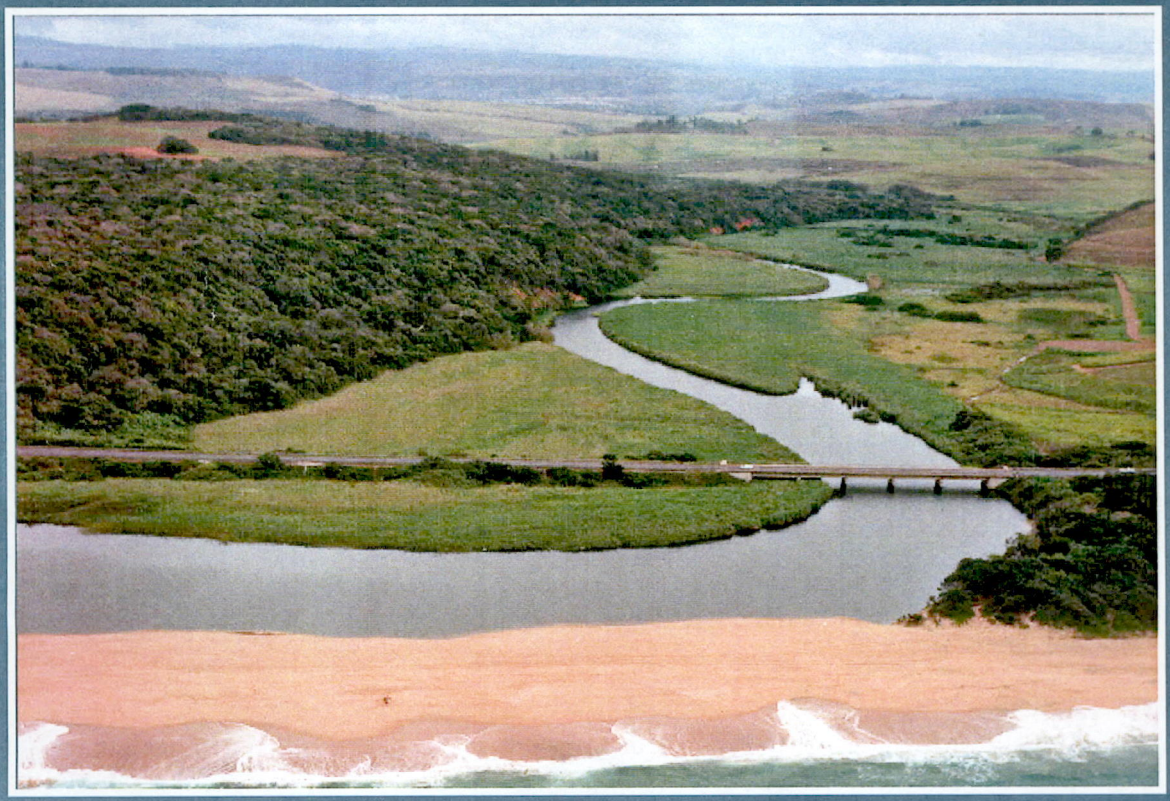

Estuarine Vegetation

Durban Metropolitan Area

Step Report 1996

East
Coast
Programme
CSIR

A QUALITATIVE STUDY OF THE VEGETATION OF THE ESTUARIES OF THE DURBAN METROPOLITAN AREA

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A QUALITATIVE STUDY OF THE VEGETATION OF THE ESTUARIES OF THE DURBAN METROPOLITAN AREA

1. BACKGROUND AND OBJECTIVES

The population pressure along the coastal strip of KwaZulu-Natal in particular within the Durban Metropolitan Area (DMA) is increasing rapidly. The resulting development within this area as well as impacts further upsteam of river systems threaten the estuarine resources within this region. The management of estuaries is crucial to the conservation of biodiversity and the preservation of the functioning of these systems as nursery areas for marine species. In addition the maintenance of natural areas is vital to tourism , an important economic activity in the region.

The Durban Metropolitan Council has recently completed the first phase of a comprehensive state of the environment study of the DMA in order to promote and plan for sustainable development of the region. The East Coast Programme has consequently accumulated several data sets on various environmental issues pertaining to the region. Information on the estuarine vegetation resources will be of value for decision support in the management of the estuaries and consequently, the environmental sustainability of the region.

The aims of this project were to review existing data on the estuarine vegetation and broadly assess the present state of the vegetion of the estuaries within the DMA. The project was also intended to provide training (for author) on interpretation of vegetation communities from arial photography.

2. METHODS

A infomation review of vegetation studies for the nine estuaries within the DMA was undertaken. Description of the types of communities present in these systems was then undertaken by

interpretation of 1994 arial photography. This interpretation was undertaken with the assistance of Geoff Nichols of Nichols Consulting Services as he has an excellent knowledge of the fauna and flora of the region. The vegetation types were then plotted on the relevant orthophotographs from where the information was digitized by Mike Webster of the East Coast Programme. Field varification at this stage was essentially to provide a qualitative assessment of the "health" of the estuarine communities. It is envisaged that details of species composition and refinement of the present classification will be undertaken in subsequent studies. At this stage only broad catagories of community types were utilized.

3. PREVIOUS STUDIES

Begg (1978; 1984) briefly described the flora of the estuaries of Natal. This study indicated that owing to changes in mouth characteristics the flora of most systems had altered with time from the original condition especially in catchments with major disturbances upstream. Poor catchment practices particularly agricultural encroachment onto the flood plain had resulted in estuarine siltation and changes in mouth dynamics. For example, the draining of the large swamp area at the head of the Umhlanga lagoon for sugar farming (Wager, 1976) led to siltation and subsequent proliferation of reeds as inflow of tidal water was reduced.

Ward (1980) mapped the vegetation of the Isipingo Beach Area at a scale of 1:10 000 and the study included the Isipingo and the Umbokodweni estuaries. The study identified 20 different communities, including disturbed catagories, and provided detail of characteristic species and the likely seral succession to the development of each community. An annotated checklist of plants was also provided for the area. While this was one of the most comprehensive botanical studies undertaken in the Durban area it was largely based on field work undertaken in 1949 and 1950 many changes have subsequently occurred.

The mangrove swamps at Beachwood has been extensively studied by the Universities of Natal and Durban-Westville. However, many of these studies were on plant physiology and nutrient cycling. Nonetheless, the plant community of this area which is controlled by the Natal Parks Board is relatively well known and is an important resource in terms of its educational value. The conservation of this unique habitat is vital as this community is regarded as rare along our coastline. The small relict of the original Durban Bay mangrove community requires similar protection.

Mapping of the coastal vegetation of KwaZulu-Natal from Umhlanga northwards was undertaken by Ematek, CSIR for the Natal Town and Regional Planning Commission (TRP, 1995). The mapping units were largely determined through interpretation of 1990 colour arial photography but field varification was undertaken where necessary. The mapping included a rating of the conservation importance of the various communities. The catagories were high, medium, low and neglible. This is an extremely valuable data set and may be used as a basis for areas requiring more detailed botanical survey.

4. VEGETATION OF THE DMA ESTUARIES

4.1. General

Major tranformations of the vegetation in these regions began with the advent of urban and agricultural development in the mid 1800's. Mangrove and swamp forests trees were cut down for timber. Subseqent draining of many areas led to the destruction of most swamp forests. Agricultural development has led to the siltation of estuaries. The development and expansion of Durban and changes to the Umgeni mouth has led to large scale destruction of the extensive mangrove communities in this area. Today this community is restricted to the Beachwood Nature Reserve and the small relict population in the bay. Similarly, this community in Isipingo has been reduced through development pressure.

In general, the vegetation of the estuaries to the north of the city centre are in a relatively better condition today. However, the encroachment of sugar plantations onto the floodplains further upstream is still an unacceptable practice. The hotel at Isipingo has encroached onto the mangrove and fringing *Hibicus tiliaceus* communities and adequate management of these rare community types is becoming increasingly urgent. In addition, urban and industrial development in all catchments has led to deterioration in estuarine water quality which threatens the biodiversity of these systems.

4.2. The Tongati

The estuarine flood plain at the Tongati (figs. 1a and 1b) is dominated by reedswamp (*Phragmites mauritianus*) and a mosaic of reedswamp and *Barringtonia racemosa* communities. The Ematek study identified this latter community as swamp forest (fig 10). Dune thicket occurs along the coastline to the north and south of the estuary. Landward of the dune thicket to the south of the estuary is a good stand of mature coastal forest. Further upsteam there is a belt of riverine vegetation separating the canefields from the water. It is vital that this belt be maintained and any agricultural encroachment be prevented to provide some protection of the water quality downstream.

4.3. The Mdloti

A fairly extensive reedswamp community occurrs on the north bank of the Mdloti estuary (figs. 2a and 2b). Patches of *Barringtonia racemosa* communites occur at the mouth of the north bank and along the south bank in the vicinity of the N2 freeway. The Ematek study identified these communities as swamp forest (fig. 11). Dune thicket occurs along the coast to the north and south of the estuary. A fairly narrow belt of riverine vegetation occurs upsteam to estuary preventing agricultural encroachment onto the stream bank.

4.4. The Mhlanga

Past history of siltation in this catchment has led to the development of extensive *Phragmites mauritianus* reedswamp communities (figs 3a , 3b and 12). This is the largest reedswamp community within the metro and occurs along both banks and a long arm exetend southwards beyond the primary coastal dune. *Jucus krausii* salt marsh is common in the more saline areas. *Barringtonia racemosa* communities occurs interspersed amongst the reedswamp areas and fringe the river further upstream. A belt of dune thicket extends southwards and northwards on the foreshore dunes. Beyond the dune thicket and reedswamp in the south is the mature coastal forest known as the Hawaan forest that has been protected over a long period of time. The conservation of this community type is extremely important as it is not typical of remaining coastal forest communities in that the dominant species include *Cola natalensis* and *Cavacoa aurea* as apposed to the red milkwoods, Mimusops caffra. The coastal forest on the north bank, the Umhlanga Forest, has a different species composition with red milkwoods dominating.

4.5. The Mgeni

As noted earlier the mouth of Mgeni was originally characterised by extensive mangrove swamps that disappeared with the development and expansion of the city. To the north of the Umgeni mouth the protected Beachwood Nature Reserve (figs. 4a and 4b) has resulted in conservation of the remaining mangrove community covering an area of about 2km^2. All three of the Natal mangroves viz., the black mangrove, Bruguiera gymnorrhiza; the red mangrove, Rhizophora mucronata and the white mangrove, Avicennia marina are found at Beachwood. Tidal exchange to the swamp is provided via the beachwood creek. A relict population of mangroves occurs in the Durban Bay. The vegetation upsteam of the estuary has been disturbed and the river is canalized further upstream.

4.6. The Sipingo

The only other location of mangove swamps within the DMA occur along the Sipingo estuary and lagoon (figs. 5a and 5b). This is the only estuary with an extensive lagoon besides the Mhlanga and this community is of great conservation significance. Hibicus tiliaceus communities fringe the mangrove communities and some Juncus krausii salt marsh occurs to the west. Upstream of the estuary the vegetation is highly disturbed and development along the coast has distroyed dune and coastal forest vegetation.

4.7. The Mbokodweni

This estuary is surrounded by development and no natural communities of significance occur (figs 6a and 6b). Upsteam the riverine fringe is also highly disturbed. Dune thicket occurs along the coast to the north and south of the estuary.

4.8. The Manzimtoti

No estuarine communites of significance remain in this system due to urban development (figs. 7a and 7b). A fringe of riverine vegetation occurs upstream and and dune thicket occurs along the coast to the south of the estuary.

4.9. The Little Toti

Urban development has resulted in little estuarine vegetation of significance occurring in this system (figs. 8a and 8b). Some *Phragmites* reeds occur and the upper reaches consists of alien infested vegetation along the river. A narrow strip of dune thicket occurs further to the north and south of the estuary.

4.10. The Lovu

A *Phragmites mauritianus* reedswamp community occurs along the north bank of the estuary (figs. 9a and 9b). Upstream a fringe of riverine vegetation occurs along the stream. The coastal vegetation surrounding this on the north and south sides are disturbed and alien infested. Dune thicket occurs along the coast on either side of the estuary. Further upstream the area is characterisee by agricultural development.

5. DISCUSSION

This study has provided a broad classification and qualitative assessment of the "health" of the vegetation of the estuaries of the DMA. This information is expected to be of value in the management of the estuarine resources of the DMA. However, more detailed studies of the species composition of the various communities would be required in acertaining the conservation value of these communities and determining the importance of rehabilitation measures that would be necessary to improve these systems. Past agricultural and urban development has resulted in degradation of the estuarine resources in the region and the southern estuaries appear to be more severely degraded. This study has also provided an opportunity to build capacity in the East Coast Programme on the interpretation of arial photography and vegetation analysis. Further studies are envisaged to provide more detail on the communities present and to determine the importance rating of the various estuaries within the DMA.

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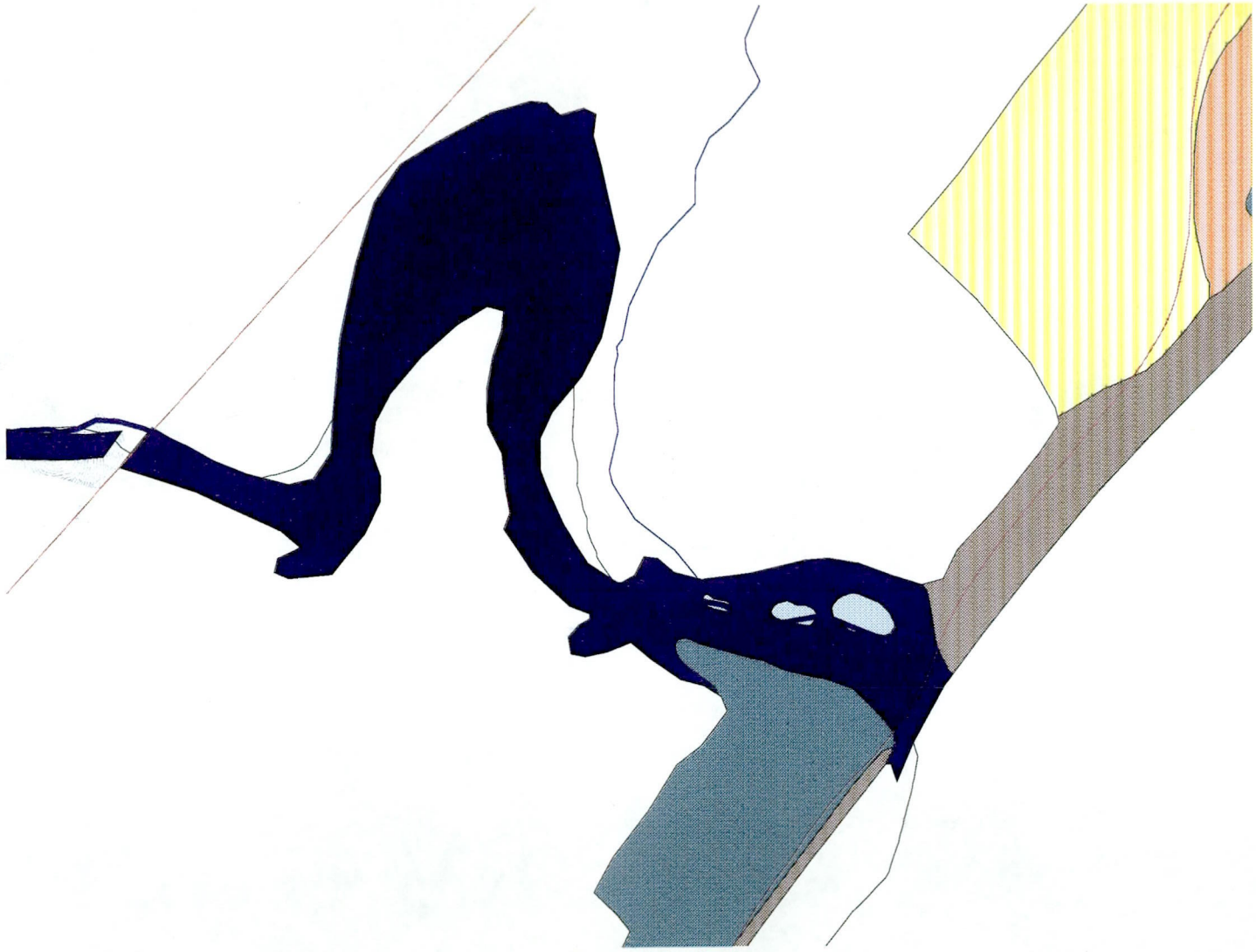
7. ACKNOWLEDGEMENT

Geoff Nichols is thanked for his patient instruction in interpretation of arial photography .

Fig 1a Tongati

TONGATI ESTUARY
MOSS VEGETATION MAP (G.Nichols)



Major Rivers
Perennial Rivers
Roads (Main)

Moss

Albizia adianthifolia/Brachylaena discolor Woodland
Barringtonia racemosa Community
Dune Forest
Dune Thicket
Golfcourse, Park and gardens
Riverine Floodplain

Durban Metro Area

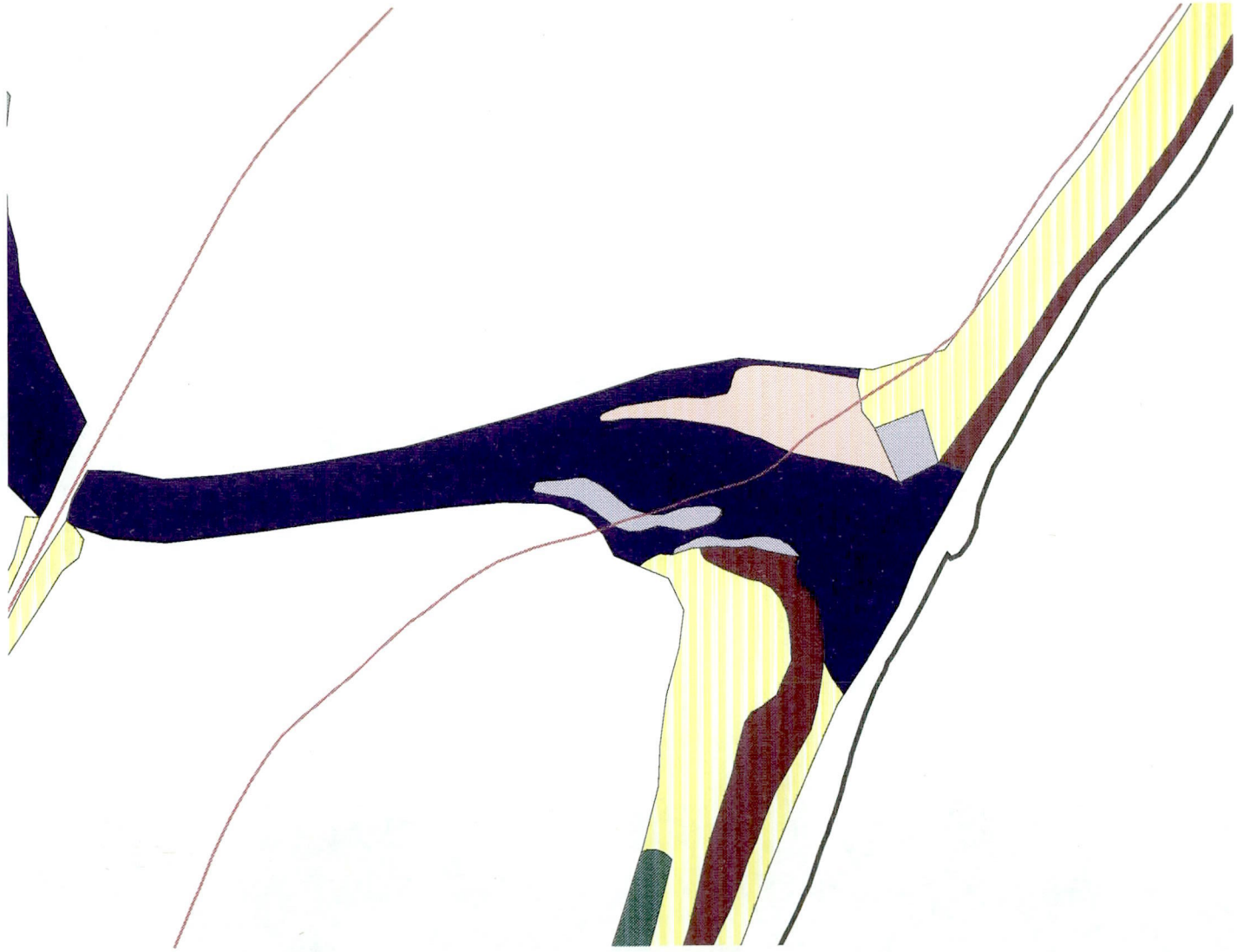
N
W
E
S

1 0 1 Kilometers

Fig. 1b

Fig 2a Mdloti

MDLOTI ESTUARY
MOSS VEGETATION MAP (G.Nichols)



Roads (Main)

Moss

- Agriculture
- Albizia adianthifolia/Brachylaena discolor Woodland
- Alien infested
- Barringtonia racemosa Community
- Coast Scarp Forest
- Coastal Lowland Forest
- Dune Forest
- Dune Thicket
- Golfcourse, Park and gardens
- Mangrove Woodland
- Reed Swamp
- Riverine Floodplain
- Swamp Forest

Durban Metro

N
W E
S

0.8 0 0.8 Kilometers

Fig. 2b

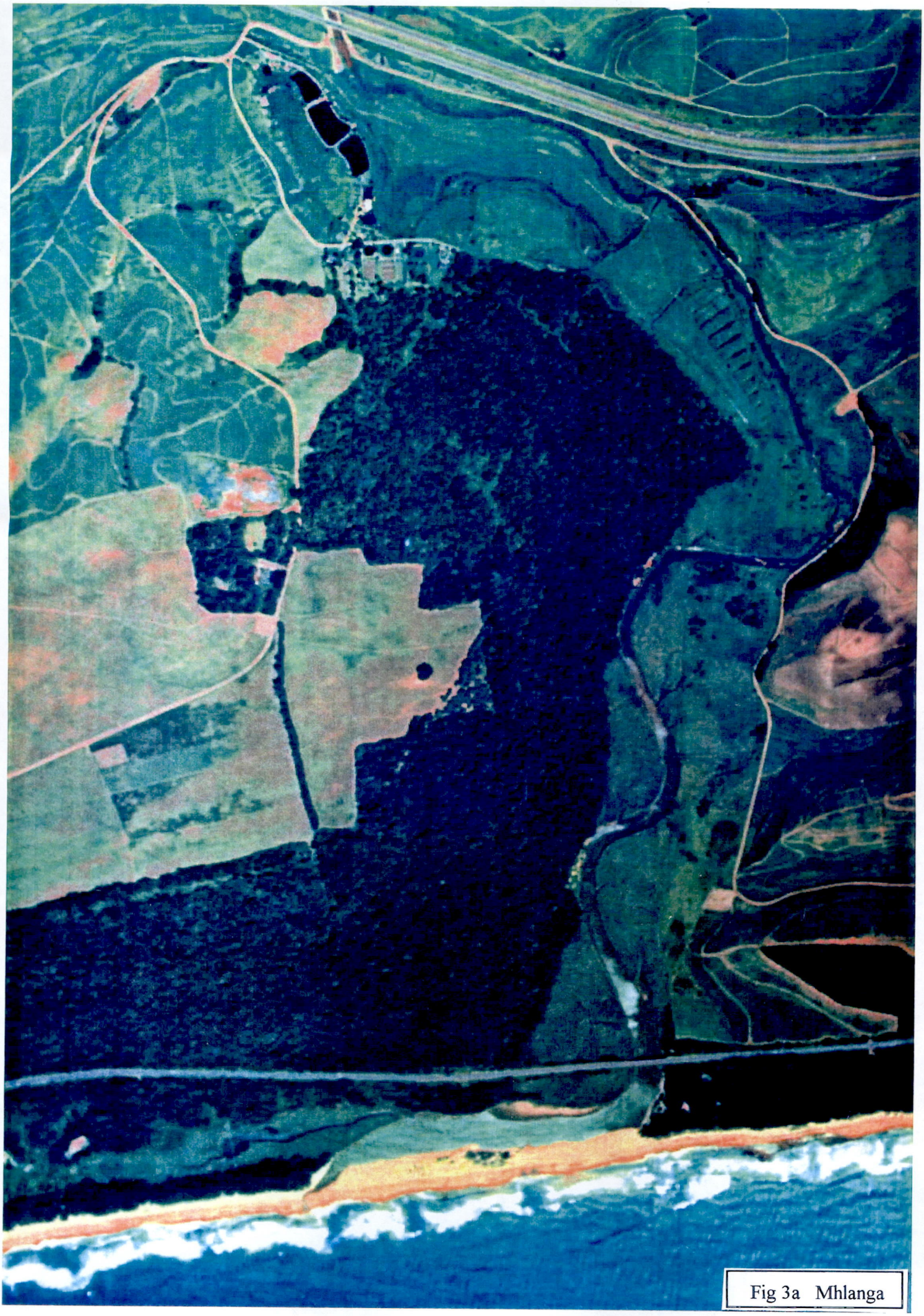


Fig 3a Mhlanga

OHLANGA ESTUARY
MOSS VEGETATION MAP (G.Nichols)

Roads (Main)
Durban Metro

Moss
Agriculture
Alien infested
Coastal Lowland Forest
Dune Forest
Dune Thicket
Golfcourse, Park and gardens
Mangrove Woodland
Reed Swamp
Riverine Floodplain

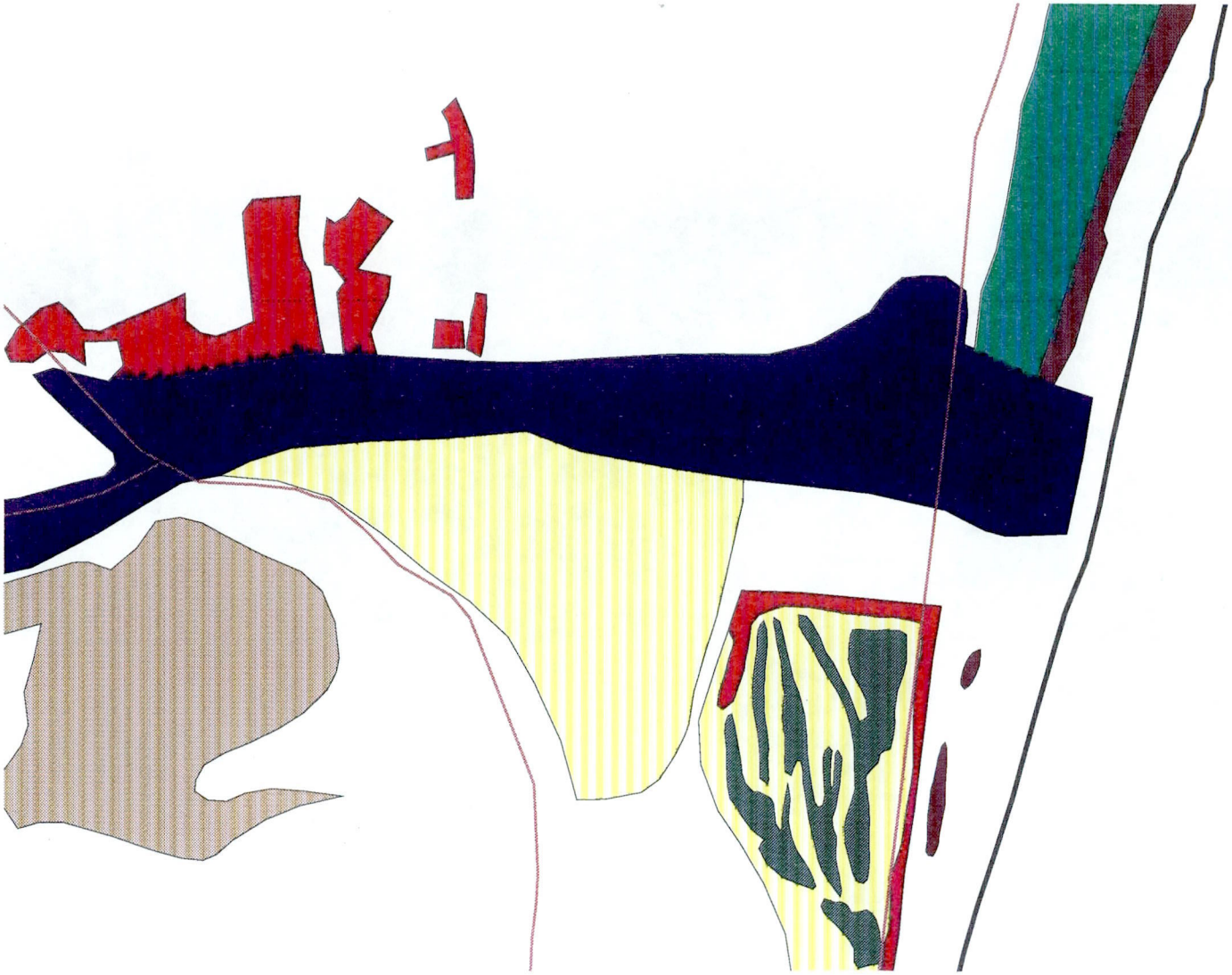
N
W E
S

0.8 0 0.8 Kilometers

Fig. 3b

Fig 4a Mgeni

MGENI ESTUARY
MOSS VEGETATION MAP (G.Nichols)



Roads (Main)
Durban Metro

Moss
Alien infested
Coastal Lowland Forest
Dune Forest
Dune Thicket
Golfcourse, Park and gardens
Mangrove Woodland
Reed Swamp
Riverine Floodplain

0.8 0 0.8 Kilometers

N
W E
S

Fig. 4b

Fig 5a Sipingo

ISIPINGO ESTUARY
MOSS VEGETATION MAP (G.Nichols)

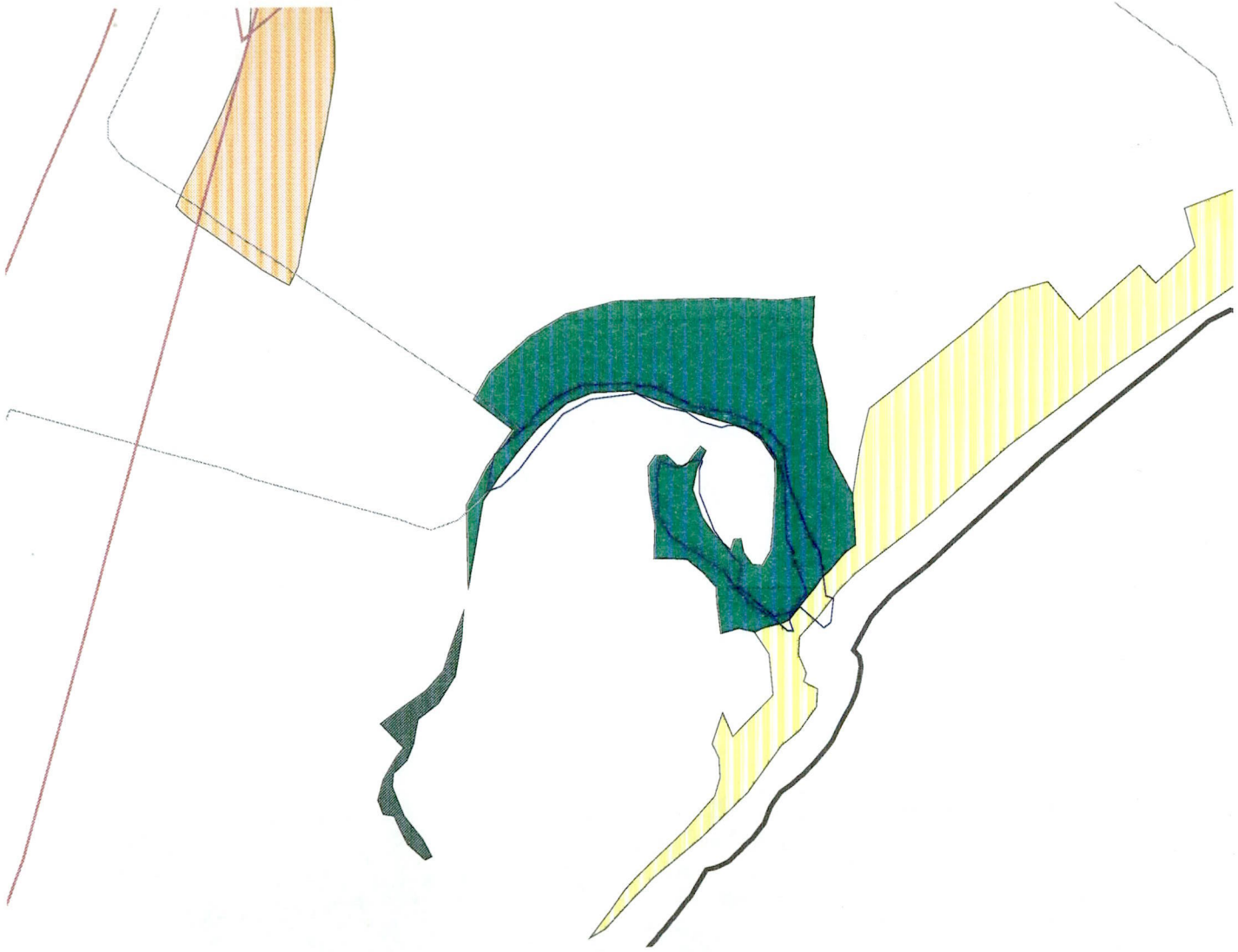


Fig. 5b

Fig 6a Mbokodweni

UMBOKODWENI ESTUARY
MOSS VEGETATION MAP (G.Nichols)

Major Rivers
Roads (Main)

Moss
Albizia adianthifolia/Brachylaena discolor Woodland
Alien infested
Coastal Lowland Forest
Dune Thicket
Floodplain disturbed
Golfcourse, Park and gardens

Durban Metro

N
W E
S

0.8 0 0.8 Kilometers

Fig. 6b

Fig 7a Manzimtoti

AMANZIMTOTI ESTUARY
MOSS VEGETATION MAP (G.Nichols)

Roads (Main)
Perennial Rivers
Canals

Moss
Alien infested
Dune Thicket
Riverine Floodplain

Durban Metro

N
W E
S

0.8 0 0.8 Kilometers

Fig. 7b

Fig 8a Little Manzimtoti

LITTLE TOTI ESTUARY
MOSS VEGETATION MAP (G.Nichols)

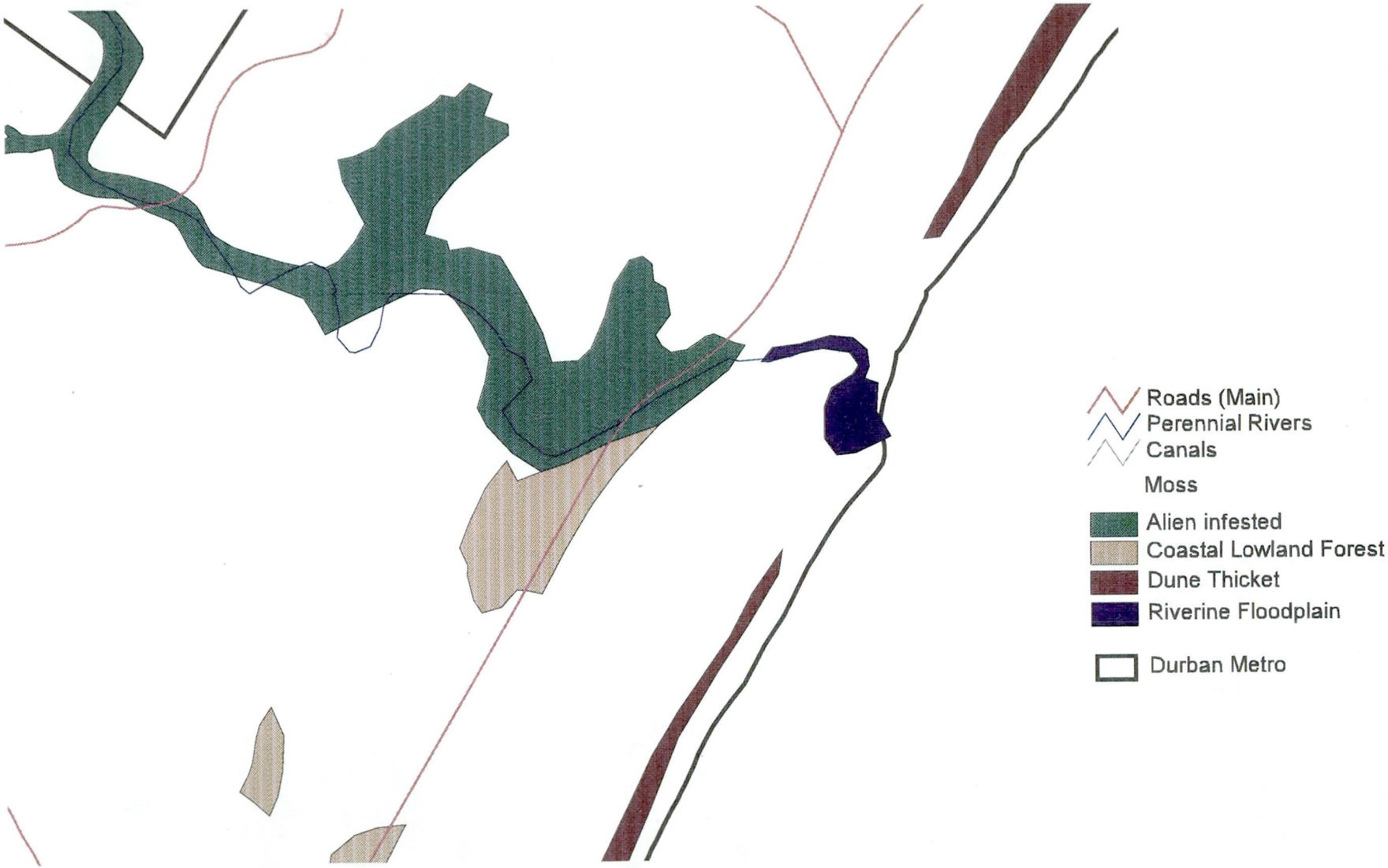


Fig. 8b

Fig 9a Lovu

LOVU ESTUARY
MOSS VEGETATION MAP (G.Nichols)

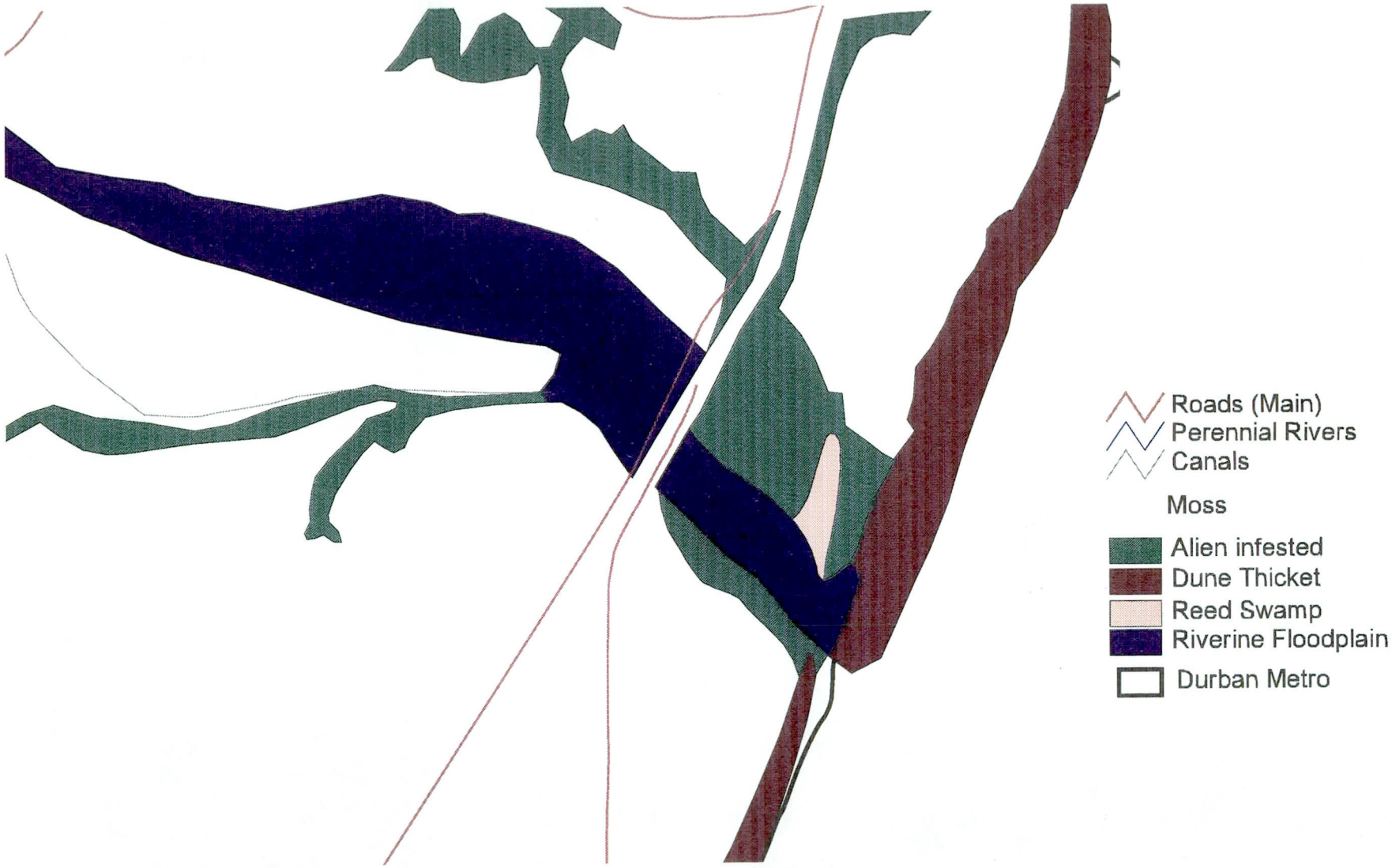
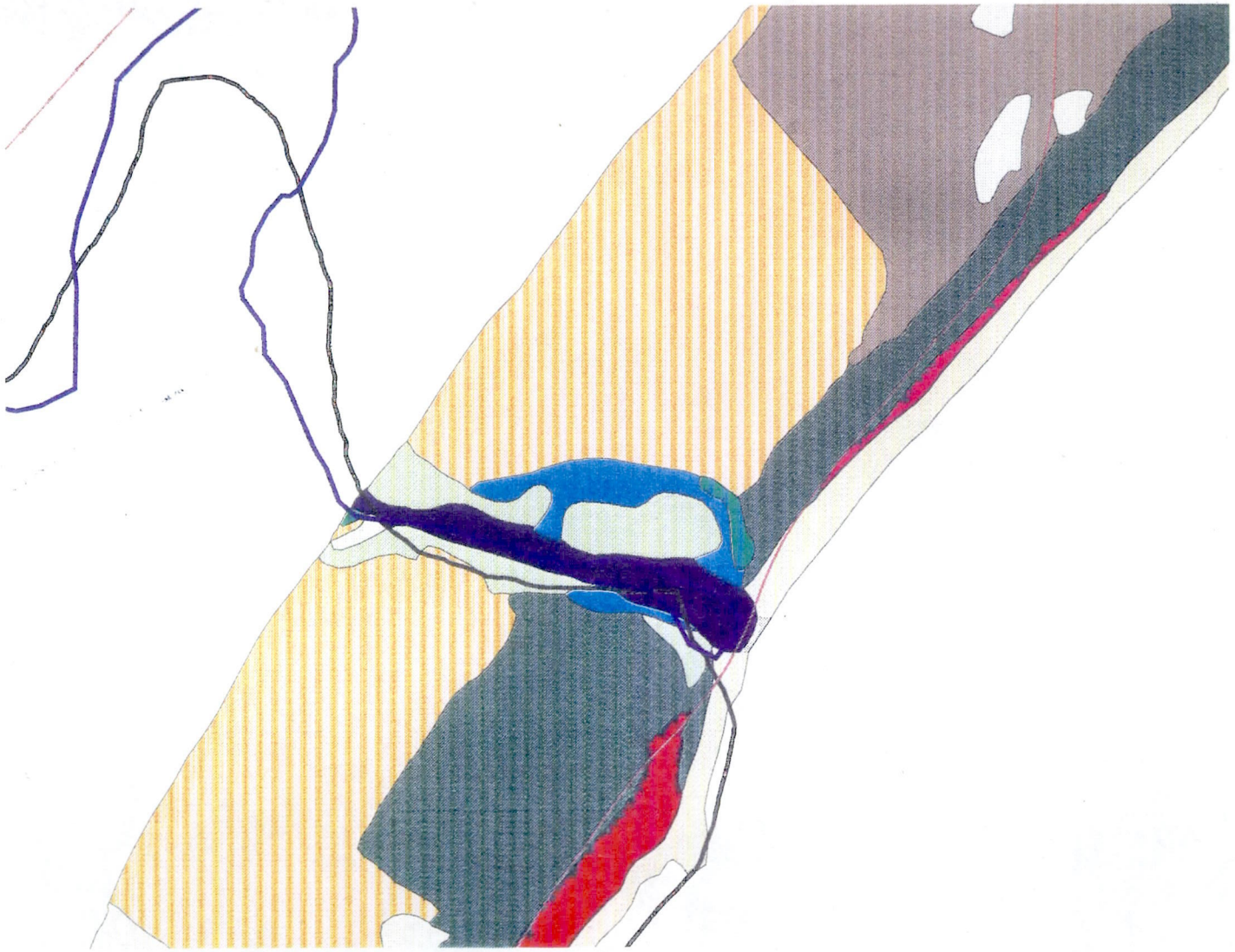


Fig. 9b

TONGATI ESTUARY
COASTAL VEGETATION MAP (P.Raal)



Major Rivers
Roads (Main)
Coastal Vegetation
AGRICULTURAL LANDS
CLIMAX DUNE FOREST
COASTAL AREAS
DEVELOPED AREAS
DWARF SHRUBLAND
MOSAIC OF PRIMARY REEDSWAMP AND SWAMP FOREST
MOSAIC OF SECONDARY REEDSWAMP AND PLANTATIONS
PLANTATIONS
PRIMARY DUNE SHRUBLAND
PRIMARY REEDSWAMP
SWAMP FOREST
WATER
Durban Metro

N
W E
S

0.8 0 0.8 Kilometers

Fig. 10

MDLOTI ESTUARY,
COASTAL VEGETATION MAP (P.Raal)

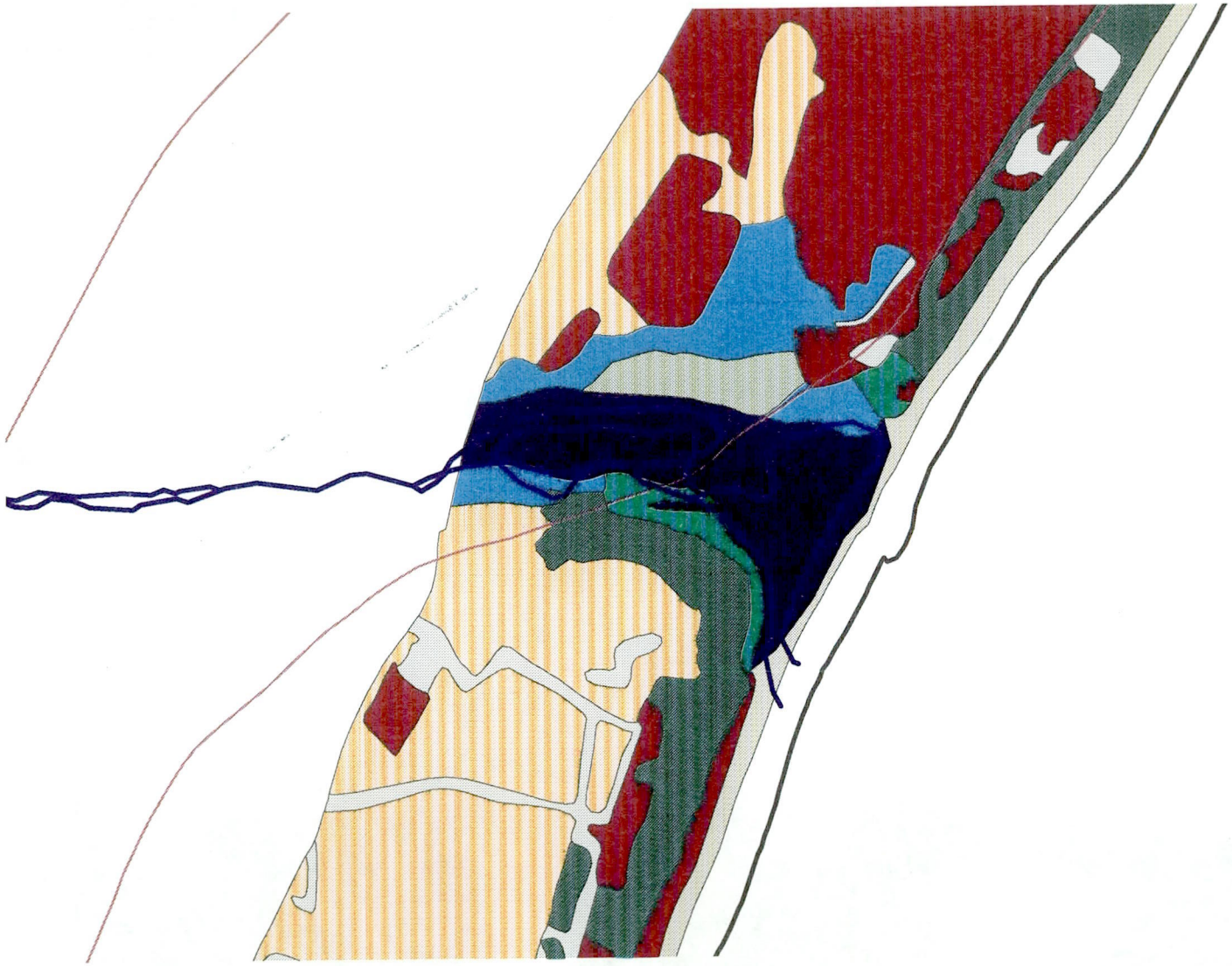


Fig. 11

OHLANGA ESTUARY□
COASTAL VEGETATION MAP (P.Raal)

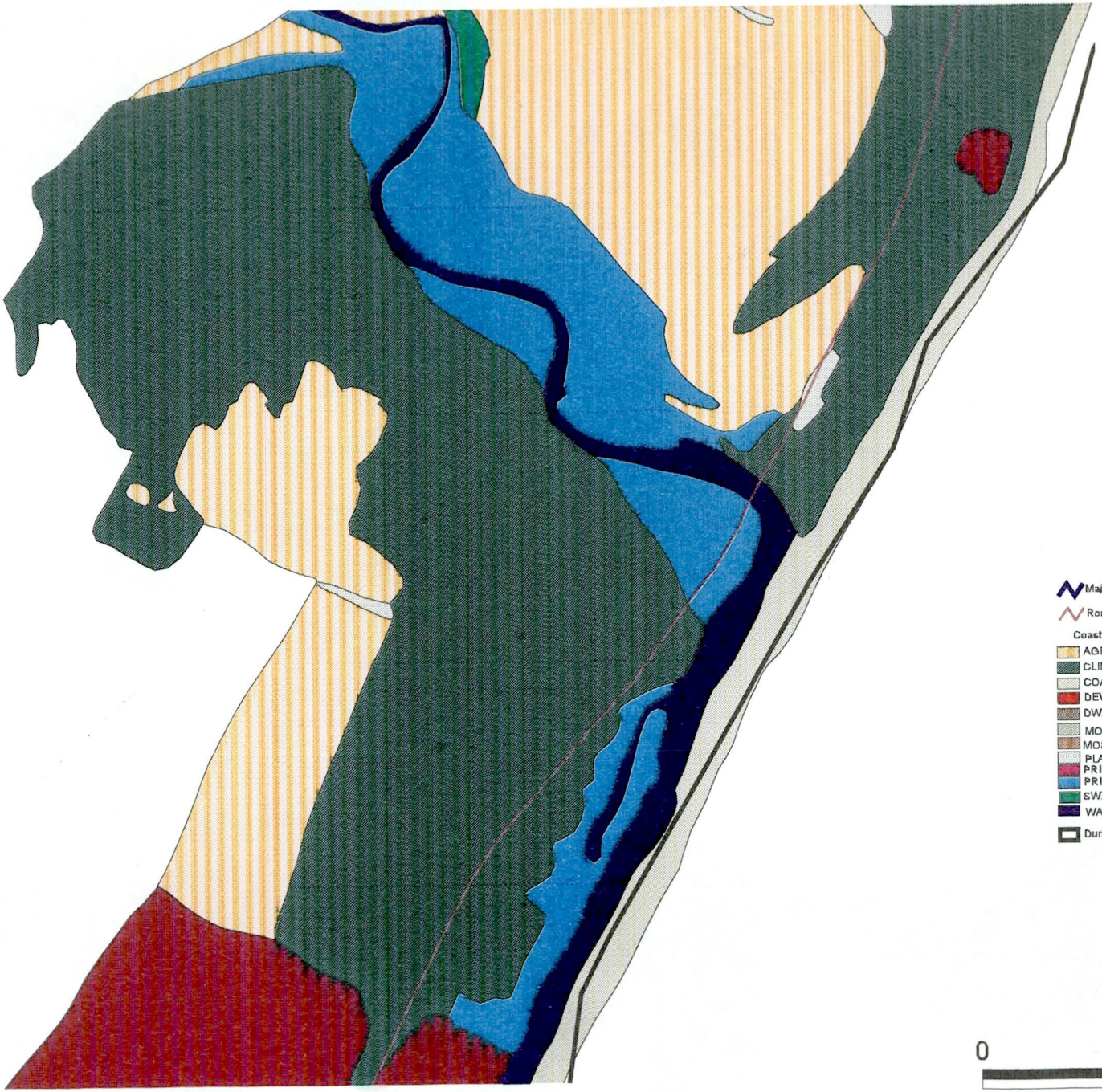


Fig. 12