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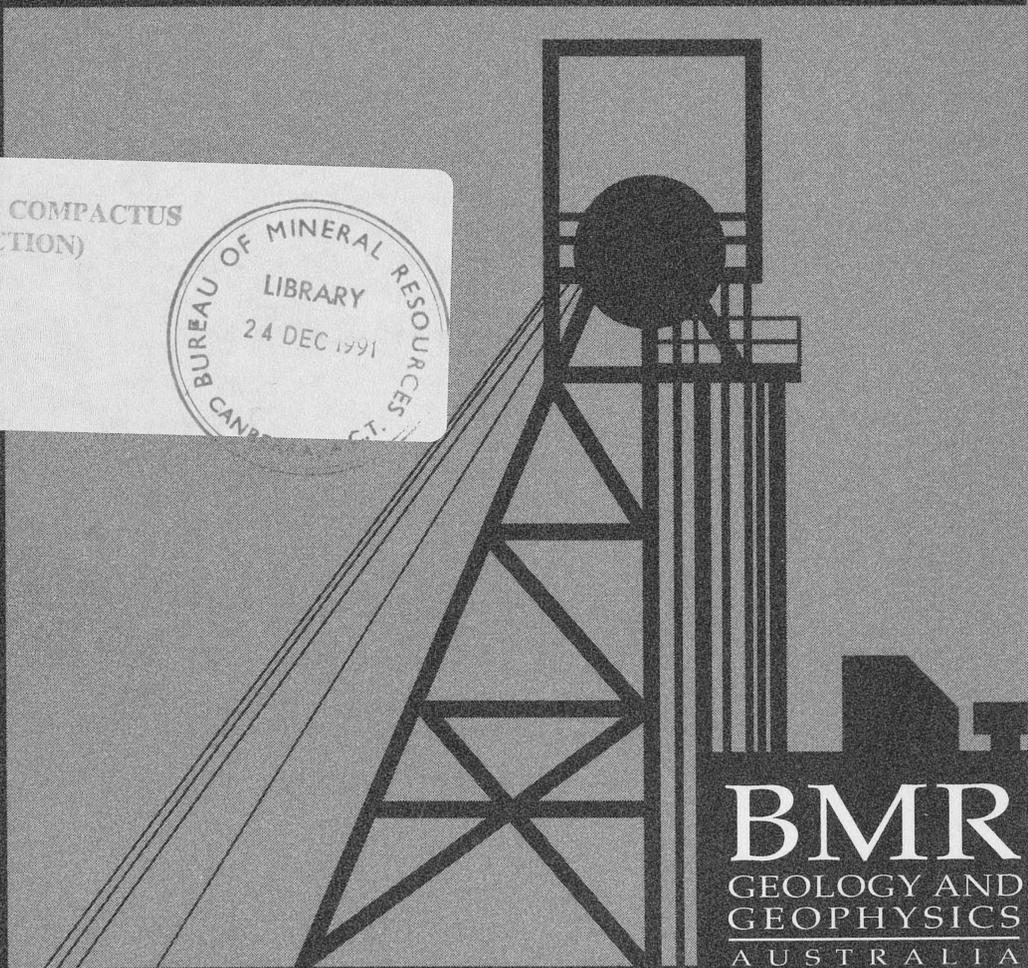
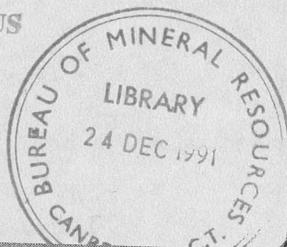
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# Mineral Provinces

Cape York Peninsula: Comments on Mineral Potential  
and Availability of Data as at January 1990  
Record 1991/74



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**BMR**  
GEOLOGY AND  
GEOPHYSICS  
AUSTRALIA

by  
**Y. Mieztis and J.H.C. Bain**

MINERALS AND LAND USE PROGRAM  
BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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and Availability of Data as at January 1990  
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**A Contribution to the National Geoscience Mapping Accord  
NORTH QUEENSLAND PROJECT**

**BMR**  
GEOLOGY AND  
GEOPHYSICS  
AUSTRALIA



by  
**Y. Mieзитis and J.H.C. Bain**

*Geoscience for Australia's Future*



DEPARTMENT OF PRIMARY INDUSTRIES AND ENERGY

Minister: The Hon. Alan Griffiths

Secretary: G.L. Miller

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Executive Director: R.W.R. Rutland AO

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## **SUMMARY**

General comments on the mineral potential of the various geological provinces of Cape York Peninsula (CYP) are based upon a brief examination of outdated reconnaissance scale (1:250 000) geological maps of the region dating from 1956 to 1974. The Geological Survey of Queensland (GSQ), and BMR have remapped some of the 1:250 000 sheets in the south eastern part of the peninsula at a scale of 1:100 000. However the detail of the geological maps over most of the peninsula could be compared to that of the Kakadu National Park prior to the commencement of BMR's 1:100 000 geological mapping in the early 1970s. The current National Geoscience Mapping Accord (NGMA) North Queensland Project's 6 year plan is designed to upgrade the geological map coverage over selected parts of the peninsula to 1:100 000 scale level. It is probable that this program will identify areas which will require additional specialised investigations in future. Detailed mapping, assessment of mineral potential and on going exploration will lead to substantial revision of the preliminary comments on mineral potential presented here.

Comments on the mineral potential of the various areas in CYP are:

### **Cape York - Oriomo Inlier**

- Moderate to high potential for gold and silver; low to moderate potential for tin, tungsten, copper and uranium.

### **Coen Inlier**

- Moderate to high potential for gold and silver; moderate potential for tin and heavy mineral sands, and low potential for copper, lead, zinc, antimony, uranium, manganese and iron.

### **Yambo Inlier**

- Moderate potential for gold; low to moderate potential for copper, lead and zinc.

### **Hodgkinson Fold Belt**

- High potential for gold, tin, tungsten; moderate potential for antimony, molybdenum, copper, lead, zinc, silver and uranium.

### **Georgetown Inlier**

- Moderate to high potential for gold, tin, base metals, uranium. Also some potential for tantalum, bismuth, topaz and diamonds.

### **Karumba Basin**

- High potential for bauxite and kaolin in the northern part; low to moderate potential for heavy minerals.
- High potential for groundwater.
- Low potential for petroleum.

## **Carpentaria Basin**

- Low to moderate potential for bauxite and kaolin, silica sand for north east coast; low potential for oil shale and moderate potential for petroleum; high potential for groundwater.

## **Olive River Basin**

- High potential for silica sand; low to moderate potential for heavy mineral sand; low potential for coal.

## **Laura Basin**

- Moderate to high potential for coal; moderate potential for groundwater; low potential for gold, platinum and some potential for petroleum.
- It should be noted that as the total thickness of the younger sediments overlying the peninsula is less than 1000m, a large mineral deposit in the underlying basement rocks, such as Olympic Dam, could well be economic.

Because of the lack of detailed geological maps at a 1:100 000 scale for the Cape York - Oriomo, Coen, Yambo Inliers and, to a lesser degree, the northern end of the Hodgkinson Fold Belt it would be difficult to assess the mineral potential by applying geological models for new types of mineral deposits. The assessment of the potential for mineral commodities not located to date in the peninsula is also difficult because of lack of geological detail. A major co-ordinated program of geological, geochemical and geophysical mapping is required to establish an adequate base-line geoscientific data set for the entire CYP for both resource assessment and environmental monitoring.

Areas with conflicting land-use issues and land access problems, requiring additional geoscientific information on mineral resource potential, are listed in order of priority.

## **The northern part of Karumba Basin**

- potentially significant resources of bauxite and kaolin may be present within areas proposed for environmental protection.
- significant resources of bauxite may also be present within DOGIT land as at Aurukun.
- resources of bauxite and kaolin may be present within the proposed RAAF defence base near Weipa.

## **The east coastline of Cape York Peninsula bordering**

- The Olive River Basin which contains the Shelburne silica sand deposit.
- the magnitude of economic potential of such deposits is illustrated by the high grade silica sand mine, about 430km further south-east, at Cape Flattery with an annual production of about 800 000t. Most of this production is being exported to Japan.
  - BMR will have to upgrade its geoscientific database to identify areas with potential for high grade silica sand resources on the east coast of the peninsula.

### **The Coen Inlier north of the Coen township**

- This area has potential for gold, silver, tin, heavy minerals and lesser potential for base metal deposits.
- Parts of this area are under Aboriginal lands, national parks, and some parts of the area are subject to various proposals for environmental protection by the Queensland Department of Environment and Conservation and various conservation groups.
- Part of the area is on the National Estate Register.
- The northern tip of the Inlier is in the vicinity of the proposed area for the spaceport.
  - this is an area with significant mineral potential and conflicting land use issues where additional geoscientific data is required for assessing the mineral potential.

### **The Cape York - Oriomo Inlier**

- the area has potential for gold, silver, tin, tungsten, base metals and uranium.
- parts of the area are under Aboriginal and Islander lands, and are subject at least to one proposal.
- part of the area is on National Estate Register.
  - BMR will probably be required to provide advice on the mineral potential involving conflicting land use issues in this area.

### **Other parts of the CYP outside the highly contentious land use areas**

- BMR will have to upgrade its database on the mineral potential of the remaining areas of CYP in order to provide advice as required.

### **Other questions which need to be clarified in the short term are**

- the extent of freehold land granted in recent years by the state government.
- which of the national parks, shown on various maps of the CYP, have been gazetted.

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## 1 INTRODUCTION

This report was prepared at short notice, as an internal document in November 1989 to provide comments on the mineral resource potential of the Cape York Peninsula and identify areas where conflicts over land-use require additional information for assessing the mineral resource potential. The report is part of a much broader land-use study by the Commonwealth and the Queensland State governments of the Cape York Peninsula, and provides preliminary comments on mineral resource potential but does not constitute a comprehensive assessment.

The report is also part of BMR's North Queensland National Mapping Accord Program, being carried out in conjunction with GSQ. It was decided to release the report in a modified form, as a BMR record, to provide a 'bench-mark' for measuring subsequent progress in the knowledge of the mineral potential from geoscientific studies.

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## 2 BOUNDARIES OF THE CAPE YORK PENINSULA AREA

The southern boundary of the area in CYP, subjected to land-use discussions, has not been firmly established. Two different boundaries have been presented.

- An information paper on CYP, prepared by an officer in DASETT in July 1988, appears to define the subject area as that portion of the peninsula north of roughly latitude 16° South. This line is about 100km north of Cairns.
- All of the CYP was identified, in a book (G. Hutton (editor) 1981 - Australia's Natural Heritage. Australian Conservation Foundation) published by the Australian Conservation Foundation (ACF), as 'a natural heritage area' of 'international significance'. The southern boundary of this area was placed just north of Normanton and Chillagoe and thence to Cooktown. North of Normanton and Cooktown the boundary of the area is positioned 20-30km off the coast of the peninsula (Figure 4 is copied from the ACF publication).
- A map published in an earlier publication (National Parks for Cape York Peninsula by J.P. Stanton (1976) shows additional reserves proposed by ACF as discrete areas within various parts of the peninsula and does not appear to suggest that all of the CYP should be set aside for environmental protection.

Information presented in this report covers all of the onshore area of the peninsula north of a line through Normanton and Cairns. The total onshore area north of this line is about 204 000km<sup>2</sup>.

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## 3 GEOLOGICAL FRAMEWORK

Proterozoic and middle Palaeozoic basement rocks of the CYP have a combined outcrop area of about 60 000km<sup>2</sup> (Figure 1). From north to south they comprise:

- the Cape York-Oriomo Inlier which extends offshore from the cape across the Torres Strait and includes Horn Island. The inlier consists of Carboniferous acid intrusives and volcanics.
- the Coen Inlier and the Yambo Inlier consisting of Early Proterozoic metasediments and metavolcanics, Silurian-Devonian granites and Carboniferous-Permian acid intrusives and volcanics. The geology of both of these inliers is very similar to that of the Georgetown Inlier.

- the Hodgkinson Fold Belt forms the southeastern part of the peninsula consisting of metamorphosed and deformed Late Silurian to Early Devonian shelf sediments overlain by Middle to Late Devonian trough-type sediments and basic volcanics. The belt contains widespread acid intrusives of Late Carboniferous and Early Permian age.
- a small portion of the Georgetown Inlier in the southern part of the peninsula. The basement consist of Early and Middle Proterozoic metamorphics, Middle Proterozoic and Late Palaeozoic acid volcanics.

Bain, Withnall, Oversby and Mackenzie (1990), described three geologic provinces in the basement rocks of north Queensland, each of which are characterised by distinct styles of mineralisation. These provinces are present in the peninsula (Figure 3) and overlap one another in some areas. In other areas these provinces are concealed by younger sediments of the basins and the presence of the older provinces is interpreted from geophysical data.

**The Precambrian Georgetown-Coen province consists of parts of the Coen, Yambo and the Georgetown Inliers and characteristic styles of mineralisation include:**

- Metamorphosed stratiform/stratabound massive and disseminated base metal sulphides of iron, copper, lead and zinc with minor amounts of silver and gold. All of the known economic deposits of this type are south of the peninsula in the Georgetown Inlier, but subeconomic amounts of this type of mineralisation occur in the south western part of the Coen Inlier and undiscovered economic deposits of this type may be present.
- Metamorphosed stratiform/stratabound iron-manganese deposits in northern part of the Coen Inlier. Locally these deposits contain traces of gold.

**The Siluro-Devonian plutonic belt overlaps the Precambrian province of the Coen, Yambo and the Georgetown Inliers. Mineralisation in this province is characterised by:**

- mesothermal quartz veins of the Charters Towers type which carry gold and silver with minor amounts of copper, lead and zinc. In the Coen Inlier the quartz veins of the Wenlock, Coen, Hamilton, Potallah and Alice fields are in granites or in adjacent Proterozoic metasediments, often associated with shear zones
- other Siluro-Devonian mineralisation (massive sulphide deposits) occur in the Hodgkinson Fold Belt eg. Dianne, Mount Molloy and OK.

**The Carboniferous-Permian province transgresses most of the Hodgkinson Fold Belt and then cuts across the Georgetown Inlier and magnetic data suggest it extends westwards under the Karumba and Carpentaria Basins to the Carpentaria Gulf. It also occurs within the northern part of the Coen Inlier and continues north under the Carpentaria Basin to the Cape York-Oriomo Inlier. Characteristic styles of mineralisation include:**

- tin, tungsten, molybdenum and bismuth vein, pipe, greisen and skarn deposits related to shallow-level granitic intrusions as in Cooktown-Annan River and Herberton tin fields.

- gold with traces of copper, lead and zinc mineralisation in quartz-filled tension gashes in altered porphyritic granite and surrounding altered volcanics in a number of locations in the southern part of Torres Strait.
  - breccia pipe gold deposits such as Kidston south of the peninsula but could occur within this province in the peninsula.
  - uranium-fluorine-molybdenum deposits associated with felsic volcanism and related hydrothermal activity eg. Ben Lomond and Maureen.

Sedimentary basins form the western, northern and some of the eastern parts of Cape York Peninsula. The basins overlie and adjoin the older basement rocks and the combined area of the basins is about 144 000km<sup>2</sup>. They comprise:

- the Cainozoic Karumba Basin in the west.
- the Mesozoic Carpentaria Basin underlies the Karumba Basin and adjoins it to the east. The Carpentaria Basin also contains the small Olive River Basin, which was initiated as early as the Permian.
- the Mesozoic to Cainozoic Laura Basin on the eastern side of the peninsula.
  - the Carpentaria and Karumba Basins are up to 1000m thick under the peninsula and reach a thickness of 1750m offshore to the west of the peninsula.

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## 4 MINERAL POTENTIAL

The older basement rocks host a wide range of metallic commodities, particularly gold and tin, but also include tungsten and base metals. Deposits of high grade silica sand occur on the east coast and there may also be potential for heavy mineral sands. The younger sedimentary basins contain major deposits of bauxite, kaolin, some coal and hold important resources of groundwater. On current knowledge the potential for oil in these basins is low.

Comments on the mineral potential of the basement rock geological provinces are as follows:

### Cape York - Oriomo Inlier

- The geology of the Torres Strait area is similar to the regional geology of the northeast Queensland acid volcanic province (Georgetown/Townsville area). On the available information, the Cape York-Oriomo province have a moderate to high potential for gold and silver and a low to moderate potential for tin, tungsten and copper.
  - In places in southern Torres Strait, volcanic rocks and small porphyritic granite intrusions have been hydrothermally altered and mineralised with gold in quartz veins and traces of base metals, particularly copper.
  - The Horn Island gold mine opened in one such area in 1988, and although it was expected to produce over 40 000 oz of gold per year, it closed in late 1989 with financial problems.

- There are small occurrences of tin on the mainland near Cape York itself, and of tungsten on islands further north in the Strait, from where small amounts of wolfram were produced in the past.
- Most of the seabed in Torres Strait area is above a bathymetric depth of 18m and is largely unexplored. Should any significant seabed mineral deposit be discovered, the technology for mining such resources is available. However, exploration would be difficult with conventional techniques because of swift tidal currents and cover of marine sediments.

### **Coen Inlier**

- The Coen Inlier has been a significant gold producer in the past. It has no current major gold producers but the province has a moderate to high potential for gold and heavy mineral sands. Low potential exists for tin, tungsten, silver, lead, antimony, manganese and iron.
  - Most of the past gold production has come from Ebagoola, Coen and Wenlock gold fields.
  - Production of other metals has included small amounts of tin concentrate (less than 200 tonnes), tungsten concentrate (about 75 tonnes), molybdenum (130kg), and antimony.
  - The Wolverson prospect north of Coen is known to contain  $4.1 \times 10^6 \text{m}^3$  of  $1.13 \text{kg SnO}_2/\text{m}^3$ .
  - On the present coast in the vicinity of the Coen Inlier there are thin discontinuous seams of heavy mineral sands in which high percentages of ilmenite and rutile have been recorded.

### **Yambo Inlier**

- The western part of the Palmerville Goldfield is within the Yambo Inlier but most of the gold production was to the east in the Hodgkinson fold belt. There is some potential for further recovery of alluvial gold along the Palmer River.

### **Hodgkinson Fold Belt**

- The part of the Hodgkinson Fold Belt within the peninsula has been an important producer of gold, tin, tungsten, antimony and copper. The province has a high potential for gold, tin and tungsten and a moderate potential for antimony, molybdenum, copper, lead, zinc and silver.
  - Main gold producers in the past have been the Palmer River and Hodgkinson goldfields. Current producers include Fine Gold Creek mine and Mt Madden. Resources are also known at Tregoora, Belfast Hill and mining of the Cradle Creek deposit in Palmer River Field is expected in 1989.
  - The Cooktown - Annan River tinfield, now largely within the NE Queensland Rainforest World Heritage Area, was a major tin producer. Substantial tin resources are known at Collingwood. (refer Table 1).

- An operating gold mine is in production at Red Dome. A \$50 million expansion of the mine is near completion. The new development is expected to yield 600 000 oz of gold, 1.8 million oz silver, and 36 000t of copper.
- Mt Carbine has been a major tungsten producer with substantial resources still remaining and additional resources are present at Watershed Grid.
- Copper production has come from the Mt Molloy and Dianne copper mines.
- High grade silica sand is currently being mined on Cape Flattery at an annual rate of the order of 800 000t.

### **Georgetown Inlier**

- A small portion of the Georgetown Inlier occurs within the area of the peninsula as defined by the line from Normanton to Cairns. The province has had significant production of gold, base metals and tin.

The mineral potential of the individual basins is as follows:

### **Karumba Basin**

- The Karumba Basin has a high mineral potential for bauxite and kaolin in the northern part of the basin and is also an important source of groundwater. There is a low to moderate potential for heavy mineral sand deposits in fossil shorelines inland from present coastline.
  - Extensive deposits of bauxite and kaolin occur in the northern part of the basin between Vrilya Point in the north and Archer Bay in the south. The mine at Weipa is a major producer of bauxite by world standards with an annual production of 8.5 million tonnes. Exploration for offshore extension of the bauxite deposits have been inconclusive.
  - Kaolin is currently being produced at Weipa. Kaolin resources are also known at Skardon River.
  - Important groundwater sources occur in aquifers of the Bulimba Formation and Wyabba Beds.
  - Alluvial tin and gold deposits may occur in areas adjacent to pre Mesozoic rocks.
  - Sub-economic deposits of heavy mineral sands (zircon and rutile) are present in Albatross Bay at Weipa and farther south at Norman Creek.

### **Carpentaria Basin**

- The Carpentaria Basin has low to moderate potential for bauxite and kaolin, silica sand and oil shale. It is an important source of groundwater. The Weipa Sub-basin of the Carpentaria Basin is considered to have moderate potential for petroleum (McConachie, Filatoff & Senepati, 1990). It has a low potential for concealed heavy mineral deposits in fossil shorelines.

- Small deposits of bauxite and silica sand on the east coast near Escape River and Turtle Head Island.
- Hydrologically the Carpentaria Basin is the northern part of the Great Artesian Basin and has important aquifers in the Gilbert River formation, Eulo Queen Group and in the Helby Beds.
- Toolebuc Formation containing bituminous shale with interlaminated fossiliferous limestones, is present in the Carpentaria Basin south of latitude 16°S in the south-eastern part of the peninsula. It occurs at depths of up to 500m and is between 5 and 20m thick with an average thickness of about 12m. The organic content in the formation, and its 'oil shale' character, decreases northwards and limestone bands become less common, indicating changing depositional environment.
- The late Jurassic Garraway Formation and the early Cretaceous Wallumbilla Formation in the Weipa Sub-basin are considered to be moderately prospective for petroleum.

### **Olive River Basin**

- The Olive River Basin has high potential for silica sand deposits, low potential for coal and heavy mineral sand deposits.
  - High grade silica sand occurs at Shelburne Bay.
  - Coal is known to occur in the basin but exploration has not located significant deposits.
  - Exploration for heavy mineral sand in the high dunes of Shelburne Bay has not proved successful to date.

### **Laura Basin**

- There is high potential for groundwater, moderate potential for coal and low potential for gold in the Laura Basin, and high potential for groundwater.
  - Resources of non-coking coal, mineable by underground methods have been located in the basin (refer Table1).
  - Deposits of alluvial gold and platinum have been reported to occur near Laura, shedding from the Hodgkinson Fold Belt further to the south, but little mining has occurred.
  - Groundwater occurs in the Mesozoic strata of the Laura Basin.
  - Hawkins and Williams (1990) reviewed the available data pertaining to hydrocarbons and concluded that an evaluation of the petroleum potential of the Laura Basin is not possible because of the insufficient data.

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## **5 ABORIGINAL LANDS, NATIONAL PARKS AND WORLD HERITAGE AREAS**

Total area of *Aboriginal lands* in the peninsula north of the Normanton-Cairns line is about 28 000 km<sup>2</sup>.

- Extensive areas of Aboriginal lands occur along the west coast and in vicinity of areas of bauxite and kaolin potential.
- The northern end of the Coen Inlier occurs within Aboriginal lands.
- Aboriginal lands include land granted to Aboriginal communities by Deeds of Grant in Trust under the Land Act (Aboriginal and Islander Land Grants) Amendment Act 1982. Exploration and mining on these grants has to be approved by the Governor-in-Council who must consider recommendations of the trustees (usually the Community Council) before making a decision.
- Existing Aboriginal reserves are progressively being handed over to Community Councils.
- To date the negotiating process of exploration and mining proposals has not been tested extensively between the mining industry and the Community Councils.

The total onshore area of *national parks and world heritage areas* in the peninsula is roughly 21000 km<sup>2</sup>. National parks in Queensland are completely closed to mineral exploration and mining by the Mining Act, but new proposals for parks have been scrutinised by the Department of Resource Industries (DRI) to minimise conflicts with mineralised areas. By contrast, petroleum exploration and production are allowed in national parks.

- In the Coen Inlier, national parks are present at Iron Range, and north of Coen (eastern part of the Rokeby National Park). There are plans to expand both of these parks in the near future, particularly the latter to cover the southern crest of the McIllwraith Range. The other major national parks cover Mesozoic sediments of the Laura and Carpentaria basins. Smaller parks at Cape Melville and Starke include parts of the northern end of the of the Hodgkinson Fold Belt, including Permian granites. A small park covers Possession Island in Torres Strait.
- South of Laura, mineral exploration and mining are not permitted in two *Reserves for the Protection of Aboriginal Relics* (the Quinkan Reserves), but these areas are chiefly escarpments of Mesozoic sandstone of no particular mineral potential.
- There are also several multipurpose *Departmental and Official Purposes Reserves*, partly controlled by the Department of Environment and Conservation, where mineral exploration and mining are permitted subject to approval of the trustees. One such Reserve covers potentially mineralised areas at Iron Range, in rainforest adjacent to the Iron Range National Park. The Department of Mines is co-trustee, and exploration has been proceeding there over potentially mineralised areas in the McIlwraith Range.
- Areas on the *Register of the National Estate* are shown on Figure 9.

Under the Australian Heritage Commission Act 1975, an individual or an organisation may nominate areas for listing on the Register if they consider that such areas have components of the natural or cultural environment of Australia that have aesthetic, historic, scientific or social significance, or other special value for the present or future generations. Nominated areas are assessed by a Commission for Registration. Areas which are accepted by the Commission are placed on the Register after a period of at least

three months and involves an announcement of intended registration by public notice and hearing of objections. Once an area is registered, the Act provides that Commonwealth Ministers and agencies must not take any action which would adversely affect any place on the Register unless there is no other feasible alternative. The Act is not directed at the actions of State or Local Government, private owners or institutions. The Register is used as a basis for development of programs to protect, improve, and preserve properties and places forming part of the national Estate.

Two of the larger areas on the Register, outside national parks are:

- the North East Cape York area which is a coastal strip north of latitude 14°S and about 50km wide stretching to the tip of the peninsula.
- The Quinkan Country area south of Lakefield National Park.
  - the Commonwealth Government has intervened to prevent mineral exploration and mining over some lands on the National Estate register by using its foreign investment and export control powers (eg. Shelburne Bay, Fraser Island).

A brief outline on restrictions on mineral exploration and mining over the various types of reserves and parks, as presented here was prepared in consultation with staff of the DRI, Brisbane. A comprehensive account would require more time and would require input from mineral development and legal experts.

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## **6 GEOSCIENTIFIC DATA ON CAPE YORK PENINSULA HELD BY BMR AND KNOWN TO BE AVAILABLE AT MINES DEPARTMENT, QUEENSLAND**

Several regional geological surveys have been carried out in the peninsula by joint BMR/DRI teams. The major reports in which these studies have been summarised are:

- De Keyser, F, and Lucas, K.G., 1968 - Geology of the Hodgkinson and Laura Basins, north Queensland. BMR Bulletin 84.
- Smart, J., Grimes, K.G., Douth, H.F., Pinchin, J. 1980 - The Carpentaria and Karumba Basins, north Queensland. BMR Bulletin 202.
- Willmott, W.F., Whitaker, W.G., Palfreyman, W.D., Trail, D.S. 1973 - Igneous and metamorphic rocks of Cape York Peninsula and Torres Strait. BMR Bulletin 135.
- Bain, J.H.C., Withnall, I.W., Oversby, B.S., and Mackenzie, D.E. 1990 - North Queensland Proterozoic inliers and Palaeozoic igneous provinces - regional geology and mineral deposits. AusIMM Geology of Mineral Deposits of Australia and PNG.

Other BMR, GSQ and open file company reports can be located on the AESIS and GEODEX geoscience literature databases.

Information on the peninsula held by BMR on various databases include

- MINDEP - detailed data on 7 gold deposits on the peninsula.
- ROCKCHEM - geochemical and geochronological data.
- PEDIN - data on wells and geophysical surveys.

The DRI have set up several databases for the storage and retrieval of various types of geoscientific data (Table 3). The MINOCC database contains mineral occurrence information for the 1:100 000 sheets of Chillagoe, Bullock Creek and Lyndbrook. These sheets occur just south of the Normanton-Cairns line at the base of the CYP. Some of the information held on the other databases listed in Table 3 has been derived from CYP. The coverage of geological maps over the peninsula is as follows:

- 1:250 000 scale maps – the peninsula is covered by some 21 map sheets as shown in Figure 6. These maps date from 1956 when geological field surveys were started in Atherton to 1974 for Ebagoola and Coen
  - by 1988 GSQ with some BMR input had completed the remapping of the Mossman, Atherton and the southern half of Cooktown sheets on 1:100 000 scale. The final maps are yet to be published.
- Four separate 1:500 000 scale maps cover the eastern side of the peninsula.
- One 1:1 million scale geological map covers the western two thirds of the peninsula.
- Photoscale compilation sheets are available for the Mossman, Atherton and southern half of Cooktown 1:250 000 sheet areas.
- A 1:100 000 geological map for the Cairns regions was published by the GSQ in 1989.

The coverage of airborne geophysical surveys carried out by the BMR is shown in Figure 7, and some technical details are outlined in Table 2.

Digital gravity data is available for all of the peninsula.

The DRI in Brisbane also holds numerous exploration company reports on open file on microfiche. Many of these reports are listed on AESIS database system.

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## **7 AREAS OF MINERAL POTENTIAL WHICH MAY BE SUBJECTED TO CONTENTIOUS LAND USE ISSUES**

Areas of mineral potential where there may be conflicting land use issues, and where BMR may be required to provide advice are listed in decreasing order of known economic significance.

The area with the highest known mineral potential on CYP is the northern part of the Karumba Basin which has the bauxite and kaolin deposits at Weipa. Aluminous laterite, the host rock to bauxite and kaolin deposits, extends south of Weipa towards Aurukun and north to Vrilya Point (Figure 10). Aluminous laterite is also known to occur on the north-east coast at Turtle Island and Escape River in the northern part of the Carpentaria Basin.

- The economic potential of some areas of this aluminous laterite is not known to BMR and
  - the mining industry may hold data that could help in identifying those areas of laterite which may be economic in the foreseeable future.
- In regard to land use issues:
  - The known areas with aluminous laterite on the western side of CYP do not appear to be affected by proposed areas of environmental

protection and national parks (Figures 9 & 10) although some of the laterite is on Aboriginal lands.

- Some of the aluminous laterite on the north east coast of the CYP is in the North East Cape York Area which is on the Register of the National Estate (Figures 9 & 10). Some of the laterite further inland may be aluminous and occurs within the Jardine River National Park.
- BMR should ascertain from the industry and the DRI whether potentially economic resources of bauxite and kaolin are present within areas proposed for environmental protection.

Large deposits of silica sand on the east coast of CYP at Shelburne Bay which borders the Olive River Basin (Figures 1 & 10).

- Land use issues affecting various parts of this silica sand deposit are:
  - the entry of the North East Cape York Area on the Register of the National Estate. All of this sand deposit is within the estate area (Figures 9 & 10).
  - a proposal by the ACF to establish a national park over the eastern part of the deposit (Figures 2, 5 & 10).
  - the southern portion of the deposit is within a land subdivision which contains the proposed site for a spaceport (Figures 2 & 10).
- at Cape Flattery a high grade silica sand mine (Figure 1) occurs on the coast bordering the Hodgkinson Fold Belt. It has an annual production of about 800 000t, most of which is exported to Japan.
  - On the available information, this sand deposit is not subject to conflicting land use issues even though it adjoins the Great Barrier Reef World Heritage Area.
  - BMR should consult the industry and DRI to identify areas of high grade silica sand resources which may be affected by proposals for environmental protection and other land use issues.

The Coen Inlier north of the Coen township has potential for gold, silver and base metal deposits. However, the area is also subject to conflicting land use issues where BMR is likely to be required to provide advice on mineral potential.

- Parts of this area are under Aboriginal lands, national parks and some parts of the area are subject to proposals for environmental protection by the ACF (Figures 1, 5).
- About three quarters of the area is within the North East Cape Area on the Register of the National Estate (Figure 9).
- The northern tip of the inlier is within a land subdivision which contains the proposed site for the spaceport.

The Cape York-Oriomo Inlier has potential for gold, silver, tin, tungsten and base metals. BMR will probably be required to provide advice on the mineral potential of this area as:

- parts of the area are under Aboriginal lands, and are subject to proposals for additional environmental protection (Figures 2, 5 & 10).

- part of the area is within the North East Cape York Area on the Register of the National Estate (Figures 9 & 10).

In other parts of the CYP which are outside the areas of mineral potential with conflicting land use issues and which are away from obvious known mineral resources.

- BMR will need to upgrade its database on the mineral potential of the remaining areas of CYP in order to respond to any new areas of conflicting land use issues.

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TABLE 1 MINERAL DEPOSITS AND MINES (CURRENT AND PAST PRODUCERS)  
IN CAPE YORK PENINSULA

Name	Type of Deposit	Commodity	Recorded production years of main production and resources
<b>Cape York - Oriomo Inlier</b>			
Horn Island	Mineralisation in quartz filled tensional veins in altered porphyritic granite and granodiorite.	Au, Ag	Production commenced in mid 1988, production anticipated in excess of 1244 kg per annum. Mine closed in December 1989.
<b>Coen Inlier</b>			
Wenlock goldfield	Alluvial; deep leads in Mesozoic sediments; qz reef in granite.	Au	1459 kg Au bullion produced during 1892 - 1966 (spasmodic)
Coen goldfield	Qz reefs in shear zone in granite; alluvial.	Au	2333kg Au bullion produced during 1876 - 1910
Ebagoola (Hamilton goldfield)	Qz reefs along granite-metamorphic contact; alluvial	Au	2292 kg Au bullion produced during 1900 - 1921
Wolverton	Alluvial shed from small cassiterite bearing quartz veins in granite.	Sn	A resource of $34.1 \times 10^6 \text{ m}^3$ at $1.13 \text{ kg SnO}_2/\text{m}^3$
Iron Range	Magnetite and hematite in schist and quartzite	Fe, minor Au	A resource of 1Mt at 54 to 62% Fe. Gold occurrences currently under investigation
<b>Hodgkinson Fold Belt</b>			
Cooktown - Annan River tin field	Qz tourmaline veins in granite; disseminated cassiterite in argillised granite; alluvial deposits	Sn	Past production totalled 14 000t of cassiterite concentrate
Starcke goldfield	Slate belt-type qz reefs in flysch-type sediments; alluvial	Au	About 440 kg Au produced during 1890-1908
Palmer River - Maytown goldfield	Alluvial; slate belt-type qz reefs in flysch-type sediments	Au	>41,500 kg Au produced during 1873-1891

Name	Type of Deposit	Commodity	Recorded production years of main production and resources
Dianne	Volcanogenic massive sulphide (Besshi, Kieslager or Cyprus-type)	Cu, Ag	About 15,500 t Cu and 1000 kg Ag produced during 1980-1983
Cannibal Creek prospect	Chert-hosted metamorphic vein or disseminated Au in siliceous exhalites associated with mafic volcanics	Au	Minor alluvial production
Fine Gold Creek	Gold in chert horizon and very thin quartz reefs	Au	Proved 4.6 million loose cubic metres (lcm) at 0.6gm/lcm; probable 3.4 million lcm at 0.42 gm/lcm; indicated 9.75 lcm at 0.33-0.5g/lcm Produced 338.3 kg Au in 1987/88.
Mt Madden	Gold in alluvial and eluvial material	Au	Produced 106.15 kg Au in 1987/88
Mitchell River	Slate belt-type qz reefs in flysch-type sediments	Au	Minor production
Tregoora	Gold and stibnite in shear zone	Au, Sb	460,000t at 3.3 gm/t (resource)
Belfast Hill	Gold in shear zone and quartz stockwork	Au	700,000t at 1.9 g/t (resource)
Cradle Creek	Gold in quartz veins in crests of anticlines	Au	A resource of 600,000t to 750,000 cum at 0.6 cum.
Normanby River		Au	A resource of 867,000 lcm at 0.37 gm/lcm Production anticipated in 1989
OK	Volcanogenic massive sulphide (Besshi, Kieslager or Cyprus-type)	Cu	7800 t Cu produced during 1902-1912
Mount Molloy	Volcanogenic massive sulphide (Besshi, Kieslager or Cyprus-type)	Cu	>3870 t Cu produced during 1903-1910

Name	Type of Deposit	Commodity	Recorded production years of main production and resources
Collingwood	Sheeted vein system below a Greisen zone	Sn	4Mt at 0.7% Sn (resource)
Jeannie River	Stockwork	Sn	1-2Mt at 1% Sn (resource)
Baalgammon Cu and Sn prospect	Stockwork replacement in porphyry dyke	Cu, Sn, Ag, In	3Mt of 1.2%Cu, 50g/t Indium 46g/t Ag, 0.3% Sn
China Camp	Alluvial deposit	Sn	0.57Mm <sup>3</sup> at 1.2kg/m <sup>3</sup> cassiterite (resource)
Mt Carbine	Sheeted qtz veins in meta-sediments at granite contact.	WO <sub>3</sub>	Past production 13 650t WO <sub>3</sub> Resources at 9Mt at 0.1% <sup>3</sup> WO <sub>3</sub>
Watershed Prospect	Calc-silicate hosted skarn type	WO <sub>3</sub>	14mt at 0.3% WO <sub>3</sub> <sup>3</sup> (resource)
Thornborough - Kingsborough (Hodgkinson goldfield)	Slate belt-type qz reefs in sediments; alluvial	Au, Sb	About 9000 Kg Au and 3150t Sb produced during 1875-1882
Red dome	Mineralisation in feldspar porphyry and associated skarn	Au, Cu, Ag	1474.16kg Au produced in six months to 31.12.88
Cape Flattery		Silica	200Mt silica sand resource with an annual production of about 800 000t
Georgetown Inlier	A wide variety of mineral deposits include Qz reefs in granite and metamorphic contact rocks, stratabound massive sulphide deposits, and deposits associated with felsic volcanism.	Au, Cu, Pb, Zn, Ag, Sn, Sb, WO <sub>3</sub> , Mo Bi, Fe, Mn	The bulk of mineral production is from the Georgetown Inlier to the south of the peninsula
Karumba Basin			
Weipa		Bauxite	About 4000Mt bauxite resource with an annual production of about 8.5Mt

Name	Type of Deposit	Commodity	Recorded production years of main production and resources
		Kaolin	23.5Mt kaolin resource with an annual production of about 100 000t
Aurukun		Bauxite	About 300Mt mineable resource
Wenlock River		Bauxite	About 75Mt subeconomic resource
Skardon River		Kaolin	27Mt kaolin resource at 32% Kaolin at less than 2 micron
Olive River Basin			
Shelburne Bay		Silica	About 200Mt of silica resource
Laura Basin			
Bathurst Range		non-coking coal	15Mt underground mining resource

**Table 2 BMR Airborne Geophysical Surveys**

Survey No	Date	Line Spacing (km)	Height (metres above ground level)	Type	Digital
520	1986	1.5	150	M,R.	Yes
521	1986	1.5	150	M,R.	Yes
522	1986	1.5	150	M,R.	Yes
485	1982-84	1.5	150	M,R.	Yes
484	1982-84	1.5	150	M,R.	Yes
402	1973	1.5, 3.0, 6	150	M,R. <sup>2</sup>	Yes
410	1974	3, 6	150	M,R.	Yes
367	1969	1.6	250	M,R.	3
479	1982	1.5	150 <sup>4</sup>	M,R.	Yes

1 M = Magnetic, R = Radiometric

2 except Cape Melville - no radiometric

3 digital magnetic data - no digital radiometric

4 1500m above sea level for INNISFAIL

**TABLE 3: GEOSCIENCE DATA BASES  
HELD BY DRI (note: only some of the  
data is relevant to CYP)**

Name	Content	Status
Regional Mapping Field Data Management System (REGMAP)	Geological field observation data comprising location, rock class, lithology, structure, direction, remarks and sketches	Operating. Contains 21 200 field points, some of which are in CYP
Mineral Occurrence Data Management System (MINOCC)	Mines, prospects and other mineral occurrences (location, status, commodity, geological setting, deposit characteristics, ore mineralogy, exploration, production)	Operating. Contains 4100 occurrences some of which are in CYP
Queensland Energy Resourced Data Base (QERDB)	Data from petroleum wells (1270), stratigraphic bores (354), coal exploration bores (150) and water bores (170) comprising location, staus, hydrocarbons, drill stem tests, analytical reports and geological formations	Operating. Contains 1944 wells and bores some of which are in CYP
Groundwater Data Base	Bore details, chemical analyses, stratigraphic data	Operating. Contains 14 500 bores
Geophysical Survey	Data	
- SEISSURV	Inventory of seismic reflection surveys (date, line kilometres, company report reference)	Operating. Contains approx. 790 surveys
- SURVMAP	Relates seismic surveys to 1:000 000 sheets	Operating. Contains approx. 790 surveys
- LINDAT	Inventory of seismic line sections and shot point maps	Operating. Contains approx. 31 000 sections
-SPLOC	Shot point locations by Lat./Long. for each seismic survey	All four data bases are being integrated into one petroleum exploration geophysical data base
Aerial Geophysical Surveys Queensland (AGSQ)	Inventory of analogue and digital data from aerial geophysical surveys of Authorities to Prospect (mainly mineral)	Operating. Contains approx. 400 surveys
Earthquake Data Base	Earthquakes recorded by reservoir-induced seismic monitoring networks in eastern Queensland	Operating. Contains 1300 records

**TABLE 4. LIST OF AREAS INCLUDED ON THE REGISTER OF THE  
NATIONAL ESTATE FOR THEIR NATURAL, HISTORIC OR  
ABORIGINAL VALUES**

4/6/270/3	North-East Cape York
4/6/270/1	Quinkan Country
4/6/270/2	Archer River Bend National Park
4/6/270/4	Bathurst Bay Area
4/6/270/11	Melville National Park
4/6/270/5	Weipa Shell Mounds Area
4/6/270/26	Koolburra Aboriginal Sites
4/6/270/27	St George River Aboriginal Sites
4/6/270/10	Mt Webb National Park
4/6/270/12	Starcke National Park
4/6/270/13	Possession Island National Park
4/6/270/15	Lakefield National Park
4/6/270/16	Palmer River Goldfield - Four Deep Mines
4/7/281/5	Mitchell and Alice Rivers National Park
4/6/258/13	Staaten River National Park

NB Several other areas which have been nominated for inclusion on the Register await evaluation. These include the Rokeby-Croll National Park (adjacent to Archer River Bend NP) and the Holroyd River - Edward River Area.

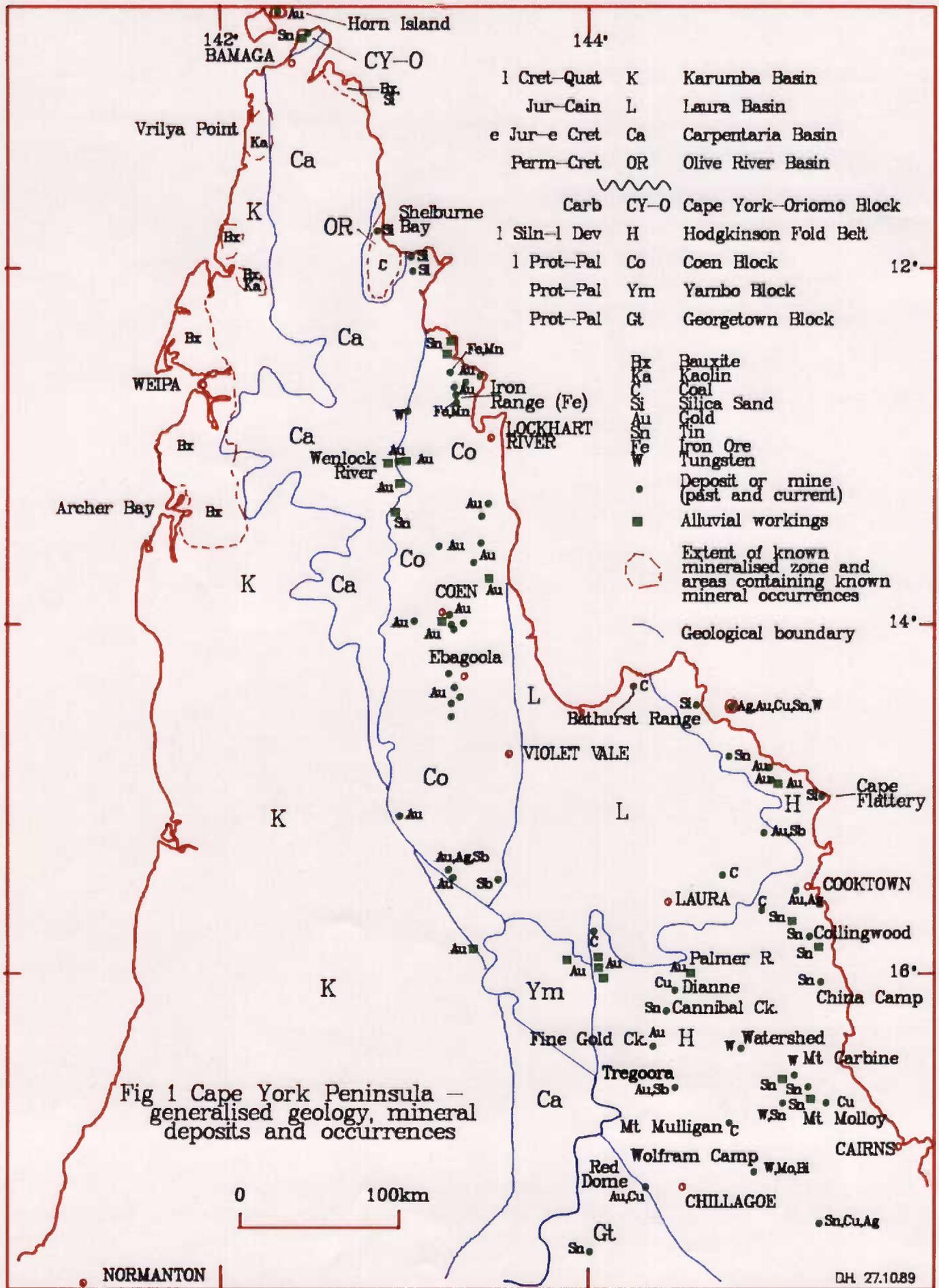


Fig 1 Cape York Peninsula - generalised geology, mineral deposits and occurrences

0 100km

NORMANTON

DH 27.10.89



\*R9107402\*

142°

144°

FIG 2 ABORIGINAL LANDS, NATIONAL PARKS, AND WORLD HERITAGE AREAS

12°

Proposed spaceport to be located within this area

Iron Range

National Parks and World Heritage Areas

Aboriginal Lands

Additional reserves, national parks and 'areas of interest' as proposed by the Australian Conservation Foundation in 1976

Proposed spaceport to be located within this area

Basin and inlier boundaries 14°

Rokeby

Cape Melville

Staroka

COOKTOWN

Lakefield

Mitchell & Alice Rivers

16°

Wet Tropics World Heritage Area

PORT DOUGLAS

CAIRNS

Staaten River

CHILLAGOE

0 100km

Main Sources: AUSLIG 1:5,000,000 map series - Aboriginal Land and Population (1988, 2nd edn); Nature Conservation Reserves (1983, 3rd edn).

Note: Great Barrier Reef World Heritage Area not shown

Areas on the Register of the National Estate are shown on Figure 9.

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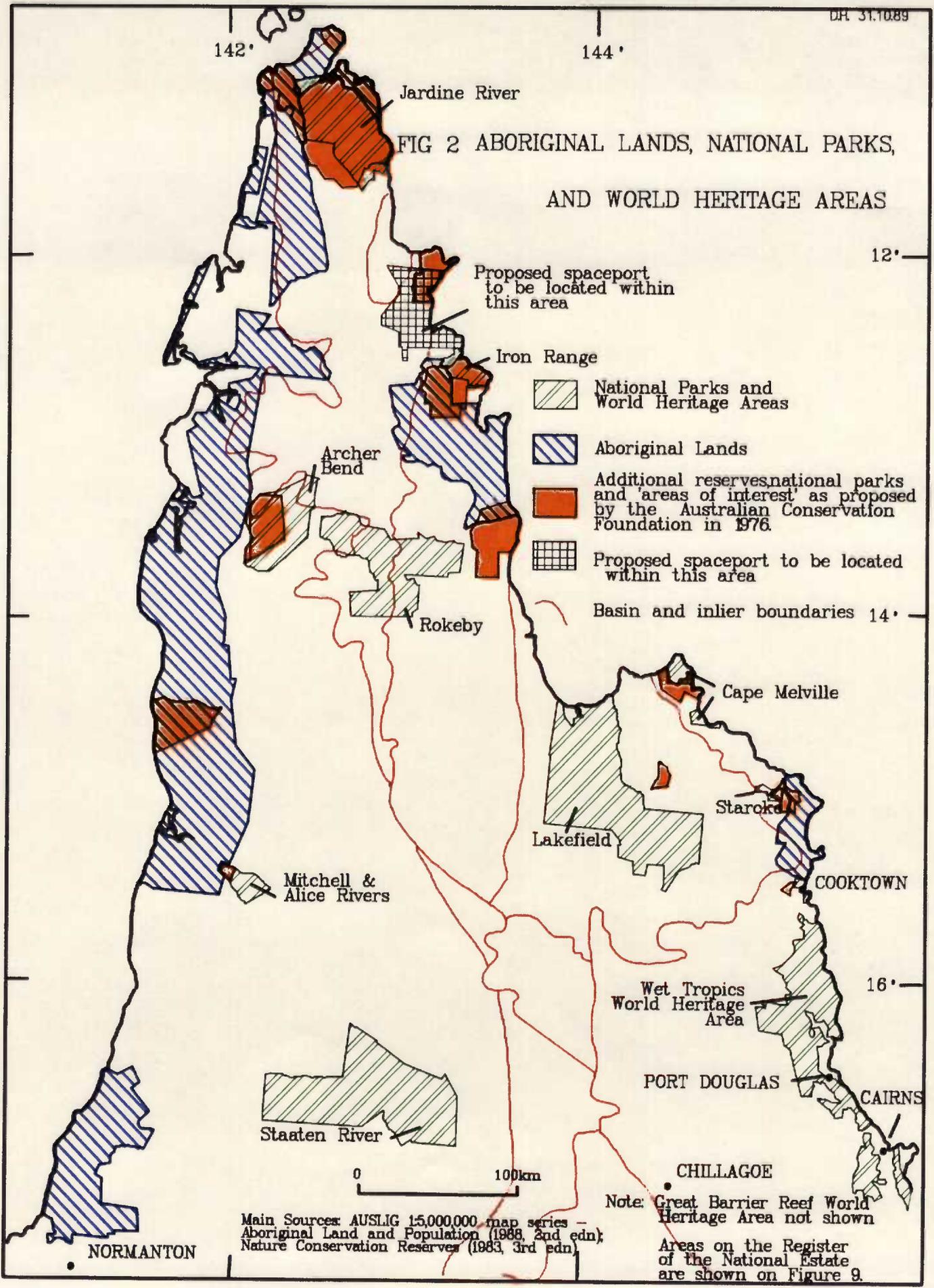


FIG 3 GEOLOGICAL PROVINCES IN THE BASEMENT ROCKS WITH POTENTIAL TYPES OF MINERALISATION

(After Bain et al (1990))

LEGEND

POSSIBLE TYPES OF MINERALISATION

- 
 Permian-Carboniferous Province  
 Sn(W,Mo,Bi) -vein,pipe,greissen,  
 skarn as in Cooktown-Annan  
 River, Herberton Au-breccia pipe  
 (Kidston) Au(Ag,Cu,Zn) calc-silicate  
 skarn (Red Dome) U(F,Mo) deposits  
 associated with felsic volcanism  
 (Ben Lomond, Maureen)
- 
 Shurian-Devonian Plutonic Belt  
 mesothermal qtz veins of the  
 Charters Towers type Au,Ag(Cu,Pb,Zn)
- 
 Pre-Cambrian Province  
 stratabound/stratiform deposits  
 Cu,Pb,Zn(Ag,Au) massive sulphides  
 Fe,Mn(Au) iron manganese
- 
 Geological provinces  
 concealed by younger  
 rocks

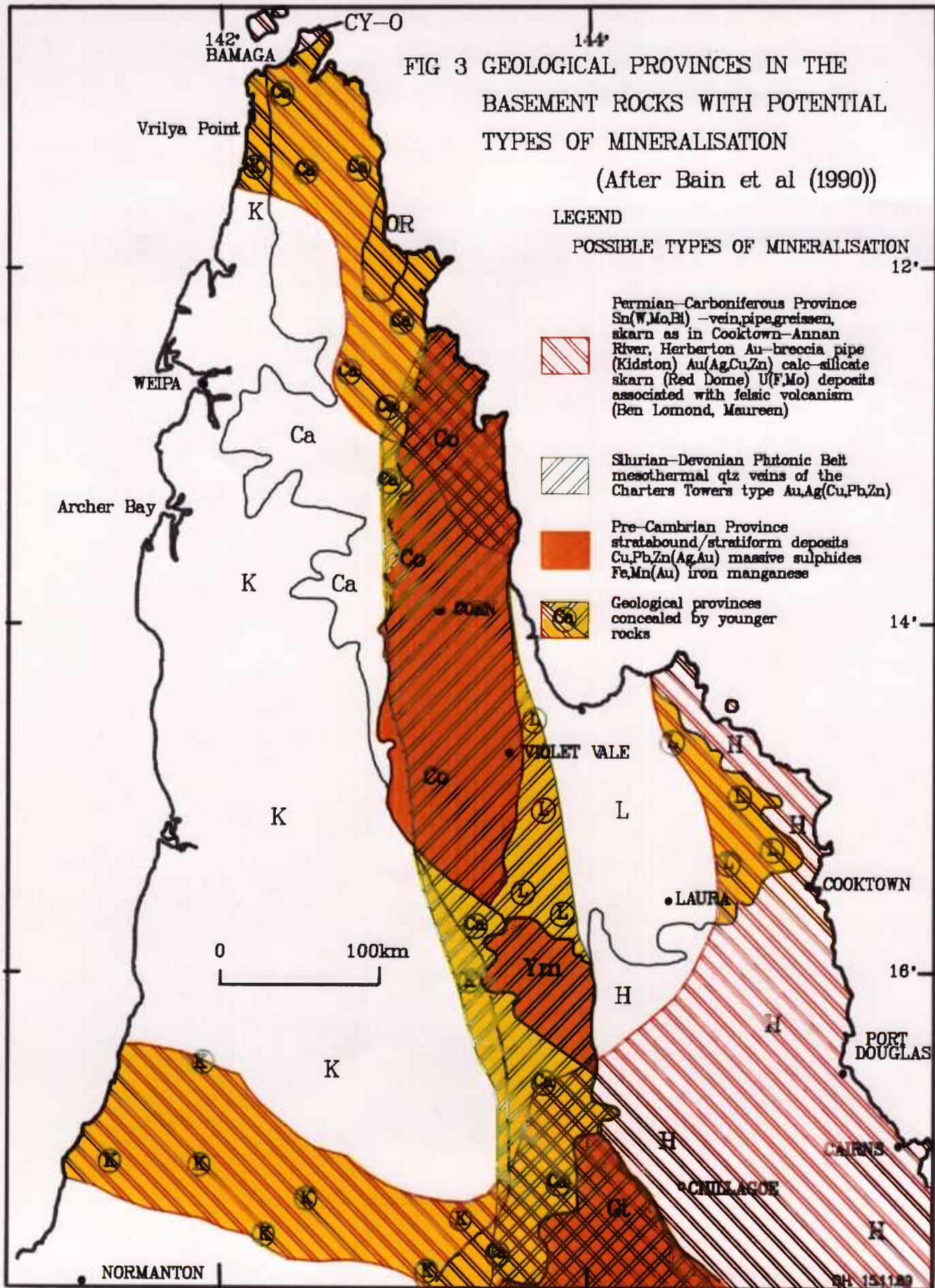
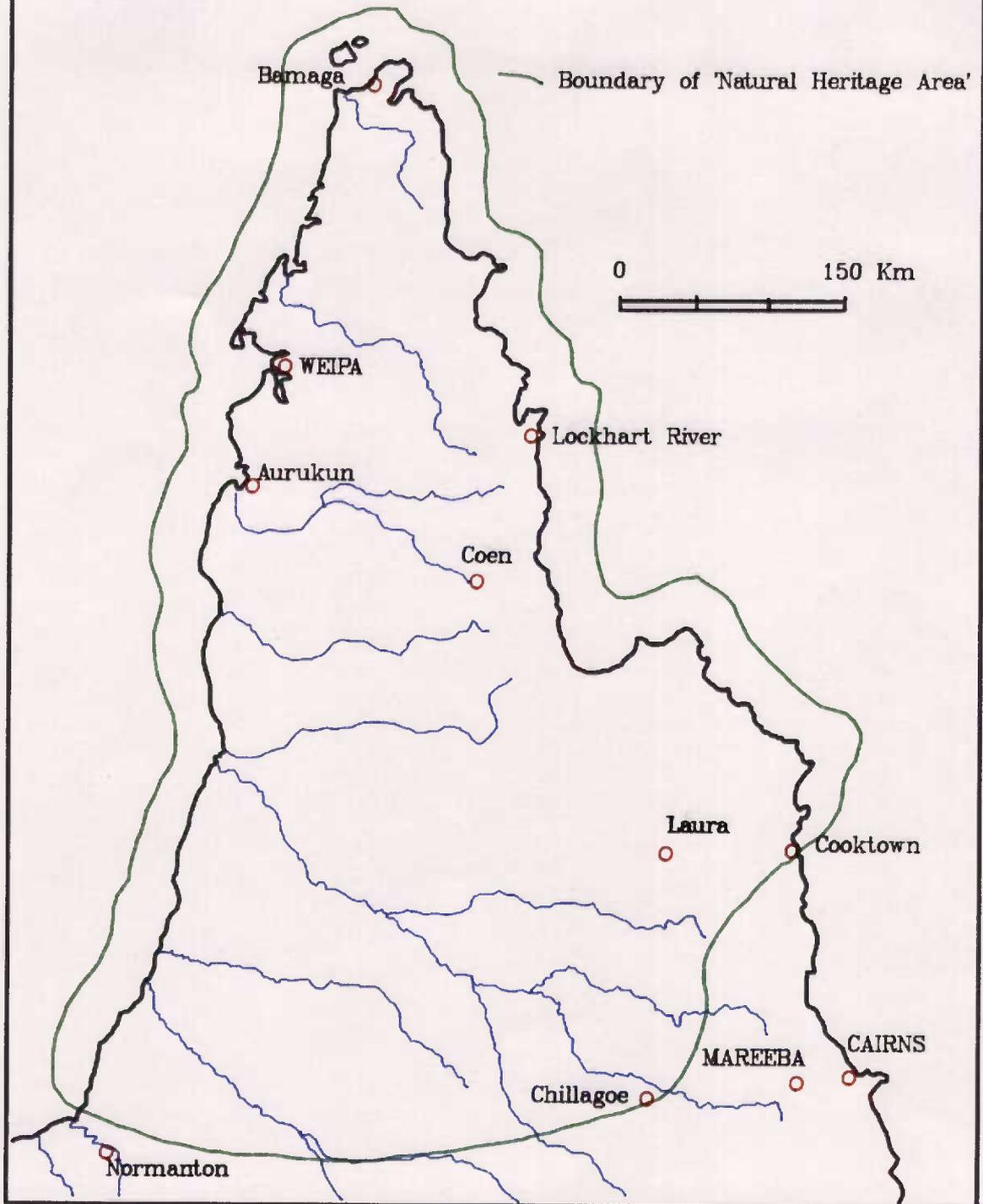
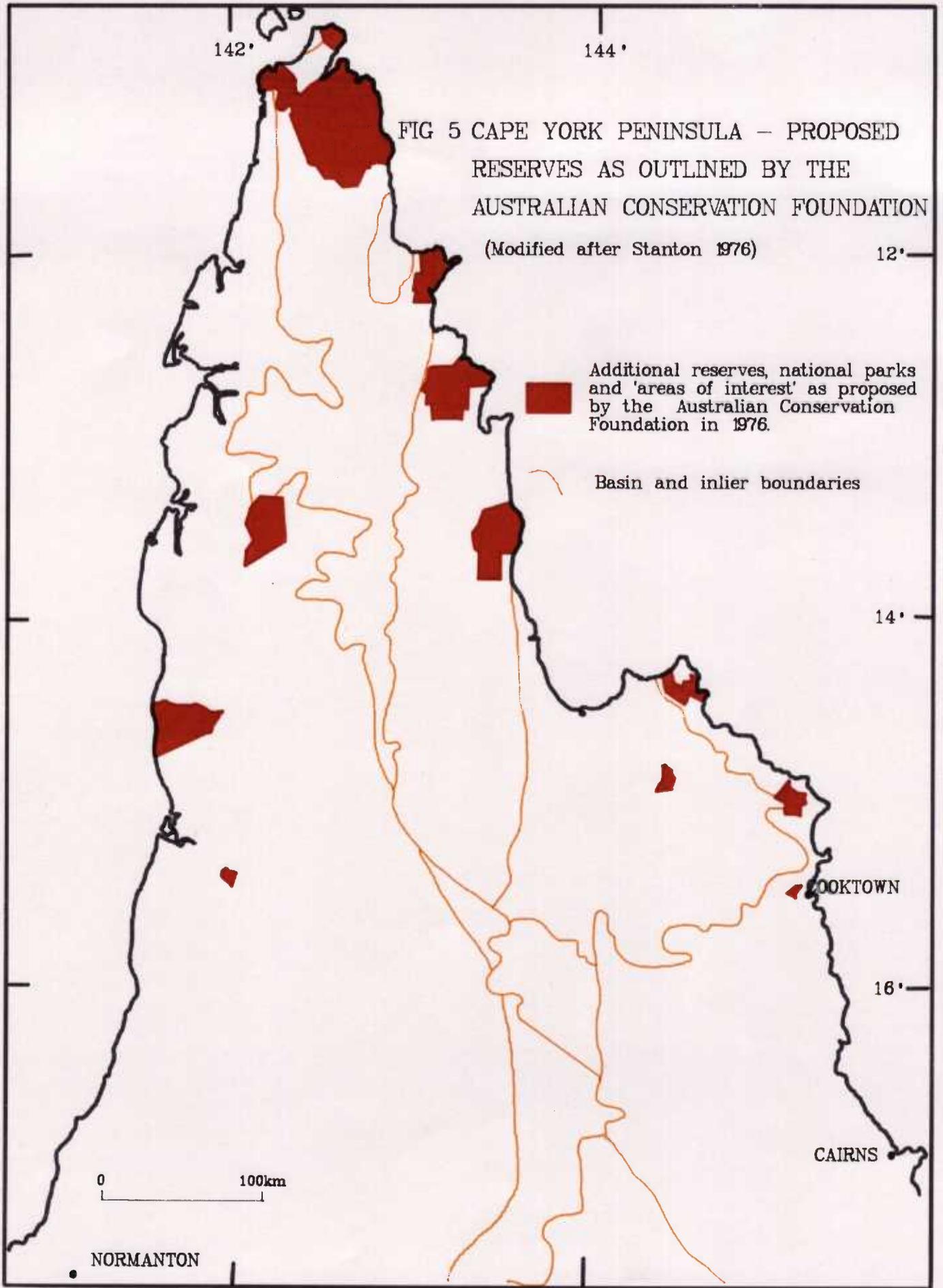
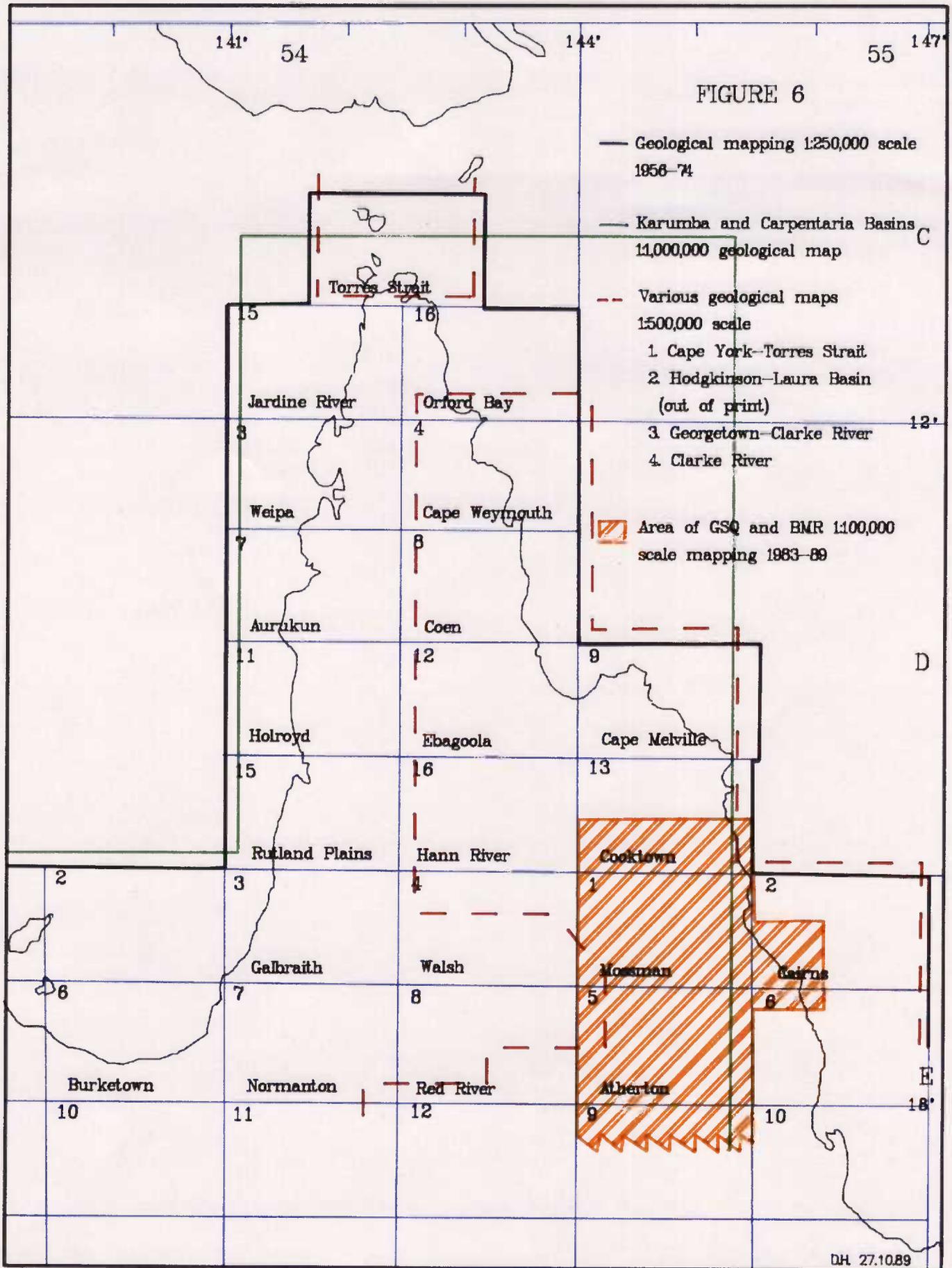
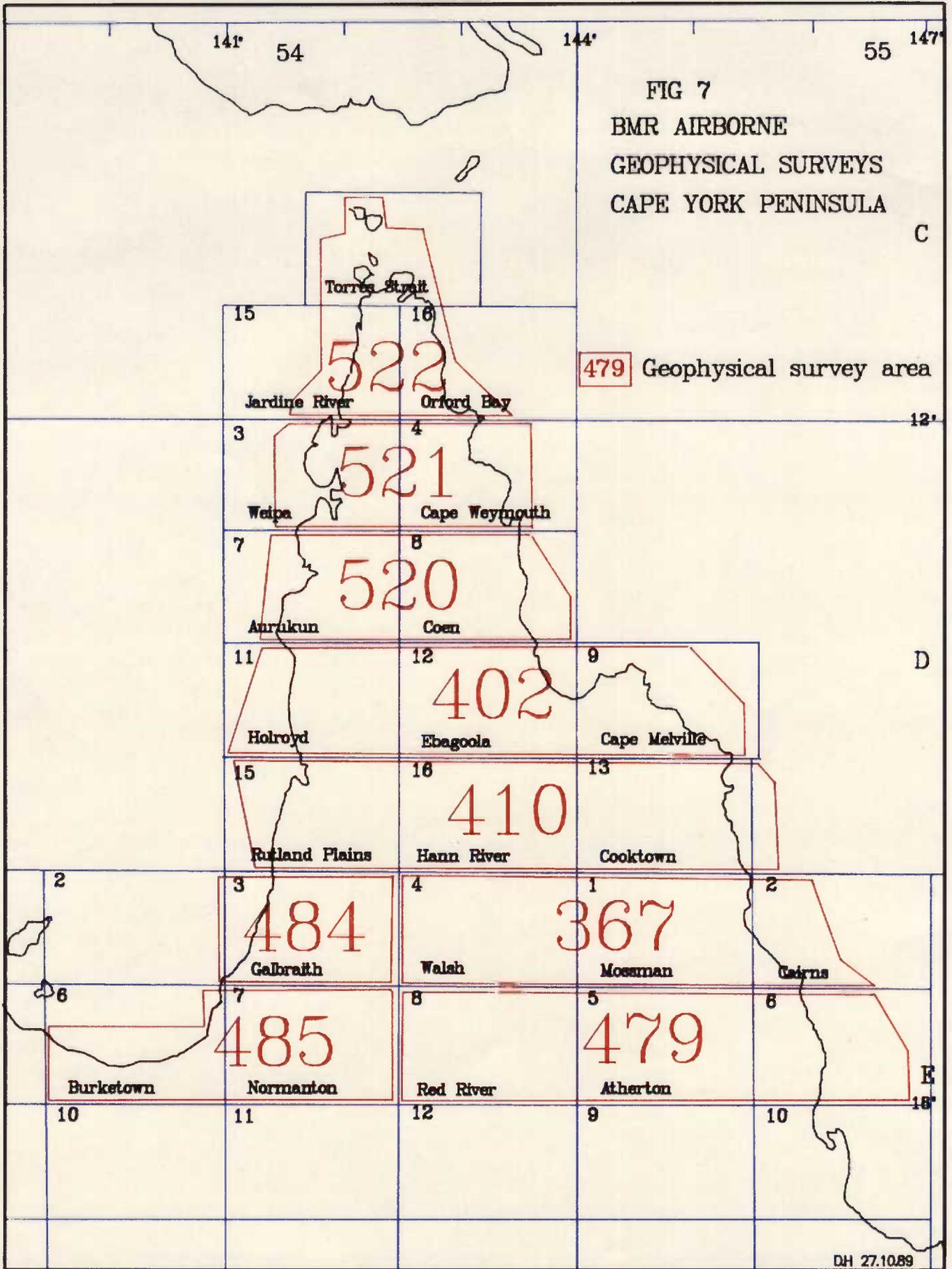


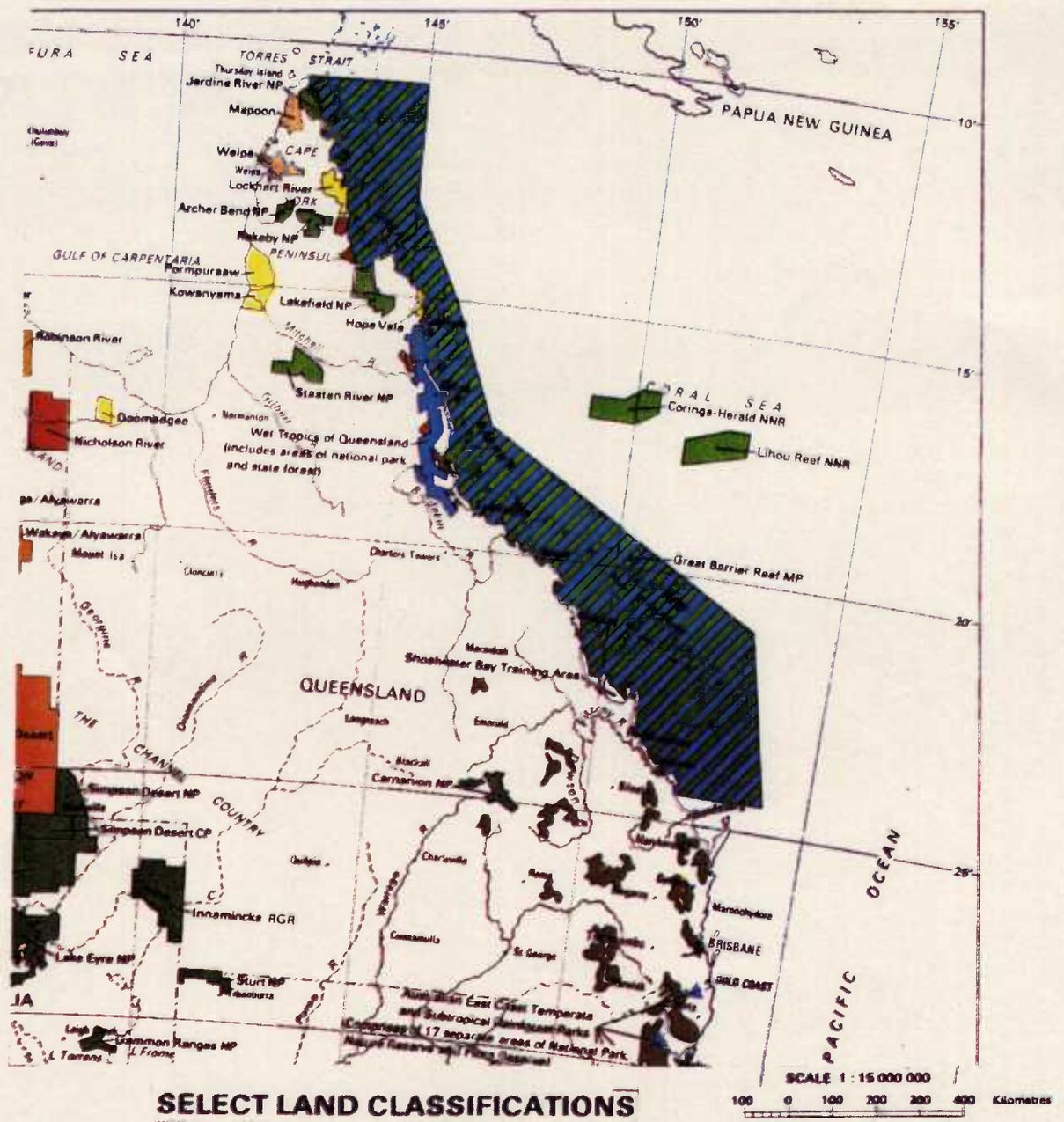
FIGURE 4 - NATURAL HERITAGE AREA ('OF INTERNATIONAL SIGNIFICANCE')  
AS OUTLINED BY AUSTRALIAN CONSERVATION FOUNDATION  
(modified after HUTTON 1981)











NOTE: Where two classifications apply to an area their colours are shown as striped.

Figure 8 – Areas of 100,000 hectares or more to which special land use/access conditions may apply (modified after Australian Surveying and Land Information Group 'AUSMAP' series CSU 89/004.6).

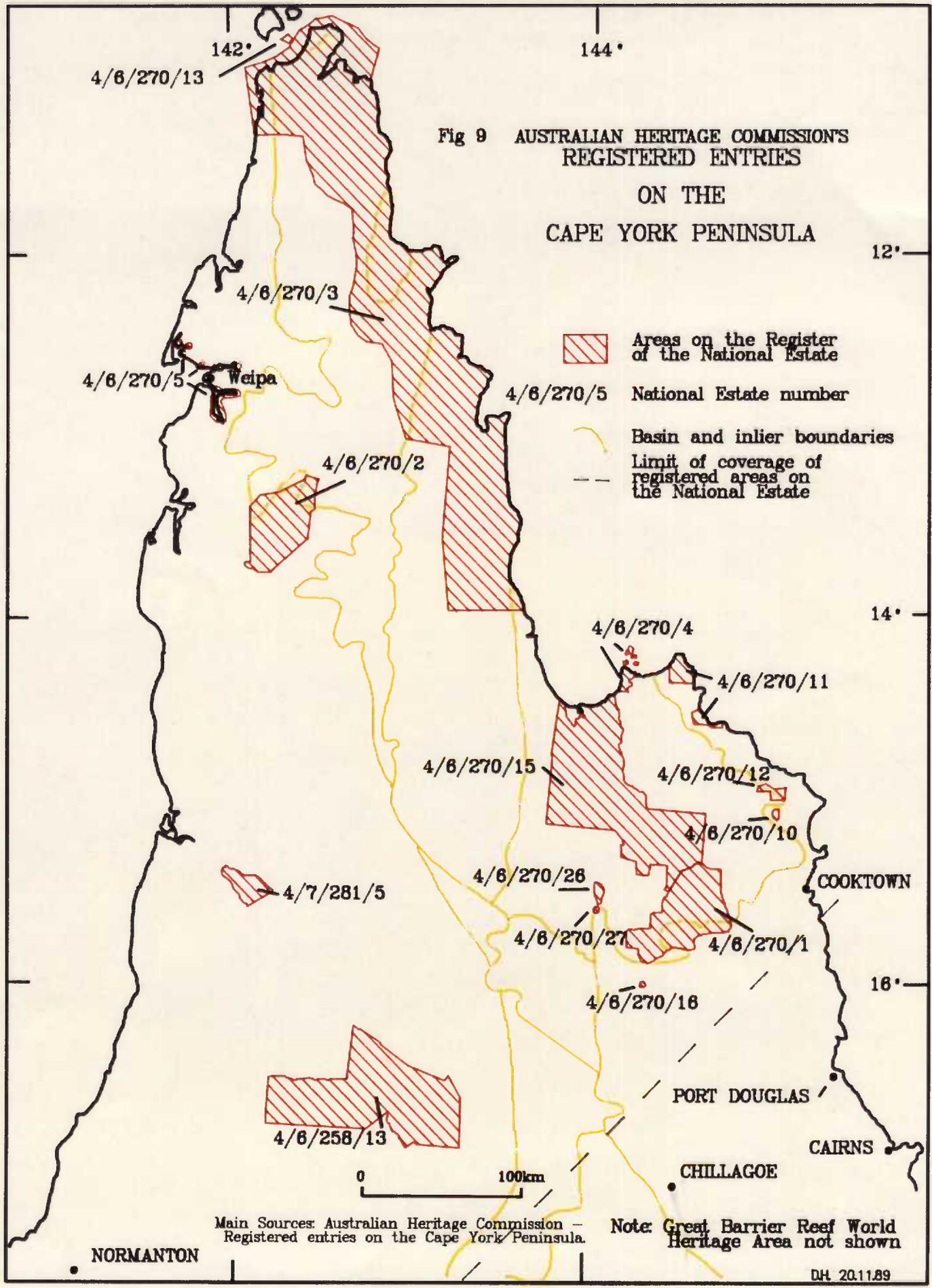


Fig 9 AUSTRALIAN HERITAGE COMMISSION'S REGISTERED ENTRIES ON THE CAPE YORK PENINSULA

-  Areas on the Register of the National Estate
-  National Estate number
-  Basin and inlier boundaries
-  Limit of coverage of registered areas on the National Estate

Main Sources: Australian Heritage Commission - Registered entries on the Cape York Peninsula. Note: Great Barrier Reef World Heritage Area not shown

