

CHANGES IN THE DISTRIBUTION OF MANGROVES IN THE PORT JACKSON-PARRAMATTA RIVER ESTUARY FROM 1930 TO 1985

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The Division of Fisheries is mapping the historical distribution of estuarine vegetation in a number of estuaries as part of an Estuarine Inventory of New South Wales. This preliminary report outlines the changes in distribution of mangroves in the Port Jackson - Parramatta River Estuary from 1930 to 1985.

INTRODUCTION

The Port Jackson - Parramatta River estuary is a ria (drowned river valley) on the coast of NSW, surrounded by the cities of Sydney and Parramatta. It is composed of three arms - Middle Harbour, the Lane Cove River, and Parramatta River/Duck Creek, and a deep harbour in which they converge (see Fig. 1). Two species of mangrove grow in this estuary, *Avicennia marina*, the grey mangrove, and *Aegiceras conniculatum*, the river mangrove.

MATERIAL AND METHODS

Aerial photos of Sydney from 1930, 1951, 1961, 1970, 1978 and 1985 were used to map the distributions of mangroves on a scale of 1:2500 using a Bausch and Lomb Zoom transferscope.

Mangrove area was estimated by overlaying the maps with millimetre graph paper, counting the squares, and converting this to hectares.

RESULTS AND DISCUSSION

The total area of mangroves in the estuary increased from 182 ha in 1930 to 217.5 ha in 1951. From 1951 to 1970 there was a substantial decrease in mangrove area, with 145.5 ha remaining in 1970. A slight increase in mangrove area to 147.8 ha in 1985 occurred (Fig. 2). All mangrove areas in the estuary did not follow this pattern, rather, these gross changes are composed of many increases and decreases within each stand. The distributions of mangroves in the estuary in 1930 and in 1985 are shown in Figures 3, 4 and 5.

In most cases decreases in mangrove area were a result of reclamation and/or drainage of tidal land, with mangrove areas eventually being converted into parkland and industrial sites. Reclamation activities reached a peak in the 1961 - 1970 period, when approximately 48 ha, or 24% of the mangrove area in the estuary, was reclaimed. There were also some minor incidents of mangrove loss due to bank erosion.

The causes of increases in mangrove area are not clear. However, many increases in area were preceded by clearing of the native vegetation in the catchment, or conversion of agricultural land to urban or industrial land. These activities result in increased soil erosion in the Sydney region, (Lamy, 1965), and a consequent increased deposition of sediment

in the estuary. New intertidal surfaces are therefore available for mangrove colonisation. This could well be the cause of the marked increase in mangrove area throughout the estuary from 1930 to 1951, a time of rapid industrial and urban expansion in the region (Anon).

In Homebush Bay another possible cause of increase in mangrove area was apparent. Drainage channels were dug through the mangroves and into adjacent low-lying land. This low-lying land was subsequently colonised by mangroves. Thus the drainage works may have increased the area of saltwater inundation, creating more, rather than less, mangrove habitat.

CONCLUSIONS

Over the period 1930 to 1985 the activities of European man have had a substantial effect on the distribution of mangroves in Port Jackson and the Parramatta River. Presumably European man's activities since settlement around this estuary in 1788 to 1930 also had an effect on mangrove distributions. For this earlier period McLoughlin (1985) found that there had been increases in mangrove area in the Lane Cove River. Some change from earlier distributions is also evident on the 1930 aerial photographs. For example, by 1930 approximately 20% of the shoreline had been reclaimed, and some of the mangrove stands mapped from the 1930 photos were substantially composed of seedlings, indicating a recent increase in mangrove area (eg Hen and Chicken Bay). So the pre-European distribution of mangroves in this estuary is still unknown. For management of mangrove ecosystems this study indicates that it is not only necessary to control activities along the foreshore and in the waterway, but also activities in the entire catchment.

REFERENCES

- Anon. Manufacturing development in the Sydney region - problems and opportunities. The Australian Institute of Urban Studies.
- Lamy D.L. (1965). An erosion survey in the Ku-ring-gai Chase and adjoining catchment. Part 1. Soil Conservation Journal. 121 (3), 94-170.
- McLoughlin L. (1985). The Middle Lane Cove River: History and a Future. GEUS Monograph No. 1, Centre for Environmental and Urban Studies, Macquarie University.

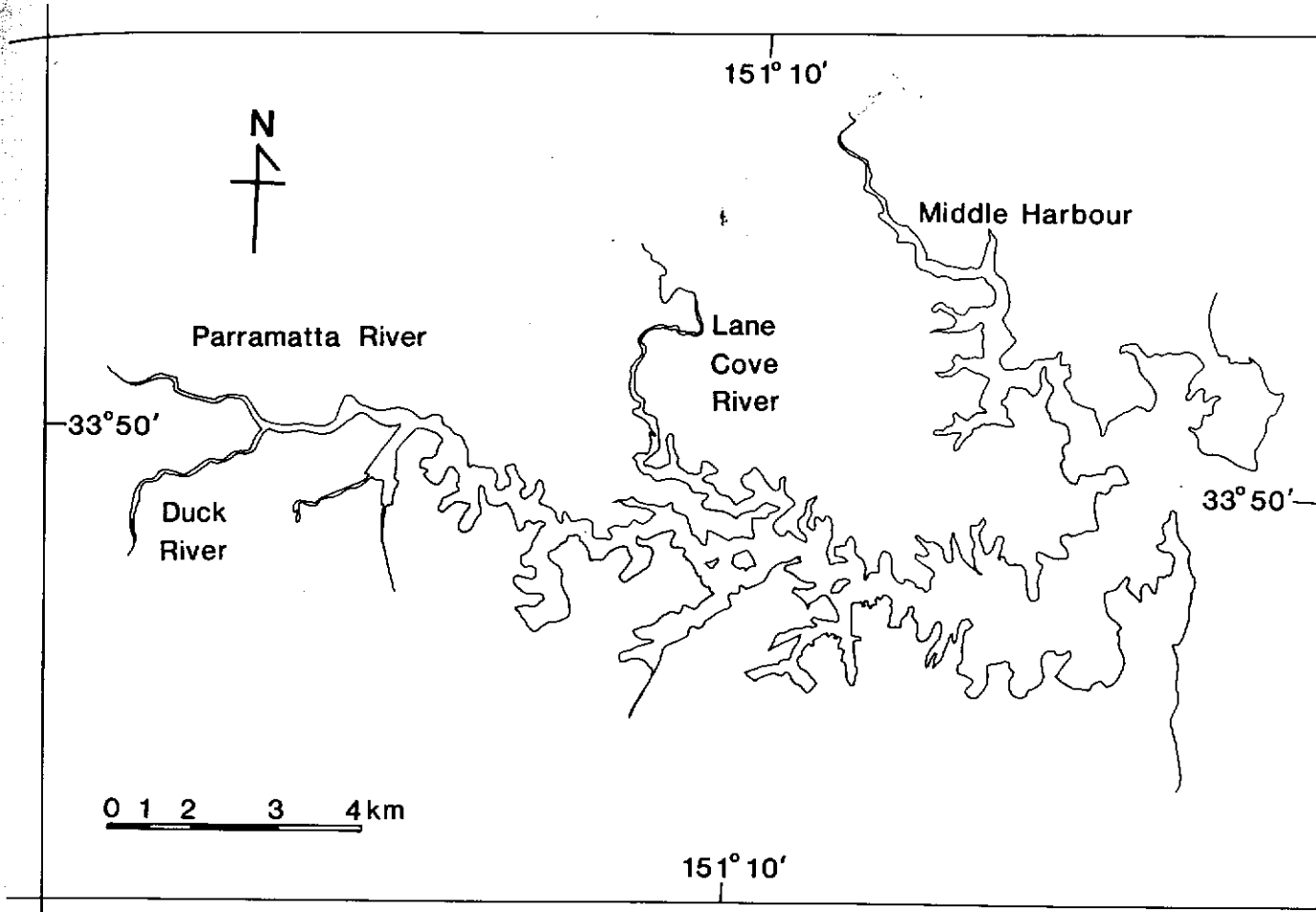


Figure 1. Port Jackson - Parramatta River estuary.

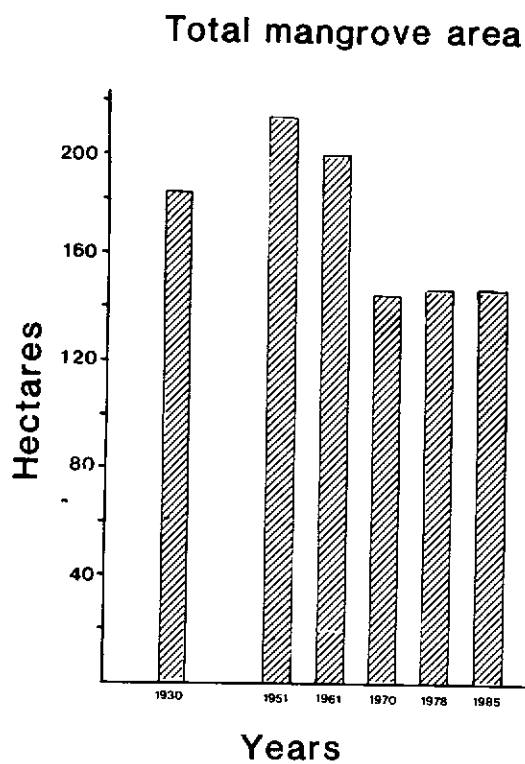


Figure 2. 1930, 1951, 1961, 1970, 1978, and 1985 mangrove areas for the Port Jackson - Parramatta River estuary.

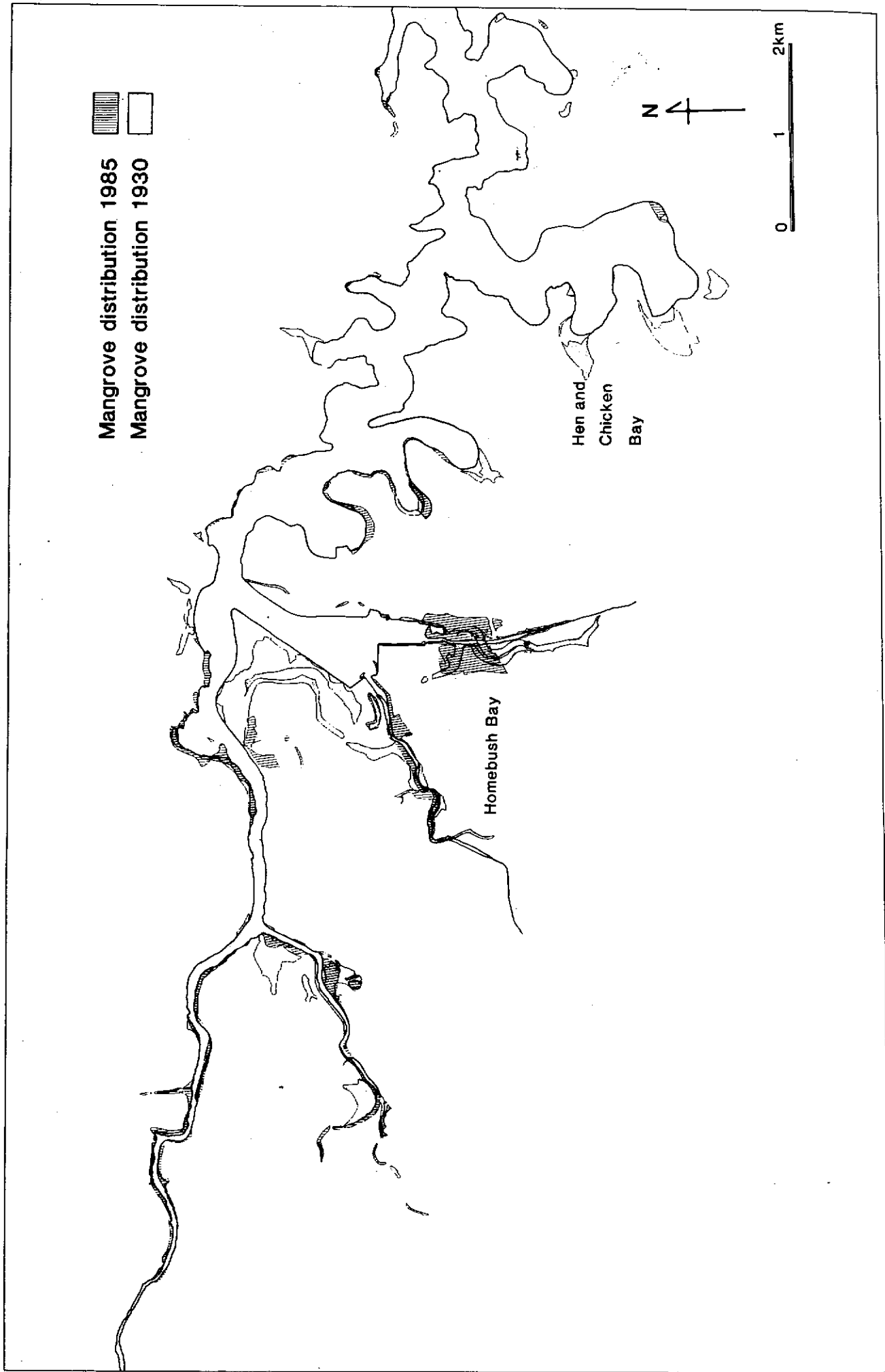


Figure 3. Distribution of mangroves in the Parramatta River and Duck River in 1930 and 1985.

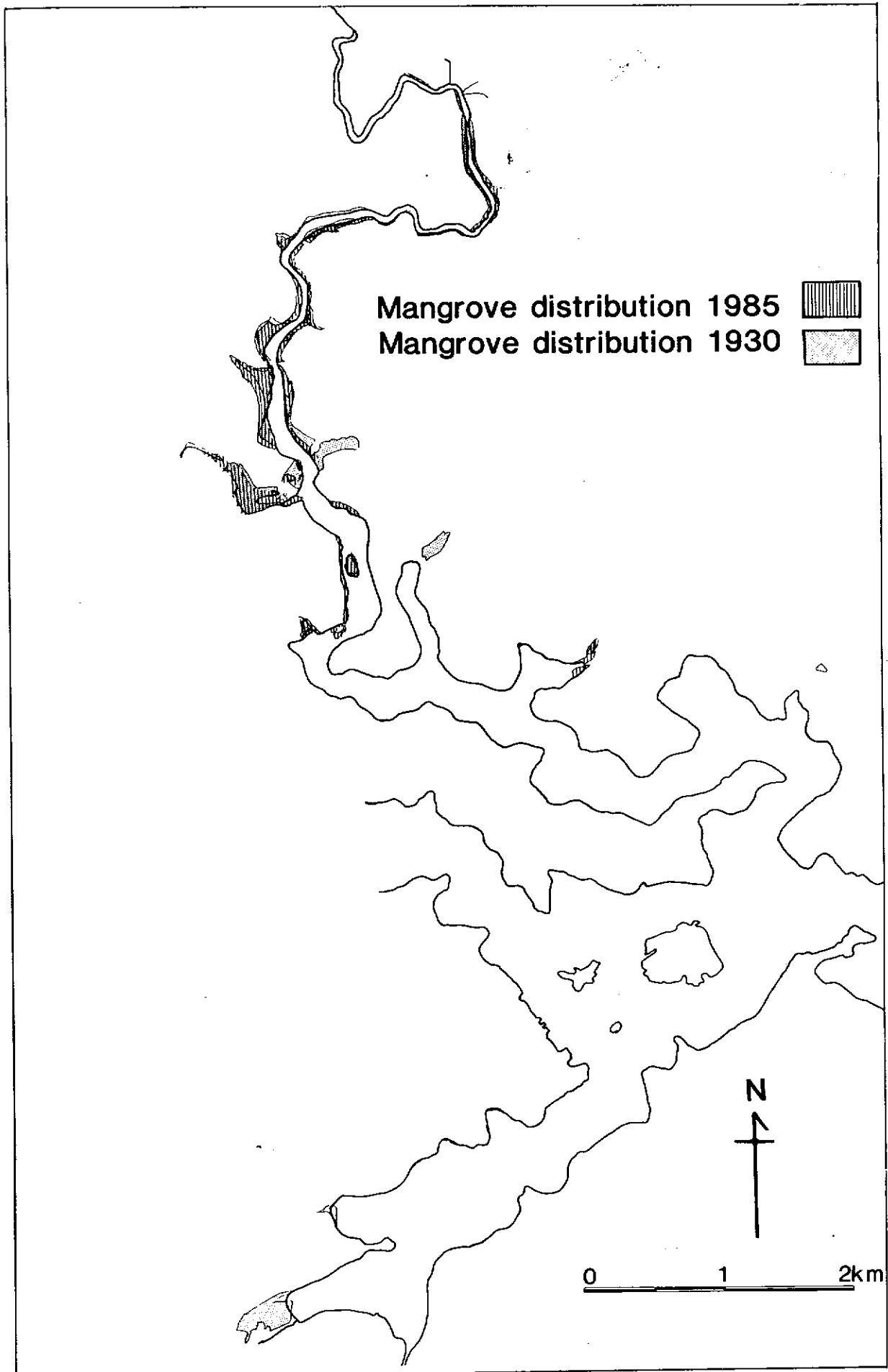


Figure 4. Distribution of mangroves in the Lane Cove River and part of the Parramatta River in 1930 and 1985.

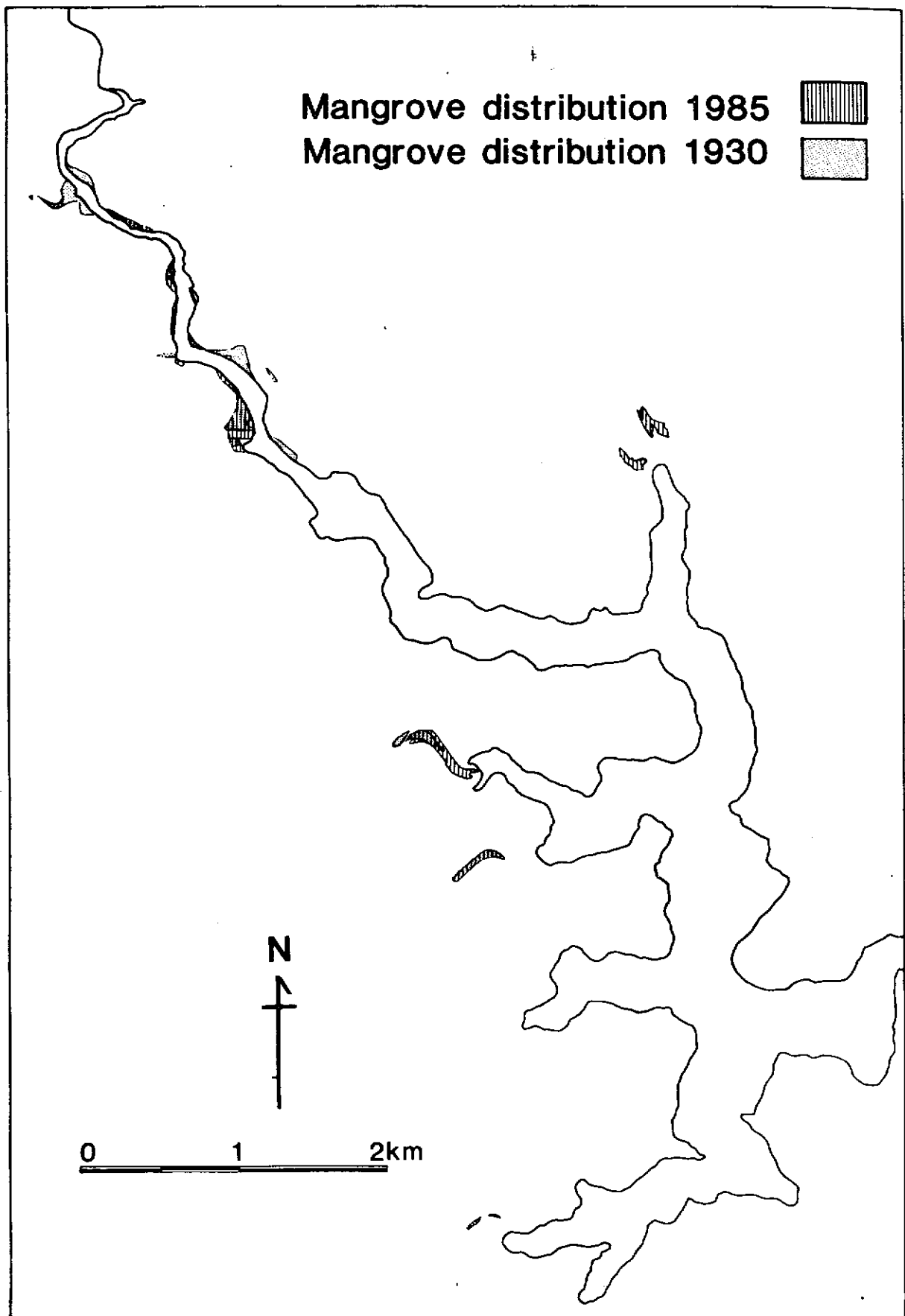


Figure 5. Distribution of mangroves in Middle Harbour in 1930 and 1985.