing order of richness:

- Notophyll vine forest of the mid-Peninsula rainforests.
- The semi-deciduous mesophyll vine forest of the Claudie and Normanby Rivers.
- Evergreen to semi-deciduous notophyll vine forest of the east coast dominated by *Syzygium* spp., *Terminalia* spp. and *Xanthostemon* spp.
- Semi-deciduous mesophyll/notophyll vine forest on alluvia in the Cooktown area.
- Semi-deciduous notophyll vine forest of Lockerbie Scrub.

The distribution of these classes on the Peninsula is shown on **Figure 29**.

The link between the biota of Cape York Peninsula and New Guinea is well demonstrated by the plants and animals that have an Australian distribution limited to Cape York Peninsula, but which also occur in New Guinea (**extra-continental endemic species**). There are at least 21 plant species that fall into this category and nearly all of these have widespread distributions across the northern half of the Peninsula. The greatest concentration of these species occurs in the mid-Peninsula rainforests. There are 16 extra-continental bird species and seven extra-continental mammal species which have a similar distribution.

The **fish** species of the mid-Peninsula rainforests also have a strong affinity with New Guinea, although the strongest relationship is with the Jardine River where 63% of the fish species are common between the two countries. There is also a relatively large New Guinean element amongst invertebrates in the Jardine River system. The rainforests of the northern Peninsula, particularly those at Lockerbie, also contain a significant number of invertebrate species that are shared with New Guinea. For example, 84% of the butterfly species known from the Lockerbie Scrub also occur in New Guinea.

The twenty-two **extra-continental amphibians and reptiles** are not rainforest species and have a different distribution from that of the plants, birds and mammals. These species are either widespread across Cape York Peninsula or are confined to the northern tip or nearby islands. The Heathlands area contains a high concentration of amphibians and reptiles which also occur in the New Guinea lowlands.

The importance of rainforest, particularly that in the northern half of the Peninsula, in demonstrating biogeographic connections outside of Australia is further highlighted by the distribution of 233 **extra-continental plant species**. These plant species are widespread with the greatest species richness occurring in the following vegetation classes:

- Semi-deciduous mesophyll vine forest of the Claudie and Normanby Rivers.
- Notophyll vine forest of the mid-Peninsula rainforests.
- Simple evergreen notophyll vine forest of north-east Cape York Peninsula.
- Evergreen notophyll vine forest of the major streams.
- Evergreen to semi-deciduous notophyll vine forest of the east coast dominated by *Syzygium* spp., *Terminalia* spp. and *Xanthostemon* spp.
- Evergreen mesophyll vine forest with *Archontophoenix alexandrae*.
- Simple evergreen notophyll vine forest of the Iron Range and Wet Tropics areas.
- Semi-deciduous notophyll vine forest of Lockerbie Scrub.
- Evergreen notophyll vine forest dominated by *Melaleuca leucadendra*, *Xanthostemon cremulatus* and *Lophostemon suaveolens*.
- Coastal woodlands dominated by *Eucalyptus tessellaris*, *E. clarksoniana*.
- Deciduous vine thicket on granite slopes dominated by *Cochlospermum gillivraei*.

The distribution of these classes on the Peninsula is shown on **Figure 30**.

**Endemic species** are of conservation significance because of their distributions, and the understanding that they can provide to evolutionary and biogeographical processes. Areas with a high level of endemism, either in terms of numbers of taxa or the evolutionary distinctiveness of the taxa, are important components of a region's biodiversity.

There are no **endemic plant** families and very few endemic plant genera on Cape York Peninsula. The three monospecific (i.e. single species in the genus) endemic genera are:

- *Jedda multicaulis* (no common name) in the Thymelaeaceae from the eastern edge of the Kimba Plateau.
- Black palm (*Normanbya normanbyi* in the Arecaceae) which is restricted to the Wet Tropics area.
- Foxtail palm (*Wodyetia bifurcata* in the Arecaceae) which is restricted to the Melville Range area.

The restricted distribution and genetic isolation of these species means that all their habitats are of conservation importance (5).

There are 264 **endemic plant species** on Cape York Peninsula (37). The number of endemics is not outstandingly high in a national comparison of similar sized areas. However, there are areas on Cape York Peninsula such as the McIlwraith-Iron Range area where the level of endemism, at the species level, is high in the national context.

The distribution of endemic species within the broad vegetation groups found on Cape York Peninsula, using the Environmental Resources Information System (ERIS) database from ERIN (5) suggests that the vegetation groups supporting the largest number of endemic species are:

- Closed-forests of the McIlwraith-Iron Range region.
- Gallery closed-forests.
- Woodlands and tall woodlands dominated by Darwin stringybark (*Eucalyptus tetrodonta*) on deeply weathered plateaus and remnants.

In terms of numbers of species per total area, the closed forests of the Wet Tropics region and the eucalypt open forests of the Wet Tropics region are the outstanding broad vegetation groups.

The CORVEG database from the Queensland Herbarium (37) also provides information on the distribution of 100 of the plant species endemic to Cape York Peninsula. Vegetation communities particularly rich in these endemic species are all rainforest and vine forest communities. Indeed, it appears that it is the vine thicket patches, within the northern *Eucalyptus tetrodonta* woodlands, that are of importance to endemic species rather than the woodlands themselves.

Vegetation classes that support particularly high levels of endemic species are, in order of decreasing species richness:

- Notophyll vine forest of the mid-Peninsula rainforests.
- Simple evergreen notophyll vine forest of north-east Cape York Peninsula.
- Semi-deciduous mesophyll vine forest of the Claudie and Normanby Rivers.
- Evergreen to semi-deciduous notophyll vine forest of the east coast dominated by *Syzygium* spp., *Terminalia* spp. and *Xanthostemon* spp.
- Evergreen notophyll vine forest of the major streams.
- Simple evergreen notophyll vine forest of the Iron Range and Wet Tropics areas.
- Evergreen mesophyll vine forest with *Archontophoenix alexandrae*.
- Araucarian microphyll vine forest on coastal dunes dominated by *Austromyrtus angustifolia*.
- Semi-deciduous notophyll vine forest of Lockerbie Scrub.

The distribution of these classes on Cape York Peninsula is shown on **Figure 31**.

There are forty **endemic terrestrial vertebrate species** on Cape York Peninsula (40). In addition to these species, Godman's Rock Wallaby (*Petrogale godmani*) is largely restricted to the CYPLUS area but also occurs just outside the boundary in the Mt Carbine area. In addition, an undescribed frog only known from Cape Melville is likely to be classified as an endemic species. The most important habitats for endemic terrestrial vertebrate species are :

- Rainforest (10 species).
- Boulder mountains and cliffs (8 species) including Black Mountain, Cape Melville Boulder Range, Laura (Quinkan) Sandstone Plateau, Glennie Tableland, rocky outcrops in the vicinity of Coen.
- The Cape Bedford-Cape Flattery dunefields (2 species). The dunefields also provide habitat for the skink, *Carlia dogare*, which is also known from Lizard Island.

**Figure 32** shows habitat of probable significance for endemic vertebrates using vegetation patches in which an endemic species has been recorded.

**Endemic invertebrates species** identified include dragon and damselflies, stoneflies, termites, grasshoppers and katydids, beetles, moths and butterflies, wasps, flies. **Figure 33** shows the collecting localities for the 258 invertebrate endemic species. Areas in which endemic species are concentrated include:

- Mt Webb-Hopevale area.
- Vicinity of Coen.
- McIlwraith Range.
- Iron Range.
- Weipa.
- Batavia Downs.
- Heathlands.
- Lockerbie - Somerset area.



**Figure 34** shows the collecting localities for those endemic invertebrate species that are only known from one or two records. All of the recorded sites for these rare and endemic species are considered to be of conservation significance (5). Areas from where several rare and endemic insect species are known include:

- Mt Webb.
- McIlwraith Range.
- Iron Range.
- Heathlands.
- Bamaga-Somerset area.
- Coen.
- Batavia Downs.

**Disjunct species** have widely separated populations. These disjunctions can be caused by events of long distance dispersal, but commonly represent remnant isolated populations which were continuous during different climatic and geographical situations.

One hundred and thirty four **plant species with disjunct distributions** were identified on Cape York Peninsula using the ERIS database (5). About 80% of these occur across northern Australia. Most of these have distributions within many of the broad vegetation groups, but have not been recorded in the south-west and central Peninsula areas.

While those species with eastern Australian disjunctions are not concentrated in a particular broad vegetation group, they do tend to occur on the eastern side of the Peninsula outside of *Eucalyptus tetradonta* and *Eucalyptus hylandii* woodlands.

The CORVEG database (37) also identifies 81 **plant species with disjunct distributions** on Cape York Peninsula. About one third of the disjunct species have been recorded in the monsoon thickets of the Northern Territory and it is the vine thickets on the Peninsula which have a richness in disjunct species. The vegetation classes with the largest number of disjunct species are:

- The evergreen to semi-deciduous notophyll vine forest of the east coast dominated by *Syzygium* spp., *Terminalia* spp. and *Xanthostemon* spp.
- Drainage swamps dominated by *Restio tetraphyllus*.

**Figure 35** shows areas of significance for disjunct species.

There are only seven **terrestrial vertebrate species with disjunct distributions** on the Peninsula. These species are not confined to one particular habitat type but are found in woodlands, closed forests, heaths and grasslands. The greatest richness of disjunct faunal species occurs in the north-east of the Peninsula. The site locations for the disjunct species are shown on **Figure 36**.

***o) Areas of significance for rare and threatened plant and animal species***

There are 379 **plant** taxa considered to be rare and threatened that are known to occur on Cape York Peninsula. These include 15 endangered, 49 vulnerable, 213 rare and 102 poorly known but suspected of being at-risk species. Thus Cape York Peninsula is amongst the most important areas in Australia for rare and threatened plant species (5).

Rare and threatened taxa are most common on the east and north of the Peninsula. The known locations of rare and threatened plants are particularly concentrated in the following areas:

- The forests of the Wet Tropics.
- The Hopevale area.
- The Cape Bedford-Cape Flattery Dunefield.
- Cape Melville-Cape Bathurst area.
- The McIlwraith Range area.
- The Iron Range area.
- The Heathlands area.
- Lockerbie Scrub.
- East of Weipa.
- In the vicinity of Laura.

The following broad vegetation groups support the largest number of **rare and threatened plant species**:

- Closed-forests of the McIlwraith - Iron Range region.
- Gallery closed-forests and *Melaleuca* spp. dominated open-forest on alluvia.
- Darwin stringybark (*Eucalyptus tetradonta*) dominated woodlands and tall woodlands on deeply weathered plateaus and remnants.
- Open heaths on dunefields, sandplains and headlands.

The CORVEG database contains site records of 137 **rare and threatened plant species** (37). The vegetation classes that support a particularly large number of rare and threatened species are all closed forests and include:

- Notophyll vine forest of the mid-Peninsula rainforests.
- Semi-deciduous mesophyll vine forest of the Claudie and Normanby Rivers.
- Simple evergreen notophyll vine forest of the Iron Range and Wet Tropics areas.
- Simple evergreen notophyll vine forest of north-east Cape York Peninsula.
- Evergreen to semi-deciduous notophyll vine forest of the east coast dominated by *Syzygium* spp., *Terminalia* spp. and *Xanthostemon* spp.

The distribution of these classes on the Peninsula is shown on **Figure 37**.

The areas of greatest concentration of **rare or threatened vertebrate fauna** are the:

- Forests of the Wet Tropics.
- McIlwraith Range.
- Iron Range.
- Lockerbie Scrub.
- Weipa.

The recorded locations of **rare or threatened vertebrate fauna** are shown on **Figure 38**.

Eleven **endangered terrestrial vertebrate species** have been recorded within the CYPLUS study area. Four of these are frogs which occur in the extreme south-east corner of the study area and are endemic to the Wet Tropics. The remaining species are the:

- Little tern.
- Golden-shouldered parrot.
- Red goshawk.
- Northern sub-species of the Star finch.
- Loggerhead turtle.
- Gouldian finch.
- Northern bettong.

**Figure 39** shows the habitat on Cape York Peninsula that is of significance for endangered fauna (based on the Little tern, the Golden-shouldered parrot and endangered frog species).

Sixteen **vulnerable terrestrial and marine vertebrate species** have been recorded within the CYPLUS study area. The significance of Cape York Peninsula to four of these vulnerable species (three species of turtle and one species of crocodile) is detailed below. The remaining species are the Beach stone-curlew, Southern cassowary, Eclectus parrot, northern or white-bellied subspecies of the Crimson finch, Fawn horseshoe bat, Greater wart-nosed horseshoe bat, Spectacled flying-fox, Northern sheath-tail-bat, Ghost bat, Black-breasted button-quail, Northern hopping mouse and Yakka skink. **Figure 40** shows the location of significant habitat for vulnerable terrestrial vertebrate species.

There are fifty-eight **rare vertebrate species** recorded on Cape York Peninsula and many of these are largely restricted to rainforest areas. **Figure 41** shows the location of significant habitats for rare species.

The only **rare fish** identified in the *Fish Fauna Survey* (47) is the Short-finned catfish collected from the Olive, Claudie and Lockhart Rivers. It is also known from the Jackson and Jardine Rivers at the northern tip of Cape York Peninsula. The Short-finned catfish is known only to occur on Cape York Peninsula and in New Guinea.

The *Fish Fauna Survey* (47) also identified a number of species that appear to be restricted to confined areas and then only occur in low numbers. The dunefield lakes near Shadd Point, Orford Bay, Shelburne Bay and Cape Flattery each contain a unique fish assemblage, and sometimes species far outside their previously known distribution.

**Unique fish assemblages** are also found at:

- Scrubby Creek/Three Quarter Mile Lake.
- Ronnie's Rocky Creek.
- Black Creek.
- Kupandhangan Swamp near Weipa.
- Creek near Bolt Head.

**Figure 42** shows the river systems important for rare freshwater fish and containing habitats of special interest (5).

**Turtles** are marine vertebrates that nest on offshore islands or along the coast and are therefore appropriately considered separately from terrestrial vertebrates. All species of turtles found in the CYPLUS area are considered to be rare or endangered in either an international, national or State context. Significant feeding or nesting populations of four species of turtles occur within or are adjacent to the study area. **Figure 43** shows the significant locations for turtles.

The **Dugong** is listed as vulnerable to extinction by the IUCN and is the only herbivorous marine mammal listed on the Convention on International Trade in Endangered Species (CITES). **Figure 44** shows areas of dugong seagrass habitat.

**Crocodiles** are considered nationally vulnerable. **Figure 45** shows areas significant for estuarine crocodiles on the Peninsula. These areas are:

- Jardine River Wetlands and Jacky Jacky Creek.
- Wenlock and Dulcie River Systems.
- Lakefield National Park.
- Iron Range National Park and Lockhart River Mangrove Swamps.

*p) Areas of significance for their contribution to research or as type localities*

Although much of the biological research on Cape York Peninsula has had a survey focus, there have been some permanent or longer term **research sites** used. These include:

- Permanent insect survey sites across Cape York Peninsula.
- The Heathlands survey undertaken by the Royal Geographical Society of Queensland.

The locations of these significant research sites are shown on **Figure 46**.

The **type locality** of a species is important as it is the key area from which further specimens of the same population as the type may be sought. Cape York Peninsula has been an important centre for plant and animal collection since the times of first European exploration. Many species that have widespread distributions across northern Australia have their type locality on the Peninsula. Although the invertebrate and flora coverages are far from complete, they do highlight areas that have been a particular focus for biological collection. The vicinities of Cooktown, Somerset, Thursday Island, Iron Range and Coen are the key areas on Cape York Peninsula for biological type localities (**Figure 47**).

### 3.3.4 Conservation values of the wilderness resources

The assessment of wilderness on Cape York Peninsula was undertaken as part of an overall Australia-wide development of a National Wilderness Inventory (5). The Inventory considers wilderness to be part of a spectrum of remote and natural conditions varying in quality from pristine to urban.

Four indicators were used to estimate the quality of wilderness across the natural landscape:

- Remoteness from settlement.
- Remoteness from access.
- Apparent naturalness.
- Biophysical naturalness.

Analysis of Cape York Peninsula using these four indicators produces a graded assessment of wilderness quality (see **Figure 48**). The key findings of this analysis were that Cape York Peninsula:

- Is internationally significant as it is a significant wilderness area within the Australian biogeographic realm.
- Is one of Australia's few biogeographic regions where a majority of the region is of high to very high wilderness quality.
- Has the largest area of high quality wilderness in eastern Australia and the only large areas of high wilderness quality on the east coast.
- Has coastal landscapes of high wilderness quality (which in eastern Australia are largely restricted to Cape York Peninsula).
- Is unique in Australia in containing areas of high and very high wilderness quality that encapsulates large areas of diverse ecosystems (i.e. woodland, forest, closed forest, heaths, riparian vegetation, coastal wetlands and freshwater wetlands).
- Contains the largest areas in Australia of heathlands, riparian vegetation and tropical rainforest that are of high wilderness quality.
- Has large areas of high quality wilderness that are of importance in a national context for the maintenance of ecosystem processes.
- Is characterised by the presence of river catchments in high quality wilderness areas that are now rare in Australia (i.e. Jardine, Jackson, Olive and Holroyd Rivers).

- Is characterised by the absence of extinctions of either plants or vertebrate fauna.
- Provides areas of wilderness that are the stronghold of several bird species that were originally widely but sparsely dispersed across Australia. These species include the Pied Oyster Catcher, Sooty Oyster Catcher, Black Necked Stork, and possibly the Red Goshawk.

### 3.3.5 Collation of values into areas of natural conservation significance

In total, 40 separate analyses of conservation values were undertaken (5,6) and the results presented as maps of either point locations or areas with values that are significant at the regional level or greater (national or international). These maps included geomorphological values (from **Section 3.3.2**) and biological values (from **Section 3.3.3**). Following the completion of the individual value coverages, an aggregate cover was produced by combining the area-based coverages. Places of conservation significance were determined from this aggregate layer (5).

In total, 36 areas of conservation significance covering 82% of the Peninsula were identified. The largest area is the Holroyd Wilderness Area covering 1,676,110 hectares or just over 12% of Cape York Peninsula. The names and sizes of all thirty-six areas are given in **Table 5**, while **Figure 49** plots their distribution.

In determining areas of conservation significance, large areas with no known conservation value were excluded. Boundaries between areas were drawn to equate to changes in the types of values present. The boundaries of the areas identified were particularly determined by the distribution of the more widespread conservation values such as wilderness quality, representative vegetation, wetland sites and geological sites.

The results of this collation (5) show that 82% of the Peninsula is significant for at least one natural conservation value. The analysis also shows that features of conservation value are not restricted or concentrated in a few areas but are generally widespread and occur over most of the Peninsula.

This analysis has led the Australian Heritage Commission (5) to conclude that Cape York Peninsula is one of Australia's key conservation areas. Its dunefields and deltaic fan deposits are amongst the best developed in the world, while the biogeographic and evolutionary relationships of the plants and animals to the biota of New Guinea provides important insights into the evolutionary history of Australasia. In a national context, Cape York Peninsula is a key area for wilderness, heathland, rainforest, riparian, and wetland conservation.

The Peninsula also contains some of Australia's highest concentrations of rare and threatened species as well as restricted endemics. It is also an important area for species richness and is particularly rich for invertebrates, freshwater fish, mangroves, seagrass and orchids.

**Table 5: Areas of nature conservation significance on Cape York Peninsula**

NAME OF AREA	Size (ha)	Percent of CYPLUS Study Area	Geological Feature, Landform or Process	Area of Biogeographical or Evolutionary Significance	Biodiversity or Centre of Endemism	Vegetation Community or Species of Significance	Wetland Ecosystem of Significance	Terrestrial Vertebrate Fauna of Significance	Marine or Aquatic Vertebrate Fauna of Significance	Avifauna of Significance (including bats)	Invertebrate Fauna of Significance	Major Habitat Linkage or Corridor	Key Research Site or Type Locality	Wilderness Area of Significance
1. Lockerbie	39,895	0.3	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	
2. Jardine Wilderness Area	542,072	3.97	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
3. Vriya Wilderness Area	295,798	2.17				Yes			Yes	Yes				Yes
4. Port Musgrave Area	215,441	1.58	Yes			Yes	Yes	Yes	Yes					Yes
5. Central-North Cape York Peninsula	78,799	0.58				Yes				Yes				
6. Shelburne-Olive River Area	278,867	2.04	Yes	Yes	Yes	Yes	Yes		Yes					Yes
7. Pennefather-Duyfken Area	98,094	0.72	Yes		Yes	Yes		Yes	Yes	Yes				Yes
8. Wenlock Corridor	298,511	2.19	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes		Yes
9. Iron Range	322,669	2.37		Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes
10. Mission River Area	73,284	0.54				Yes								Yes
11. Embley Range Area	66,825	0.49	Yes			Yes								
12. Hey-Embley Rivers Area	187,698	1.38	Yes	Yes		Yes			Yes					Yes
13. Pera Head Area	88,245	0.65	Yes			Yes								Yes
14. Mt White	670	0.00									Yes			
15. Geike Range	2,685	.02	Yes											
16. Aurukun Wetlands	176,406	1.29	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes			Yes
17. Archer-Coen Area	1,113,835	8.17	Yes		Yes	Yes		Yes	Yes	Yes		Yes		Yes
18. Mollwraith-Lockhart Area	555,472	4.07		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
19. Holroyd Wilderness	1,676,109	12.29	Yes	Yes		Yes	Yes	Yes	Yes	Yes			Yes	Yes

(continued over)

**Table 5: Areas of nature conservation significance on Cape York Peninsula (continued)**

NAME OF AREA	Size (ha)	Percent of CYPLUS Study Area	Geological Feature, Landform or Process	Area of Biogeographical or Evolutionary Significance	Biodiversity or Centre of Endemism	Vegetation Community or Species of Significance	Wetland Ecosystem of Significance	Terrestrial Vertebrate Fauna of Significance	Marine or Aquatic Vertebrate Fauna of Significance	Avifauna of Significance (including bats)	Invertebrate Fauna of Significance	Major Habitat Linkage or Corridor	Key Research Site or Type Locality	Wilderness Area of Significance
20. Gorge Creek and Timber Reserve	139,786	1.03	Yes			Yes	Yes							Yes
21. Lakefield	697,393	5.12	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
22. Starcke Area	643,236	4.72	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes			Yes
23. Cape Flattery - Cape Bedford	66,368	0.49	Yes		Yes	Yes	Yes	Yes		Yes				Yes
24. Mitchell Delta	572,613	4.20	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes		
25. Upper Alice-Coleman	1,302,715	9.55				Yes	Yes							Yes
26. Golden-Shouldered Parrot Habitat	433,337	3.18				Yes				Yes			Yes	
27. Kimba Plateau	174,109	1.28	Yes			Yes								
28. North Kennedy River Area	53,966	0.40									Yes			Yes
29. Red Bluff Area	44,034	0.33				Yes								
30. Deighton-Normanby Area	220,368	1.62			Yes	Yes						Yes		
31. Isabella Falls Area	6,995	0.05									Yes			
32. Endeavour-Annan Area	160,272	1.18	Yes	Yes	Yes	Yes		Yes			Yes		Yes	
33. Palmer-King River Area	188,385	1.39			Yes	Yes					Yes			
34. Quinkan Area	291,737	2.14				Yes								
35. Wet Tropics	81,571	0.60	Yes	Yes	Yes	Yes		Yes	Yes	Yes				
36. Mitchell-Palmer Karst	28,810	0.21	Yes	Yes		Yes		Yes		Yes				Yes
<b>Total</b>	<b>11,217,067</b>	<b>82.31</b>												

Source: Study team compilation based on (5)



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## 4 ECOLOGICAL THREATS

### 4.1 Introduction

The natural resources and their conservation values have been previously described in **Chapter 2** and **Chapter 3** respectively. It is evident from Stage 1 studies that in certain areas these values are under threat from a number of sources, namely:

- Incompatible land uses (e.g. involving large scale habitat modification).
- Non-sustainable land use practices (e.g. those which result in land degradation including soil erosion).
- Ecological agents.

The first two types of threats are related to issues of land use and are discussed in the *Land Use and Economy* theme report. The final category is discussed here. The main ecological threats to the conservation values of Cape York Peninsula are:

- Weeds.
- Pest animals.
- Fire.

The nature of these threats is that they:

- Are not restricted to particular tenures or land uses and even occur in protected areas (7, 62).
- Can be affected by management practices.

Each of these threats is further discussed below.

### 4.2 Weed pests

Weed pests are plants that have been introduced from other areas of the world and which pose a threat to the integrity of ecosystems and native plant species. They are also described as “unwanted plants” or “plants in the wrong place”. A total of 247 species (8% of total flora) of naturalised exotics have been recorded for Cape York Peninsula. Only thirty five of these are considered weed pests (10). The distribution of weed species around Cape York Peninsula is, in general, poorly known.

Management of certain weeds defined as Declared Plants is undertaken by the Queensland Rural Lands Protection Board under the provisions of the *Rural Lands Protection Act (1985-1988)*.

Declared Plants are considered to be a serious enough pest to warrant legislative control and this is on the basis of five categories as follows:

- P1 Plants whose introduction into Queensland is prohibited.
- P2 Plants which are to be completely destroyed in an area.
- P3 Plants whose numbers and distribution should be reduced in an area.
- P4 Plants which should be prevented from spreading beyond the places in which they occur.
- P5 Plants which should be controlled only on land under the control of a Government Department or Local Government.

In addition to the above categories, other plants, while not being declared under the *Rural Lands Protection Act*, are considered to be harmful by various agencies in the study area.

The main weed pests, together with their Declared Plant Category where relevant, are detailed below in **Table 6**.

**Table 6: Main weed pests found in the study area**

Common name (category)	Ecosystem	Distribution in the study area	Threat to ecosystem
Rubber Vine (P3)	Gallery and other riparian communities, dry rainforests	80% of Mitchell River catchment, Coleman River and Lakefield National Park	Destroys riparian and remnant rainforest vegetation, smothers trees, shrubs and shades out the ground layer
Pond apple	Wide range of habitats, especially low lying melaleuca and mangrove areas along the coast	Cooktown and Temple Bay	Aggressive spreader, rapidly out competing native vegetation
Sicklepod (P3)	Confined to the higher rainfall districts of coastal Queensland	Iron Range, Bloomfield, Wujal Wujal, Cooktown, Hopevale, Starcke and Wenlock River	Invades and completely dominates pastures and native vegetation
Thunbergia (P2)	Lowland rainforests and remnant riparian vegetation	South of Cooktown	Vigorous rapidly spreading vine, that smothers native vegetation to the canopy
Lantana	A variety of habitats from dry hillsides to wet, heavily shaded gullies	Eastern coast of the Cape	Forms dense thickets and out competes native vegetation
Chinee apple (P3)	Restricted to drier tropics	Kowanyama, Laura and just below Lakefield National Park	Forms dense infestations which produce impenetrable thickets

(continued over)

**Table 6: Main weed pests found in the study area (continued)**

Common name (category)	Ecosystem	Distribution in the study area	Threat to ecosystem
Mossman river grass	Coastal dunes and rivers	Scattered patches along the east coast, and near Laura	Spreads amongst native grasses and eventually out competes them
Grader grass	Drier areas of Queensland	South-east coast and inland, around Weipa, Rokeby and Cape Grenville	Strong growing tufted grass which grows in dense patches, competes with native and introduced pasture
Water hyacinth (P3)	Standing surface waters, especially where nutrient levels are high	Kowanyama, Rutland Plains	Aggressive invader of open water with potential for very rapid growth, alters aquatic ecosystems
Salvinia (P3)	Stationary and slow moving water, especially where nutrient levels are high	Small patch around Cooktown	Aggressive invader of open water with potential for very rapid growth, alters aquatic ecosystems

Source: Study team compilation from (10), Humphries and Groves (1991) *Plant invasions in Kowari 2* and Department of Environment and Heritage (I. Garven, pers. comm.)

Rubber vine is clearly the most serious weed on Cape York Peninsula at present. The Department of Environment and Heritage (I. Garven, pers. comm.) suggests that the Pond apple (*Annona glabra*) is likely to become one of the worst environmental weed species on Cape York Peninsula. It is already a serious problem in the Cairns area, and is currently known from around Cooktown and from Temple Bay in the CYPLUS study area.

No assessment has been made (10) of the impact of exotic grass species used in ponded pastures (e.g. *Brachiaria mutica* and *Hymenachne amplexicaulis*), although advice from DEH is that these grasses have the potential to be an ecological threat (P. Fisk, pers. comm.).

In addition to the species already known to be present, there are five weeds which currently occur outside the study area, but have the potential to become significant weed species on Cape York Peninsula (10). Details of these weeds are given in **Table 7**.

**Table 7: Potential weed species**

Common name	Potential ecosystem	Threat to ecosystem/area
Prickly acacia	Pasture areas and waterways, native grasslands.	Out-competes native vegetation, and waterways, blocks access to waterways.
Mesquite	Waterways, flood plains and pasture areas.	Infests waterways, outcompetes natives and block access to watering places.
Giant sensitive tree	Disturbed areas, especially floodplains	Totally displaces native species leaving bare mud if removed, spreads by floods
Parkinsonia	Ephemeral wetlands and riparian communities	Invades mesic habitats and seasonal wetlands, threatens waterbird habitats
Siam weed	Remanent rainforest and riparian vegetation, especially in high rainfall areas of Queensland	Invades riparian and remnant rainforest vegetation, dense thickets could cause more frequent and intense bushfires

Source: Study team compilation from (10), Humphries and Groves (1991) *Plant invasions in Kowari 2* and Department of Environment and Heritage (I. Garven, pers. comm.)

It appears that there has historically been few resources directed towards the control of weeds across Cape York Peninsula. Low human population levels and large tracts of land cause management levels to be minimal thereby making control of pest species more difficult (10). In addition, it has been noted (37) that:

While the risk of undesirable species reaching Cape York Peninsula from the north is being carefully monitored by quarantine authorities, movement from the south is receiving little attention.

### **4.3 Pest animals**

Pest animals are animals which have been introduced from other countries and which have become a nuisance in their adopted country. These pest animals frequently have an impact on natural ecosystems as well as economic activities. The distribution of pest animals around Cape York Peninsula is, in general, poorly known. Although there has been no comprehensive assessment of the impact of pest animals on the natural values of Cape York Peninsula, the most significant pests are (10):

- **Feral pigs**, which are the main pest animal with an estimated population of 1-2 million. The highest density populations occur on the south-west of the Peninsula below Weipa and in Lakefield National Park. Pigs cause major destruction of native ecosystems and permanent waterways and are potential vectors for exotic livestock diseases.
- **Dingos and feral dogs**, which cause loss to livestock by predation and are vectors for disease. Areas with high infestations are around Lakefield National Park and on the west coast from Weipa to Pormpuraaw.

- **Feral horses**, which have high infestations on the south-west of the Peninsula south of Weipa. Feral horses cause destruction of native ecosystems with their most obvious impact being around waterholes. They are also potential vectors for exotic diseases.
- **Feral cats**, which have high infestations on the west coast from Weipa south to the study area border and medium infestations in Lakefield and Rokeby National Parks. Cats are predators of native animals and are also potential vectors for exotic diseases.

There are other pest animals (rabbit, toad, fox, deer, rodents and numerous species of birds), but these occur in either limited areas or low numbers.

Existing control of pest animals is generally undertaken by shooting, trapping, poisoning or biological control. However, dingos are protected in all National Parks. Further options for the control of pest species include:

- Culling through the commercial use of pest species.
- Involvement of Aboriginal communities in pest management.

#### **4.4 Fire**

Fires on Cape York Peninsula are mostly managed burns (man-made fires) and wildfires (natural fires). Managed burns are a deliberate land management practice and are initiated throughout the year depending on conditions and the requirements of land managers. Wildfires are started by lightning, which mostly occurs in the storm season between October and March. Most wildfires are grass fires whose intensity increases as fuel dries out further into the dry season.

A further source of unwanted fires is tourists or travellers (11). These fires may either arise accidentally as a result of carelessness or may be deliberate.

The community's use of and attitudes to managed burns varies markedly. Aboriginal people have used fire as part of their management of the land for thousands of years, seeing fire as a means of cleaning the country. Restrictions to access and land tenure over the last century have led to a reduction of active fire management by Aboriginal people.

In many ecosystems on Cape York Peninsula, fire plays an important role in the recycling of nutrients. Many plants are clearly adapted to fire, and fire plays a role in the maintenance of the boundaries of some vegetation communities. The main ecological threat posed by fire is, therefore, the potential for it to affect existing vegetation patterns and animal habitats. Fire also temporarily reduces ground cover and depletes soil moisture, creating conditions for increased soil erosion.

Managed burns are seen as an appropriate land management tool by many of the people directly involved in indigenous land management, pastoralism and nature conservation.

Managed burns are seen as inappropriate by some members of the public with a concern for conservation and animal welfare, including some land owners on Cape York Peninsula. Managed burns are undertaken for the management of:

- **Aboriginal areas**, where managed burns occur throughout much of the year, in order to provide for a variety of needs. The present features of Aboriginal burning regimes on Cape York Peninsula are inadequately documented.
- **Nature conservation areas**, where managed burns are used for the maintenance and protection of a diversity of habitats in National Parks. In particular, managed burning is used to avoid more destructive wildfires.
- **The pastoral industry**, where managed burns are mostly used to maintain feed through the dry season. After burning, grasses produce new growth that is attractive to cattle. Its use varies depending on environmental conditions and attitudes of land managers. Some pastoralists restrict their use of fire because of concerns about:
  - the loss of forage
  - an inability to control fires
  - destruction of animals, nests and habitat.

Interruption to Aboriginal burning patterns has been identified as affecting the distribution of some vegetation communities (11), namely:

- The expansion of Melaleuca woodlands at the expense of grasslands, due to a change in the timing of burning (i.e. in the dry season rather than the early wet season).
- The expansion of grasslands and woodlands at the expense of rainforest, due to a change in burning frequency and intensity (i.e. hotter and/or more frequent burns).
- The expansion of rainforest at the expense of grasslands and woodlands, due to a change in burning frequency and intensity (i.e. cooler and/or less frequent burns).

It is considered (11) that the interruption to Aboriginal burning patterns over the last century has coincided with significant changes in the distribution of vegetation communities and vertebrate species. In particular, the Golden-shouldered parrot (*Psephotus chrysopterygius*) is known only from Cape York Peninsula and is listed as endangered (under Queensland's *Nature Conservation Act 1992*), with an estimated population of less than 250 pairs. It is now confined to a few small pastoral areas of Cape York Peninsula, each with small populations. One of the reasons cited for its decline (57) is the lack of food in the wet season caused by a drop in the frequency of burns during the early wet season ("storm burns"). The decline in "storm burns" is due to the increased extent of dry season fires that consume fuel that would otherwise be burnt later in the season.

## 5 KEY POLICY ISSUES

### 5.1 Introduction

This chapter describes the key policy issues related to the natural resources and ecology of Cape York Peninsula. Policy issues were identified:

- From study reports in the Land Use Program.
- During the process of collating information from Stage 1 for the theme reports.
- From community and agency consultation.

During this process, the core objectives and guiding principles for Ecologically Sustainable Development [from National Strategy for Ecologically Sustainable Development - (61)] were used to help identify key issues. The core objectives of Ecologically Sustainable Development (ESD), as adopted by Queensland and Commonwealth Governments from the National Strategy (61), are:

- To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations.
- To provide for equity within and between generations.
- To protect biological diversity and maintain essential ecological processes and life-support systems.

Details of the seven guiding principles of ESD are provided in **Appendix D**.

As previously described, Cape York Peninsula contains extensive areas of national and international conservation and wilderness significance. Over 80% of the Peninsula has been identified as having conservation values that are significant at the national level for at least one natural heritage attribute (5). Features of conservation value are not restricted to, or concentrated in a few areas, but are generally widespread and occur over most of the Peninsula.

Assessment of all the issues raised in the Stage 1 process revealed that the key policy issue related to natural resources and ecology is the protection of natural values. As identified above in the National Strategy (61), this refers to the protection of biodiversity and the maintenance of ecological processes. The issue of the sustainability of nature conservation as a land use is discussed in *Land Use and Economy* theme report.

Some of the important sub-issues on Cape York Peninsula are:

- Protection of natural values within protected areas.
- Protection of natural values outside protected areas.
- Management of ecological threats.

These are further discussed below.



## **5.2 Protection of natural values within protected areas**

Many of the conservation values described previously currently lie within protected areas managed under National Parks, Fisheries and other legislation (as described in **Chapter 4** of the *Land Use and Economy* theme report). National Parks comprise the largest single component of protected areas on Cape York Peninsula covering 1,352,400 hectares (10% of total area). These areas are principally managed for the protection of their conservation values.

The Queensland National Parks and Wildlife Service (62) found that, based on current conditions within National Parks, the priorities for policy development are:

- Stock grazing within National Parks.
- Resource management (feral animals, weeds and fire).
- Administration policy (including opportunities for future joint management).
- Rationalisation of National Park boundaries.
- Attention to the management needs of new National Parks.

For fisheries and marine resources, the main issues (other than those related to sustainable use) are those related to maintaining water quality (2). This issue also applies to land outside protected areas.

## **5.3 Protection of natural values outside protected areas**

Areas with significant conservation values have been identified outside protected areas (5). The management of these areas (90% of Cape York Peninsula) is not primarily directed towards maintenance of conservation values. As a result of the widespread distribution of natural values across Cape York Peninsula (5), substantial areas of conservation significance occur in areas currently subject to:

- Pastoral tenures (57.2% of Cape York Peninsula), where the land is managed primarily for beef production with a variety of intensities of use.
- Aboriginal and Torres Strait Islander tenure (14.8% of Cape York Peninsula), where the land is managed for a variety of uses.

In addition, there are smaller areas managed for mining (2.9%) and timber use (1.6%). The impact of land uses in some of these tenures may conflict with the protection of conservation values. In order to protect the conservation values of these areas, two options are possible:

- Expansion of the protected area network to include such areas.
- Introduction of management practices which facilitate conservation objectives as part of a multiple-use framework.

The potential expansion of the protected area network is described in **Chapter 6** of the *Land Use and Economy* theme report.

Potential for multiple-objective management already exists on leasehold land. The Department of Lands requires sound and sustainable land management practices on Crown leasehold land used for primary production through the use of management plans. These may also provide a suitable mechanism for the cooperative management of natural areas under these tenures. The need to protect conservation values across Cape York Peninsula presents an opportunity for the development of cooperative management arrangements across a variety of land tenures. This issue is further discussed in the *Overview of Current Resources, Land Uses and Issues* report.

#### **5.4 Management of ecological threats**

As noted in **Chapter 4**, certain ecological agents (animal pests, weed pests and fire) threaten the conservation values of Cape York Peninsula and this is an issue that affects all of the study area regardless of tenure and land use. The Land Use Program study of **animal and weed pests** (10) found that:

- Weed and animal pests have the potential to be the principal problem for future management on Cape York Peninsula.
- Feral or pest animals are likely to be vectors in the outbreak of a potentially serious exotic diseases (e.g. foot-and-mouth disease by feral pigs).
- Low population levels and large tracts of land cause management levels to be minimal therefore making control of pest species more difficult.
- The majority of the Cape York Peninsula general community perceives animal and weed issues as a low priority. The long term impacts of these pests are not conspicuous to the community and other prominent concerns affecting the Cape York Peninsula generally override the pest issue.

A new initiative with additional funding totalling \$4.5 million over three years has been approved in the context of the 1995-96 Queensland budget to address the control of noxious weeds in Queensland. The Department of Lands will be the lead agency responsible for implementation of this control initiative, which may have a positive impact on weed control on Cape York Peninsula. It is not known whether or not any of these funds are to be allocated to the CYPLUS area.

The Land Use Program study of **fire** (11) found that:

- There is very little data relating to fire from Cape York Peninsula.
- The disappearance of grassland in specific areas has been flagged as a major conservation concern. This may be associated with a change in fire regime.
- Extensive late dry season fires are undesirable, because of their effects on vegetation, wildlife, the pastoral industry and aesthetics.
- Extensive late dry season wildfires can most effectively be reduced by adequate early dry season burning.
- Fire management may be compatible with more than one land management objective (i.e. pasture maintenance for cattle and conservation).

- Management of fire in the future provides an opportunity to ensure the Peninsula retains its high conservation value.

In addition, it has been suggested (28) that the existing burning process is uncoordinated with different approaches being undertaken by:

- Pastoralists.
- Traditional owners.
- The Department of Primary Industries.
- Rural Fire Brigade.
- National Parks and Wildlife Service.

As land use on the Peninsula becomes increasingly oriented towards multiple-use (i.e. Aboriginal lands, National Parks and pastoral areas), creating the appropriate coordinated fire management strategies will become crucial to overall land management. These strategies may need, in some areas, to be compatible with more than one land management objective (i.e. conservation as well as pasture maintenance for cattle). In order to maintain the natural values of Cape York Peninsula it has been suggested (11) that:

- In some areas an increase in early wet season (storm) burning should occur in order to maintain a diversity of food supplies (e.g. for the Golden-shouldered parrot). This will also help to suppress woody weeds and thereby enhance growth of wet season grasses for cattle.
- It is also suggested that extensive late season (dry season) fires be reduced by adequate early dry season burning as late season fires consume much of the fuel that can burn during storm burns and increase the density of woody weeds. They may also have undesirable effects on vegetation, wildlife, the pastoral industry and aesthetics.

## 6 INFORMATION GAPS

### 6.1 Introduction

As part of the Natural Resource Analysis Program and Land Use Program a large amount of information has been gathered, in a relatively short period of time, on the natural, economic and social resources of Cape York Peninsula. Given the large area of Cape York Peninsula (13.7 million hectares) it could not be expected that the data collection would be absolutely comprehensive. It is clear that in the on-going development of planning and management arrangements there will be a need to update and expand some of the information which has been collected. This will be in response to:

- Particular planning issues which have become evident during the course of CYPLUS.
- The need for further information on particular geographical areas of interest.

At this stage, it has been possible to identify a number of information gaps which may impede the development of land use planning policies in Stage 2. These have been identified:

- By individual studies in the Natural Resource Analysis Program and Land Use Program.
- By the critical assessment of information during the preparation of the three theme reports.

In terms of natural resources and ecology, gaps in information have been identified in the following areas:

- Natural ecosystems.
- Occurrence and impact of weed and animal pests.
- Interaction of indigenous people with ecosystems.

### 6.2 Natural ecosystems

There has been a focus of research effort on many individual attributes of the ecosystems on Cape York Peninsula over the last three years. Although a huge amount of data has been gathered, there is still a paucity of information on some of the species and on how the ecosystems function.

In comparison with many areas of Australia, the point collection data for plant and animal species on Cape York Peninsula is still of a low intensity. In general, much effort has been concentrated in the rainforests with the much more widespread woodlands still not adequately surveyed.

In particular, more information is needed on:

- **Fish** from the Mitchell and Jardine Rivers.
- **Insects** from the south-west of the study area and Shelburne Bay.
- **Plants** from the south-west of the study area, and ephemeral herbs from all of the Peninsula.
- **Terrestrial vertebrate fauna** from the south-west of the study area, Olive River, Shelburne Bay, and Deighton Plateau. More information is also needed on wetland, woodland and mangrove habitats.

It is difficult to predict what impact this extra knowledge would have on our understanding of Cape York Peninsula. However, many of the geographical areas needing further survey work are known for their diversity in other taxonomic groups, and many of the habitats which require further survey are known to have a high biological diversity. This extra information is likely to provide a more refined understanding of the biogeography and diversity which will facilitate:

- A more effective **assessment** of the conservation values.
- More effective **management** of the conservation values.

There is also a lack of information regarding the **functioning of ecosystems** due to the lack of long term ecological studies of this area. In particular, the role of fire on Cape York Peninsula is not understood with little information available about its effect on ecosystems. This is most apparent for woodland ecosystems where there is a strong need for further information on the role of fire. This knowledge will assist land managers to formulate appropriate strategies for fire management.

More integrated ecological data is needed for assessment of the nature conservation values and for assessment of land use sustainability which are both central issues in planning for Ecologically Sustainable Development.

### **6.3 Occurrence and impact of animal and weed pests**

Further information is needed on the occurrence and density of animal and weed pests, and the impact of animal and weed pests on native ecosystems.

The existing mapped information on the occurrence and density of weed pests is restricted to presence/absence data gathered on a property by property basis. The mapped occurrence of each pest animal on each property is mostly restricted to four categories of data (high/medium/low/absent). Recent information from the Department of Environment and Heritage (I. Garven, pers. comm.) suggests that the accuracy of the data collected for CYPLUS (10) may not be adequate for management purposes. In addition, the assessment of dingos as animal pests may not be appropriate given its protection as a native mammal in National Parks.

Further information is needed on the occurrence and impact of other weed species including:

- Grass species used for ponded pasture - *Brachiaria mutica* and *Hymenachne amplexicaulis*.
- Pond apple (*Annona glabra*) which is likely to become one of the worst environmental weed species on Cape York Peninsula. It is currently known from around Cooktown and from Temple Bay.

Further detailed information on the occurrence, density and impact of pest animals and weeds will be required in order to develop effective management strategies for their control and eradication.

#### **6.4 Interaction of indigenous people with ecosystems**

There is only limited information available from Stage 1 regarding the interaction of indigenous people with the ecosystems on Cape York Peninsula. Existing information on communities is mostly restricted to the identification of social issues and community needs.

It appears likely that many of the existing natural values of Cape York Peninsula have been maintained by the long history of indigenous management. Yet there is relatively little documented knowledge of the role of indigenous management on Cape York Peninsula. The existing knowledge suggests that changes in Aboriginal fire regimes have been to the disadvantage of the Golden-shouldered parrot (57). Therefore, there is strong need for further information regarding the role of indigenous people in the management of ecosystems of Cape York Peninsula. This information is important for the development of effective management plans which seek to maintain the natural values of:

- Protected areas (i.e. National Parks, Resource Reserves).
- Multiple use reserves and management areas.
- Leasehold lands.

## **FIGURES**



# CYPLUS

## CAPE YORK PENINSULA LAND USE STRATEGY

CYPLUS is a joint initiative between the  
Queensland and Commonwealth Governments.

### LOCALITY MAP

#### CYPLUS Study Area



The information shown on the map has  
been supplied by the Queensland  
Department of Lands. Initial inquiries  
regarding the information should be  
directed to Cartographic Unit, Cairns.

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Note: The CYPLUS boundary includes off  
shore water up to the three mile limit.

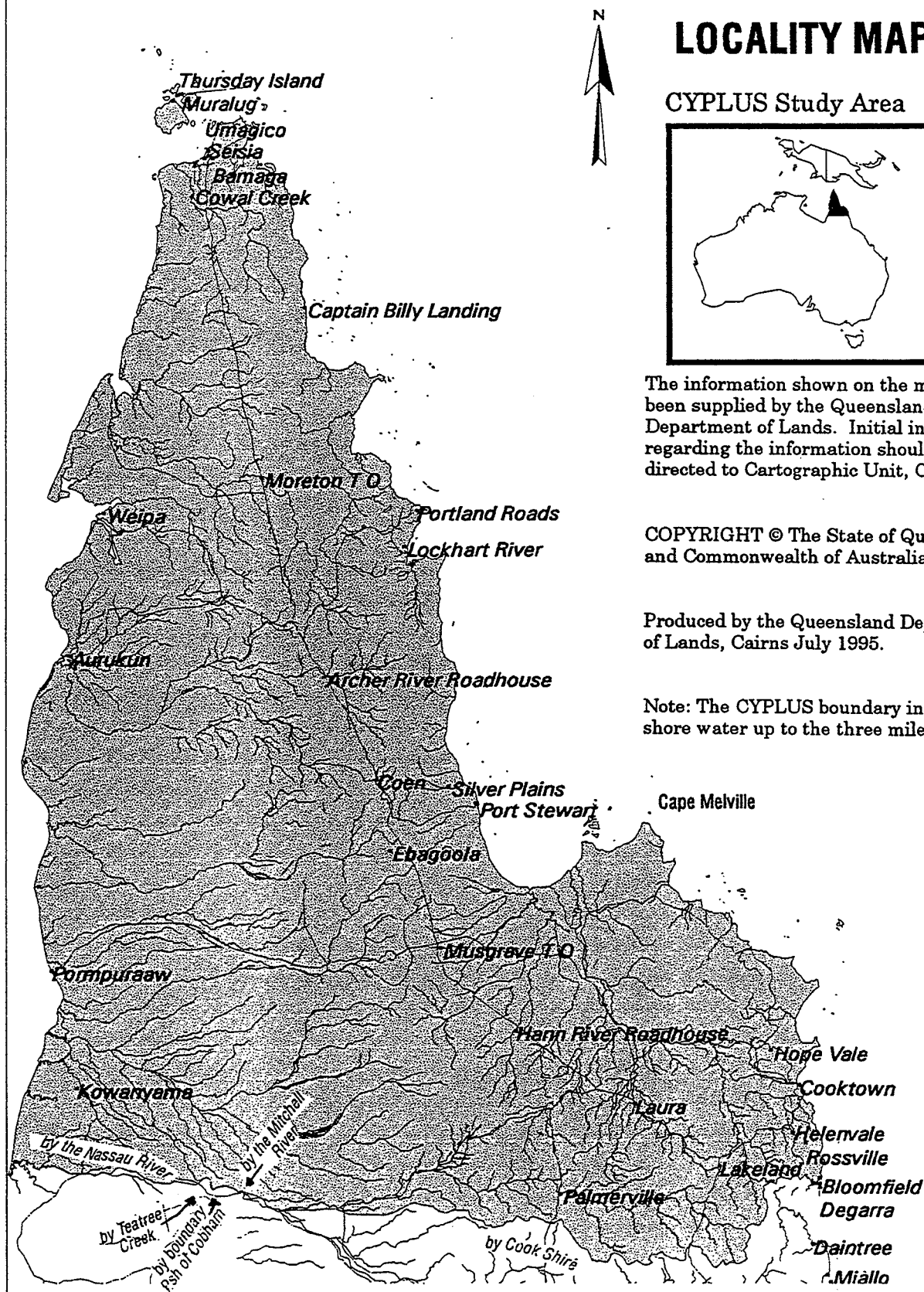


Figure 1





# CYPLUS

## CAPE YORK PENINSULA LAND USE STRATEGY

CYPLUS is a joint initiative between the  
Queensland and Commonwealth Governments.



## ELEVATION

	Below 100 metres
	100 - 200 metres
	200 - 300 metres
■	Above 300 metres

The information shown on the map has been  
derived from a Digital Elevation Model supplied  
by the Australian Land Information Group.

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Produced by the Queensland Department  
of Lands, Cairns July 1995.

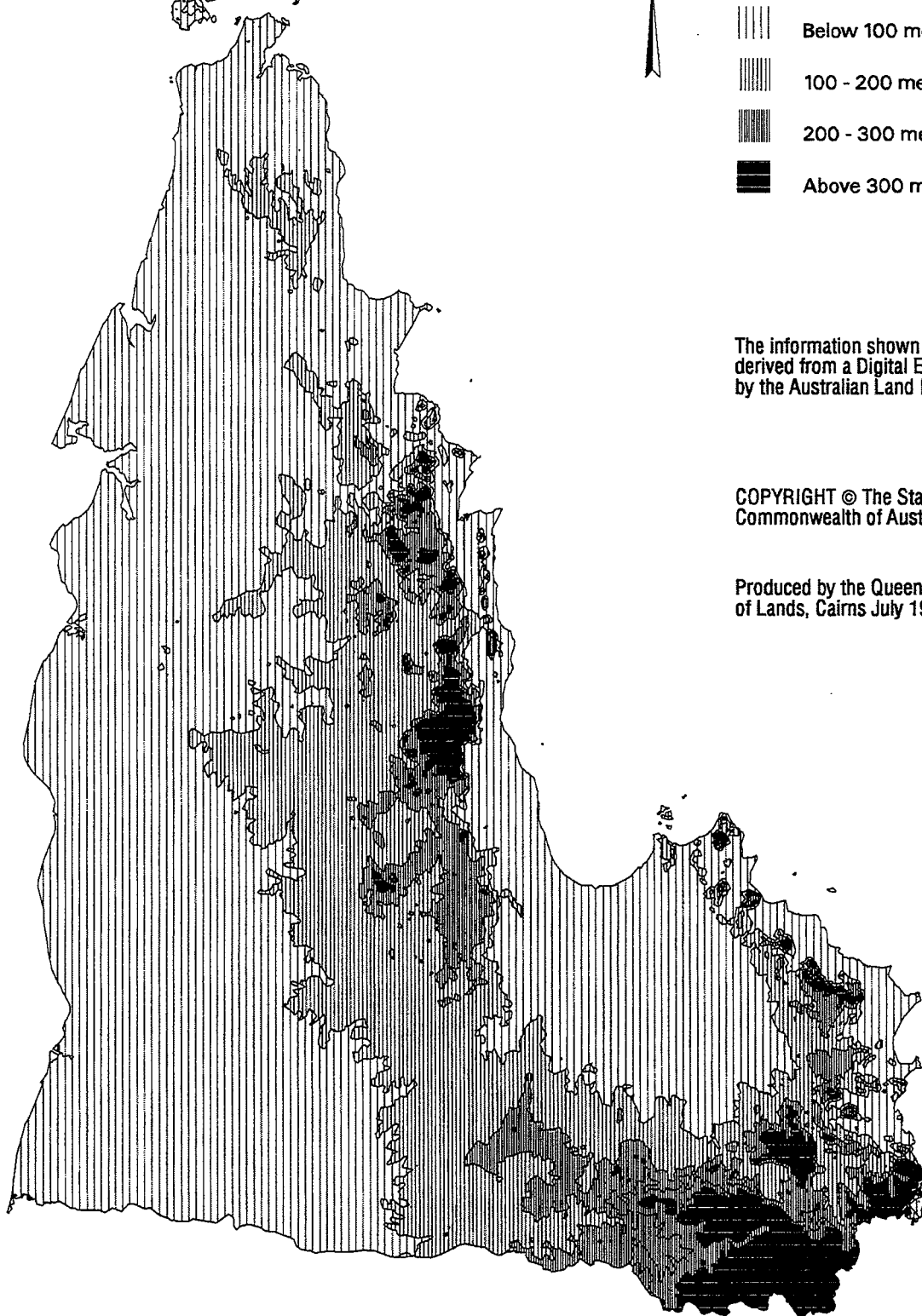


Figure 2







CYPLUS is a joint initiative between the Queensland and Commonwealth Governments.

## ISOTHERMS

Mean Maximum Summer Temperature

1 Degree Celsius Intervals

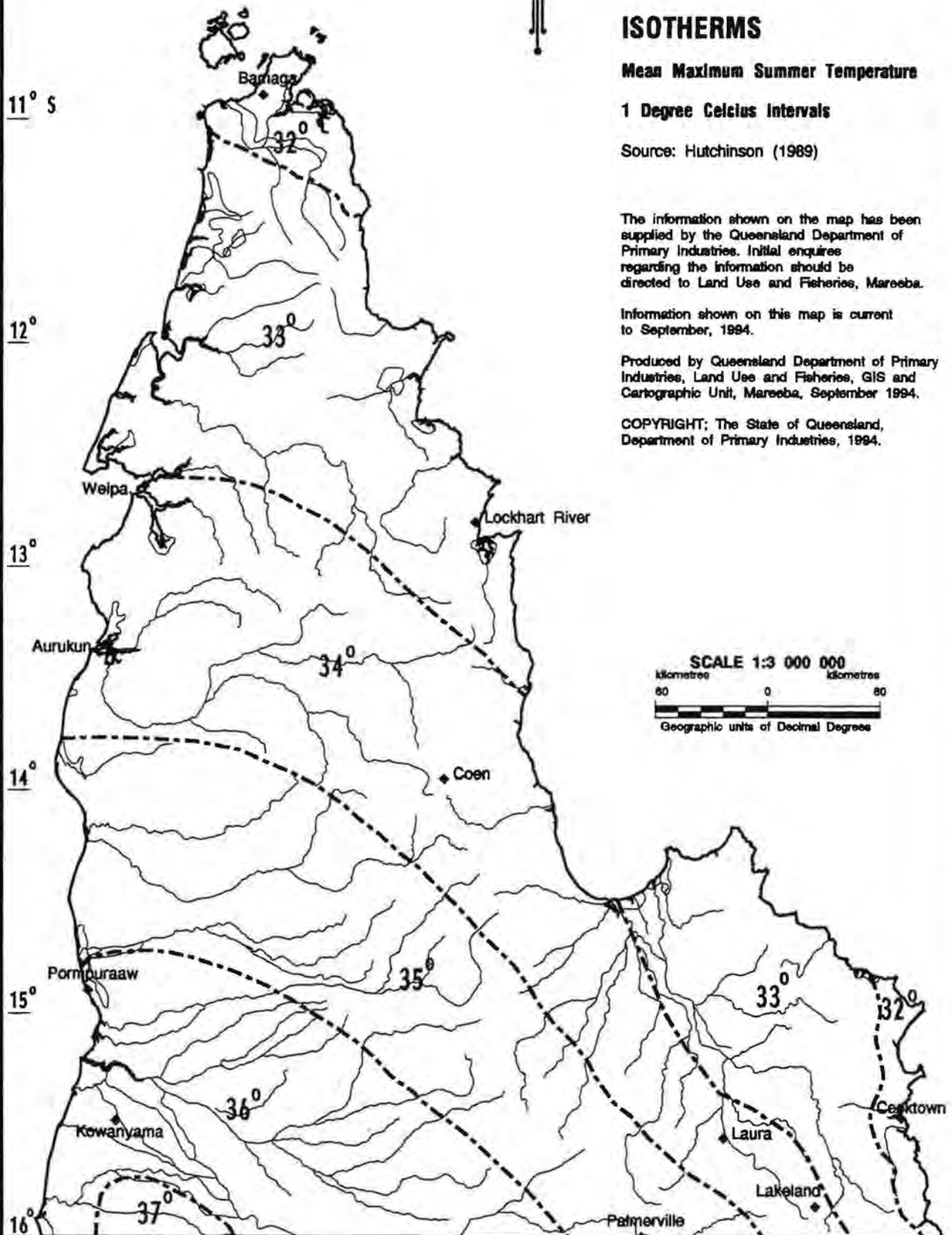
Source: Hutchinson (1989)

The information shown on the map has been supplied by the Queensland Department of Primary Industries. Initial enquires regarding the information should be directed to Land Use and Fisheries, Mareeba.

Information shown on this map is current to September, 1994.

Produced by Queensland Department of Primary Industries, Land Use and Fisheries, GIS and Cartographic Unit, Mareeba, September 1994.

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# CYPLUS

## CAPE YORK PENINSULA LAND USE STRATEGY

CYPLUS is a joint initiative between the Queensland and Commonwealth Governments.

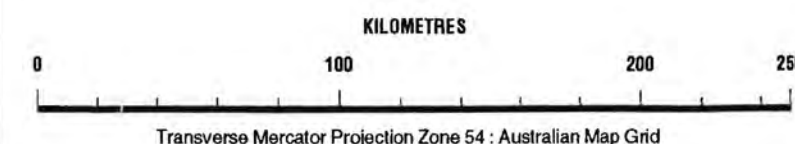
### RIVER BASINS

The information shown on this map has been supplied by the Department of Primary Industries. Initial enquiries regarding the information should be directed to Water Resources Division.

Topographic information shown on this map is current to 1989.

### LEGEND

- Roads
- Rivers
- + 1:250 000 Geology Sheet Boundaries
- Drainage Division Boundary
- - - River Basin Boundary
- IX** Drainage Division Number
- 901** Basin Number
- CYPLUS Study Area
- Extended Study Area



Prepared and produced by the Department of Primary Industries, June 1994.

Copyright © The State of Queensland, Department of Primary Industries, 1994.

31 Jul 95

EDITION NO 1

Figure 5

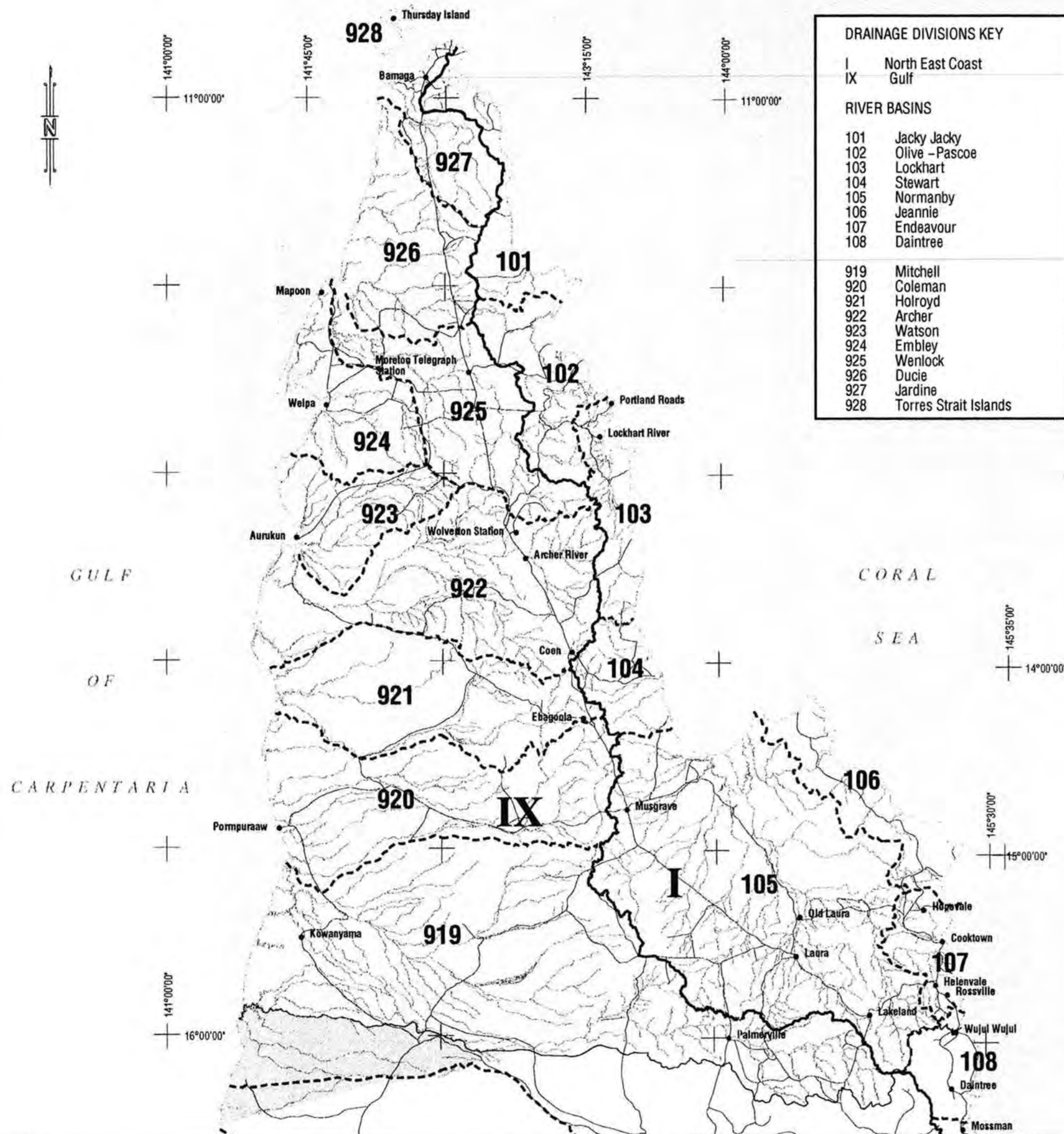
A3-103385

### DRAINAGE DIVISIONS KEY

- I North East Coast
- IX Gulf

### RIVER BASINS

- |     |                       |
|-----|-----------------------|
| 101 | Jacky Jacky           |
| 102 | Olive - Pascoe        |
| 103 | Lockhart              |
| 104 | Stewart               |
| 105 | Normanby              |
| 106 | Jeannie               |
| 107 | Endeavour             |
| 108 | Daintree              |
|     |                       |
| 919 | Mitchell              |
| 920 | Coleman               |
| 921 | Holroyd               |
| 922 | Archer                |
| 923 | Watson                |
| 924 | Embley                |
| 925 | Wenlock               |
| 926 | Ducie                 |
| 927 | Jardine               |
| 928 | Torres Strait Islands |



CYPLUS is a joint initiative between the Queensland and Commonwealth Governments.

## GEOLOGY

### Generalised Geology.

Source: Adapted from Connell Wagner (1989)

#### LEGEND

##### CAINOZOIC

- Coastal clays and windblown sands.
- Colluvial and alluvial clays, silts, sands and gravels.
- Weathered sands, gravels and clays.
- Aluminous and ferruginous laterites.
- Basalt.

##### MESOZOIC

- Shale, claystone, siltstone and quartz sandstone.

##### PALAEOZOIC

- Greywacke and other sediments.
- Volcanics and granite.

##### PRECAMBRIAN

- Metamorphics and granite.

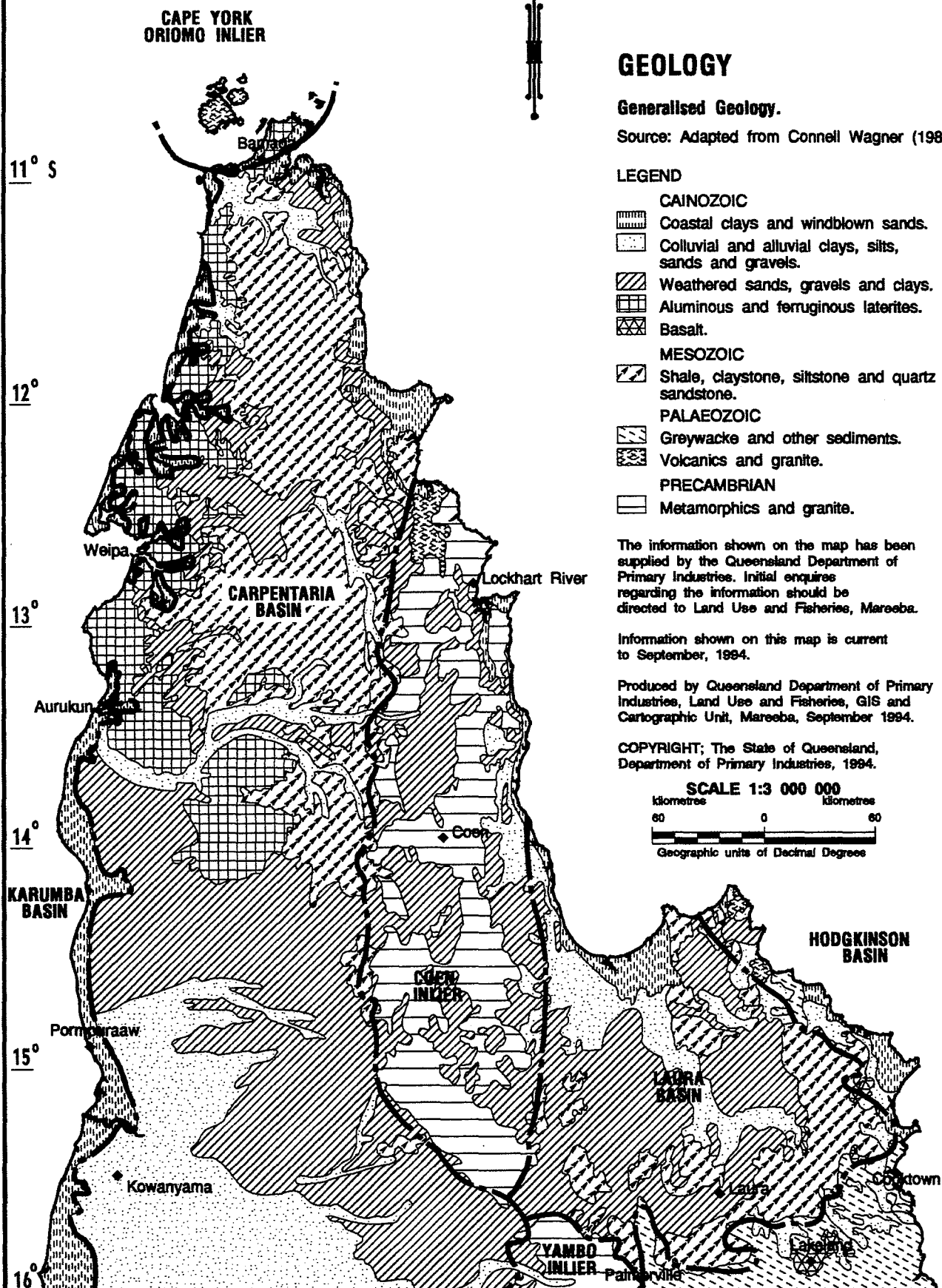
The information shown on the map has been supplied by the Queensland Department of Primary Industries. Initial enquires regarding the information should be directed to Land Use and Fisheries, Mareeba.

Information shown on this map is current to September, 1994.

Produced by Queensland Department of Primary Industries, Land Use and Fisheries, GIS and Cartographic Unit, Mareeba, September 1994.

COPYRIGHT; The State of Queensland, Department of Primary Industries, 1994.

SCALE 1:3 000 000  
kilometres  
60 0 60  
Geographic units of Decimal Degrees



CYPLUS is a joint initiative between the Queensland and Commonwealth Governments.

## PHYSIOGRAPHIC UNITS

Source: Isbell (1980), adapted by Connell Wagner (1989).

### LEGEND

1. Near-coastal plains.
2. Dunefields.
3. Subcoastal fans and alluvial plains.
4. Inland fans and alluvial plains.
5. Undulating plateau of the Northern Peninsula.
6. Gently undulating plains of the Central Western Peninsula.
7. Plains of the Northern Central Peninsula.
8. Central Eastern uplands.
9. South East uplands.
10. Sandstone plateau.

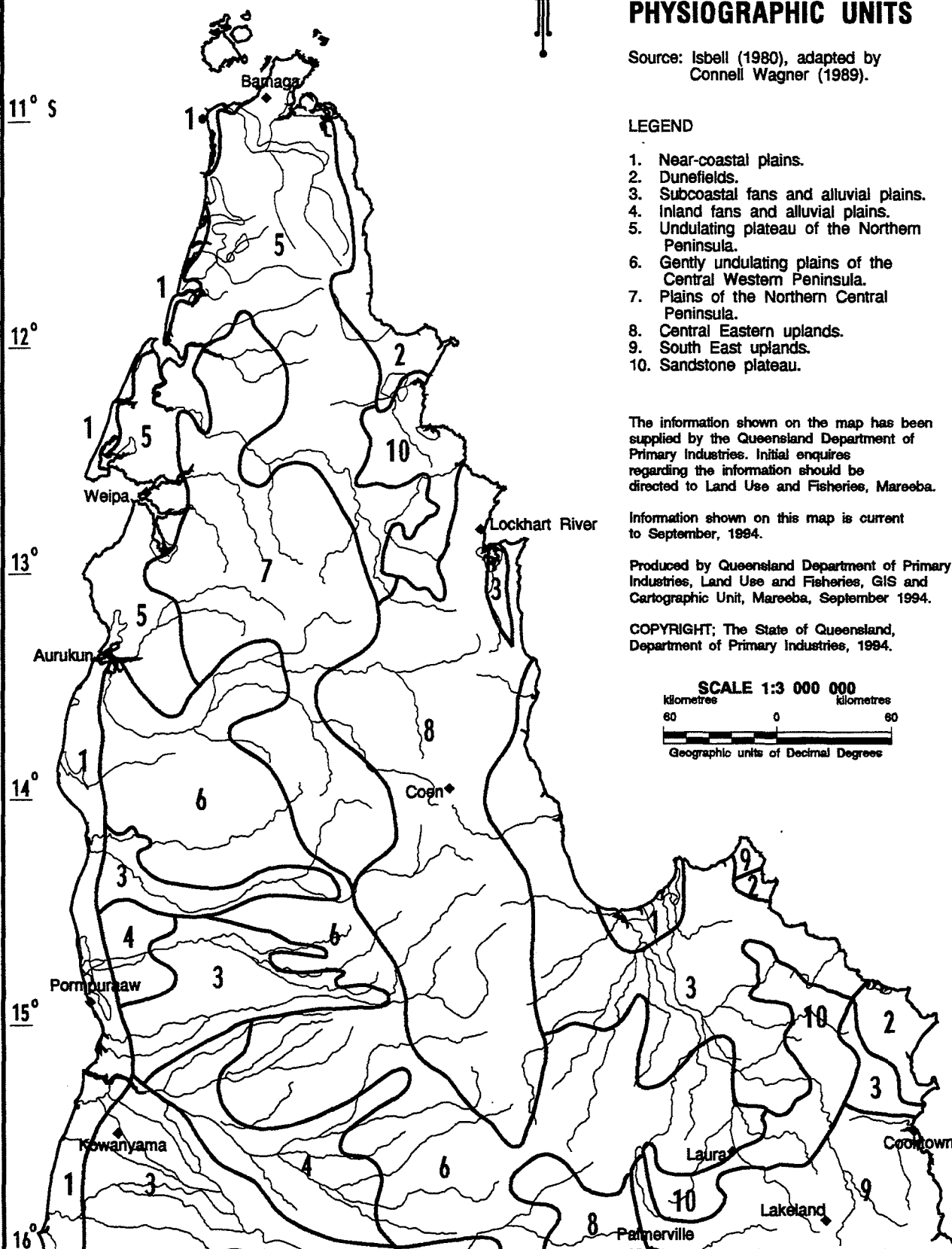
The information shown on the map has been supplied by the Queensland Department of Primary Industries. Initial enquires regarding the information should be directed to Land Use and Fisheries, Mareeba.

Information shown on this map is current to September, 1994.

Produced by Queensland Department of Primary Industries, Land Use and Fisheries, GIS and Cartographic Unit, Mareeba, September 1994.

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**SCALE 1:3 000 000**  
kilometres  
60 0 60  
Geographic units of Decimal Degrees





CYPLUS is a joint initiative between the Queensland and Commonwealth Governments.

## LANDSCAPE UNITS

### Broad soil and landscape groups

Source: The generalised landscape information shown on the map has been interpreted from the landscape diagrams, Figures 9 - 15 of the report Soil Survey and Agricultural Land Suitability of Cape York Peninsula Biggs, A.J.W. & Philip, S.R. (1994)

### LANDSCAPE UNITS

1. Heathlands Landscape
2. Batavia Landscape
3. Lockhart Landscape
4. Ebagoola Landscape
5. Edward River Landscape
6. Mitchell Landscape
7. Hodgkinson Landscape

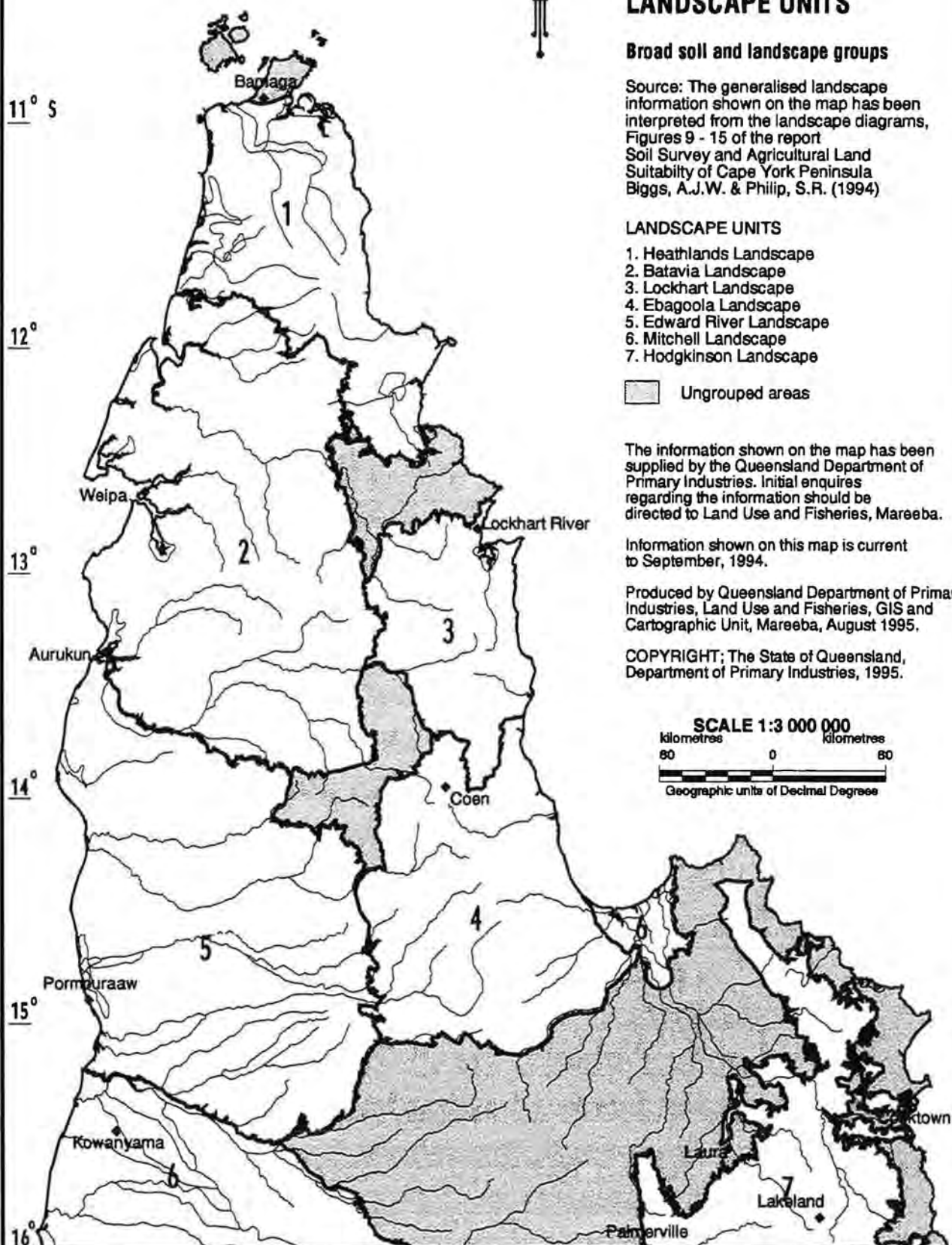
Ungrouped areas

The information shown on the map has been supplied by the Queensland Department of Primary Industries. Initial enquires regarding the information should be directed to Land Use and Fisheries, Mareeba.

Information shown on this map is current to September, 1994.

Produced by Queensland Department of Primary Industries, Land Use and Fisheries, GIS and Cartographic Unit, Mareeba, August 1995.

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# CYPLUS

## CAPE YORK PENINSULA

### LAND USE STRATEGY

CYPLUS is a joint initiative between the Queensland and Commonwealth Governments.

## Broad Vegetation Groups of Far Northern Queensland

-  Closed-forest
-  Eucalyptus
-  Melaleuca
-  Grassland
-  Miscellaneous



The information shown on this map has been supplied by the Queensland Herbarium, Queensland Department of Environment and Heritage and derived from photointerpretation by V. J. Neldner and J. R. Clarkson.

Initial enquires regarding this information should be directed to the Queensland Herbarium, DEH, Brisbane.

COPYRIGHT © The State of Queensland and Commonwealth of Australia 1995.

Produced by the Queensland Department of Lands, Cairns July 1995.

10° S

12° S

14° S

16° S

Figure 9

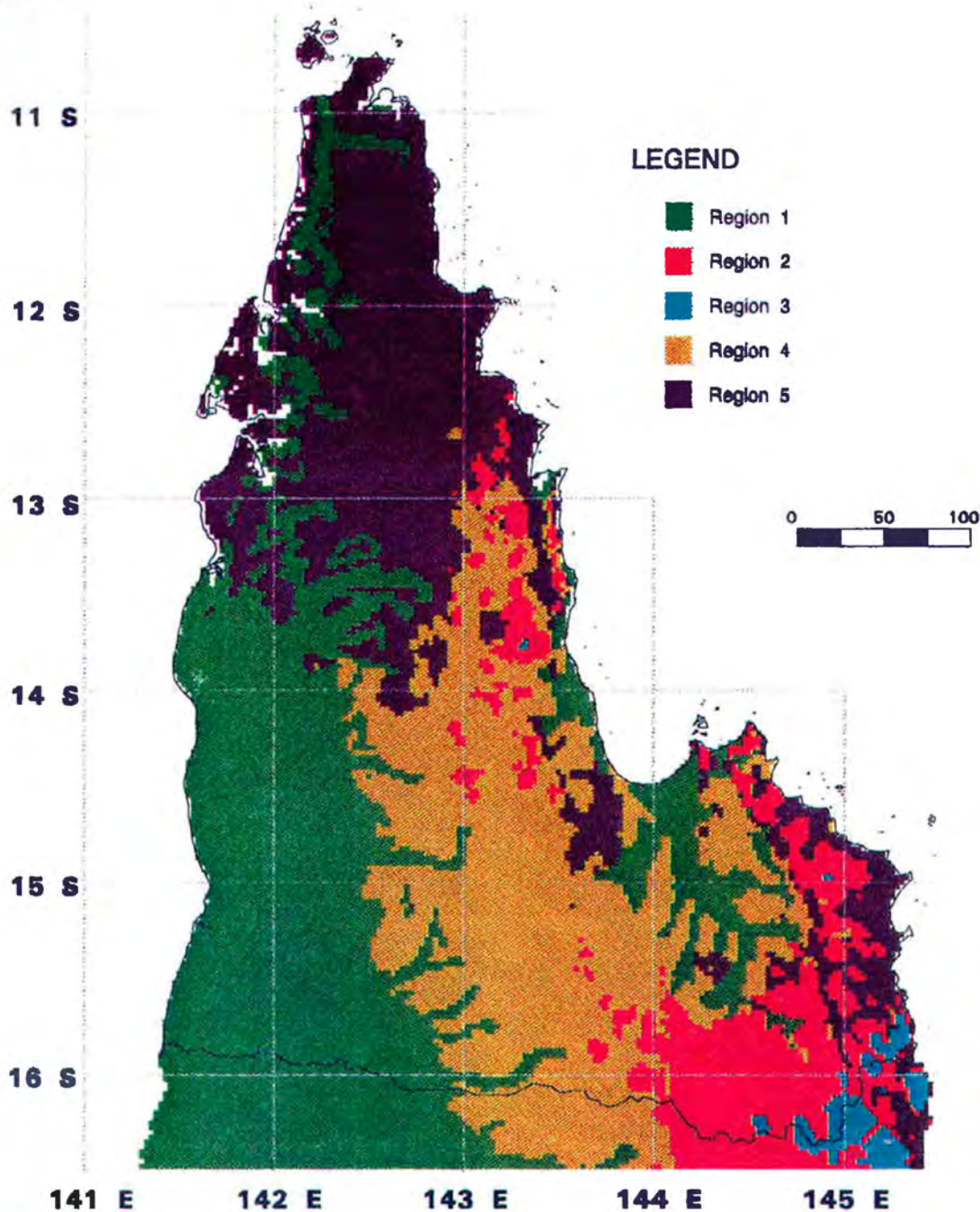




# Environmental Regions of CYP 5 Group

**CYPLUS**  
CAPE YORK PENINSULA  
LAND USE STRATEGY

CYPLUS is a joint initiative of the  
Queensland and Commonwealth Governments



Projection: Geographical representation  
Spheroid: Australian National Spheroid

## Sources....

Terrain: DEM and diamond filter program - Centre for Resource and Environmental Studies (ANU).  
Climate: derived from DEM and BIOCLIM climate surfaces fitted to data from Bureau of Meteorology (1901-1975).  
Geology: Original data generated by AGSO 1976, supplied in digital form by NRIC, DPIE, with funding from ANCA.

## Caveats....

The data used in the analysis have been assumed by ERIN to be correct as received from the data suppliers.  
Data set should not be used at local scales (finer than 2.5km).  
Class definitions of attributes used are available in report and from ERIN.

Figure 10

## DETAILED LEGEND



### REGION 1 :

**CLIMATE** –very warm annual mean temperatures with a warm winter and very warm summer with hot–very hot maximum temperatures; very dry to moist annual mean precipitation, very dry winter, moist–wet summer, moderate–high variation in monthly precipitation

**TERRAIN** –lowlands and foothills with some uplands, relief varies mainly from extremely low to low up to very high, variation in mean elevation over the landscape is generally low with some high variation

**LITHOLOGY** –dominated by cainozoic deposits, primarily sands and including calcrete sand, quartz sand, conglomerate and sedimentary rocks



### REGION 2 :

**CLIMATE** –warm annual mean temperatures with a moderate–warm winter (some cool temperatures in coldest months), warm–very warm summer; very dry to wet annual mean precipitation, very dry winter, moist–wet summer, low–moderate variation in monthly precipitation

**TERRAIN** –foothills and uplands, some highlands and lowlands, relief varies from low to high with some very low and very high relief, variation in mean elevation over the landscape is generally low

**LITHOLOGY** –dominated by sedimentary rocks and including basic volcanics, metamorphics, acid volcanics, sand, acid plutonics and quartz sand



### REGION 3 :

**CLIMATE** –moderate to warm annual mean temperatures with a warm winter and very warm summer with hot–very hot maximum temperatures; very dry to very wet annual mean precipitation, very dry winter, moist–very wet summer, low–moderate variation in monthly precipitation

**TERRAIN** –varies from foothills through to highlands (predominantly uplands), some lowlands in lowest areas, very high relief with some areas of low relief, variation in mean elevation over the landscape is generally low

**LITHOLOGY** –dominated by acid plutonic rocks and including sedimentary rocks



### REGION 4 :

**CLIMATE** –very warm annual mean temperatures with a warm winter and very warm summer with hot–very hot maximum temperatures; very dry to moist annual mean precipitation, very dry winter, moist–wet summer, moderate–high variation in monthly precipitation

**TERRAIN** –lowlands and foothills with some uplands, relief varies mainly from extremely low to low up to very high, variation in mean elevation over the landscape is generally low

**LITHOLOGY** –dominated by quartz sand and including metamorphics, conglomerate, acid plutonics, acid volcanics, basic volcanics and sedimentary rocks



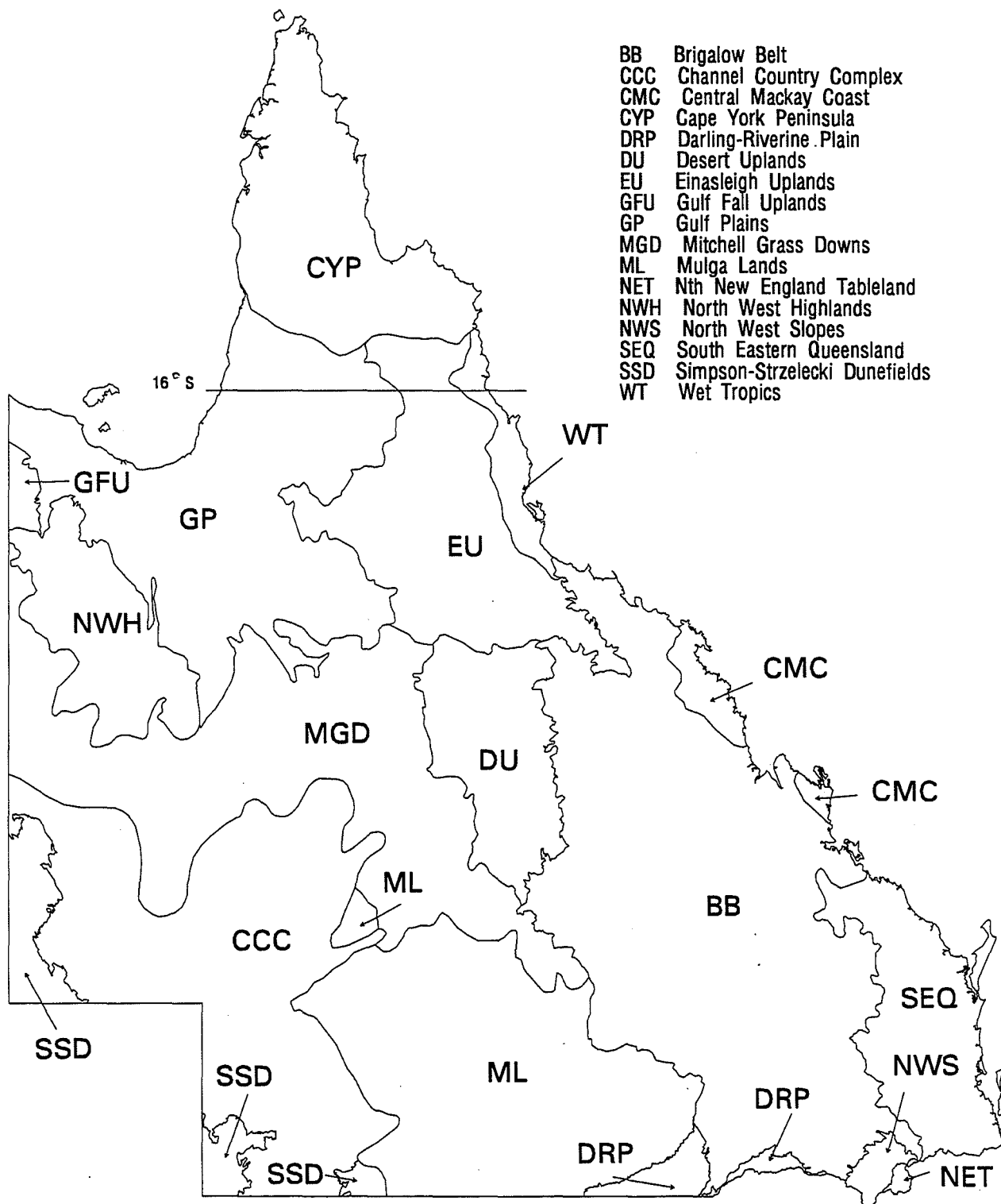
### REGION 5 :

**CLIMATE** –warm to very warm annual mean temperatures, warm summer with hot maximum temperatures, warm winter, narrower temperature range than other Groups; very dry to very wet annual mean precipitation, very dry winter, moist–very wet summer, low–high variation in monthly precipitation

**TERRAIN** –lowlands and foothills with some highlands, relief varies from extremely low to high with some very high areas, variation in mean elevation over the landscape is generally low

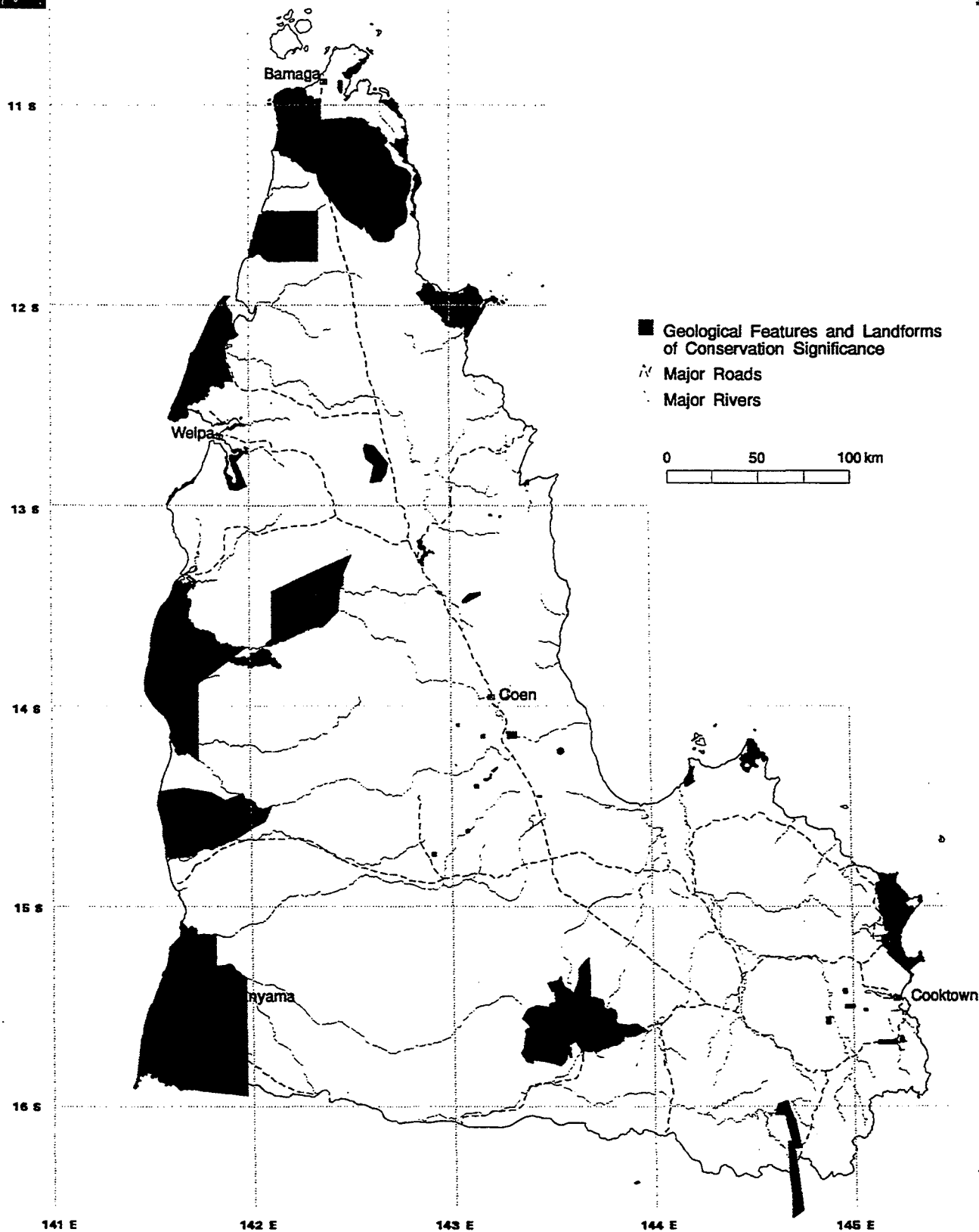
**LITHOLOGY** –dominated by sedimentary rocks and including conglomerate, acid volcanic, quartz sand, sand, metamorphics, acid plutonic and basic volcanic rocks

# Biogeographic regions of Queensland





# Geological Sites of Conservation Significance Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 08, 1995)

## Sources....

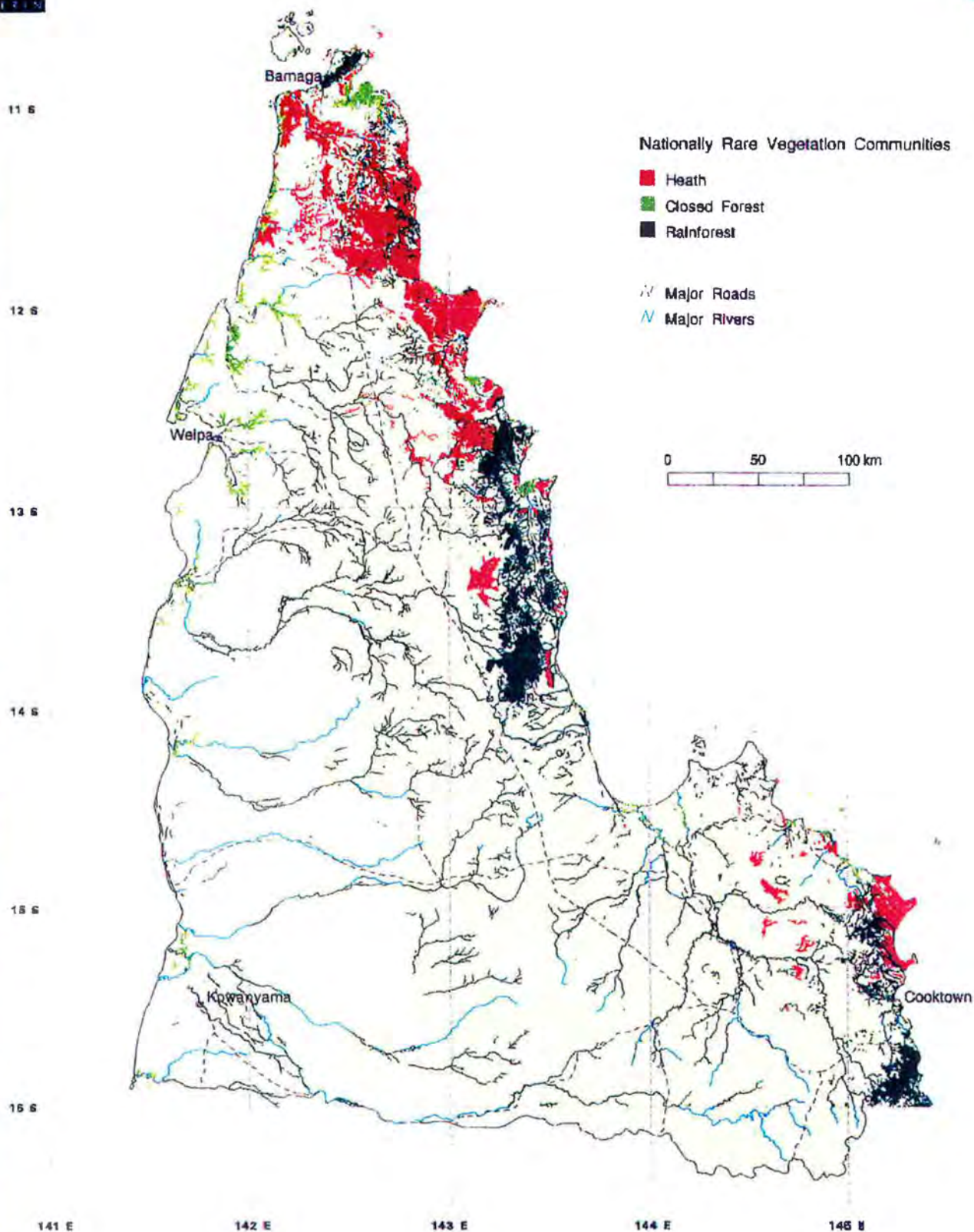
AHC, 1994. Sites of Geological and Landform Conservation Significance on CYP.  
AHC, 1995. Areas of Conservation Significance on Cape York Peninsula.  
de Jersey, N., Stevens, N. & Wilford, W. 1976. Geol Elements of the Nat'l Estate in Qld. GeolSocAust.  
Blewett, R. & Gnileinski, F. 1991. Geol of Coen & Ebagooola Shear Zones. BMR Rec 1991/14.  
See AHC 1994 for additional sources and complete citations.

## Caveats....

See AHC 1994 for descriptions and boundaries and localities of features and landforms above.  
Selection of features by AHC with consultation with subject matter experts and literature searches.  
The sizes of the smaller features are exaggerated for viewing purposes.  
Data extraction and construction of GIS coverages, map design and preparation by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 12



Map prepared through the facilities of the Environmental Resource Information Network by D. Glaeser (May 04, 1995)

#### Sources....

AHC, 1995. Areas of Conservation Significance - Cape York Peninsula.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NRD1 Vegetation Survey. Queensland Herbarium.  
Neldner, V.J. 1991. Central Western Queensland. Vegetation Survey of Queensland. QDPI Botany Bulletin No.9  
Neldner, V.J. 1993. Vegetation survey and mapping in Queensland. Queensland Herbarium Botany Bulletin No.12.  
See AHC or Neldner and Clarkson above for complete bibliography and sources.

#### Caveats....

Rainforest and heath areas above based on Basic Vegetation Groups (after Neldner and Clarkson 1994).  
Closed Forest areas based on Structure (after Neldner and Clarkson 1994) which includes rainforests.  
See sources or AHC for precise boundaries and descriptions.  
Data extraction, map design and preparation by ERIN.

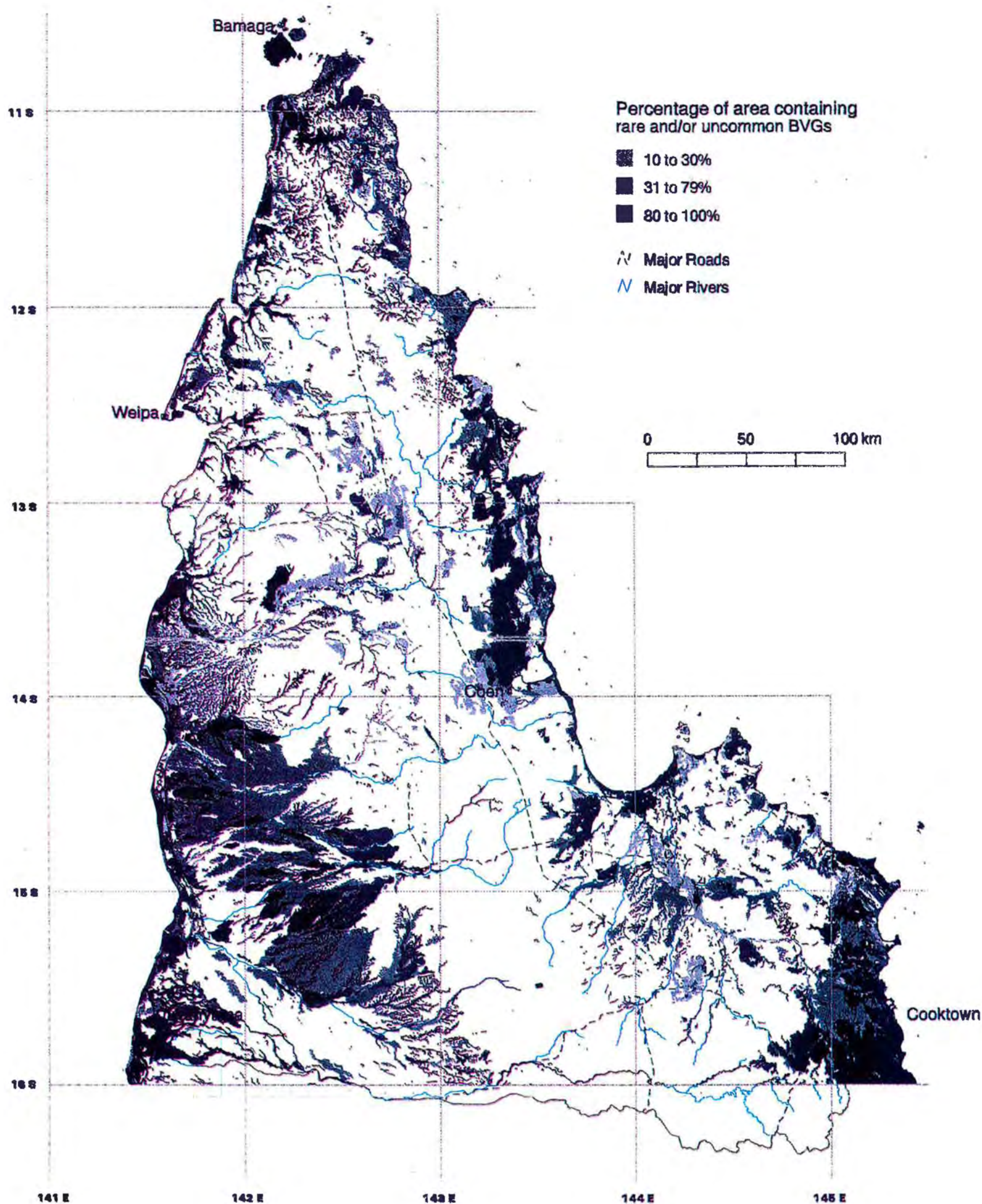
Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 13





# Rare and Uncommon BVG's (Basic Vegetation Groups) Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by G. Dunn (August 22, 1985)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Queensland Government. 1995. Nature Conservation Act.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Neldner, V.J. and Clarkson, J.R. Unpublished CYP CORVEG site and observation datasets.  
See AHC for complete bibliography and sources.

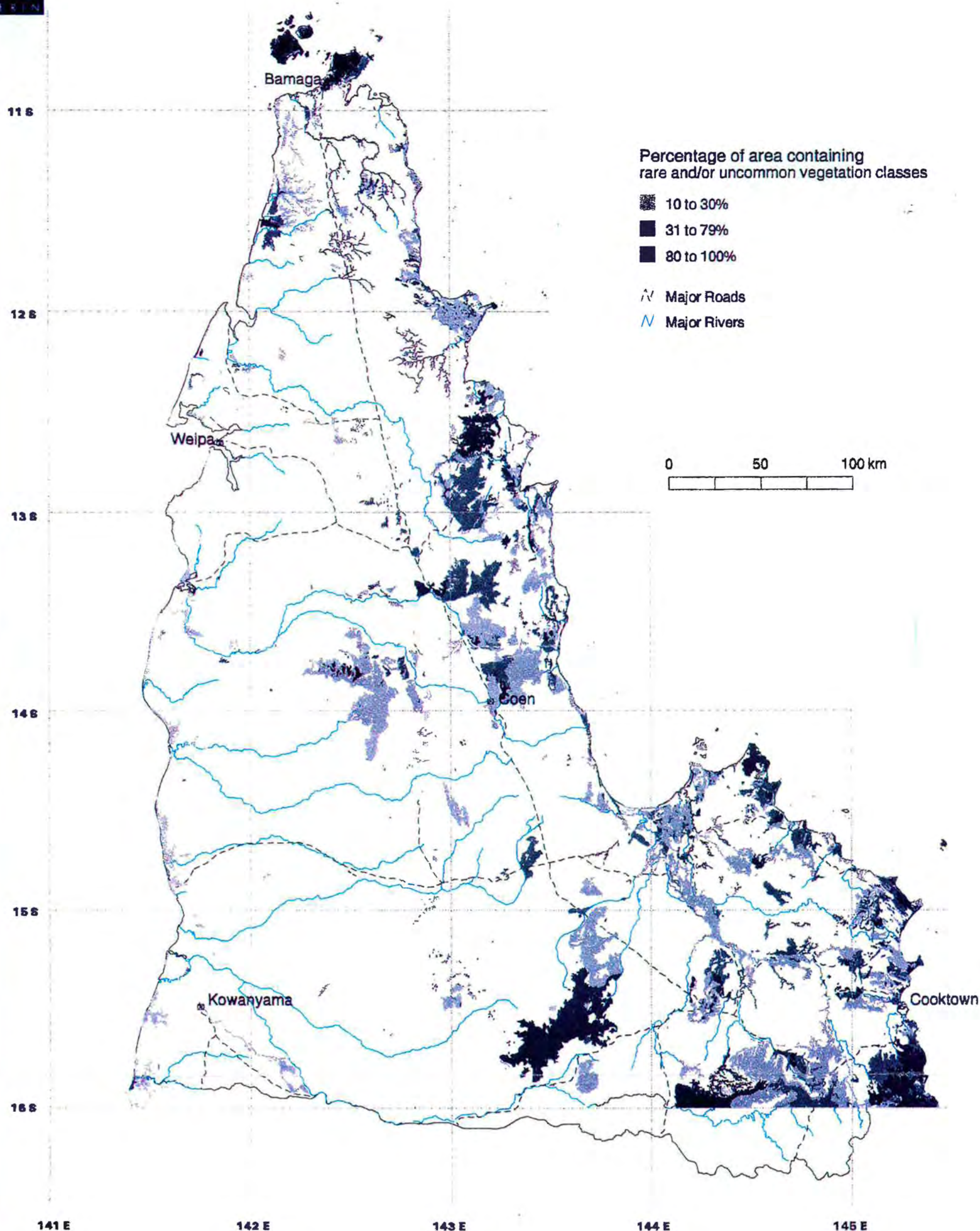
## Caveats....

The designation of rare or threatened plants within Queensland is by the Queensland Government.  
These species tend to be concentrated in the vegetation classes (after Neldner and Clarkson)  
depicted above (vegetation classes 8,20,21,24,26). See AHC or Neldner and Clarkson for details.  
Data preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 14





Map prepared through the facilities of the Environmental Resources Information Network by G. Dunn (August 22, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Queensland Government. 1995. Nature Conservation Act.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Neldner, V.J. and Clarkson, J.R. Unpublished CYP CORVEG site and observation datasets.  
See AHC for complete bibliography and sources.

## Caveats....

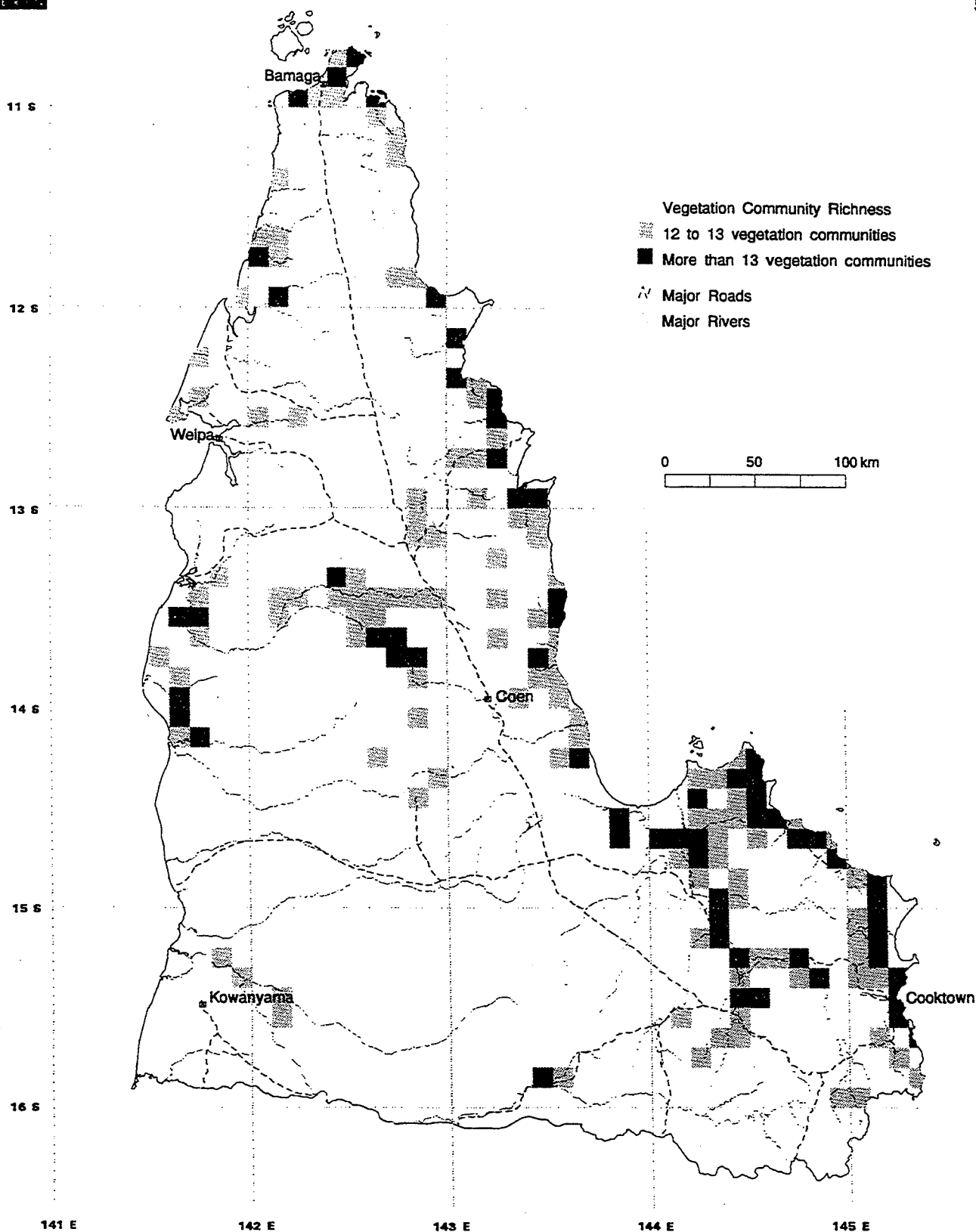
The designation of rare or threatened plants within Queensland is by the Queensland Government. These species tend to be concentrated in the vegetation classes (after Neldner and Clarkson) depicted above (vegetation classes 8, 20, 21, 24, 26). See AHC or Neldner and Clarkson for details. Data preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 15



# Vegetation Communities Richness 6 minute grids Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 04, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey, Queensland Herbarium.  
Neldner, V.J. 1991. Central Western Queensland. Vegetation Survey of Queensland. QDPI Botany Bulletin No.9  
Neldner, V.J. 1993. Vegetation survey and mapping in Queensland. Queensland Herbarium Botany Bulletin No.12.  
See AHC or Neldner and Clarkson above for complete bibliography and sources.

## Caveats....

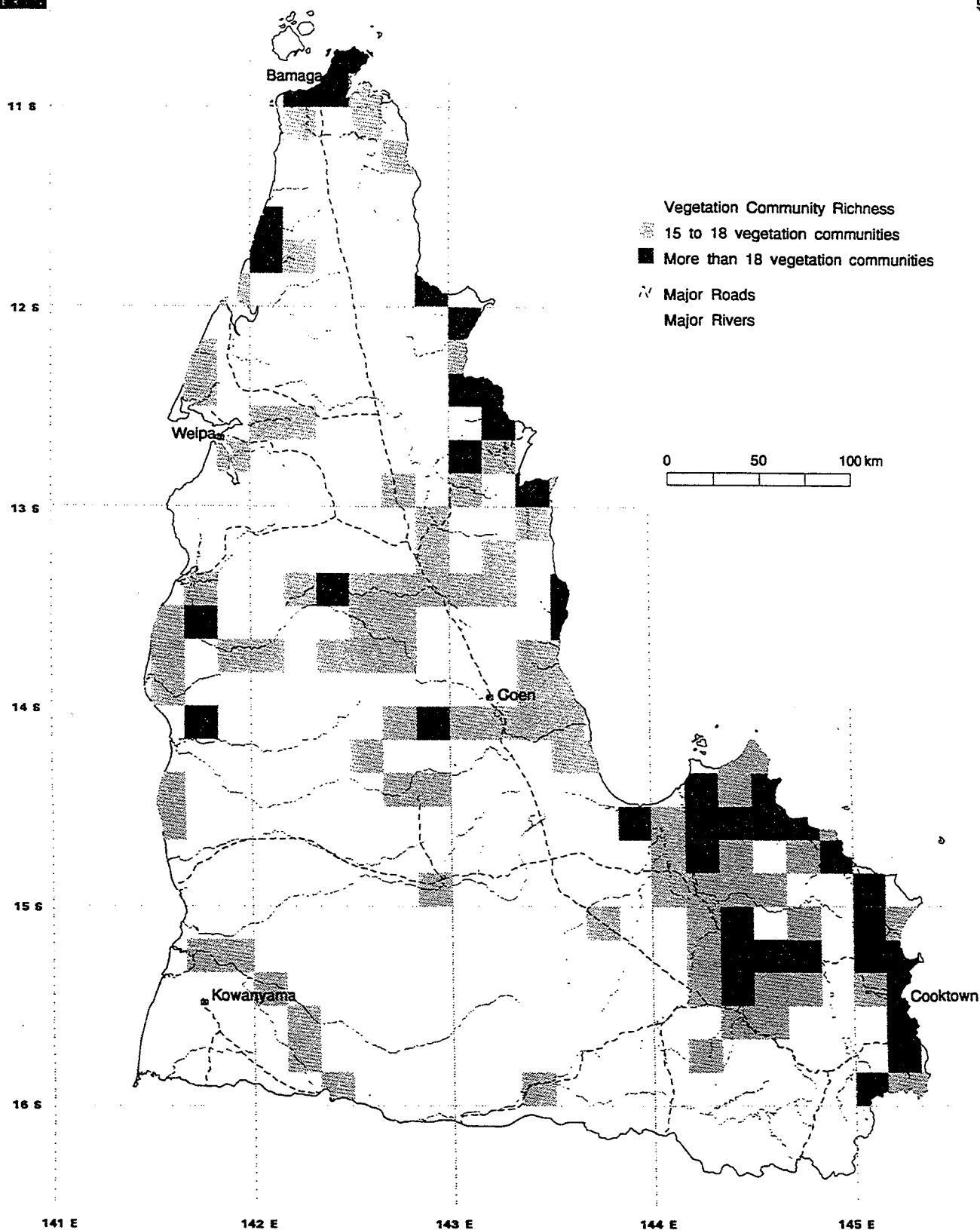
Vegetation communities richness is defined as the number of distinct vegetation types per grid.  
There are 209 vegetation types (after Clarkson and Neldner 1994). Counts per grid range from 1 to 26.  
Spatial analysis and overlays by ERIN.  
Class breaks determined by AHC. See AHC above for discussion.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 16



# Vegetation Communities Richness 10 minute grids Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 04, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
 Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey, Queensland Herbarium.  
 Neldner, V.J. 1991. Central Western Queensland. Vegetation Survey of Queensland. QDPI Botany Bulletin No.9  
 Neldner, V.J. 1993. Vegetation survey and mapping in Queensland. Queensland Herbarium Botany Bulletin No.12.  
 See AHC or Neldner and Clarkson above for complete bibliography and sources.

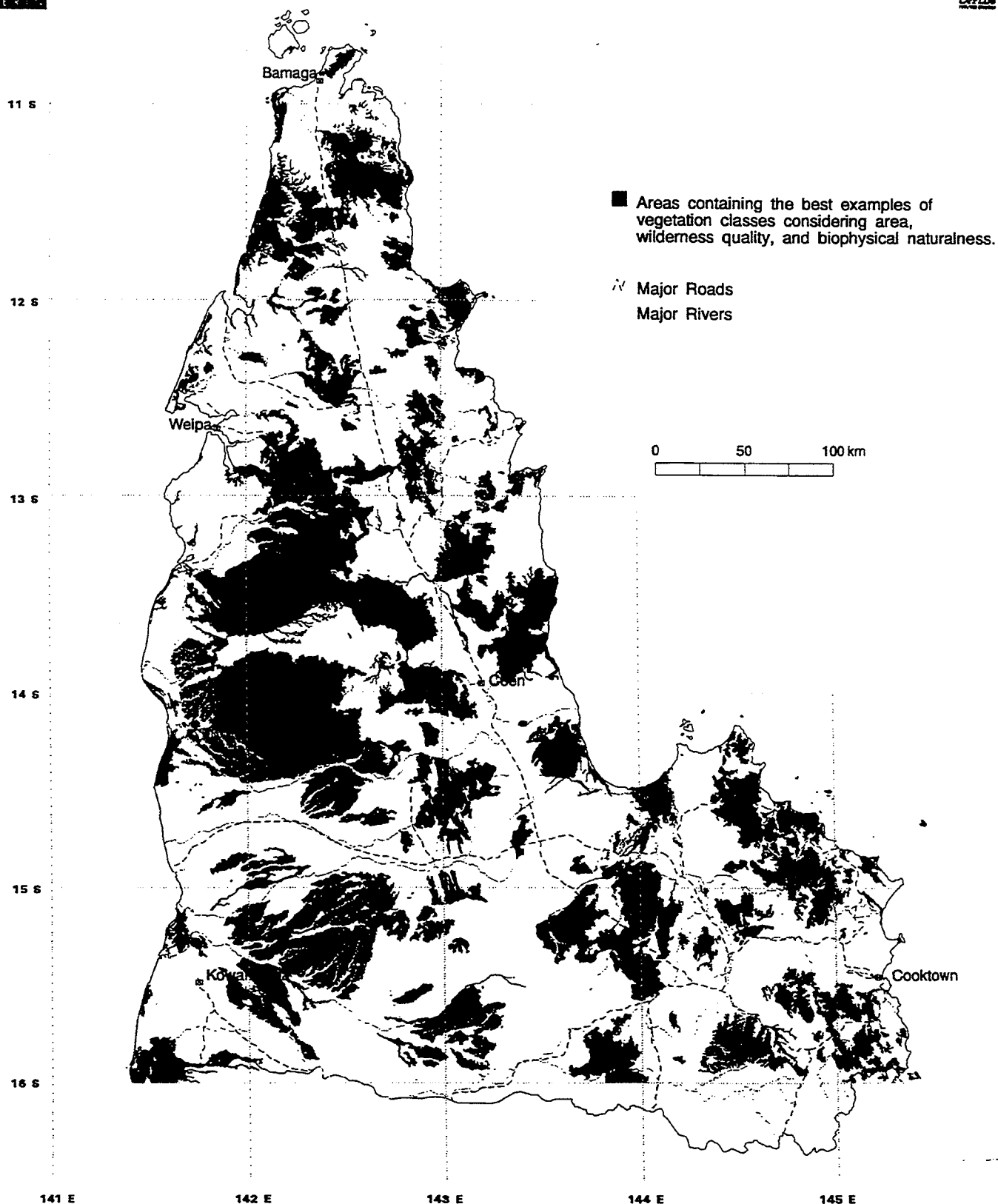
## Caveats....

Vegetation communities richness is defined as the number of distinct vegetation types per 10 minute grid.  
 There are 209 vegetation types (after Neldner and Clarkson 1994). Counts per grid range from 1 to 29.  
 Spatial analysis and overlays by ERIN.  
 Class breaks determined by AHC. See AHC above for discussion.

Projection: Geographical representation  
 Spheroid: Australian National Spheroid  
 Scale approx. 1:2,225,000 at A3 size  
 Scale approx. 1:3,125,000 at A4 size

Figure 17

# Representative Vegetation Areas Containing Best Examples Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 04, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Neldner, V.J. 1993. Vegetation survey and mapping in Queensland. Queensland Herbarium Botany Bulletin No.12.  
AHC - NWI. 1995. National Wilderness Inventory.  
See AHC or Neldner and Clarkson above for complete bibliography and sources.

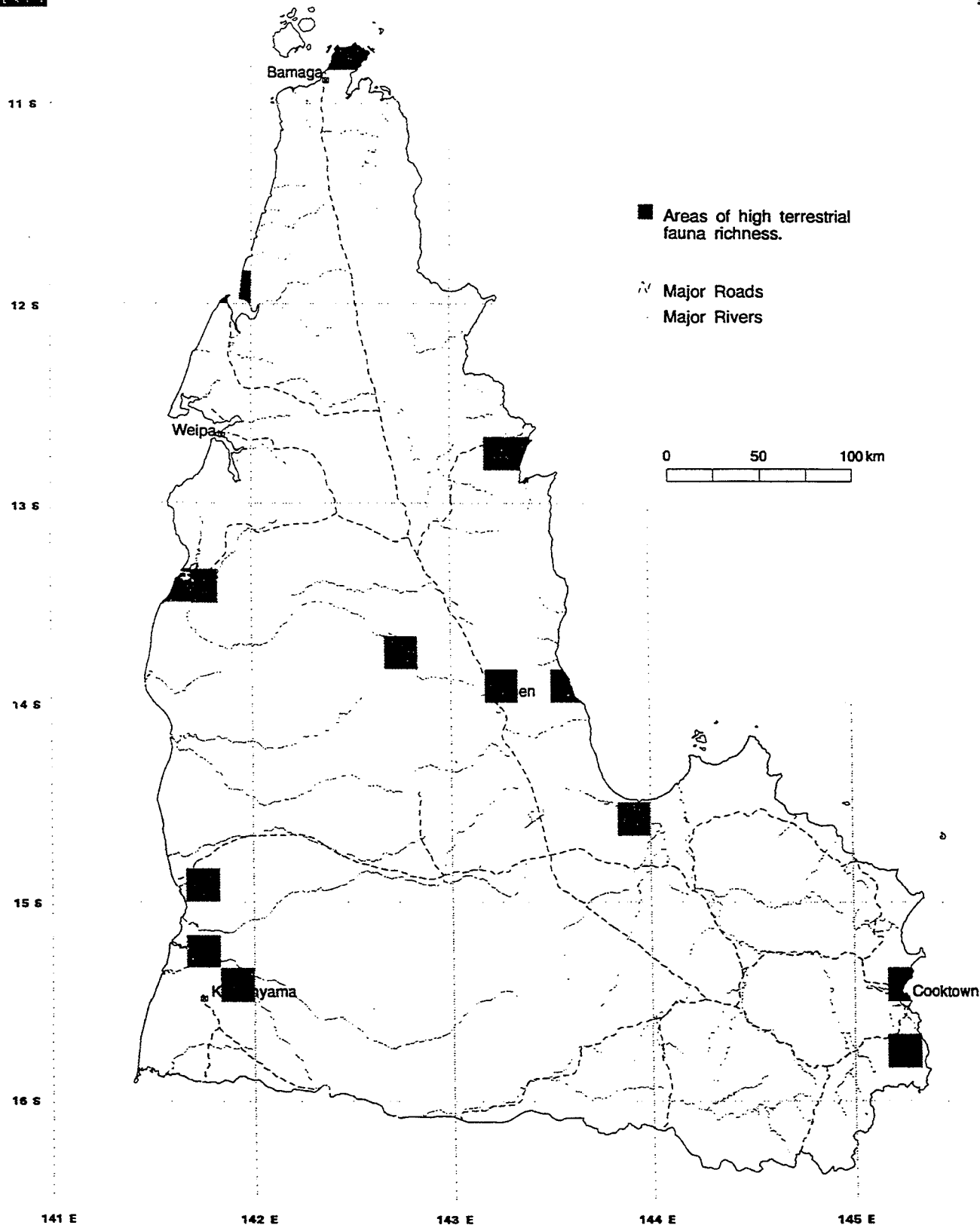
## Caveats....

The Neldner and Clarkson Vegetation coverage has been overlaid with the National Wilderness Inventory. Areas depicted above are, generally, large areas that are representative of different vegetation types that also have high wilderness value indices and high biophysical naturalness. See AHC above for discussion of methodology and thresholds.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 18

# Areas of High Fauna Richness Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 04, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
McFarland, D. 1993. Fauna of the Cape York Peninsula Biogeographic Region. QDEH.  
See AHC for complete bibliography and sources.

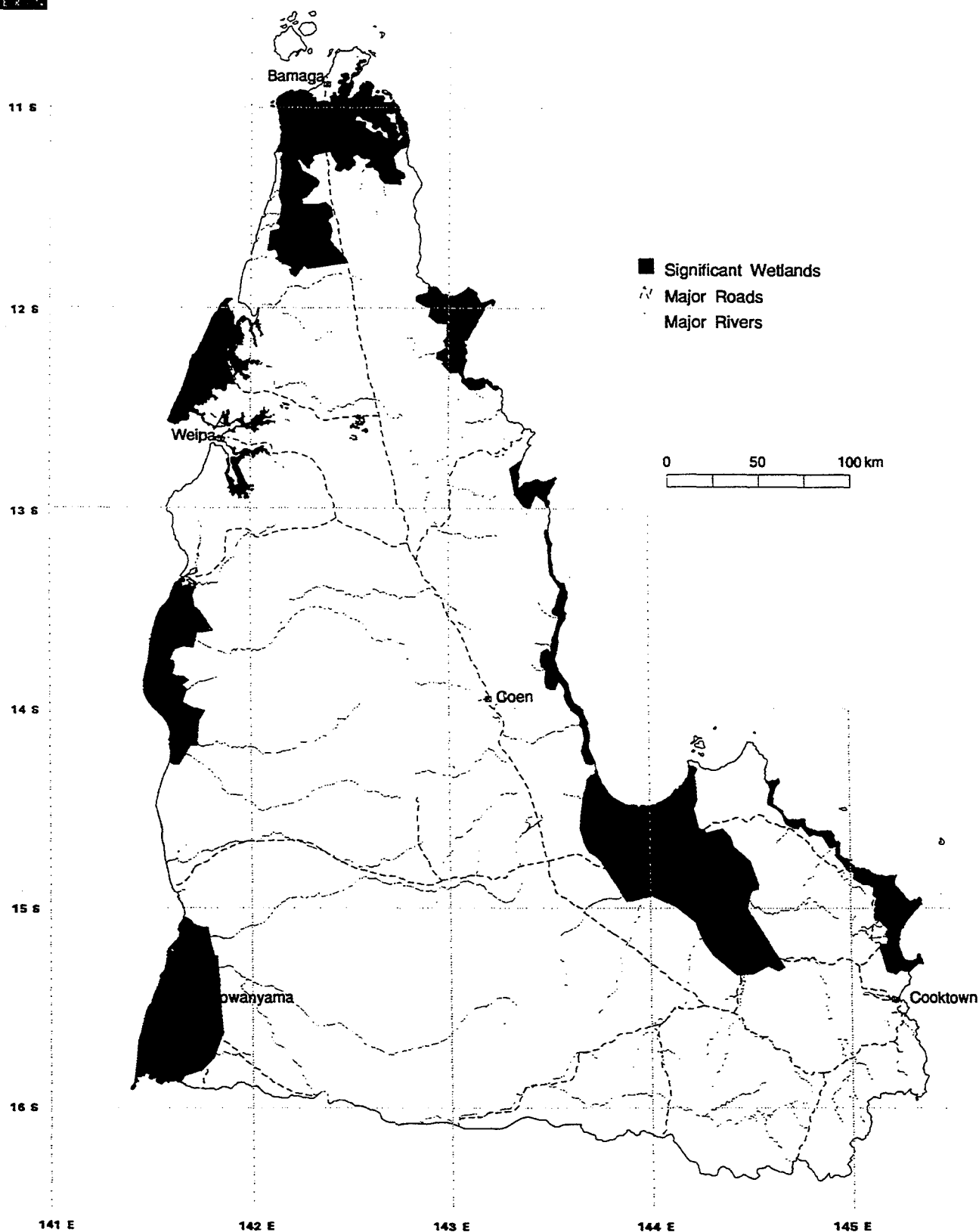
## Caveats....

Based on McFarland (1993) species diversity index on 10 minute grid.  
Index is a function of number of species in a cell and search effort.  
Cells depicted above have a species diversity index of six or higher.  
See AHC above for discussion of methodology and thresholds.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 19

# Significant Wetlands of Conservation Value Cape York Peninsula



Map prepared through the facilities of the Environmental Resource Information Network by D. Gleason (May 04, 1995)

## Sources....

AHC, 1995. Areas of Conservation Significance - Cape York Peninsula.  
Driscoll, P. V. 1994. Cape York Peninsula Wetland Conservation Assessment. Report to QDEH, Dec 1994.  
Driscoll, P.V. personal communications.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Danaher, K. 1994. Marine Vegetation Project, NRAP NR06. QDPI. See AHC for complete sources and citations.

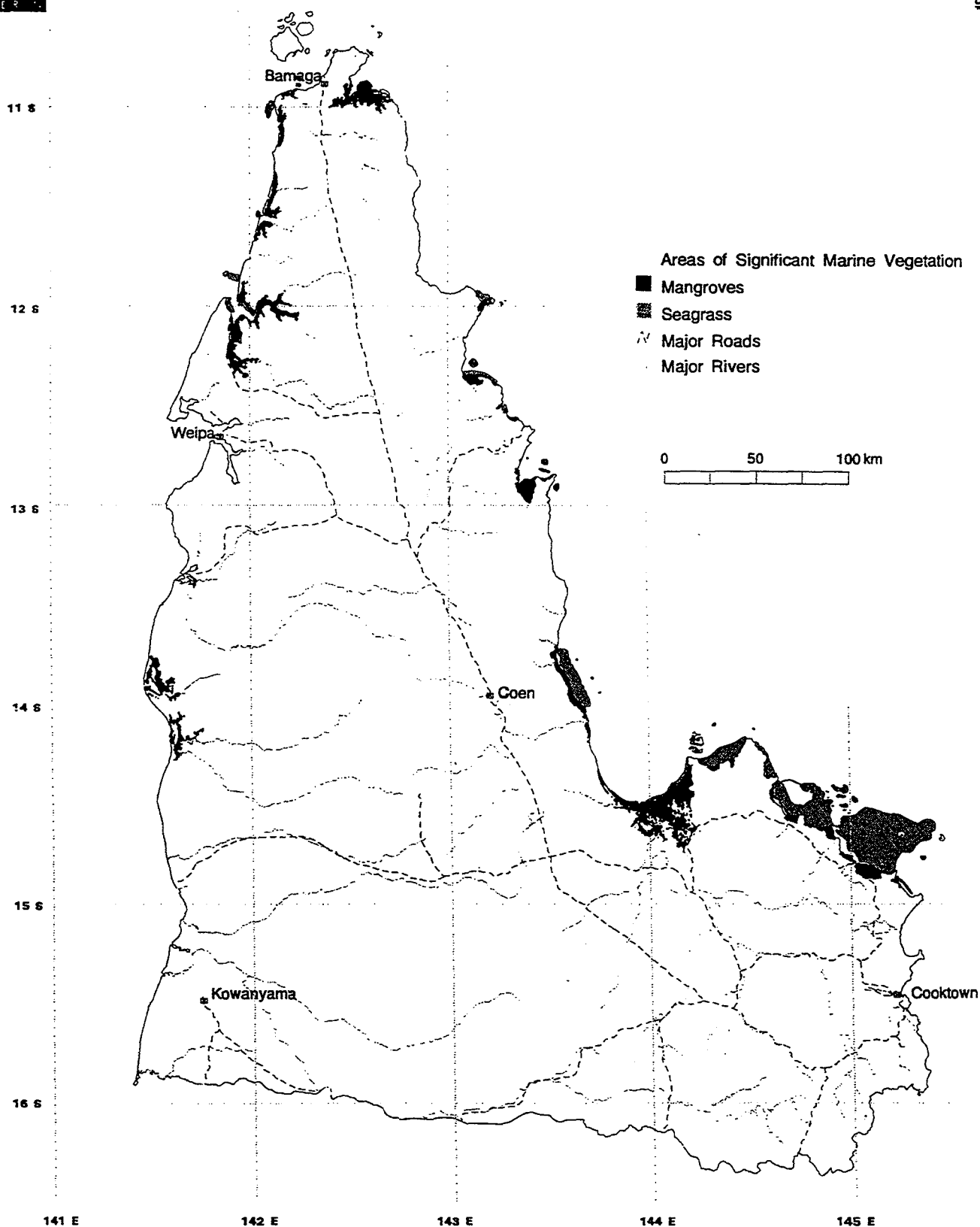
## Caveats....

Wetlands depicted, with exception of Mission River Road sinks and Weipa area, were delineated by Driscoll (1994).  
Mission River Road sinks (Veg class 129) extracted from Neldner and Clarkson (1994) polygon coverage.  
Weipa area wetlands based on Danaher mangroves, Neldner riverine vegetation, and Pennelather geology.  
Data preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 20

# Marine Vegetation Areas of Significant Heritage Value Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Gleason (May 04, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Danaher, K (1994). CYPLUS NR06 Marine Vegetation Project. Fisheries Division, QDPI.

## Caveats....

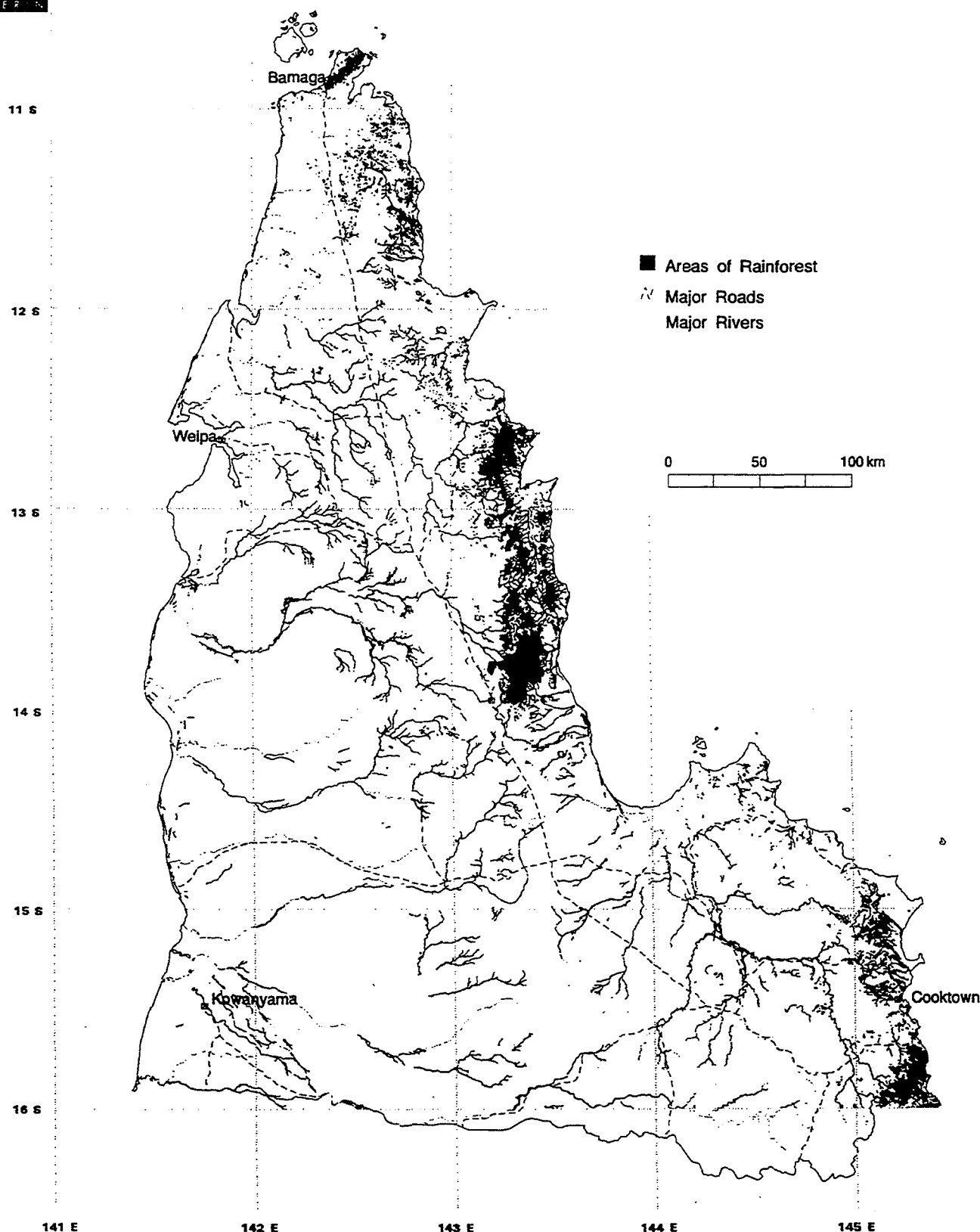
See sources or AHC Conservation and Natural Heritage Assessment for precise boundaries and descriptions.  
Selection of regions depicted made by AHC using information in Danaher (1994).  
Mangroves include adjacent saltflats and landrims.  
Data extraction, map design and production by Environmental Resources Information Network.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 21



# Rainforests Areas of Conservation Significance Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 04, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Neldner, V.J. 1991. Central Western Queensland. Vegetation Survey of Queensland. QDPI Botany Bulletin No.9  
Neldner, V.J. 1993. Vegetation survey and mapping in Queensland. Queensland Herbarium Botany Bulletin No.12.  
See AHC or Neldner and Clarkson above for complete bibliography and sources.

## Caveats....

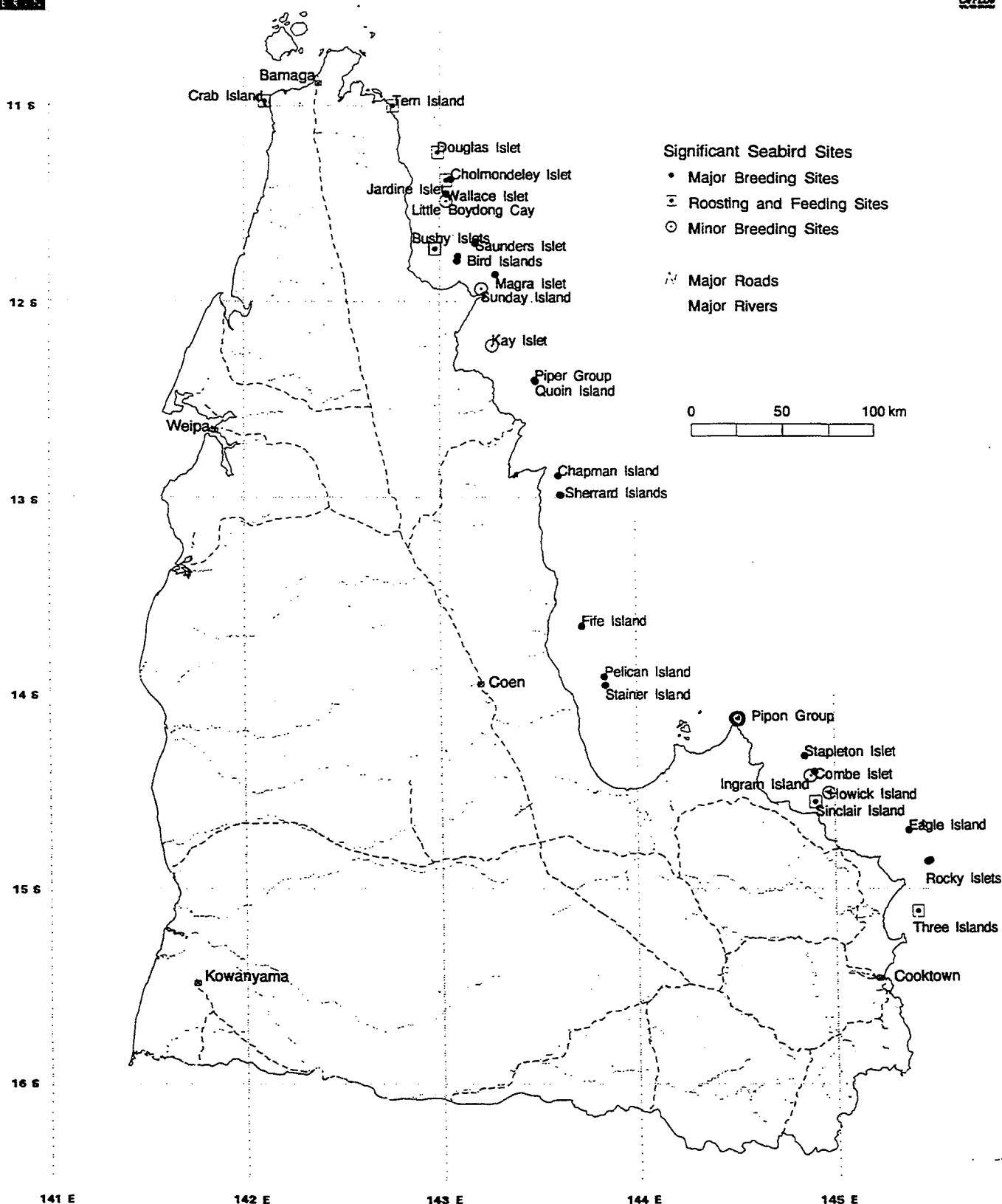
Areas depicted above are where the Basic Vegetation Group's (BVG), as defined by Neldner and Clarkson (1994), are rainforest. These include: closed forests of Wet Tropics region, McIlwraith-Iron Range region, northern cape closed forests of coastal dunes, Jardine River  
Data extraction and preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 22



# Seabirds Significant Sites Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 04, 1995)

## Sources....

AHC, 1995. Areas of Conservation Significance - Cape York Peninsula.  
King, B.R. 1993. The Status of Queensland Seabirds. Corella, 17 (3) 65-92.  
QDEH, 27 Sep 1994. Database print-out of Seabird records within Northern Great Barrier Reef Region.

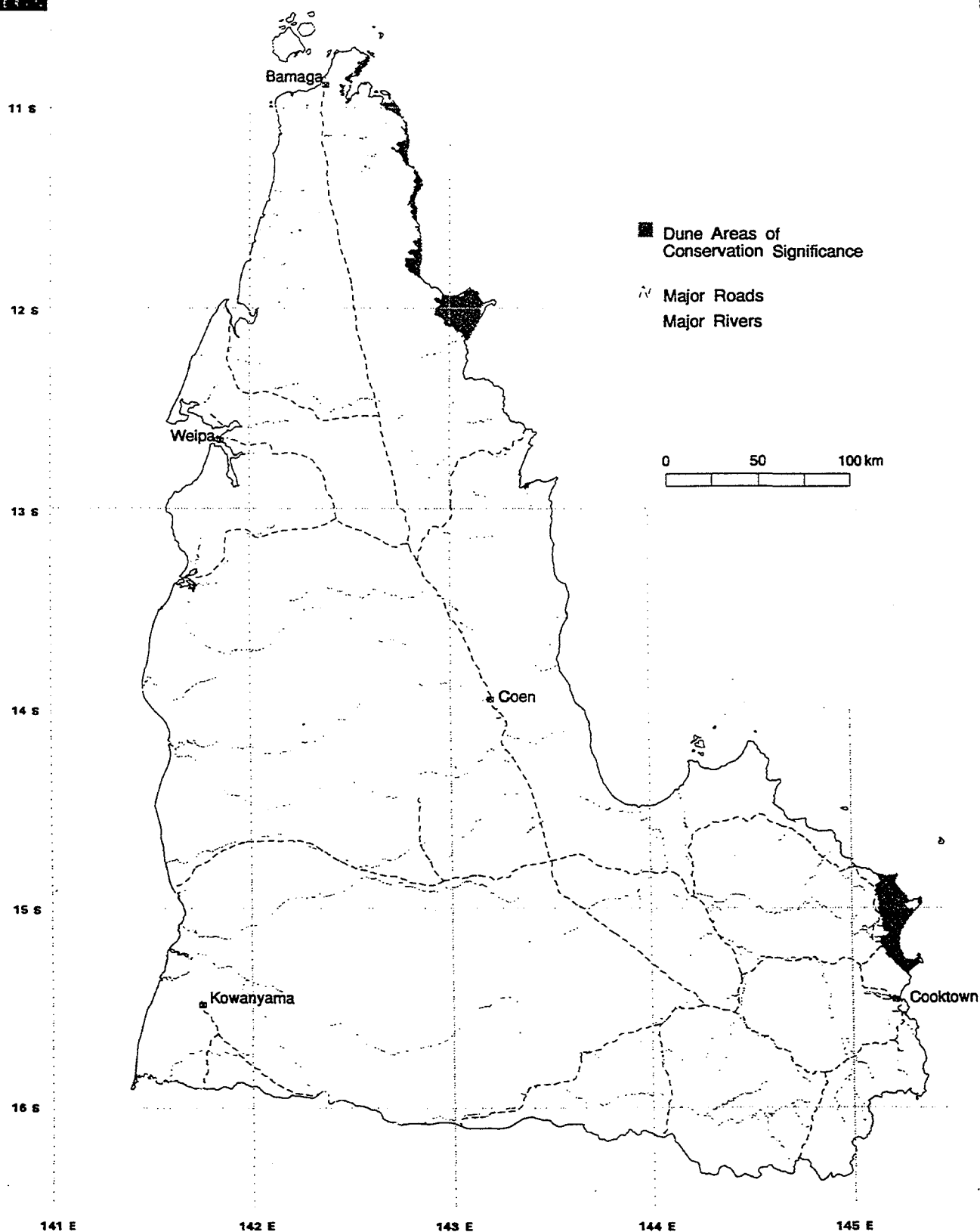
## Caveats....

See sources or AHC for precise locations and descriptions.  
Distinction of major and other significance by King and AHC.  
Data extraction and preparation, map design and preparation by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 23

# Dune Areas of Conservation Significance Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 07, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Biggs, A.J.W. & Philip, S.R. 1994. Soil Survey and Agricultural Land Suitability of CYP. CYPLUS QDPI.  
Pain, C.F. et al. 1994. CYPLUS NRAP Project NR12 Regolith Mapping of CYP. AGSO.  
Stock, E.C. (1991). Assessment of the Cape Bedford - Cape Flattery Dunefields.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

## Caveats....

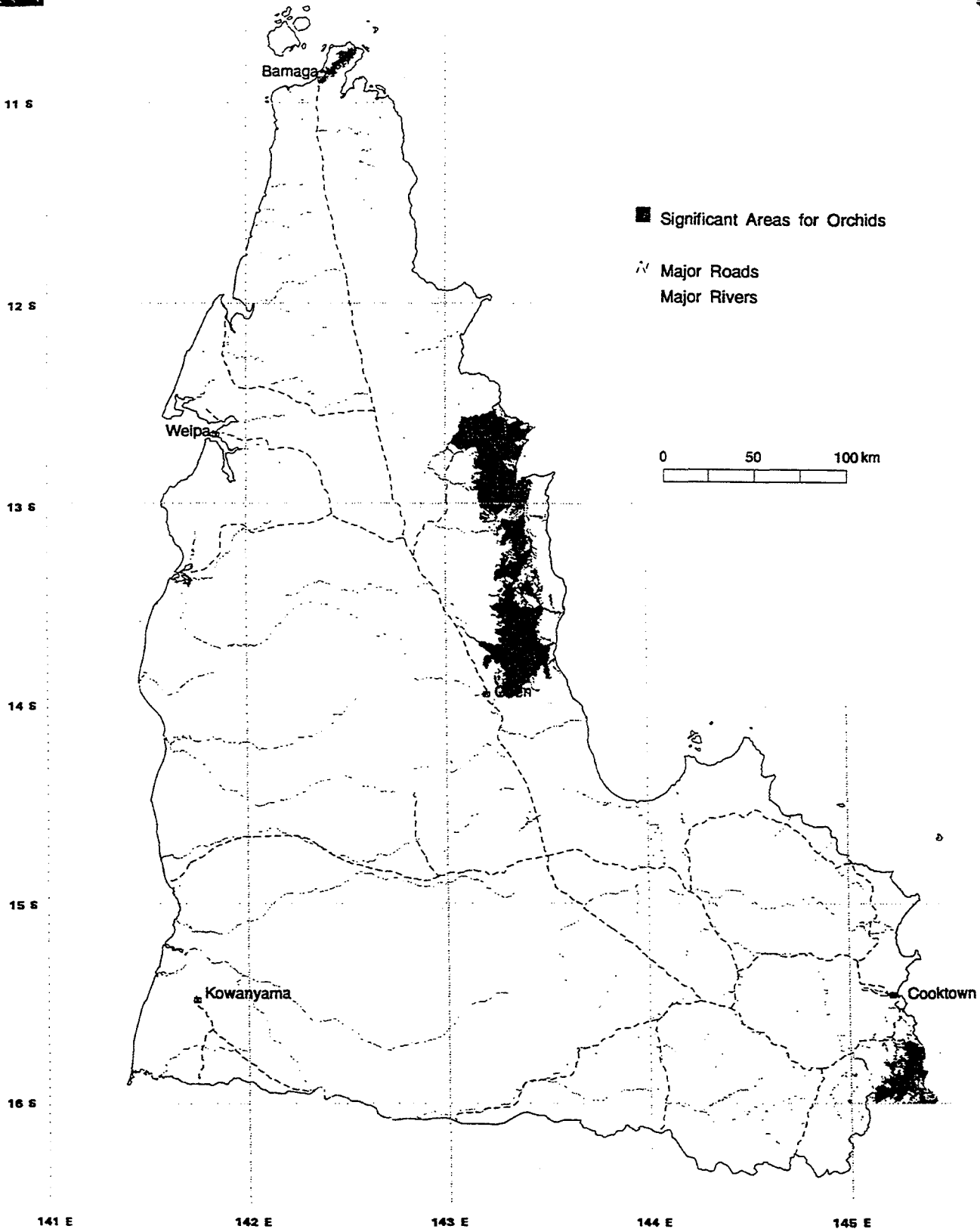
Significance determined by AHC.  
Cape Bedford dune/field polygons extracted from NR12 Regolith GIS coverage.  
All other dune/field polygons extracted from NR02 CYP/ISOILS GIS coverage.  
Data extraction and map design and preparation by ERIN.

Figure 24



# Areas Significant for Orchids Cape York Peninsula

CYPLUS is a joint initiative of the Queensland and Commonwealth Governments



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 04, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
 Hnatiuk, R.J. 1990. Census of Australian Vascular Plants. AGPS Press. Canberra.  
 Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
 Neldner, V.J. 1993. Vegetation survey and mapping in Queensland. Queensland Herbarium Botany Bulletin No.12.  
 See AHC or Neldner and Clarkson above for complete bibliography and sources.

## Caveats....

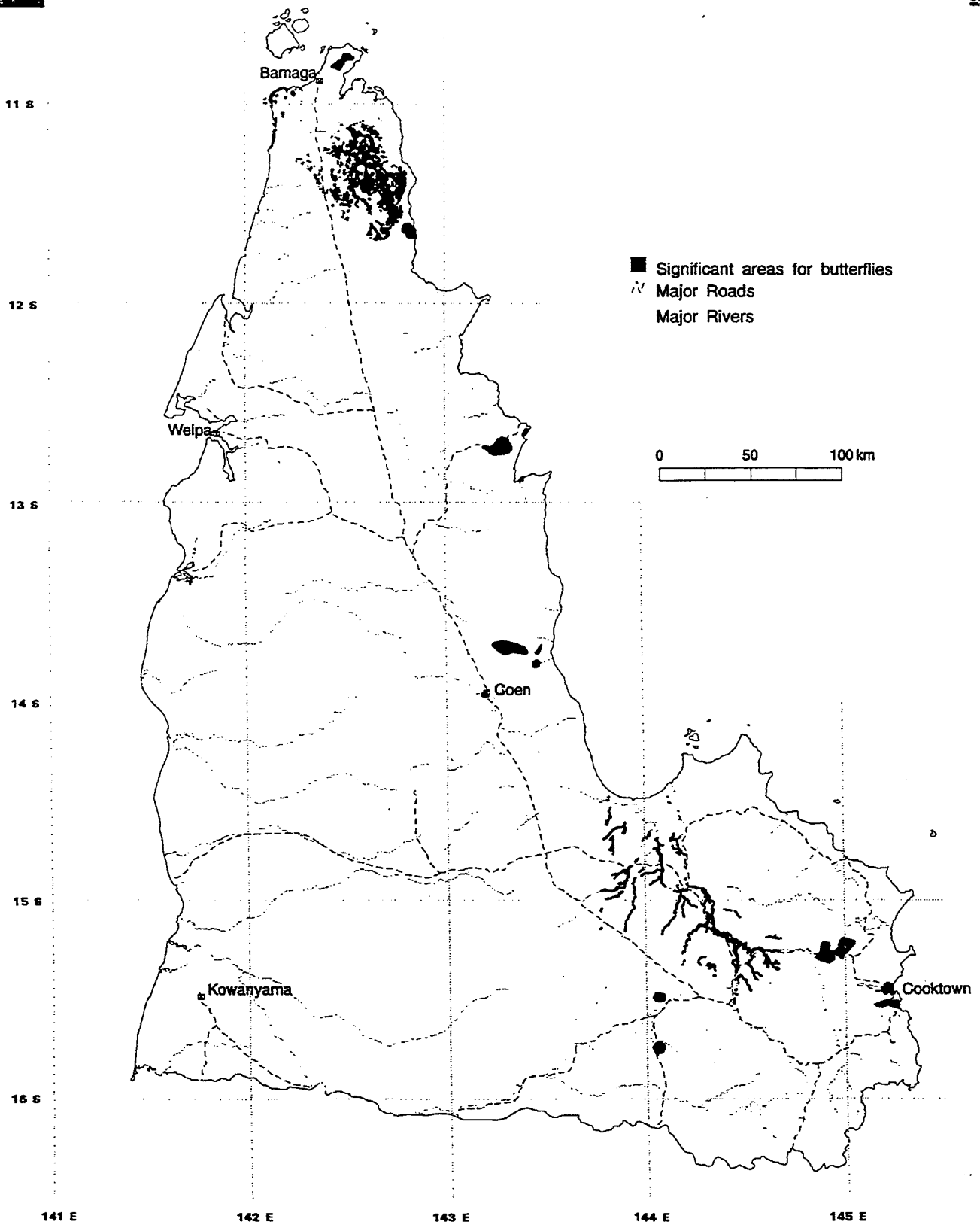
See sources or AHC for precise locations and descriptions.  
 Selection of areas depicted made by AHC using information in Hnatiuk (1990) and Neldner and Clarkson (1994).  
 Data extraction and preparation, map design and preparation by ERIN.

Projection: Geographical representation  
 Spheroid: Australian National Spheroid  
 Scale approx. 1:2,225,000 at A3 size  
 Scale approx. 1:3,125,000 at A4 size

Figure 25



# Butterflies Significant Areas Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 05, 1995)

## Sources....

AHC. Areas of Conservation Significance - Cape York Peninsula. In preparation.  
Valentine, P. and Johnson, S. 1995. Critical Locations for Butterflies on CYP. Report to the AHC.  
Clarkson, J.R. and Neldner, V.J. (1994). CYPLUS NR01 Vegetation Survey. Queensland Herbarium.

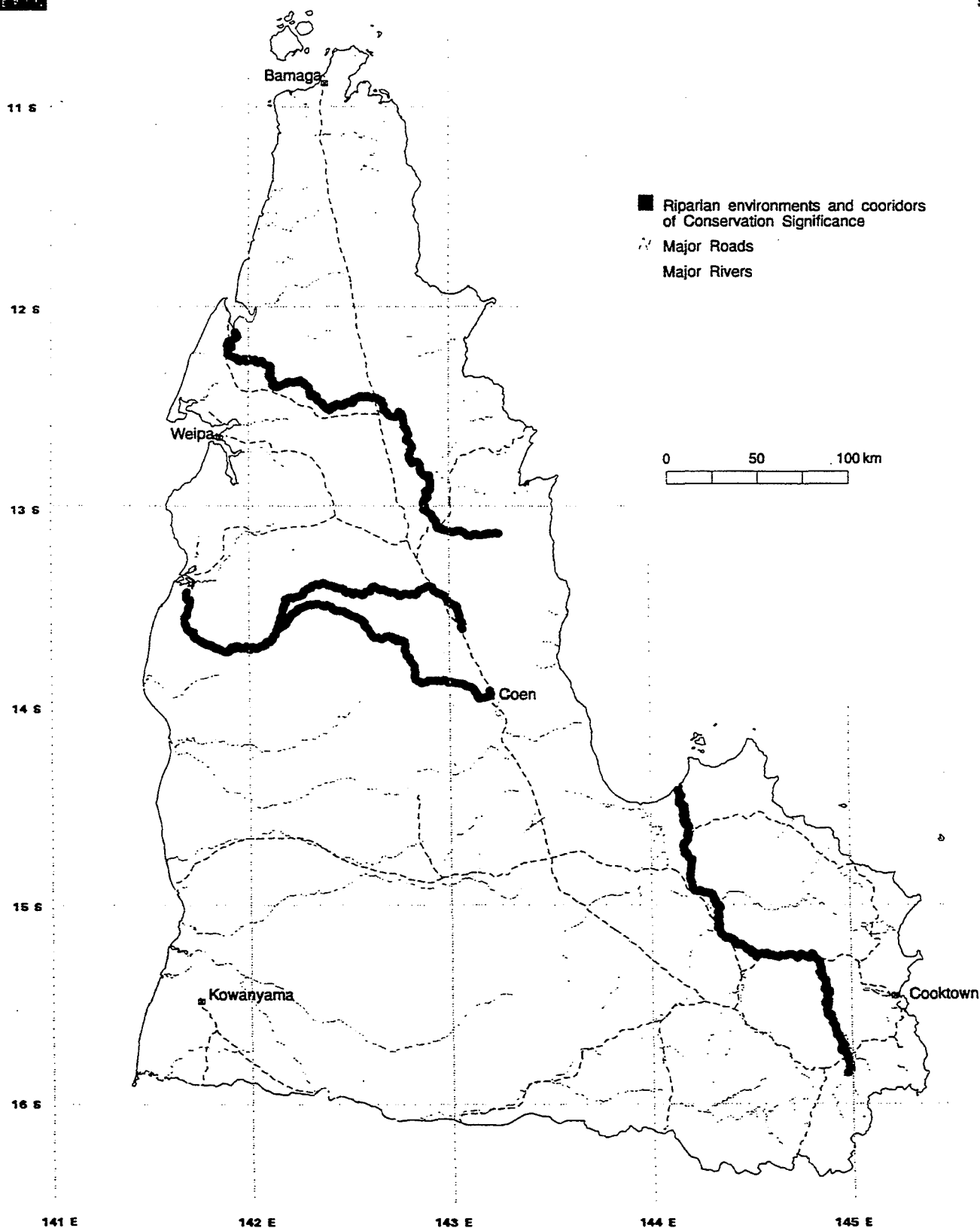
## Caveats....

Most areas delineated by P. Valentine on 1:100,000 and 1:250,000 maps. Boundaries very approximate.  
Areas depicted in Lakefield NP contain deciduous and alluvia rainforests (BVG 5 and 6) as classified by  
Clarkson and Neldner (1994). Areas depicted in Jardine Basin contain northern CYP and alluvia  
rainforests (BVG 3.6) in accordance with Clarkson and Neldner (1994).

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 26

# Riparian Environments of Significant Conservation Value Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 06, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Winter, J. and Lethbridge, P. 1994. CYPLUS Terrestrial Vertebrate Fauna. Final Rpt of Field Surveys. QDEH.  
Herbert, B., et al 1994. Fish Fauna Survey Report. Wallamin Research Station, QDPI.

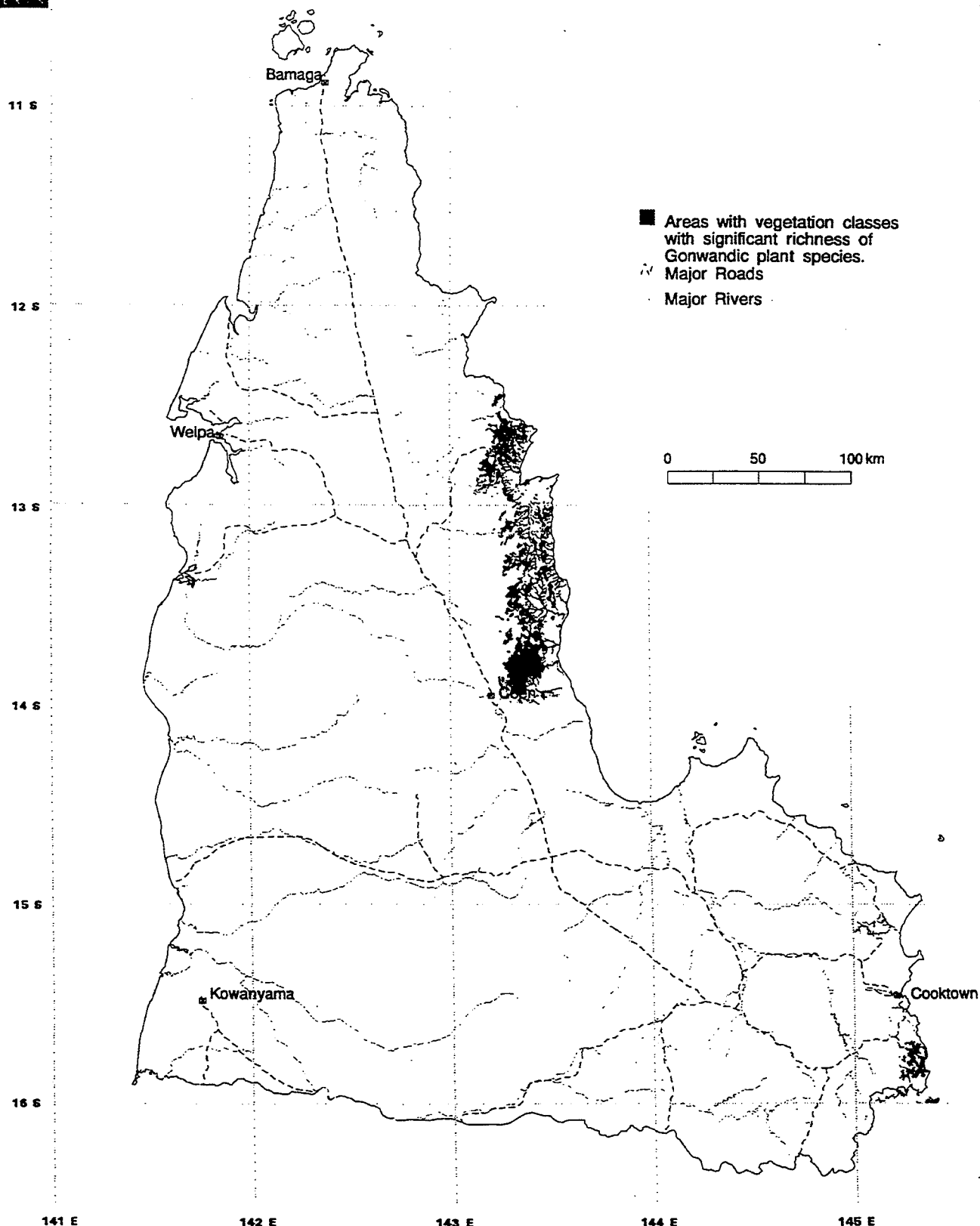
## Caveats....

See sources or AHC Conservation and Natural Heritage Assessment for precise boundaries and descriptions.  
Selection of significant riparian environments/corridors made by AHC based on sources above  
Data extraction and map design and preparation by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 27

# Gondwanic Plant Species Areas of Vegetation Classes with Significant Richness



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 05, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Barlow, B.A. 1981. Australian Flora: its Origin and Evolution. In Flora of Australia, vol. 1. AGPS.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Rainforest Conservation Society. 1984. Conservator Significance of Wet Tropics on NE Qld. Report to AHC.  
See AHC for complete bibliography and sources.

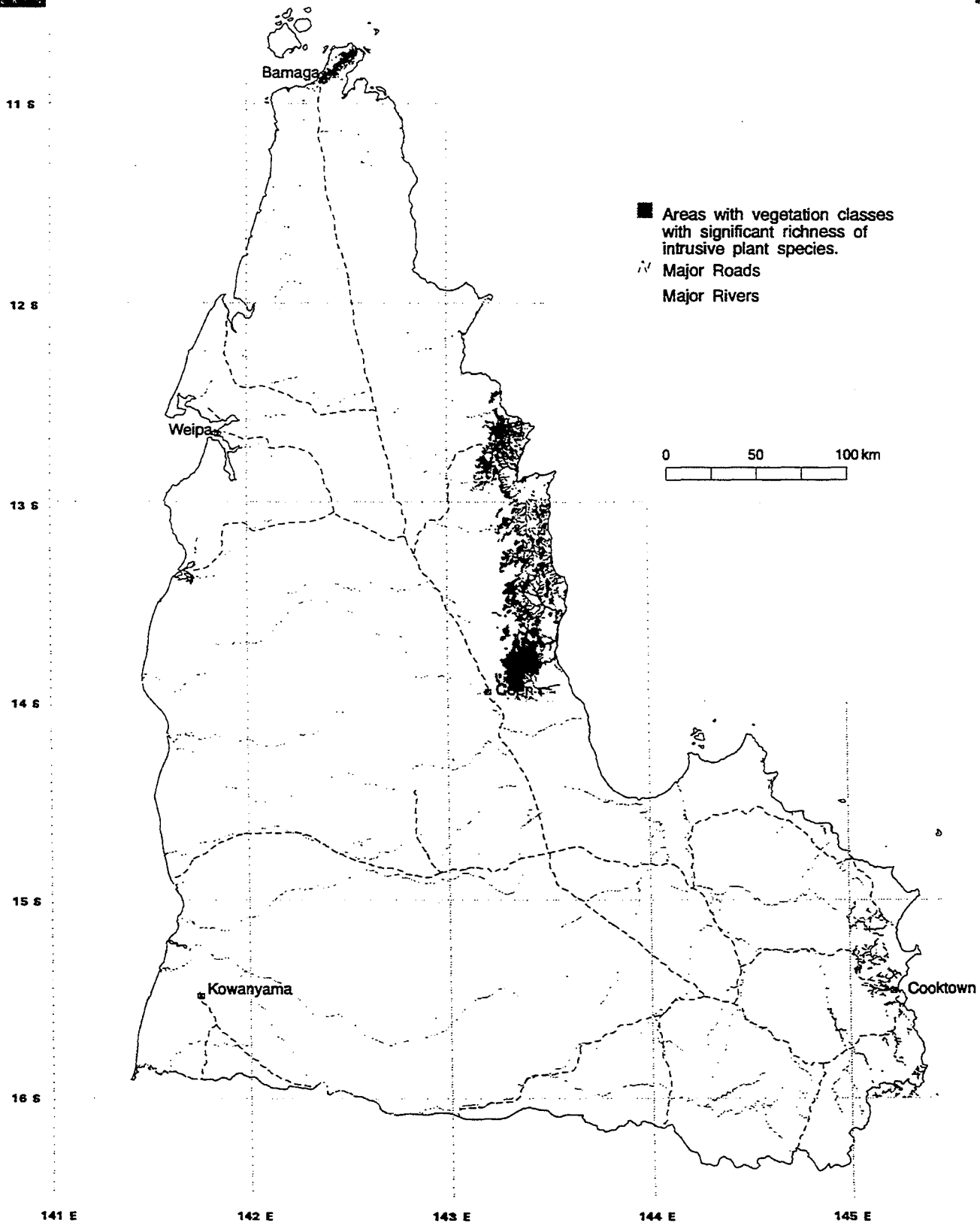
## Caveats....

Gondwanic species compiled by AHC. Known locations of these species were overlain with Neldner and Clarkson's vegetation classes to determine which classes contained the most Gondwanic species.  
The areas depicted above are vine forests (vegetation classes 3, 8, and 21).  
Data extraction and preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 28

# Areas of Vegetation Classes with Significant Richness of "Intrusive" Plant Species



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 09, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Barlow, B.A. 1981. Australian Flora: its Origin and Evolution. in Flora of Australia, vol. 1. AGPS.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Rainforest Conservation Society. 1984. Conservator Significance of Wet Tropics on NE Qld. Report to AHC.  
See AHC for complete bibliography and sources.

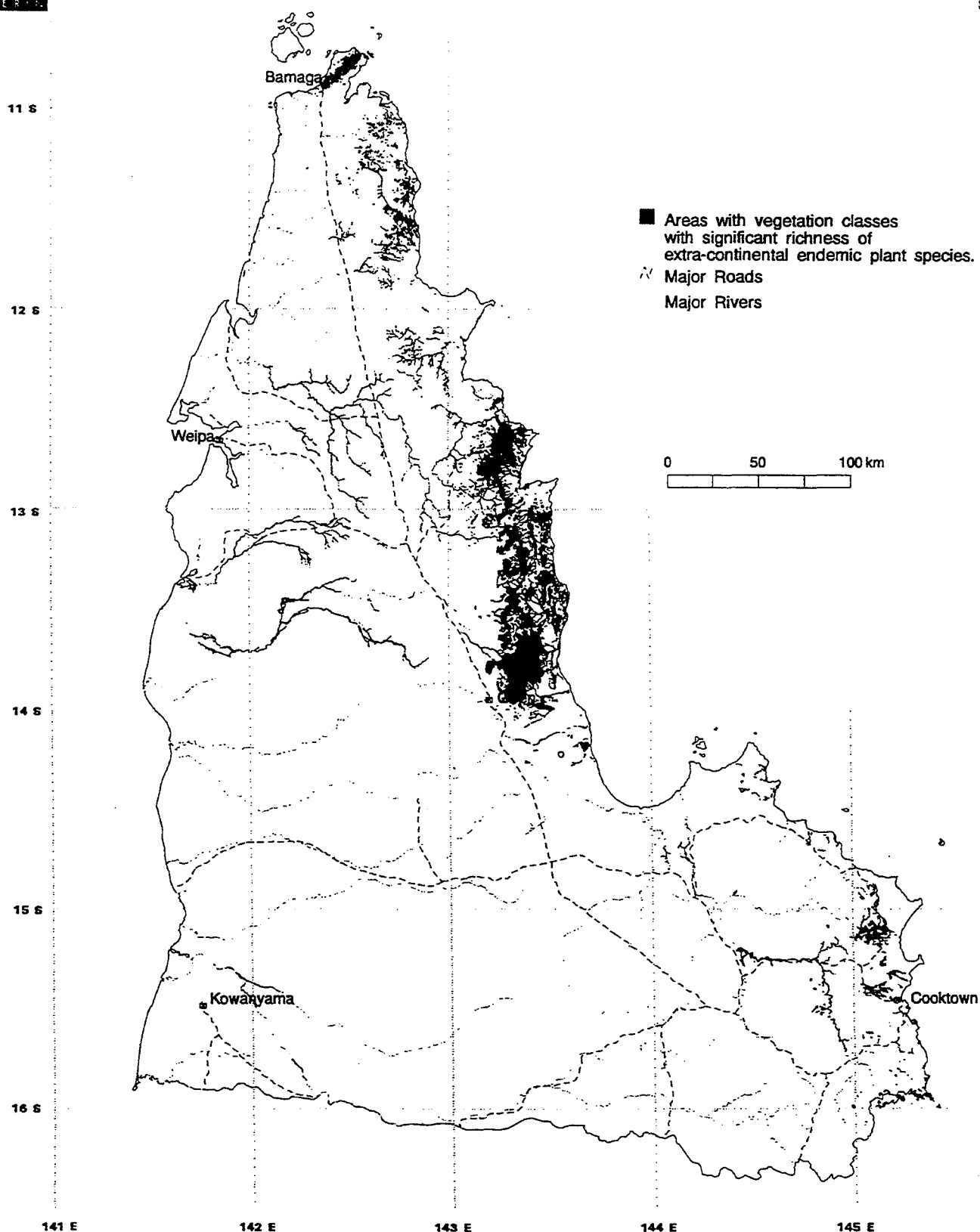
## Caveats....

Intrusive species compiled by AHC. Known locations of these species were overlain with Neldner and Clarkson's vegetation classes to determine which classes contained the most intrusive species.  
The areas depicted above are various types of vine forests (vegetation classes 8,10,11,20 and 21).  
Data extraction and preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 29

# Areas of Vegetation Classes with Significant Richness of Extra-Continental Plant Species



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 05, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Forster, P., Bean, A., Simon, B. Queensland Herbarium, pers. comm. 1994.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
See AHC for complete bibliography and sources.

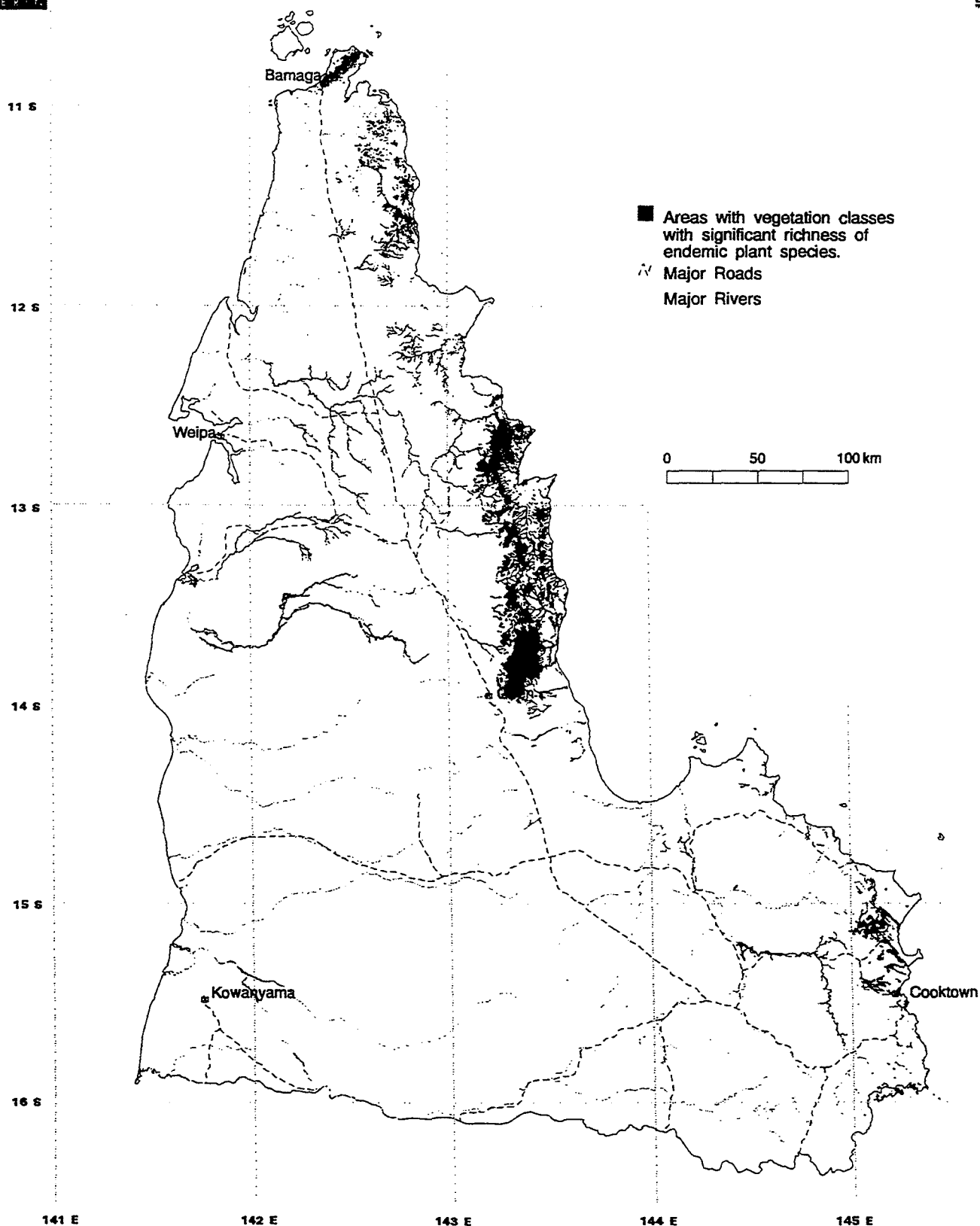
## Caveats....

Extra-continental endemics occur only in CYP within Australia, but are also outside Australia.  
Point records were overlain with Neldner and Clarkson's vegetation classes to determine which  
classes contained the most extra-continental species. The areas depicted are various types of vine  
forests and coastal woodlands (veg. classes 8,11,16,18,19,20,21,24,44 and 126).

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 30

# Areas of Vegetation Classes with Significant Richness of Endemic Plant Species



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 09, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
 Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
 Neldner, V.J. and Clarkson, J.R. Unpublished CYP CORVEG site and observation datasets.  
 ERIN database containing specimen records from most Australian herbarium and museums.  
 See AHC for complete bibliography and sources.

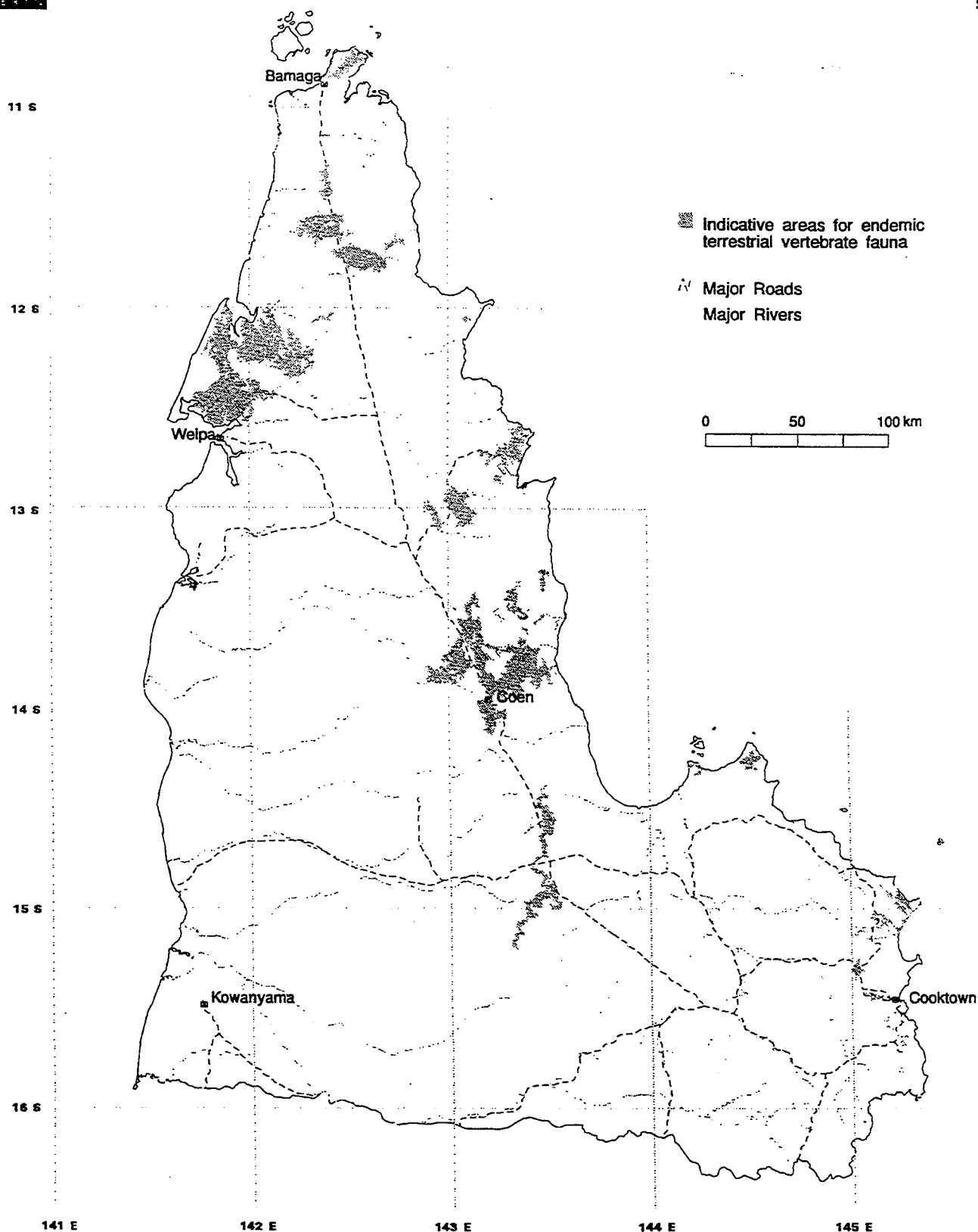
## Caveats....

Endemics are those species occurring only in CYP (between 9.5 and 16.5 degrees latitude).  
 Point records were overlain with Neldner and Clarkson's vegetation classes to determine which  
 classes contained the most extra-continental species. The areas depicted are various types of vine  
 forests and coastal woodlands (veg. classes 8,11,16,18,20,21,24,26 and 121).

Projection: Geographical representation  
 Spheroid: Australian National Spheroid  
 Scale approx. 1:2,225,000 at A3 size  
 Scale approx. 1:3,125,000 at A4 size

Figure 31

# Indicative Areas of Conservation Significance for Endemic Vertebrate Fauna



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 06, 1985)

## Sources....

AHC. 1985. Areas of Conservation Significance - Cape York Peninsula.  
 Winter, J. and Lethbridge, P. 1994. CYPLUS Terrestrial Vertebrate Fauna. Final Rpt of Field Surveys. QDEH.  
 Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
 Records from institutions, e.g. AM, OM, CSIRO, MCZ, NMV. Pers obs of G. Richards and D. Storch.  
 See AHC for complete citations and sources.

## Caveats....

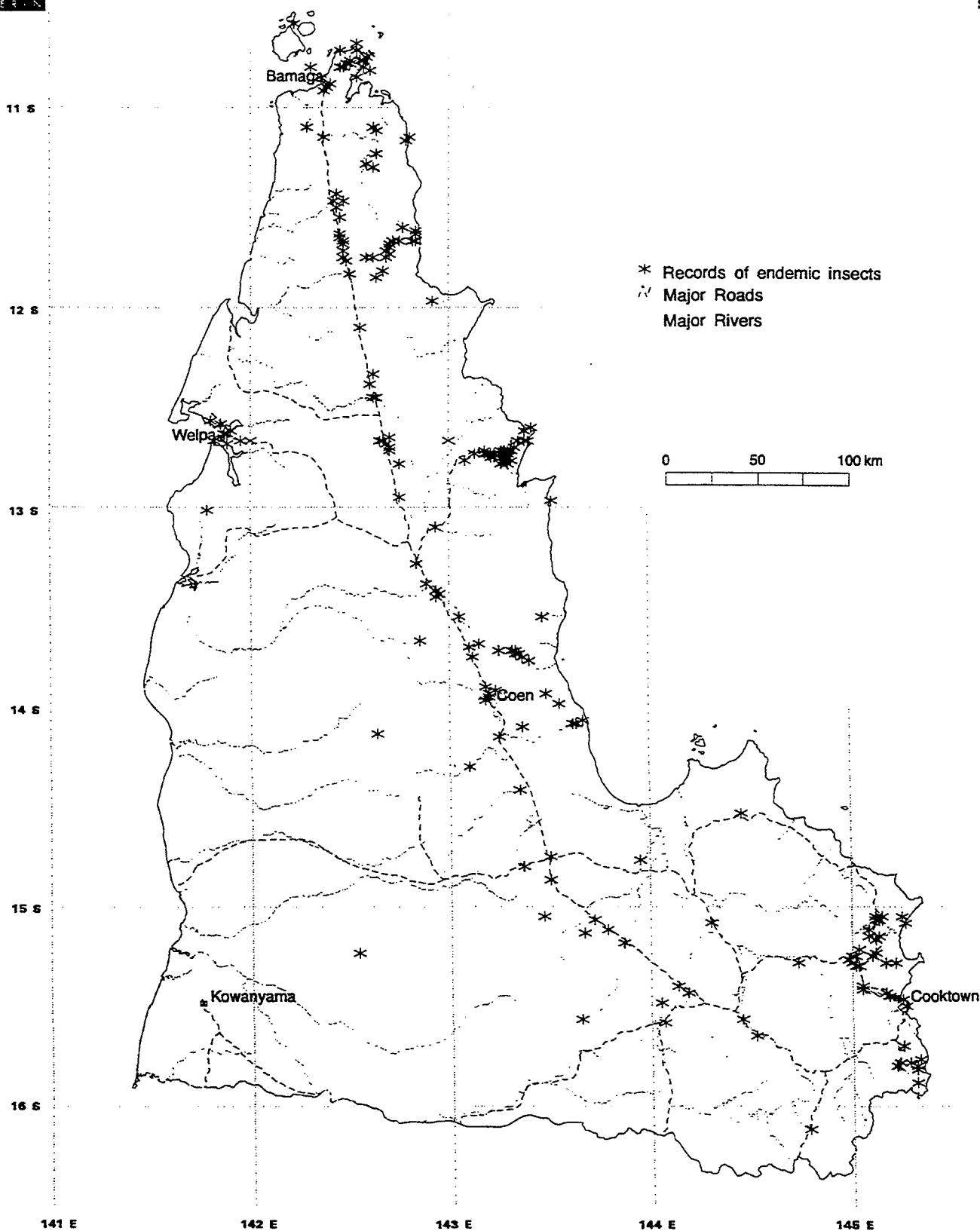
Endemic species are those occurring only in CYP, i.e. between 9.5 and 16.5 degrees latitude.  
 Areas depicted are the vegetation types (after Neldner and Clarkson) in which endemic species  
 have been recorded.  
 Data extraction and preparation and map design by ERIN.

Projection: Geographical representation  
 Spheroid: Australian National Spheroid  
 Scale approx. 1:2,225,000 at A3 size  
 Scale approx. 1:3,125,000 at A4 size

Figure 32



# Insect Species Endemic to Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 06, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Databased specimen records from CSIRO Australian National Insect Collection (ANIC). unpublished.  
Zborowski, P., Naumann, R.D., & Harwood, T.A. Project NR17 Report on Insect Survey - CYPLUS. CSIRO Div. of Ent.

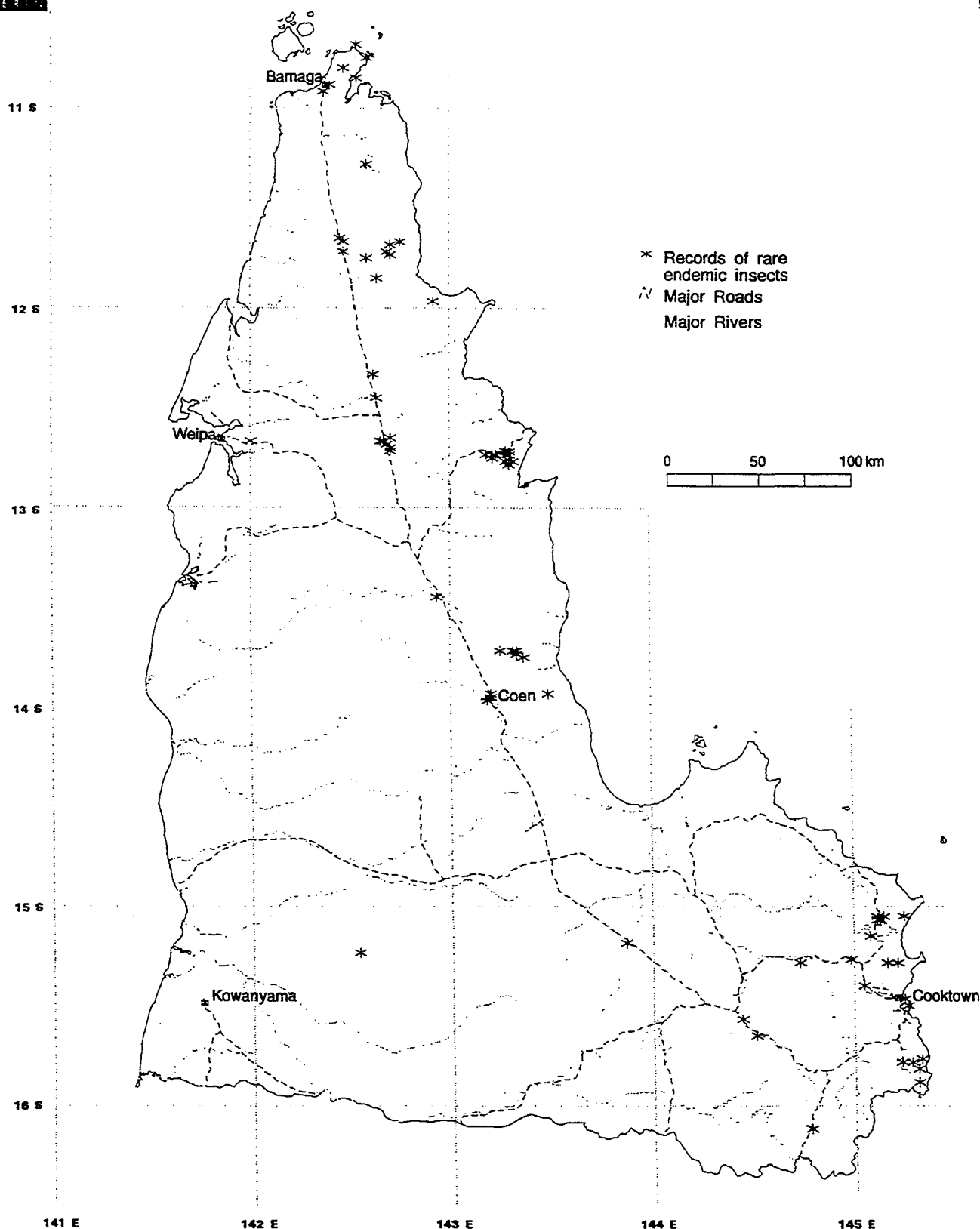
## Caveats....

Endemicism defined as occurring within Australia only in QLD north of 16.5 degrees S. Determined by ANIC.  
See text of sources for specific species.  
Only 10 of Australia's 32 insect orders have been databased as of 31 Dec 1994. These are Coleoptera, Hemiptera,  
Hymenoptera, Isoptera, Lepidoptera, Megaloptera, Neuroptera, Odonata, Orthoptera and Orthoptera.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 33

# Rare Insect Species Endemic to Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 06, 1995)

## Sources....

AHC, 1995. Areas of Conservation Significance - Cape York Peninsula.  
Databased specimen records from CSIRO Australian National Insect Collection (ANIC), unpublished.  
Zborowski, P., Naumann, R.D., & Harwood, T.A. Project NR17 Report on Insect Survey - CYPLUS. CSIRO Div. of Ent.

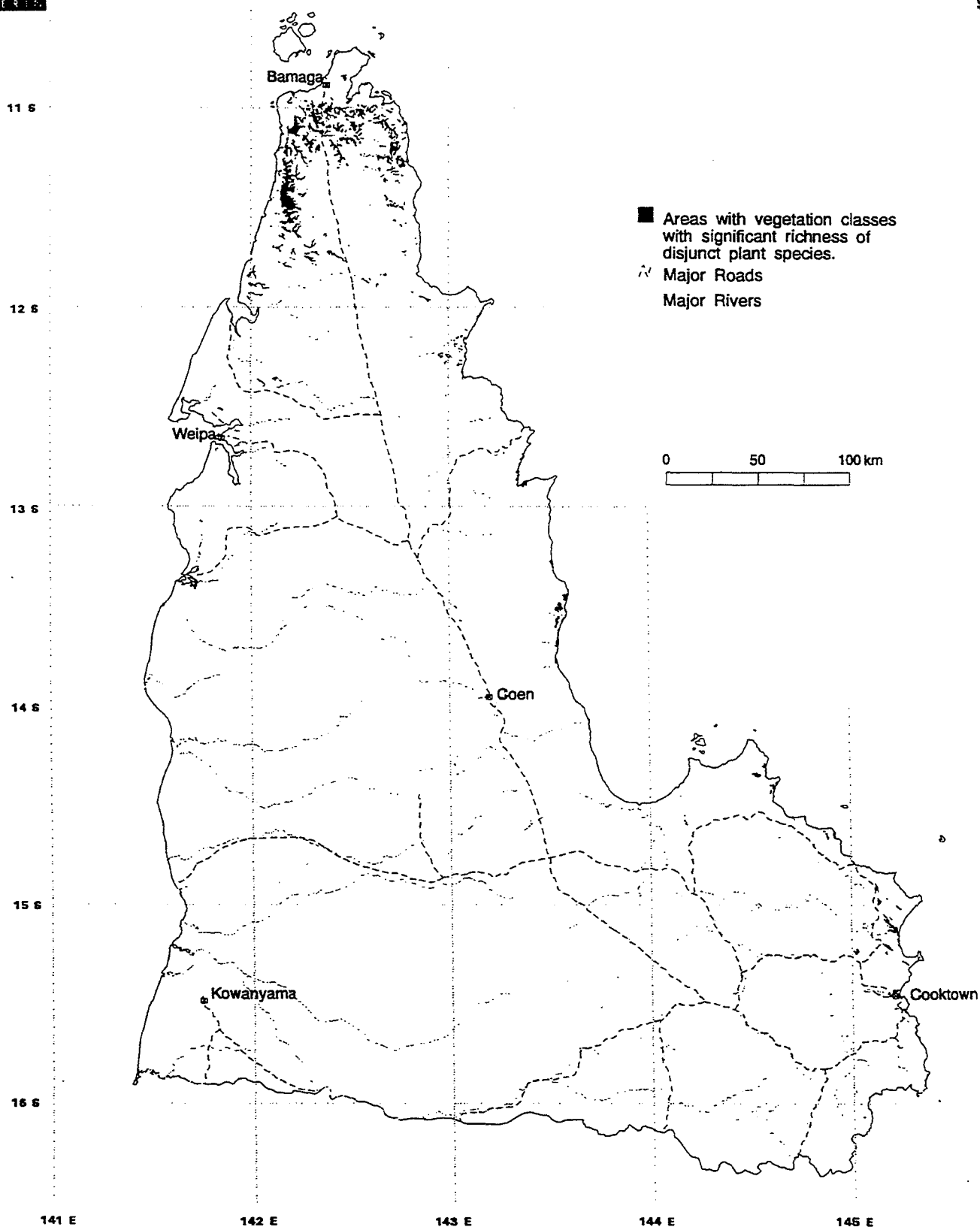
## Caveats....

Endemicism defined as occurring within Australia only in QLD north of 16.5 degrees S. Determined by ANIC.  
Rare Status determined by AHC. Defined as collected less than 3 times. See text or sources for specific species.  
Only 10 of Australia's 32 insect orders have been databased as of 31 Dec 1994. These are Coleoptera, Hemiptera, Hymenoptera, Isoptera, Lepidoptera, Megaloptera, Neuroptera, Odonata, Orthoptera and Orthoptera.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 34

# Areas of Vegetation Classes with Significant Richness of Disjunct Plant Species



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 06, 1995)

## Sources....

AHC. 1985. Areas of Conservation Significance - Cape York Peninsula.  
Neldner, V.J. and Clarkson, J.R. 1984. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Hindlark, R.J. 1990. Census of Australian Vascular Plants. AGPS Press.  
Brook, J. 1988. Top End Native Plants.  
See AHC for complete bibliography and sources.

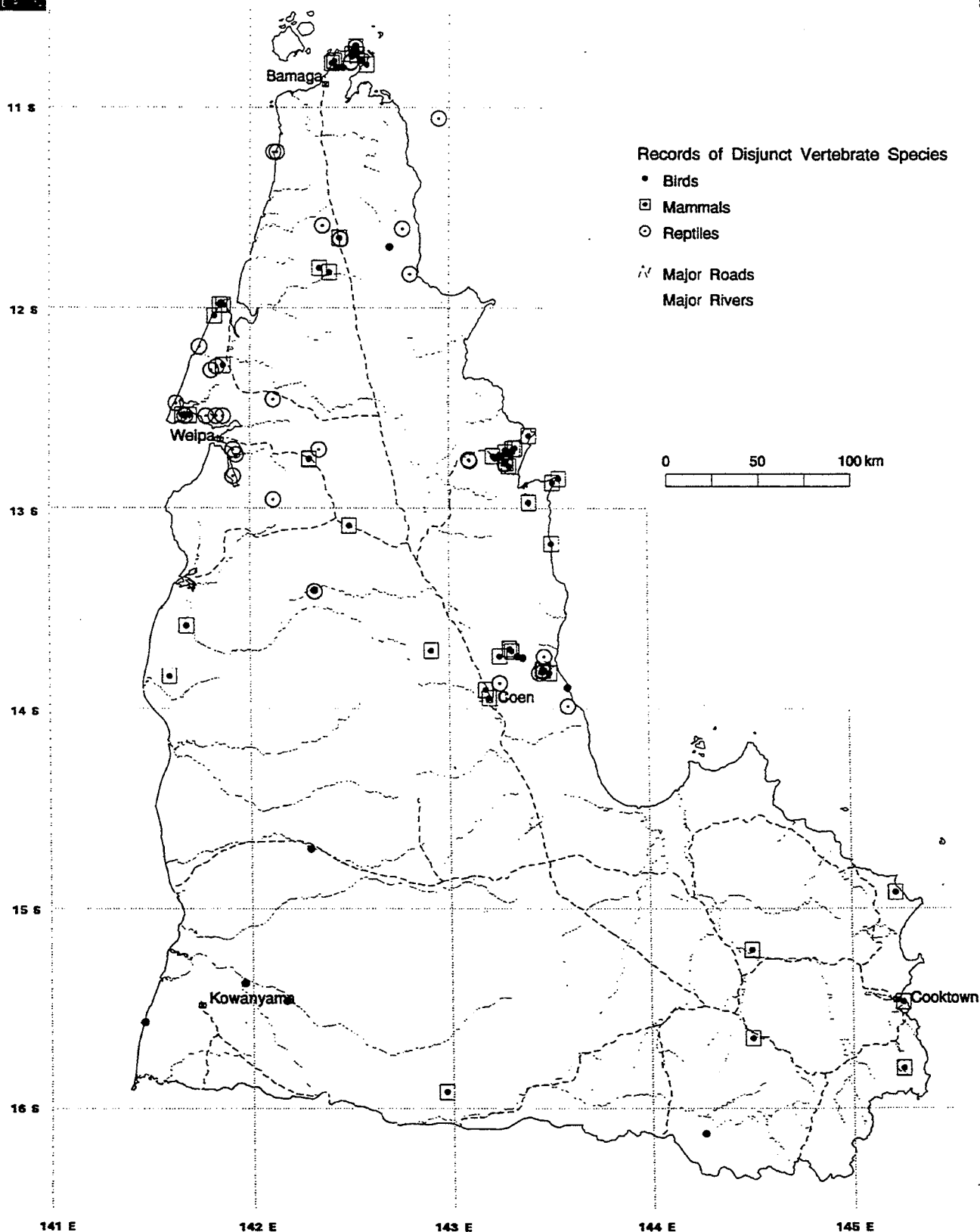
## Caveats....

Disjuncts are those species occurring in the Cook Region of the CAVP and elsewhere in Australia, but not in the regions adjacent to Cook. These species occur most frequently in the vegetation classes (after Neldner and Clarkson) depicted, i.e. evergreen vine forests and drainage swamps (veg. classes 20 and 191). See ANC and Neldner and Clarkson for details.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 35

# Terrestrial Vertebrate Species with Disjunct Distributions in Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 06, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance on Cape York Peninsula.  
Winer, J. and Lethbridge, P. 1994. CYPLUS Terrestrial Vertebrate Fauna. Final Rpt of Field Surveys. QDEH.  
ERIN Information System (ERIS) database containing records from institutions, e.g. Australian Museum, Qld Museum,  
CSIRO Nat'l Wildlife Collection, Harvard. Personal observations of G. Richards and D. Storch.  
See AHC for complete bibliography and sources.

## Caveats....

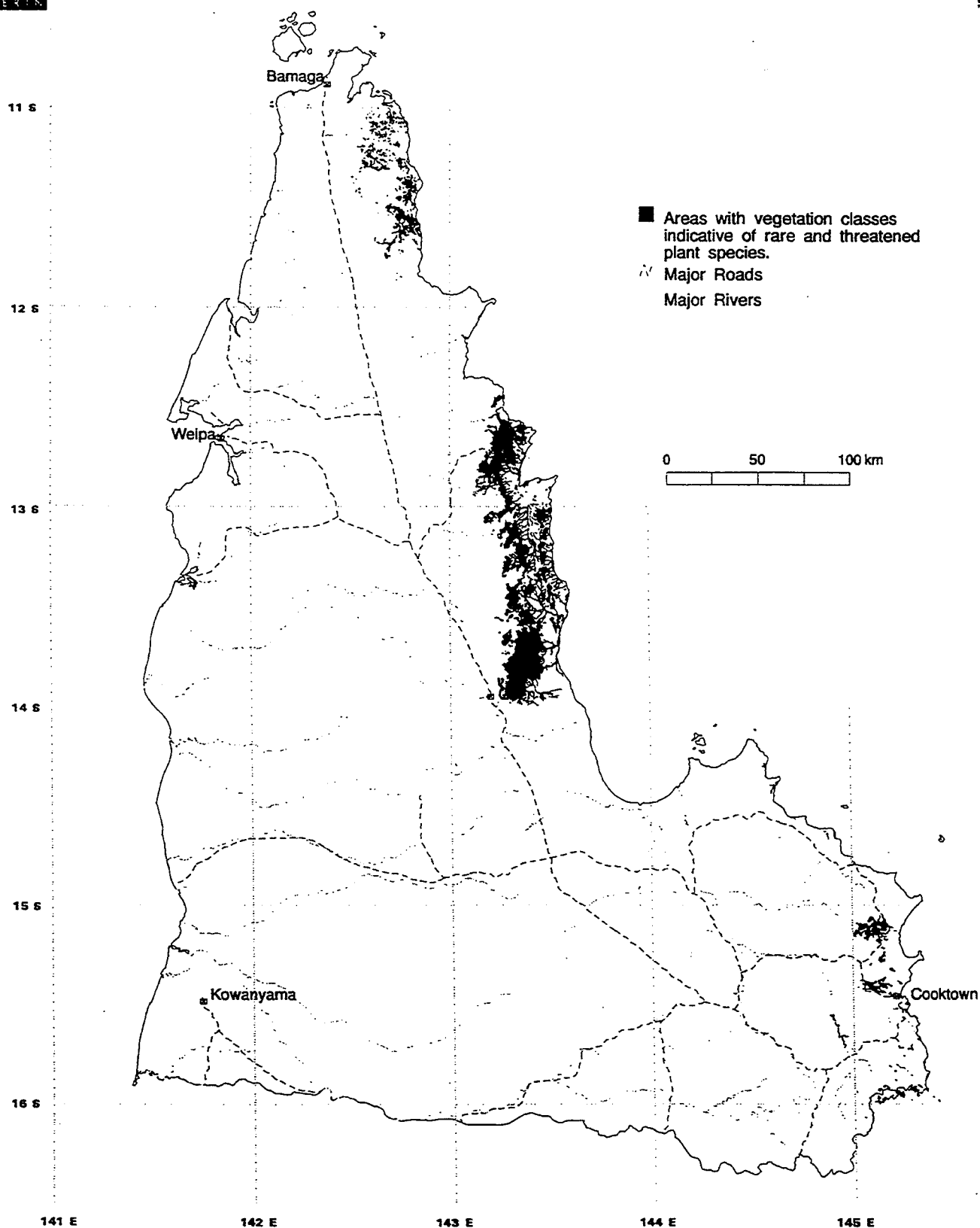
Disjunct defined as no current populations elsewhere in Northern Queensland.  
Disjunct status determined by AHC with consultation with subject matter experts and data searches.  
See AHC for specific taxa.  
Data preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 36



# Areas of Vegetation Classes with Significant Richness of Rare and Threatened Plant Species



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 06, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Queensland Government. 1995. Nature Conservation Act.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NRD1 Vegetation Survey. Queensland Herbarium.  
Neldner, V.J. and Clarkson, J.R. Unpublished CYP CORVEG site and observation datasets.  
See AHC for complete bibliography and sources.

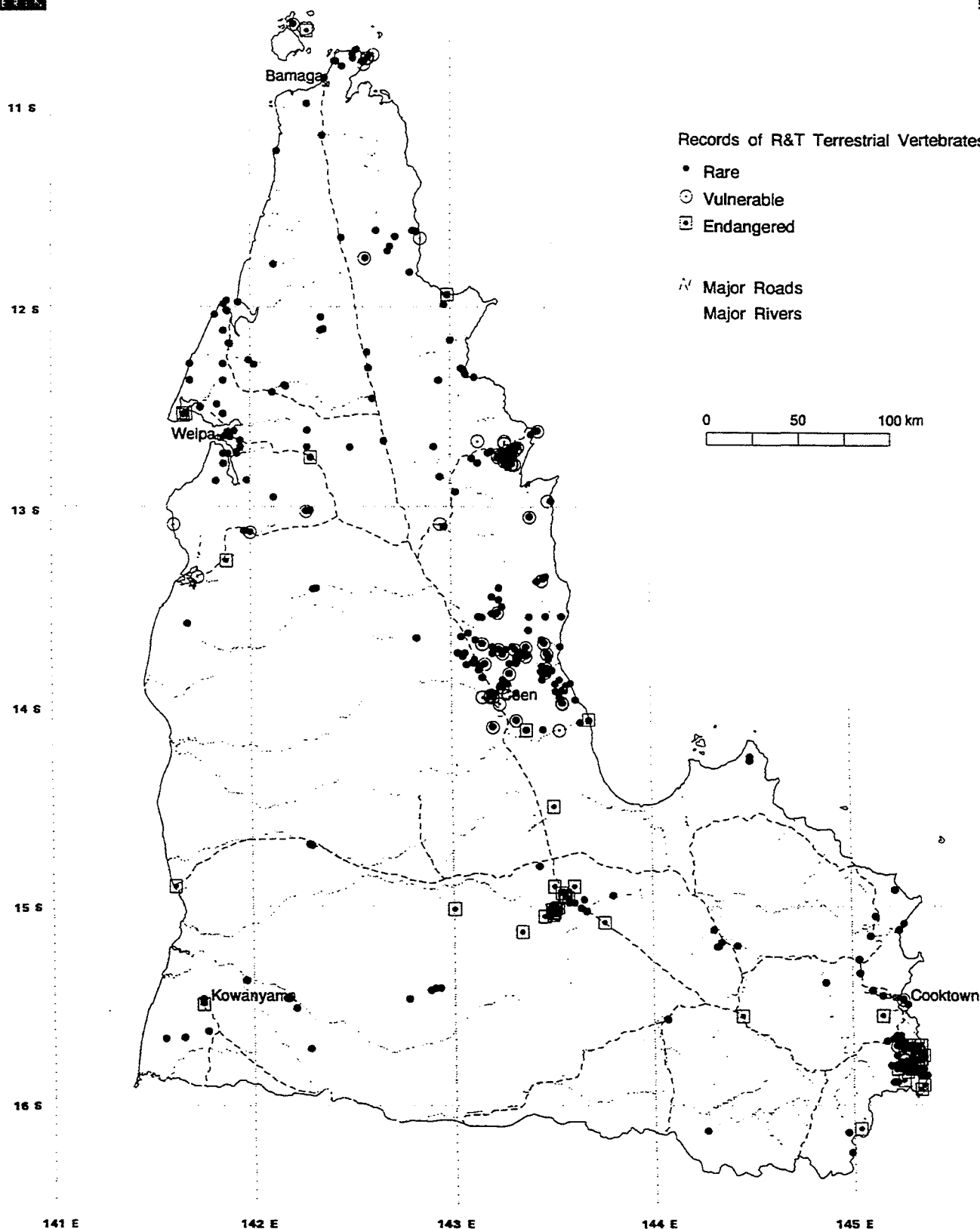
## Caveats....

The designation of rare or threatened plants within Queensland is by the Queensland Government.  
These species tend to be concentrated in the vegetation classes (after Neldner and Clarkson)  
depicted above (vegetation classes 8,20,21,24,26). See AHC or Neldner and Clarkson for details.  
Data preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 37

# Rare and Threatened Terrestrial Vertebrate Fauna Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 07, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
 Winter, J. and Lethbridge, P. 1994. CYPLUS Terrestrial Vertebrate Fauna. Final Rpt of Field Surveys. QDEH.  
 Queensland Government. 1992. Nature Conservation Act.  
 ERIS database of records from institutions, e.g. AM, QM, CSIRO, MCZ, NMV, pers obs of G. Richards and D. Storch.  
 See AHC for complete citations and sources.

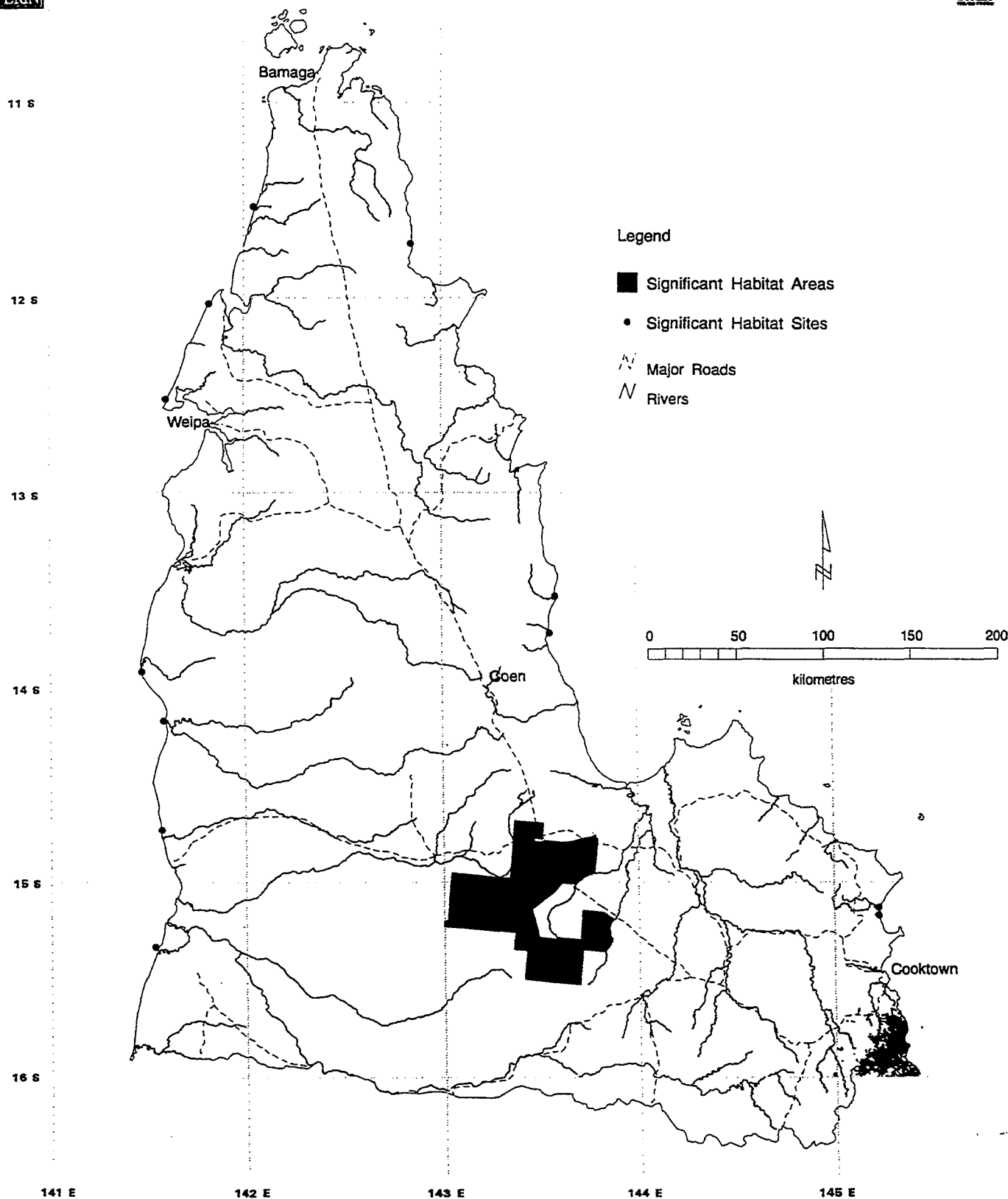
## Caveats....

Designation of R&T status by Queensland Dept of Environment and Heritage. See AHC for specific taxa.  
 Points depicted are of post 1900 recorded observations or specimens with a geocode accuracy of 10 km or better.  
 See CYPLUS-GIS or ERIN for details of records and locations.  
 Data extraction and preparation and map design by ERIN.

Projection: Geographical representation  
 Spheroid: Australian National Spheroid  
 Scale approx. 1:2,225,000 at A3 size  
 Scale approx. 1:3,125,000 at A4 size

Figure 38

# Significant Habitat Areas Endangered Terrestrial Vertebrate Species Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network ERIN (February 23, 1995)

## Sources....

AHC. Areas of Conservation Significance - Cape York Peninsula. In preparation.  
Winter, J. and Lethbridge, P. (1994) CYPLUS Terrestrial Vertebrate Fauna. Final Rpt of Field Surveys. QDEH.  
ERIN database containing records from various institutions (QM, NMV, SAMA, ANWC, ANCA, MCZ, PCGR, PCDS, KU)  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Neldner, V.J. and Clarkson, J.R. Unpublished CYP CORVEG site and observation datasets.

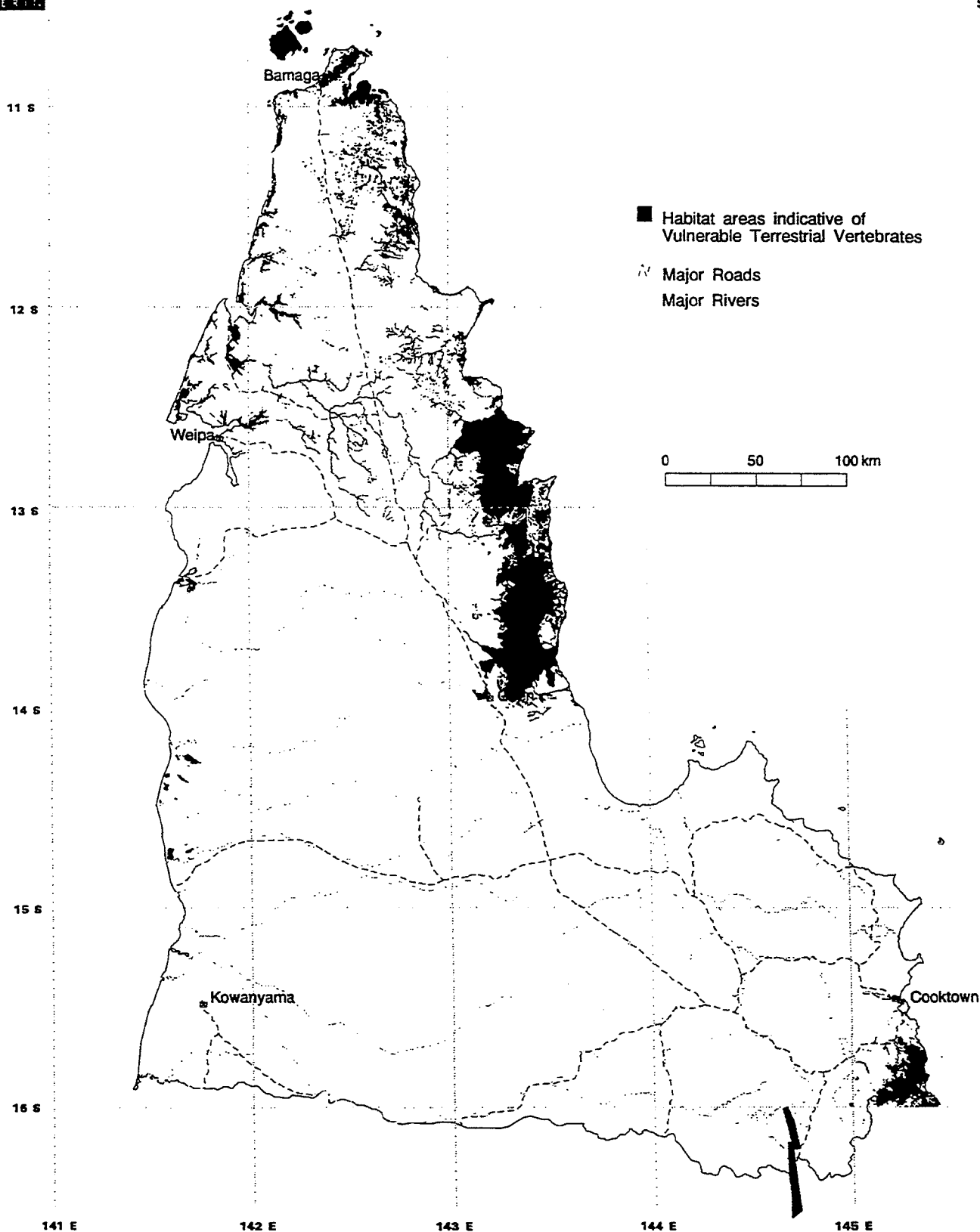
## Caveats....

Polygons depicted are from Clarkson & Neldner (1994) GIS coverage.  
See AHC text for vertebrate species of special interest and methods for selection of associated habitat areas.  
Data preparation and extraction, map design and production by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 39

# Indicative Habitat Areas of Vulnerable Terrestrial Vertebrate Species



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 07, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
 Queensland Government. 1995. Nature Conservation Act.  
 Winter, J. and Lethbridge, P. 1994. CYPLUS Terrestrial Vertebrate Fauna. Final Rpt of Field Surveys. QDEH.  
 Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
 See AHC for complete bibliography and sources.

## Caveats....

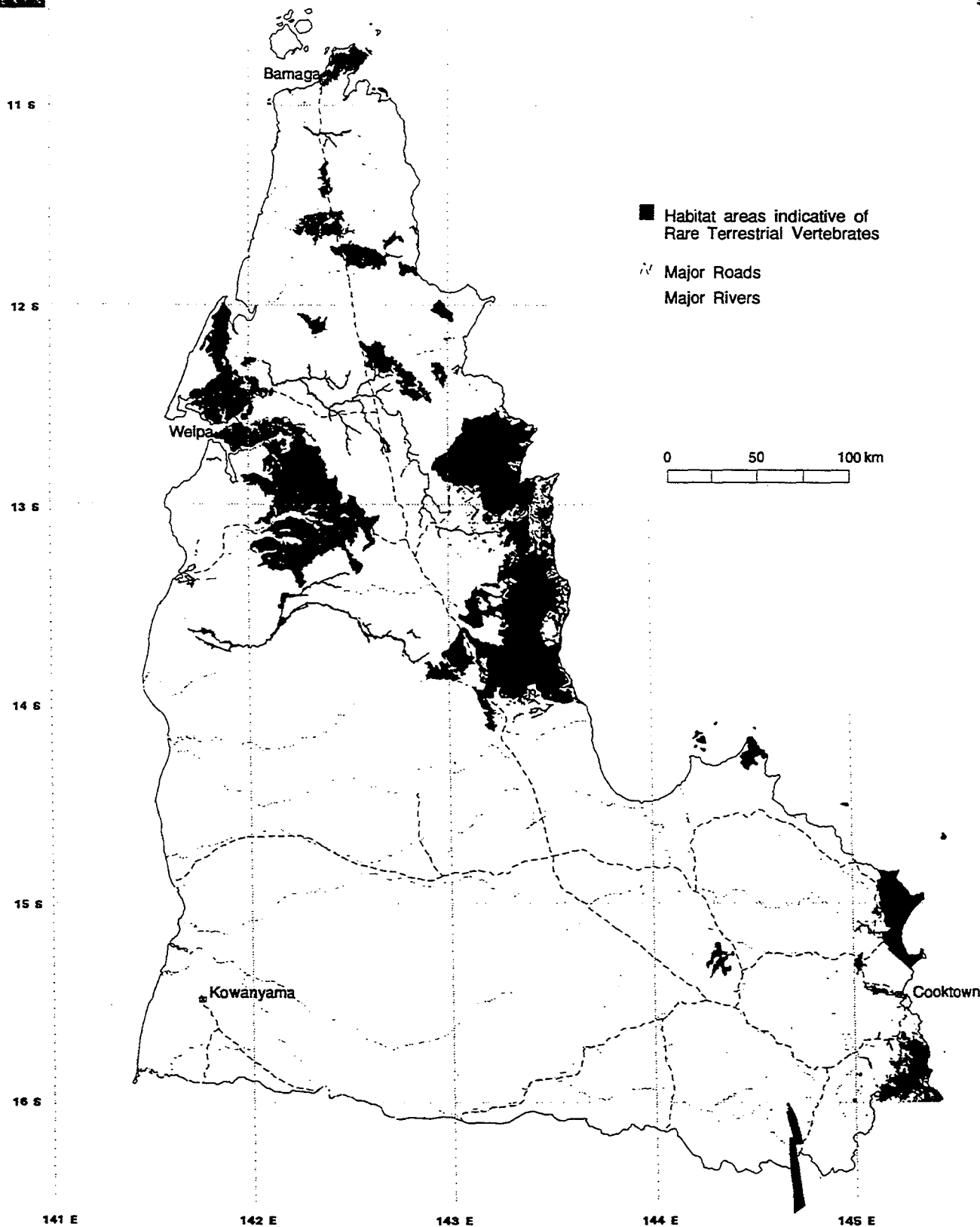
The designation of vulnerable vertebrate species is per the Queensland and Commonwealth Governments.  
 See AHC for specific taxa and explanation of habitat types.  
 Areas depicted above are a combination of several vegetation classes (after Neldner) within  
 particular regions and geological features. Data preparation and map design by ERIN.

Projection: Geographical representation  
 Spheroid: Australian National Spheroid  
 Scale approx. 1:2,225,000 at A3 size  
 Scale approx. 1:3,125,000 at A4 size

Figure 40



# Indicative Habitat Areas of Rare Terrestrial Vertebrate Species Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 07, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Queensland Government. 1995. Nature Conservation Act.  
Winter, J. and Lethbridge, P. 1994. CYPLUS Terrestrial Vertebrate Fauna. Final Rpt of Field Surveys. QDEH.  
Neldner, V.J. and Clarkson, J.R. 1994. CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
See AHC for complete bibliography and sources.

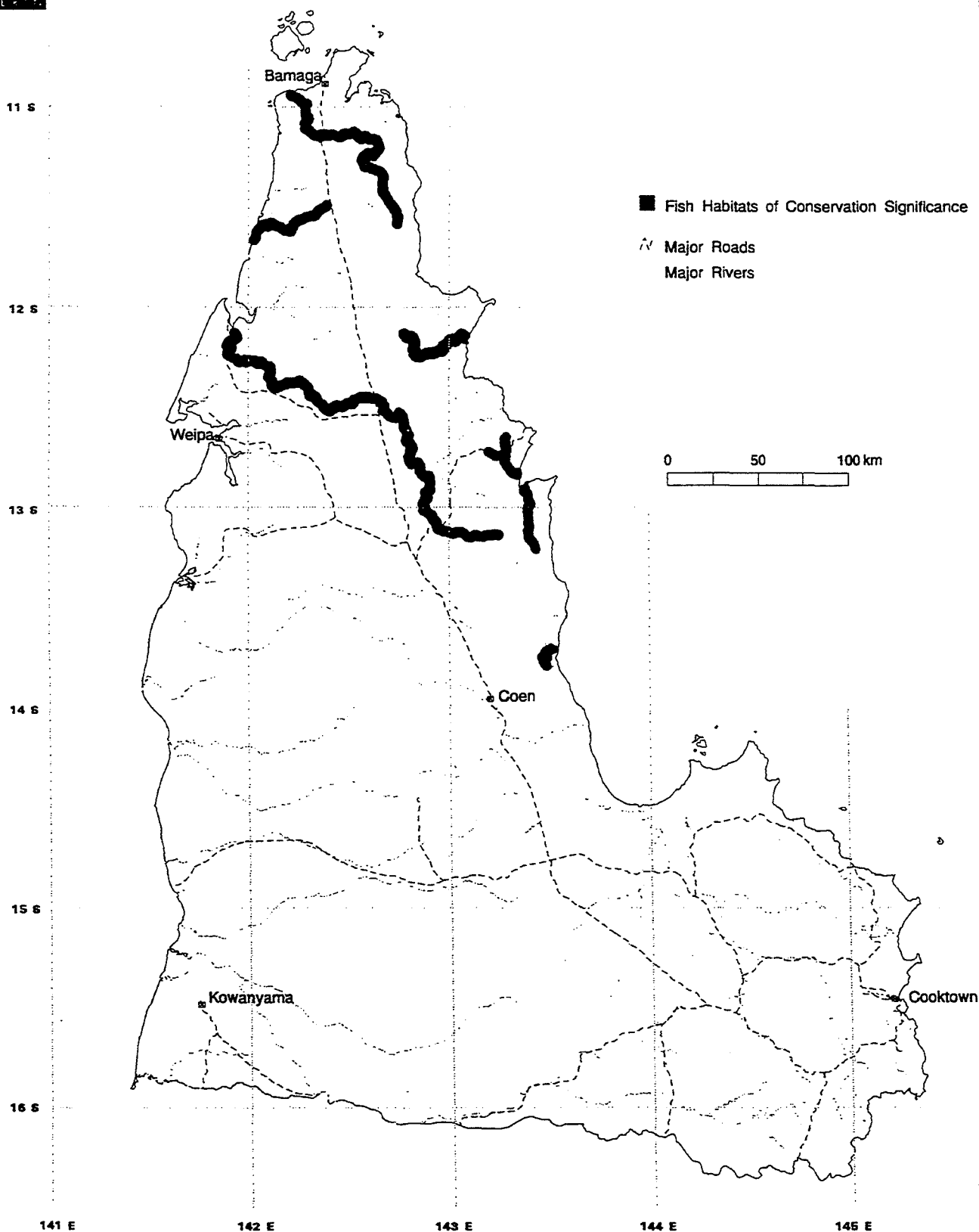
## Caveats....

The designation of rare vertebrate species is per the Queensland and Commonwealth Governments.  
See AHC for specific taxa and explanation of habitat types.  
Areas depicted above are a combination of several vegetation classes (after Neldner) within  
particular regions and geological features. Data preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 41

# Fish Habitats of Special Interest Cape York Peninsula Conservation and Natural Heritage Assessment



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 07, 1995)

## Sources....

AHC. Areas of Conservation Significance - Cape York Peninsula. In preparation.  
Herbert, B., et al (1994). Fish Fauna Survey Report. Wallamin Research Station, QDPI.  
Midgley, S. (1988). Some river systems of CYP. Account of Biol. Resource Study of Freshwaters. Unpub report.  
Leggett, R. (1990). Freshwater fish of Iron Range and adjoining areas. Qld Nat 30 (1-2): 12-13  
See Herbert above for complete bibliography and sources.

## Caveats....

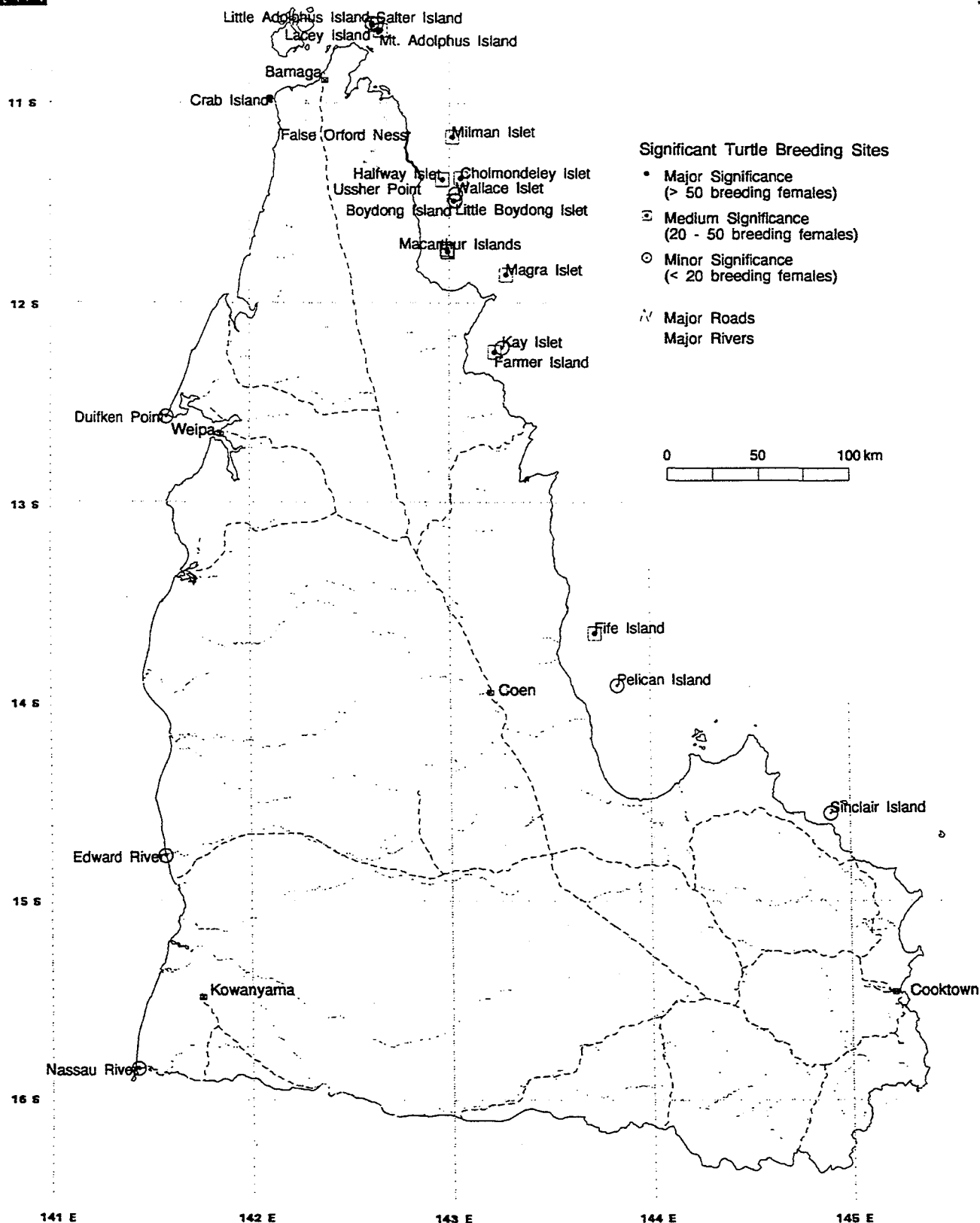
See sources or AHC Conservation and Natural Heritage Assessment for precise boundaries and descriptions.  
Selection of special interest fish habitat areas on east side of CYP based on assessment by Herbert, B. (1994).  
Significant fish habitats on west of CYP (Jardine, Jackson, and Wenlock Rivers) selected by AHC.  
Data compilation and mapping of sites and/or areas by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 42

# Turtles

## Significant Breeding Sites Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 07, 1995)

### Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
ODEH. 1994. Unpublished turtles dataset.  
Harris, A. 1994. 'The Olive Ridley', in Proc of Aust Marine Turtle Conservation Workshop, ed. R. James.  
Miller, J. 1994. 'The Hawksbill Turtle', in Proc of Aust Marine Turtle Conservation Workshop, ed. R. James.  
See AHC 1995 for additional sources and complete citations.

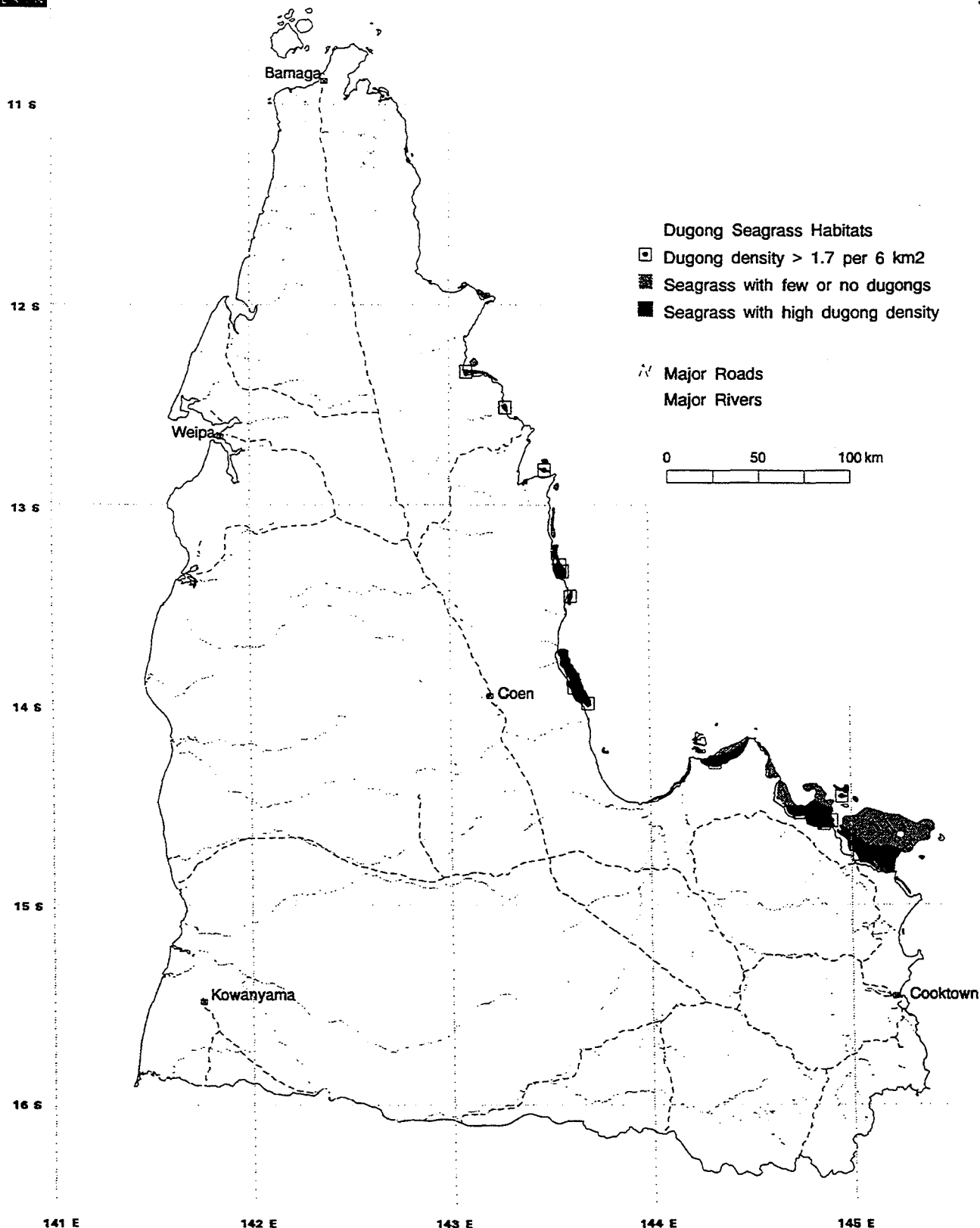
### Caveats....

See sources or AHC for precise locations and descriptions.  
Significance criteria by AHC with consultation of subject matter experts.  
Numerous sandy beaches between False Orford Ness and Ussher Point are minor breeding sites for Hawksbill Turtles.  
Data extraction and preparation, map design and preparation by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 43

# Dugongs Important Habitats Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 07, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Danaher, K. 1994. CYPLUS NR06 Marine Vegetation Project. Fisheries Division, QDPI.  
Marsh, H. and Morissette, N. 1994. Unpublished N. Qld. dugong dataset. TESAG, James Cook University.

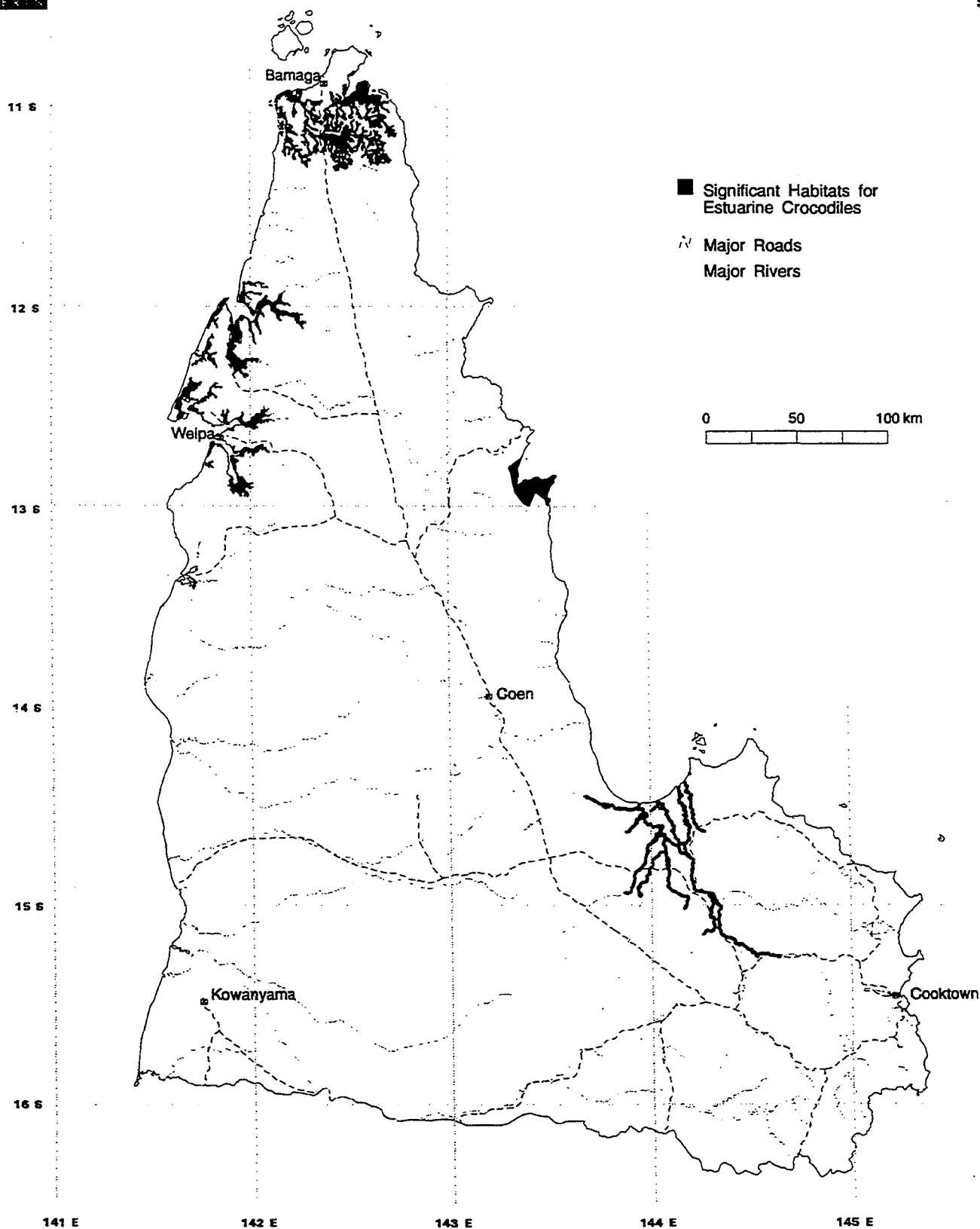
## Caveats....

Seagrass areas are as delineated by Danaher (1994). West coast seagrass beds are not depicted.  
Dugong densities were determined from Marsh marine surveys.  
Important dugong habitats are seagrass beds with a density > 1.7 per survey area (~ 6km2).  
Data extraction and preparation, map design and preparation by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 44

# Estuarine Crocodiles Significant Habitat Areas Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 06, 1985)

## Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
Thurgate, M. 1994. Significant Locations for Crocodiles on CYP. James Cook University.  
Taplin, L.E. 1987. Management of Crocodiles in Qld. in Wildlife Management eds G. Webb et al.  
Driscoll, P. 1994. Assessment of Wetlands for Nature Conservation, unpub report for CYPLUS.  
Danaher, K. 1994. Marine Vegetation Project, NRAP NR06. QDPI. See AHC for complete sources and citations.

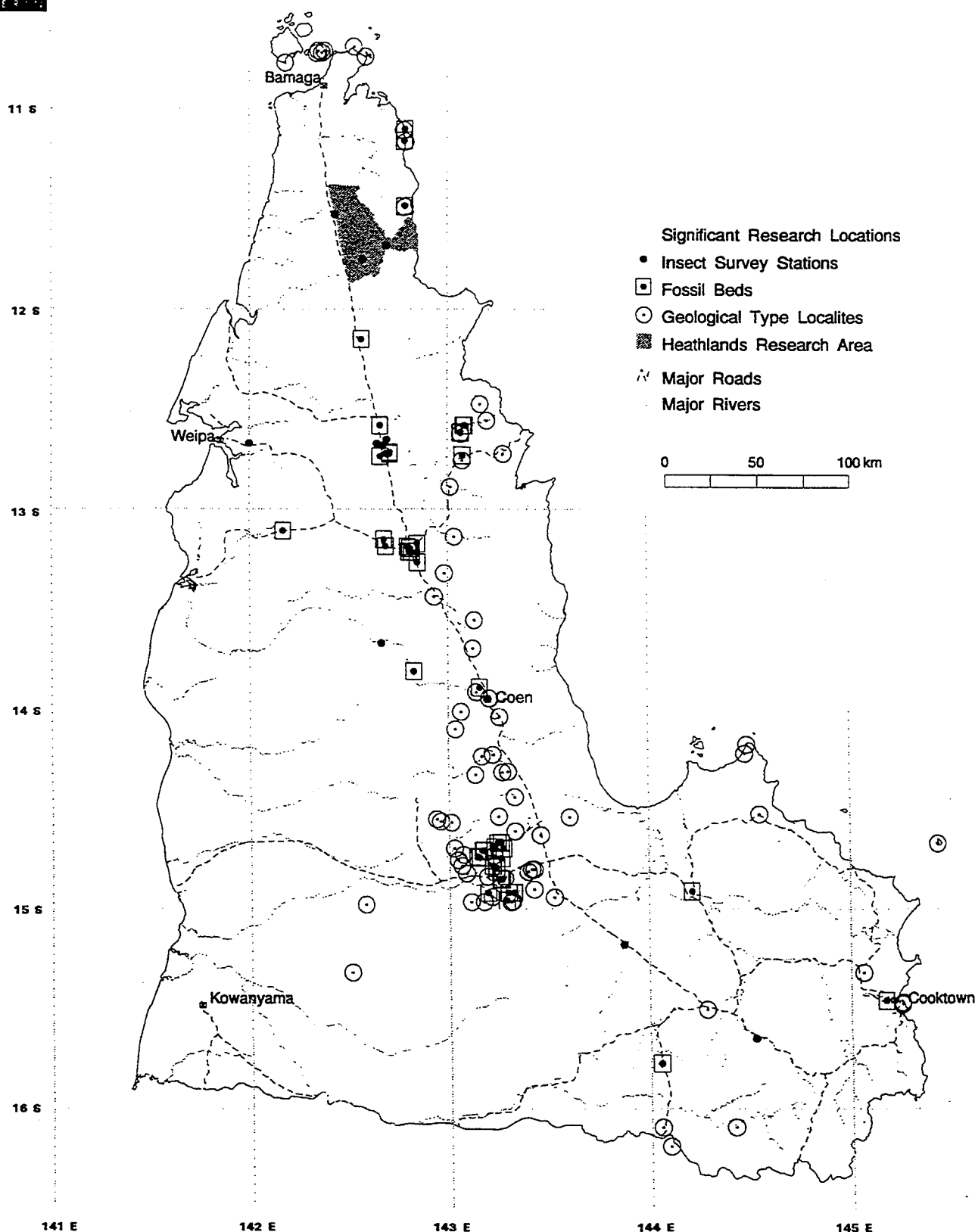
## Caveats....

See sources or AHC for precise locations and descriptions.  
Areas in Lakefield and Jardine regions determined by buffering selected drainages from AUSLIG 1:250000 GIS coverages.  
Iron Range and Wepai areas based on Danaher (1994) mangrove locations and Driscoll wetlands boundaries.  
Data extraction and preparation, map design and preparation by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 45

# Significant Research Sites and Areas Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 09, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance on Cape York Peninsula.  
AHC. 1994. Sites of Geological and Landform Conservation Significance on CYP.  
RGSQ, Inc. 1993. CYP Scientific Expedition Report: Wet Season 1992.  
Zborowski, P. et al. 1994. Project NR17 Report on Insect Survey - CYPLUS. CSIRO Div. of Ent.  
See AHC 1994 for description of geological type locality sites and complete citations.

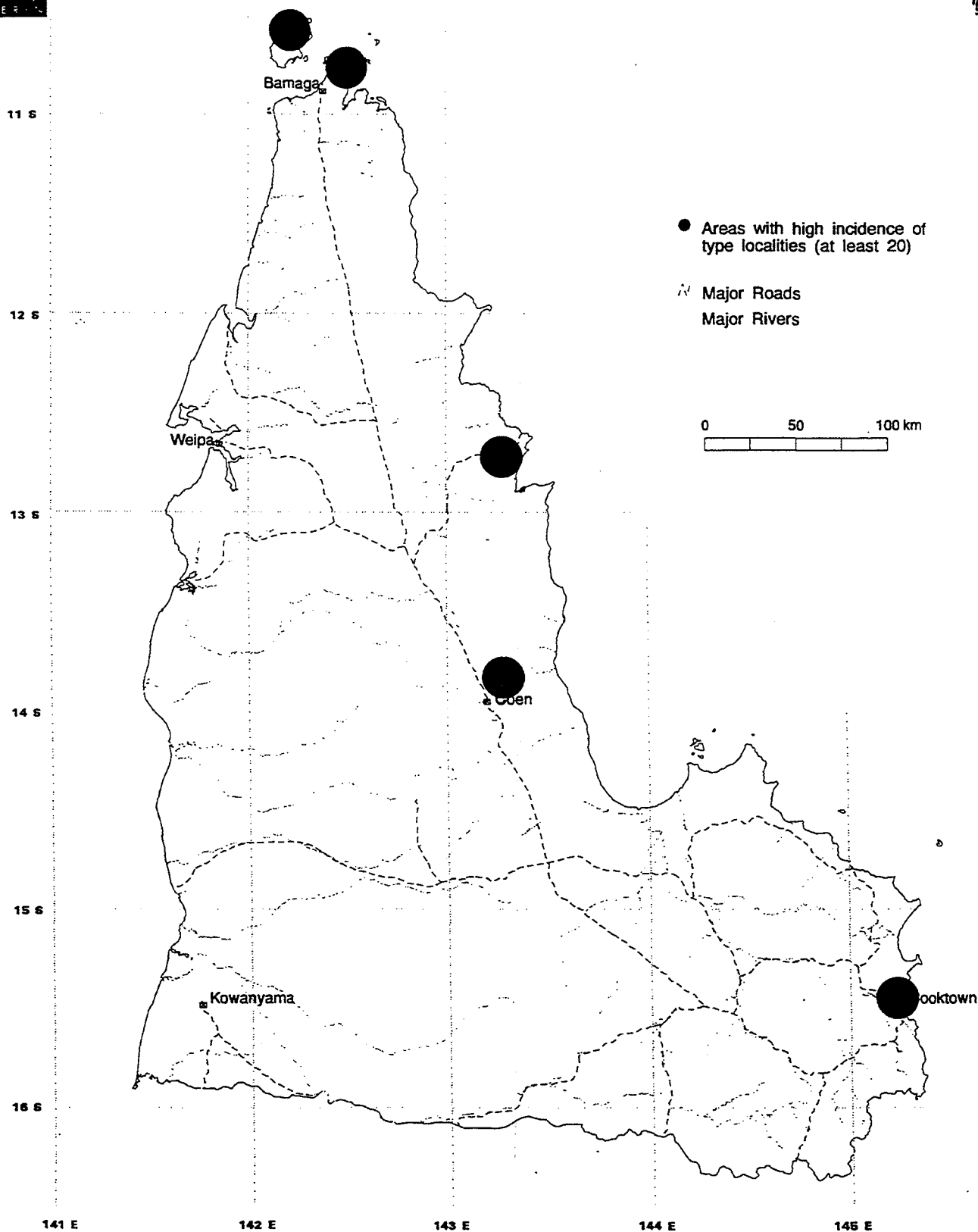
## Caveats....

Insect point locations are permanent insect survey sites (Zborowski 1994).  
The Heathlands area was the location of the most comprehensive wet season research project to date.  
Geological sites are geology/stratigraphy type localities. Some fossil sites are type localities.  
Data extraction and map design and preparation by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 46

# Type Localities Areas of High Incidence Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 08, 1995)

## Sources....

AHC. 1995. Areas of Conservation Significance on Cape York Peninsula.  
Chapman, Arthur D. 1991. Australian Plant Name Index (APNI). Canberra : ABRIS.  
Cogger, H.G. et al. 1983. Zoological Catalogue of Australia. Vol 36. Amphibia, Reptilia. ABRIS.  
Barnister, J.L. et al. 1988. Zoological Catalogue of Australia. Vol 36. Mammalia. ABRIS.

## Caveats....

Type localities extracted from APNI and ZooCat by AHC.  
Areas with at least 20 type localities, flora and fauna, are depicted. No geographic coordinates provided in sources.  
See AHC (1995) or ERIN for specific taxa and areas.  
Data preparation and map design by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

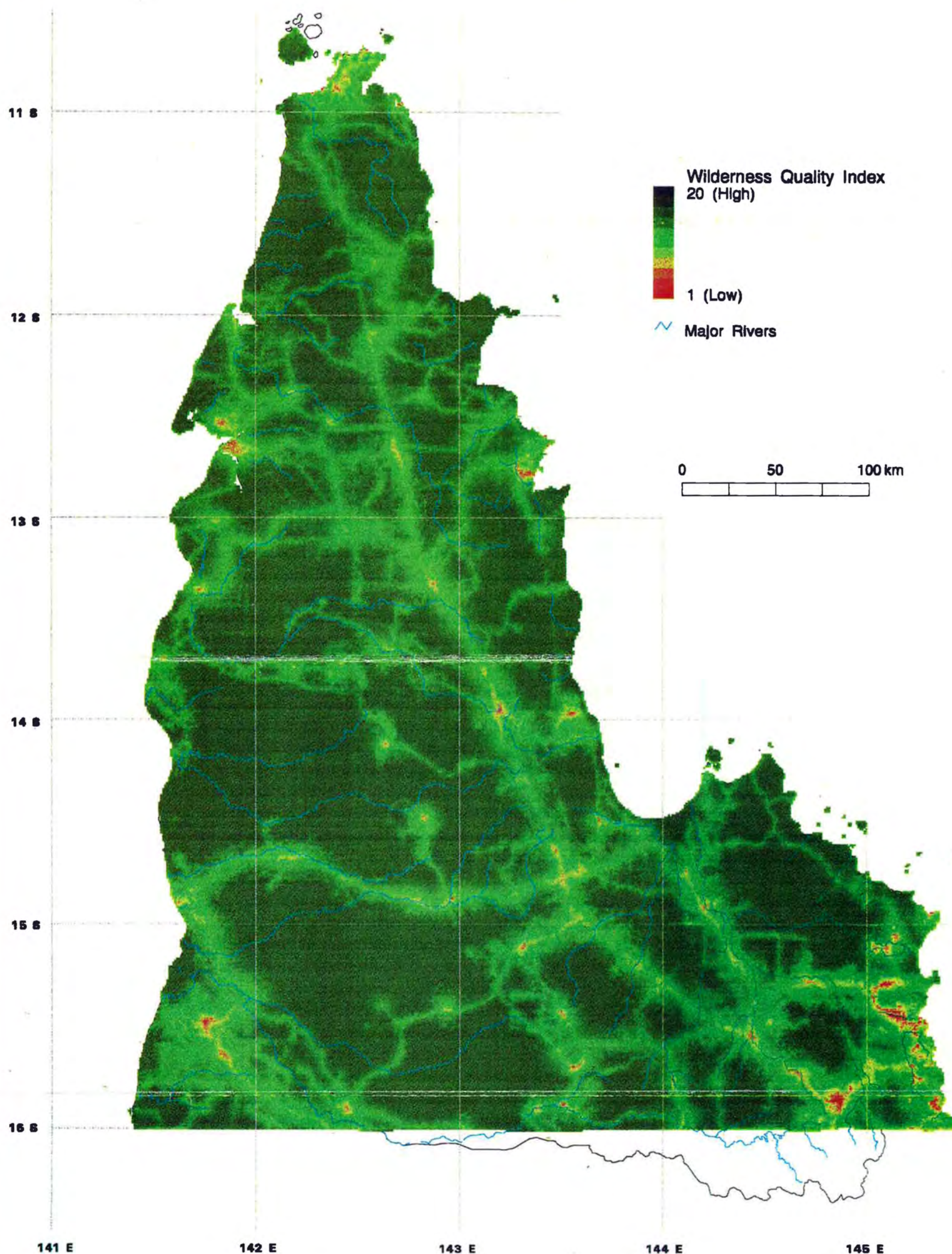
Figure 47



# National Wilderness Inventory

## Wilderness Quality Values

### Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (May 05, 1995)

#### Sources....

AHC. 1995. Areas of Conservation Significance - Cape York Peninsula.  
AHC - NWI. 1995. National Wilderness Inventory.

#### Caveats....

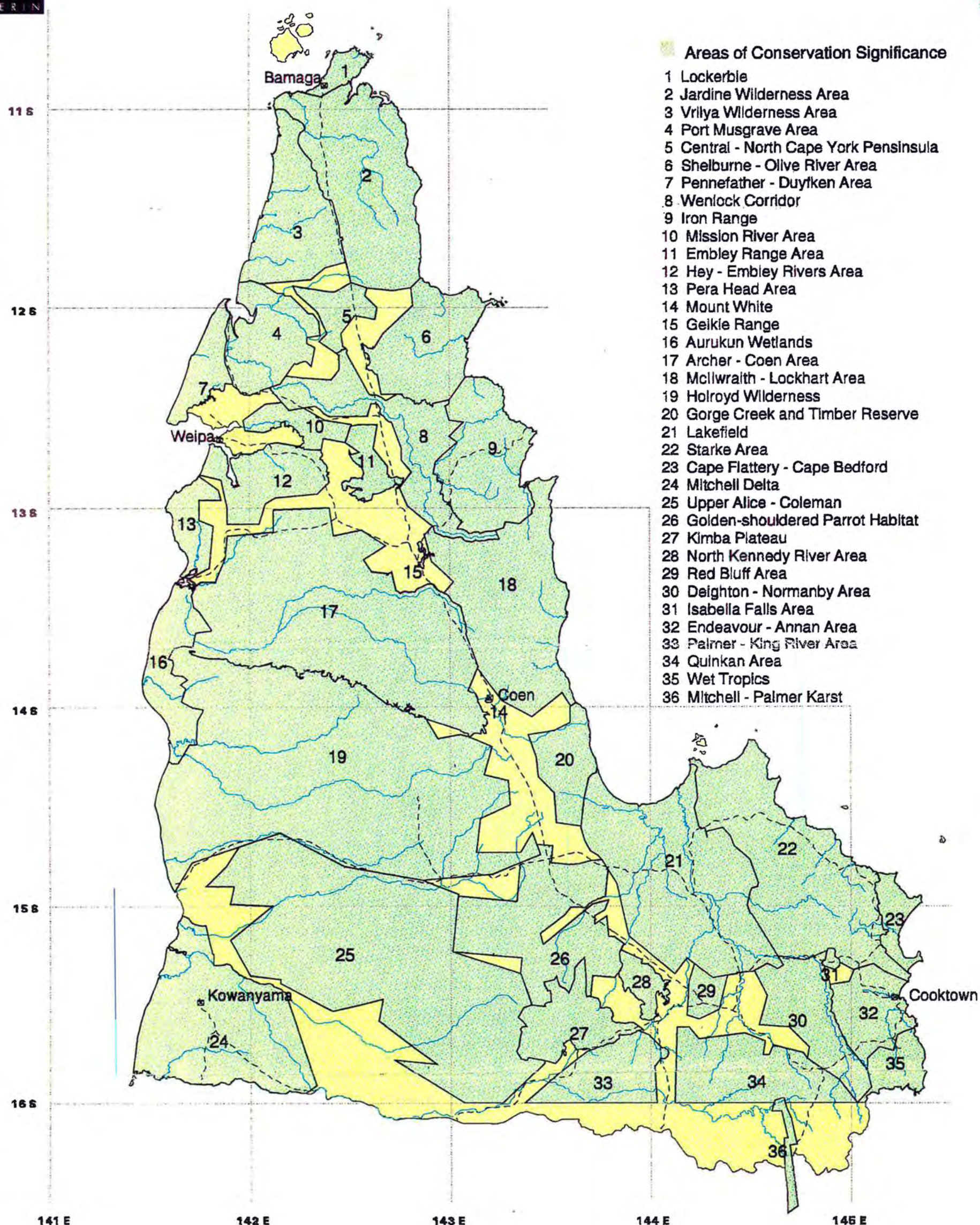
See sources for precise boundaries and descriptions of NWI methodology.  
Wilderness Quality Index is a value between 0 - 26, however values  $> 20$  are not differentiated.  
High Wilderness Quality is defined as a value  $\geq 14$ .

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 48



# Areas of Conservation Significance Cape York Peninsula



Map prepared through the facilities of the Environmental Resources Information Network by D. Glasco (August 22, 1995)

## Sources....

AHC. Areas of Conservation Significance - Cape York Peninsula. In preparation.  
Driscoll, P. V. 1994. Cape York Peninsula Wetland Conservation Assessment. Report to QDEH, Dec 1994.  
Neidner, V.J. and Clarkson, J.R. (1994). CYPLUS NR01 Vegetation Survey. Queensland Herbarium.  
Winter, J. and Lethbridge, P. (1994) CYPLUS Terrestrial Vertebrate Fauna. Final Rpt of Field Surveys. QDEH.  
See text for complete list of sources used in assessment.

## Caveats....

Areas depicted were determined by AHC. Assessment of Conservation Significance is based upon qualitative and quantitative evaluation of 40 GIS coverages or layers.  
Themes included flora, fauna, wilderness quality, wetlands, and geology.  
Data preparation and map design and production by ERIN.

Projection: Geographical representation  
Spheroid: Australian National Spheroid  
Scale approx. 1:2,225,000 at A3 size  
Scale approx. 1:3,125,000 at A4 size

Figure 49



## **APPENDICES**

## **Appendix A**

### **Terms of Reference**

## **APPENDIX A    TERMS OF REFERENCE**

### **1    Thematic Reports**

The Consultant is required to review the reports of the 24 projects from the Land Use Program and the 19 projects of the Natural Resources Analysis Program, and any other relevant available information and integrate and synthesise them under three broad based themes covering:

- \*    **Natural Resources and Ecology**
- \*    **Land Use and Economy**
- \*    **Society and Culture**

Each of the three reports should specifically address within its theme the following:

- \*    **Current Situation**

- consolidation and integration of information from relevant CYPLUS projects and other available data sources to provide a succinct, comprehensive and factual picture of current land and land related resource uses and key considerations;
- as part of this analysis, significant linkages, within and between individual projects relevant to ecologically sustainable land use, should be clearly identified for future reference.

- \*    **Capabilities and Constraints**

- sufficient analysis and interpretation to provide an objective regional perspective of land and resource use strengths, capability and constraints where;
  - capability is defined as indicative possible uses synthesised from available data, without nominating or inferring preferred ones.
  - constraints are those weaknesses or other influences, such as current infrastructure, community preferences, technology or other factors, which, with reasonable certainty, could restrict certain uses.

- \*    **Information Gaps**

- identify critical gaps in available data which will impede policy development in Stage 2.

## 2 *Summary Report*

This report should draw together the main findings of the three thematic reports to:

- \* Provide an objective, integrated perspective of significant land and resource use issues, conflicts and compatibilities. There should not be any preferences indicated.
- \* Indicate the broad potential for land and resource use consistent with ecologically sustainable development, highlighting where potential uses may be compatible or in conflict but without indicating any preferred uses. Potential uses to be compiled from the assessments of land use capabilities undertaken in each of the thematic reports.
- \* Outline community and other aspirations for the future of CYP to the extent that these have been expressed.
- \* Identify issues and opportunities for which there appears to be consistent or strong support for action in the short term (within 6 - 12 months) and urgent issues for policy development.
- \* Identify significant issues which may need to be addressed in forums other than CYPLUS.

The report should also summarise the results of the land use models report so as to highlight any factors which could guide the development of recommendations on mechanisms for implementing CYPLUS initiatives during and at the end of Stage 2.

## 3 *Expected outputs*

The following outputs are expected.

- \* An Overview report on Natural Resources and Ecological issues in Cape York Peninsula.
- \* An Overview report of Land use and Economic issues in Cape York Peninsula.
- \* An Overview report on issues about the Society and Culture in Cape York Peninsula.
- \* An Overview report highlighting the main factors influencing ecologically sustainable developments in Cape York Peninsula.

## **Appendix B**

### **Tables of Contents for all Reports**

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## **Appendix C**

### **Summary of CYPLUS Stage 1 Programs and Reports**

## **APPENDIX C    SUMMARY OF CYPLUS STAGE 1 PROGRAMS AND REPORTS**

The four summary reports integrate the information gathered so far into a series of coherent summary reports, and have used information mostly from:

- The Natural Resource Analysis Program.
- The Land Use Program.
- CYPLUS Public Participation Program.
- Land Use Strategy Models Report.

The **Natural Resource Analysis Program (NRAP)** consisted of 18 projects which examined the nature, extent and condition of natural resources on Cape York Peninsula. The program included the development of a Geographic Information System (GIS) to enable storage, manipulation and access to all CYPLUS data by the community and governments.

The **Land Use Program (LUP)** consisted of 28 projects which were the priority areas of research determined by the CYPLUS community interest groups through the public participation process. These projects, to varying extents, utilised information gathered from the NRAP projects as well as other research information to describe a wide range of aspects of land use on Cape York Peninsula. The projects were grouped under three headings: "People", "Land" and "Nature" which parallel the focus of the three thematic summary reports.

The **Public Participation Program** relies on four community-based working groups that have been established to facilitate public involvement in the CYPLUS process. Members of these groups are representatives of resident, business and public interest groups who are employed under contract to represent their constituents in CYPLUS and assist in the two way flow of information between government and community participants. Their responsibilities reflect the three themes of **Natural Resources and Ecology (Nature)**, **Land Use and Economy (Land)** and **Society and People (People)**. In addition, a group to co-ordinate community and special interest groups has been established- the Ecologically Sustainable Development (ESD) Co-ordinating Group. Government agencies are involved through project work and through CYPLUS inter-departmental committees.

The **Land Use Strategy Models Report** was commissioned to review land use strategy models which may be relevant to Cape York Peninsula. The main findings provide direction for Stages 2 and 3.

The following table indicates the CYPLUS Land Use Program and Natural Resource Analysis Program reports from Stage 1

# Summary of CYPLUS Stage 1 reports

Number in report	Title	Author
	<b>Land Use Program</b>	
2	Aspects of Commercial and Non-Commercial Fisheries	WBM Oceanics
4	Areas Containing Significant Species or Habitats Outside the Existing National Parks and Reserves Network	Qld Dept of Environment and Heritage
5	An Assessment of the Conservation and Natural Heritage Significance (Biology)	Australian Heritage Commission
6	An Assessment of the Conservation and Natural Heritage Significance (Geology)	Australian Heritage Commission
7	Current Land Use	Cairns Economic Research Unit
8	Current Administrative Structures	Focus
9	Economic Assessment and Secondary and Tertiary Industries	Cairns Economic Research Unit
10	Animal and Weed Pests	Tropical Weeds Research Centre
11	Fire	Gabriel Crowley
12	Survey of Forest Resources	Environment Science & Services (NQ)
13	Indigenous Management of Land and Sea Project and Traditional Activities Project	University of Queensland
14	Land Degradation - Existing and Potential Erosion Hazard	Qld Department of Primary Industries
15	Land Degradation - Soil Loss by Water - USLE	Australian Geological Survey Organisation (AGSO)
16	Land Degradation - Salinity Hazards	Qld Department of Primary Industries
17	Land Tenure System	Dept of Lands and CYPLUS
18	Land Tenure Issues	Holmes
19	Mineral Resource Potential/Assessment	Qld Dept of Minerals and Energy & AGSO
20	Mining Industry Issues and Impacts	Stock and Lane
21	Management of Pastoral Holdings	Department of Lands
22	An Assessment of the Pastoral Industry	Landcare Management Services

**Summary of CYPLUS Stage 1 reports (cont.)**

<b>Number in report</b>	<b>Title</b>	<b>Author</b>
	<b>Land Use Program (cont.)</b>	
23	Population Characteristics	Cairns Economic Research Unit
24	Primary Industries Assessment - Agricultural Suitability	Qld Department of Primary Industries
25	Primary Industries Assessment - Aquaculture and Mariculture	Qld Department of Primary Industries
26	Primary Industries Assessment ( <i>Identification of issues</i> )	RCS Hassall
28	Services and Infrastructure	FNQ Family Resource Service
29	Energy Needs and Resources	CAFNEC
30	Surface Water Resources	Qld Department of Primary Industries
31	Tourism Study	HJM Environmental Strategies
33	Transport Services and Infrastructure	Gutteridge Haskins and Davey
35	Values, Needs and Aspirations Study	Partners in Planning
	<b>Natural Resource Analysis Program</b>	
37	NR01 Vegetation Survey and Mapping	Queensland Herbarium
39	NR02 Soil Survey and Agricultural Suitability	Qld Department of Primary Industries
40	NR03 Terrestrial Vertebrate Fauna Survey	Qld Dept of Environment and Heritage
42	NR04 Mineral Resource Inventory	Qld Department of Minerals and Energy
43	NR05 Digital Geological Data	Australian Geological Survey Organisation
44	NR06 Marine Vegetation	Qld Department of Primary Industries
46	NR09 Wetland Definition and Fauna Assessment	Qld Dept of Environment and Heritage
47	NR10 Freshwater Fish and Aquatic Habitat	Qld Department of Primary Industries
48	NR11 Environmental Region Analysis	Environmental Resources Information Network
49	NR12 Regolith Terrain Mapping	Australian Geological Survey Organisation

**Summary of CYPLUS Stage 1 reports (cont.)**

<b>Number in report</b>	<b>Title</b>	<b>Author</b>
	<b>Natural Resource Analysis Program (cont.)</b>	
50	NR14 Coastal Environment Geoscience Survey	Australian Geological Survey Organisation
51	NR15 Airborne Geophysical Survey	Australian Geological Survey Organisation
52	NR16 Groundwater Resources	Qld Department of Primary Industries
53	NR17 Insect Fauna Survey	Australian National Insect Collection
54	NR18 Flora Data and Modelling	Environmental Resources Information Network
55	NR19 Fauna Distribution Modelling	Environmental Resources Information Network
57	NR21 Ecology and Conservation of the Golden-Shouldered Parrot	Stephen Garnett
	<b>Land Use Planning Model Report</b>	
58	Land Use Strategy Models	Focus
	<b>Public Participation Program</b>	
59	Public Participation Database	CYPLUS
	<b>Other Studies</b>	
60	Cape York Peninsula Resource Analysis	Connell Wagner (1989)
61	National Strategy for Ecologically Sustainable Development	Commonwealth of Australia (1992)
62	A Review of the Adequacy of Resourcing of the National Parks of Cape York Peninsula, Qld	Bruce Gall, Queensland National Parks and Wildlife Service (1994)
63	Australian National Report to the United Nations Conference on Environment and Development	Commonwealth of Australia (1991)

Note: Missing numbers refer to projects where no report was produced (e.g. GIS maintenance).



## **Appendix D**

### **Role of Ecologically Sustainable Development**

## **APPENDIX D    ROLE   OF   ECOLOGICALLY   SUSTAINABLE DEVELOPMENT**

The Cape York Peninsula Land Use Strategy is a framework for making decisions about use and management of natural resources on Cape York Peninsula in ways that will facilitate Ecologically Sustainable Development. The National Strategy for Ecologically Sustainable Development (61) defines the goal for Ecologically Sustainable Development (ESD) as:

Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

The National Strategy for Ecologically Sustainable Development was prepared by the Commonwealth Government following extensive governmental and community consultation. It was endorsed by the Council of Australian Governments in 1992. The Council noted that the Strategy is intended to play a critical role in setting the scene for broad changes in direction and approach that governments will take to try to ensure that Australia's future development is ecologically sustainable. The core objectives of Ecologically Sustainable Development, as adopted by State and Commonwealth Governments, are:

- To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations.
- To provide for equity within and between generations.
- To protect biological diversity and maintain essential ecological processes and life-support systems.

The National Strategy outlines the guiding principles for Ecologically Sustainable Development. These are that:

- Decision making processes should effectively integrate both long and short term economic, environmental, social and equity considerations.
- Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- The global dimension of environmental impacts of actions and policies should be recognised and considered.
- The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised.
- The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised.
- Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms.
- Decisions and actions should provide for broad community involvement on issues which affect them.

As much of Stage 1 of CYPLUS has involved the collection of data, the application of the guiding principles for Ecologically Sustainable Development has been mostly limited, at this stage, to the:

- Public Participation Program.
- Identification of issues.
- Analysis of opportunities and constraints for existing and future land use.

The application of the guiding principles will be a key part of Stages 2 and 3 of CYPLUS during:

- The development of strategic directions for land and resource use (Stage 2).
- The implementation of the Land Use Strategy (Stage 3).

The National Strategy provides the broad strategic framework under which governments will cooperatively make decisions and take actions to pursue Ecologically Sustainable Development in Australia. In particular, a broad strategic framework is provided for:

- Key industry sectors which rely on natural resources as their productive base (e.g. agriculture, fisheries, forestry, mining, tourism).
- A broad range of issues which are relevant to actions in several of the key industry sectors (e.g. nature conservation, Aboriginal and Torres Strait Islander peoples, public health, education and training, coastal zone management, water resource management, land use planning and decision making).

Many of the key industry sectors and issues are represented on Cape York Peninsula and are likely to be the focus of Stages 2 and 3. In particular, the National Strategy for Ecologically Sustainable Development recognises that the challenge for land use and decision making is:

To ensure land use decision making processes and land use allocations at all levels of government meet the overall goal of Ecologically Sustainable Development and are based on a consideration of all land values, uses and flow-on affects, while avoiding fragmentation, duplication, conflict and unnecessary delays.

The two main objectives for land use planning and decision making are identified as:

- To encourage environmental and economic land use decision making which takes full account of all relevant land and resource values (including down-stream aquatic resources) and to establish and operate systems of land use decision making and dispute resolution. (CYPLUS is cited in the National Strategy as a model approach for the development of cooperative and consultative arrangements between jurisdictions).
- To achieve clarity, certainty and accountability in the process used to clarify access to land and to determine change of use.

These will continue to be key objectives for the latter stages of the Cape York Peninsula Land Use Strategy.