

Mangroves and Estuarine Ecologies

Part C

Mangroves in the Kaipara Harbour

Changes over Time

1 Introduction

This part of the report compares the two explanations of mangrove growth and expansion against the reality of mangrove habitats in the middle areas of the Kaipara Harbour.

The sites which are examined have been subject to an informal random sampling process in that we have chosen those areas where a time series of aerial photos is available. Not all parts of the Kaipara have been photographed at the same times.

The aerial photos form a time series for each location in the years:

1953

1982/83

1993

1999/2000.

Then we have been able to access family photos taken of the same areas back to the early decades of the 20th century and some drawings of these same areas in the late 19th century.

The visual record is excellent and helps us understand the dynamics of these harbours and estuaries and the changing habitat of the mangroves.

Some sites are remarkable for the lack of change over the last one hundred years.

This section focuses on the biophysical changes in these environments. Part D (which follows) uses family photographs and other records to track the change in amenity and use of these parts of the Kaipara Harbour over time.

The areas studied, from North to South, and the focus of the commentary are:

- Otamatea River – different growth in different locations and different conditions.
- Takahoa Bay – mangrove islands, rapid growth areas, slow growth areas.
- Takapau Creek – the growth of mangroves along a sandy beach. River transport.
- Otairi Creek – the last stage of mangrove invasion.
- Whakaki River – virtually zero mangrove growth.
- Araparera Point – *Spartina* and mangroves. Roads on ridges.

2 The Clearing of the Land

The aerial photo series, and the family photos and drawings of earlier times, point up a common misconception about the clearing of the land in the vicinity of the Kaipara Harbour – and presumably around other harbours and estuaries of New Zealand.

Many of us¹ tend to have an image about the clearing of the New Zealand land which is built on a simple model.

In our mind's eye we imagine a pre-European New Zealand where almost all the land is pristine Native Forest; then we imagine the settlers arriving, clearing the forest and planting grass. And that's it – except where we built our towns and cities.

Hence it is easy to speculate that, prior to say 1900, there was little run-off of sediment and nutrients and that since then there has been a constant and almost uninterrupted flow, with a hockey stick up-turn following aerial topdressing and intensive farming after the war.

The real pattern is more complex.

To begin with Maori cleared much of the forest prior to European settlement, and presumably had cleared land around the Kaipara as well.

Certainly, the early paintings of the areas covered in this survey, show no sign of any extensive pristine forest in the area from around 1860, although family records talk of stands of kauri and kahikatea. There were major stands of pristine native bush on the Northern ends of the Kaipara Harbour and as these were milled out, some families moved down to Oneriri and Port Albert. But these Northern areas are not included in this survey.

¹ Including me.

For example “The Hermitage” farm of 100 acres (Which was bought by Messrs A and J Rintoul for £75 in 1872) was partially covered in kahikatea bush, with the remainder in light bush and scrub which was cut and burnt and the land grassed.

The original Hargreaves property on Oneriri peninsula was bought from three Maori chiefs by Joseph Hargreaves about 1868. (The original 7,536 acre farm is now split between three owners.) Nine tenths of the area is bounded by beach and water frontage. The heavy scrub and light bush covering the rolling down-type land was partly cleared by Joseph Hargreaves but reverted to manuka, although a large area was cleared and surface sown again in the early 1930s.

But after the initial clearance the land was not turned immediately into pasture.

In *Brighter Britain* (1882)² William Delisle Hay describes the early land around the Kaipara Harbour, as it appeared towards the end of the nineteenth century:

Nature has been cleared away to make room for the art of man, and art has not yet got beyond the inchoate unloveliness of bare utilitarianism. The beautiful woods have given place to a charred, stumpy, muddy waste, on which stand the gaunt new frame-houses. Garden, orchards, cornfields and meadows are things to come; until they do the natural beauty of the place is killed and insulted. But what have we to do with sentimental rubbish? This is Progress! Bless it!

And later from the same author:

The land is richly wooded. Here and there we see the heavy bush, mammoth trees soaring up, overhung with creepers and ferns; but the heavy bush is chiefly at some distance from the waterside. What we see most of here is the light bush; dense thickets of shrubs and smaller trees. ... Once upon a time, when they numbered millions, the Maoris inhabited these shores pretty thickly. They preferred to be near the water as the settlers do now, for the same reason of convenience and communication and because fish was a chief article of their diet. All the land near the rivers has been at some time under their cultivation and the light bush has grown up upon it since.

² *Brighter Britain or Settler and Maori in Northern New Zealand (Vol II)* by William Delisle Hay. London: Richard Bentley and Son, 1882. Kindly loaned from the collection held by Peter Linnell of Oneriri Road.

The Orchards.

Albertland was initially famous for its apple orchards. Cattle at the time were very expensive and many sought alternative crops. Before the first World War there were two fruit canning factories working but they were closed when the young men went off to fight and never re-opened. In 1925 there were still twelve major apple orchards in Port Albert alone. There were many very old peach groves in the area too. Before the roads were metalled the bulk of the fruit was taken by sledge, wagon or *konaki*³ drawn by horses to the river. Most orchardists owned launches of one sort or another, with which they transported the fruit to Te Hana, and from there, by train, to Auckland.

The Dams.

As the land was cleared for pasture it is easy to believe that this immediately increased the sedimentation problem following rainstorms. However, as the stock levels increased the farmers built literally hundreds of dams or ponds across the watercourses and these served to control the rate of water discharge into streams and estuaries because they acted as buffers. On my own property I have seen the silting of the main watercourse down the ravine on the eastern edge cease altogether as we have built five small dams on the property precisely to better manage stormwater erosion.

Nutrients

The pattern of land use and vegetative cover on the land surrounding this harbour has a dynamic history. The one nutrient boost certainly came with the advent of aerial topdressing on a large scale because with aerial topdressing the winds inevitably carry some topdressing material directly on to the mangrove beds and the water generally. This is not run-off; it is drift. But the same topdressing allowed farmers to increase their stock levels and hence there were more cattle-mouths to be fed by the mangroves. Again, the balance is dynamic and changing; simple-minded correlations do not stack up against what is on the ground.

³ Horse drawn sledges.

Sediment Sources.

As far as I can tell the only research paper on sediment sources around the Kaipara Harbour is the draft paper by Jessen, Trustum and Hicks, *Identification and Appraisal of Sediment in the Hotoe River Catchment*.⁴ The Hotoe River flows into the Kaipara Harbour between the Takapau Creek and the Araparera sites examined in this report. The objective of the paper was to address the questions:

1. Is there a sediment problem in the Hotoe River catchment?
2. If there is a problem, how big is it?
3. If there is a problem, where is the sediment coming from?

The list of conclusions is too long to list here, and I commend this draft report to anyone interested in the topic. The most relevant paragraph reads:

While concluding that the sediment problem is not large, sediment generation occurs in the catchment, and volumes are greater than would be expected for a forested catchment.

Anyone expecting to read of an ongoing and future crisis in sediment flows will not find it in this report. The report indicates to me that changing land use and improved land management practice (especially in the building of forestry roads and the like) means that, if anything, sediment flows have been reducing over the last few decades and will probably reduce further in future. The report also recognizes the importance of the large number of farm dams in managing storm event run-off. There is nothing in this report to indicate that the rapid growth of mangroves in this area can be attributed to dramatic increases in sediment run-off over the last two decades. This is a draft report and the final form may convey a different final impression.

However, the report does recommend better protection of stream edges in the lower slopes which reinforces the need to keep cattle away from estuarine waterways.

If our alternative hypothesis is valid then these improvements in catchment management may well lead to further rapid mangrove invasion and hence further increase the need to manage their growth and spread.

⁴ This draft report is authored by Murray Jessen and Noel Trustum of Landcare Research NZ Ltd, in collaboration with Dr Douglas Hicks of Ecological Research Associates. Published ARC June 1997.

January 2005

The Otamatea River

Aerial Photo – Oct 1953

This shows the river in this area with very few mangrove beds.

Orientation Nth/Sth.

The estuary which edges my own property is centre right. (Circled.)

The land is almost all cleared although there are significant areas of re-growth. My own property is covered with re-growth bush and a sandy area clear of mangroves lies at the bottom of the section.

The edges of the northern slopes are clear of mangroves and the land is pasture to the water's edge.



January 2005

The Otamatea River... Aerial Photo – September 1982

This photo shows mangroves beginning to grow within the river channel, even though exposed to strong winds. (Circled area centre north.)

There are still few if any mangroves on the edge of the Southern slopes of the peninsula to the North. The clear sand area (circled) at the bottom of my own property remains mangrove free.

Aerial topdressing began in 1949, but appears to have had no effect on this area.



January 2005

The Otamatea River... Aerial Photo – July 1993.

A house site has been cleared on what is now my property (left circle) but regrowth re-mains on most of the property and the clear sand area (circled) remains clear of mangroves.

Notice that the mangrove beds which do exist are all separated from the pastures by channels making them inaccessible to cattle.

Mangroves continue to extend their beds on the north slopes of the river even though regrowth proceeds to reduce runoff from the pastures on the higher slopes behind.



January 2005

The Otamatea River... Aerial Photo – 2000.

Notice substantial regrowth (circled) on Southern slopes on the Northern edges of the river. If the run-off theory is correct we would expect there would be no mangrove invasion of this area because such regrowth inhibits run-off. But notice the beds starting to establish and these are now (four years later) a continuous stretch of man-groves. Notice too the mangroves beginning to invade the clear area at the bottom of my own property and moving up the estuary. Pasture has turned into regrowth and scrub on properties around my own. (Lower circle). The cattle have gone from this side of the bay.



Takahoa Bay

Aerial Photo – 1953

There are few mangroves in the bay before the building of the causeway and dam.

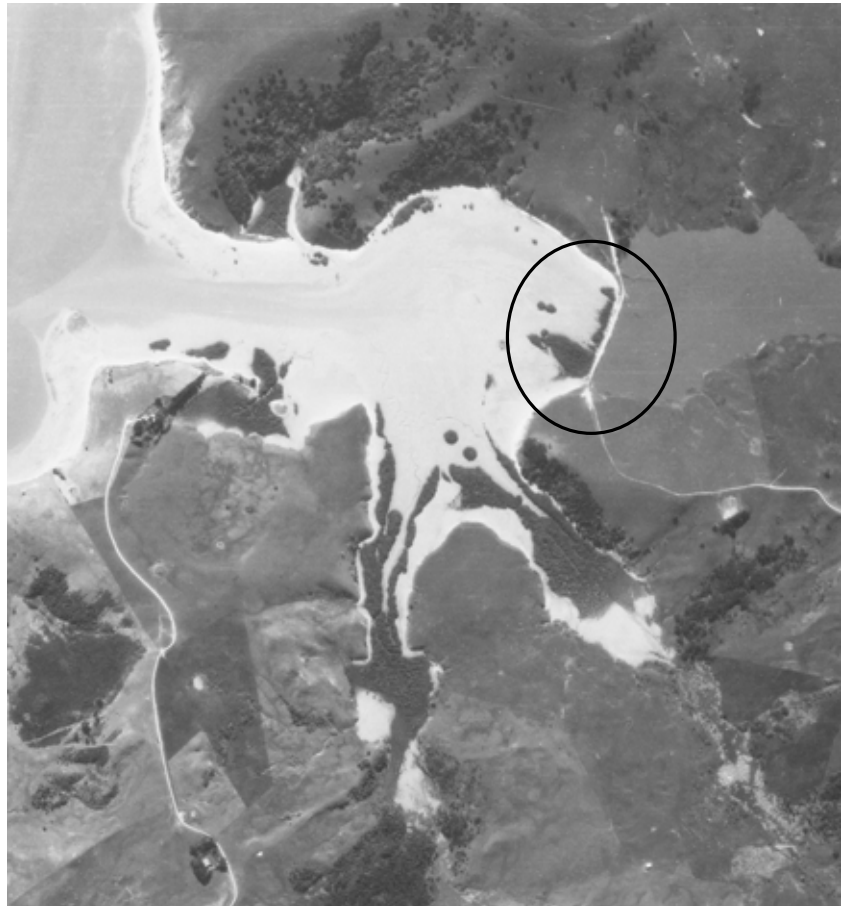
Some mangroves are moving into the estuaries but clear areas at inland ends re-main. (Circled areas).

Sometimes mangroves move from the top of an estuary down towards the sea but this invasion from the harbour or river up to the head of the estuary is much more common.



Takahoa Bay ... Aerial Photo – Sept 1982.

A causeway has been built and has formed a large lake behind it. (Circled) Already the mangroves have invaded the bank to the immediate harbour side of the causeway. No cattle are farmed around the two estuaries heading South towards the bottom of the picture and mangroves are filling these areas rapidly. Regrowth on the cliff edges and channels protect the mangroves from any live-stock which remain on the slopes to the East



and West. The same regrowth is presumably reducing sediment run-off and yet the mangroves thrive. Cattle graze the peninsula in the lower middle of the picture.

January 2005

Takahoa Bay ... Aerial Photo – July 1993

The ‘Causeway effect’ is highly noticeable as man-groves form a crescent across the top of the bay and the lack of flushing encourages growth around and along the edges. Channels, cliffs and regrowth continue to protect mangroves invading the estuaries from control by cattle. The circled area demonstrates the classic “encirclement” or “flanking” of a shallow area by mangroves which no longer have to deal with flushing from water behind the dam. Cattle still graze the point



January 2005

Takahoa Bay... Aerial Photo – October 2000



The southern area of the bay is no longer farmed with livestock at all and the mangroves continue to invade the two estuaries. The owners of the peninsula in the centre of the photo have planted some two hundred thousand trees on the property so there should be much less sediment and nutrient run-off from this land. Yet the mangroves thrive. A recent inspection reveals that mangroves are now invading the area inside the ‘flanking’ line of the previous photo. The owners witness a rapid decline in their mullet catch.

The implication of this invasion is that standard “catchment management”, aimed at reducing sediment and nutrient run-off, will have no impact on the spread of mangroves. Some claim that because the impact of run-off is delayed the cure will be too. But what if the theory turns out to be wrong?

Can we afford to wait until all our estuaries are turning into dry land before we act?

January 2005

Takapau Creek – Minniesdale House

Aerial Photo – October 1953

The historic Minniesdale House is located in the area circled. Early drawings show that schooners used to sail up the creek to service the property. By the fifties the mangroves are starting to invade this creek. The long white beach to the north (Sandy Beach) is free of mangroves.



January 2005

Takapau Creek – Minniesdale House ... Aerial Photo – September 1982

Mangroves are rapidly invading the creek and re-growth is re-placing pasture along the edges of the creek on the left. The circled Minniesdale house is no longer accessible by the estuary channel. The mangroves are beginning to move along the front of the beach. Note small limestone pan half way along the beach. (Circled)



January 2005

Takapau Creek – Minniesdale House... Aerial Photo – July 1993.

The invasion of the creek is complete and the circled mangroves are now beginning their “march” along the sandy beach. The pan is more visible. But the inhabitants of this bay are about to lose what made it so attractive to the first settlers who built Minniesdale House and developed the home-stead. The present owners are not allowed to do anything to stop this ongoing degradation of their environment, their amenities and their heritage.



January 2005

Takapau Creek – Minniesdale House... Aerial Photo – July 1999

The creek is packed with mangroves; just a narrow ditch remains of the early “harbour.” The mangroves have marched past the small limestone pan and are about to move on to the end of the bay. The white sand beach behind the mangroves on the South of the pan has now (2004) disappeared.

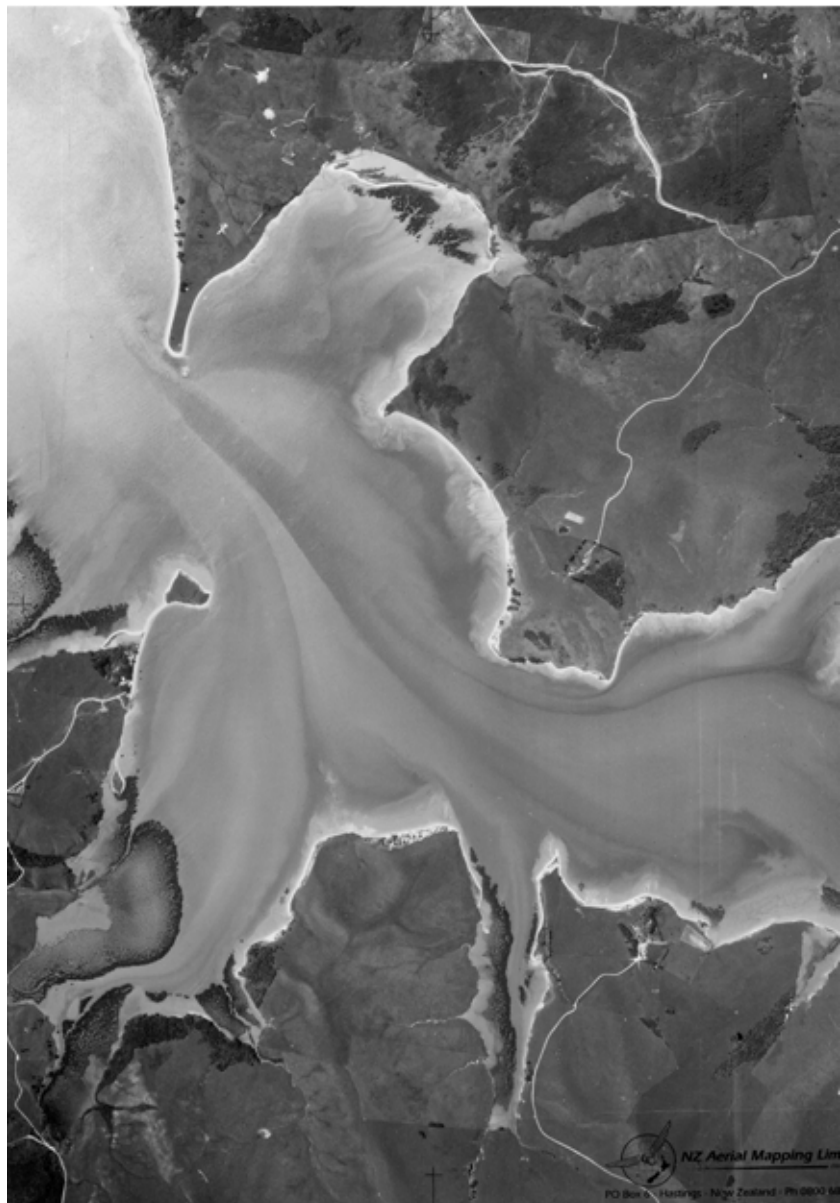


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Whakaki River – Hargreaves Family

Aerial Photo – October 1953

This area is notable for its lack of mangrove invasion. The original 'Oneriri' farm on the southern side of the river was notable for being almost an island and requiring only a short length of fence to secure the boundaries – the rest of the boundaries were the water's edge and cattle have been free to feed on mangroves. The few isolated clumps are protected from cattle by channels. Notice the white edge caused by the strong limestone pans which inhibit mangrove growth wherever they exist.



January 2005

Whakaki River – Hargreaves Family... Aerial Photo – 1982.



The extent of the mangroves is essentially unchanged. The few existing clumps remain protected by channels between the clumps and the pasture.

January 2005

Whakaki River – Hargreaves Family... Aerial Photo – July 1993



Again, virtually tree for tree, the mangrove beds remain unchanged.

If run-off and nutrients were the prime cause then one would expect there to have been some impact on the mangroves in this series of bays. But there have been no causeways built, the channels flush well. The estuaries remain controlled by the ongoing access by cattle, which are not denied access by cliffs, regrowth, or fences.

January 2005

Whakaki River – Hargreaves Family... Aerial Photo – August 2002



The dark patches in the main river flow are clouds, not new mangrove beds. There is little if any invasion of new territory around the edges of the river even though the pasture continues to flow directly to the water's edge. However, there is some intensification of the old existing beds and this may reflect aerial topdressing drift. The limestone pans are clearly evident in this photograph. Channels continue to protect most of the old beds from grazing cattle. If sediment flow was the sole explanation of mangrove spread – or even an important factor – these edges would be full of mangroves. They are not. The dynamics are complex.

January 2005

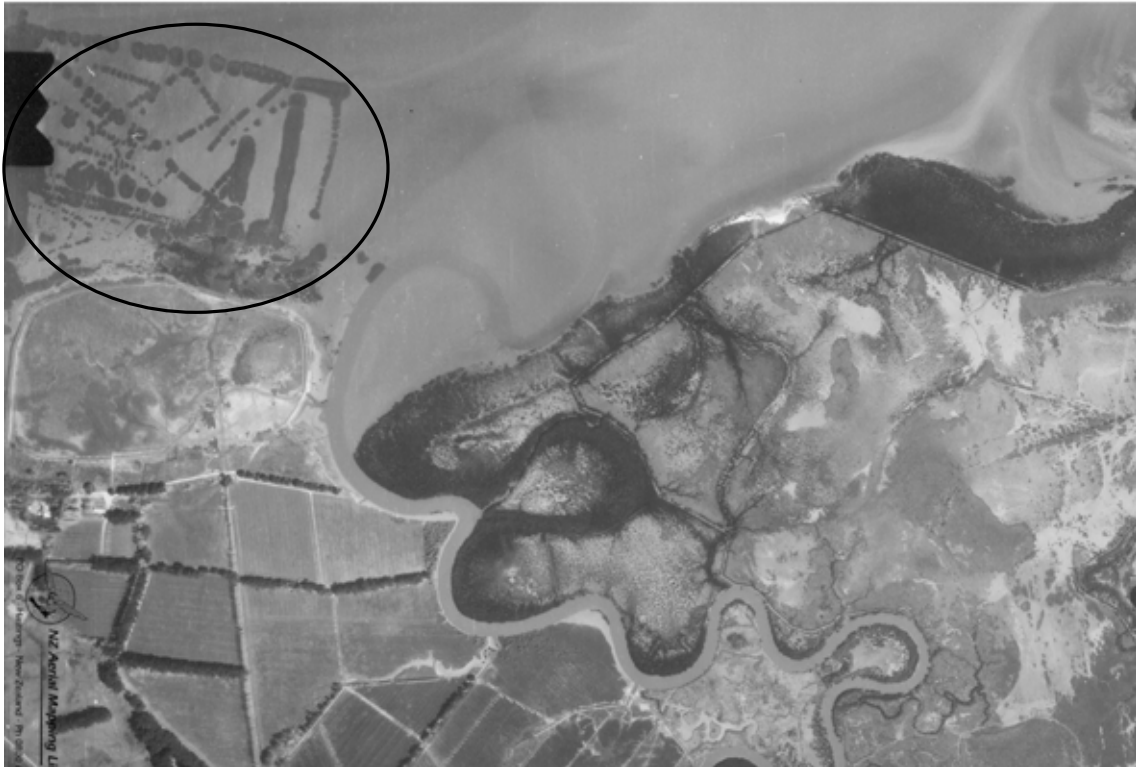
Araparera Point – Spartina Grass and Mangroves.

Aerial Photo – April 1941



There are few mangroves on the West-facing bay. The old beds in the estuaries are protected from grazing cattle by channels. The pasture flows to the water's edge. The dark patches over the water are clouds.

Araparera Point – Spartina Grass and Mangroves... Aerial Photo – September 1982



Evidently Spartina grass was planted in the rectangle (Circled) to control erosion of the area behind it which has been reclaimed. While the mangroves to the centre and right of the picture remain essentially unchanged over the 41 year interval, the spartina beds are flourishing, and mangroves may already be appearing. If anything, changes in land use and planting should be reducing sediment and nutrient run-off during this and subsequent periods.

January 2005

Araparera Point – Spartina Grass and Mangroves... Aerial Photo – February 1992



The change is remarkable. The mangroves have rapidly invaded the beds behind the Spartina grass and have begun to invade the Spartina enclave. The mangroves to the centre and centre right are becoming more dense and gradually infilling any clear areas, except where channels protect them.

January 2005

Araparera Point – Spartina Grass and Mangroves... Aerial Photo – August 1999.

The intensification of the mangroves to the east is now near complete but channels continue to prevent any spread. However, the Spartina bed is now totally converted to mangroves which are now spreading to the west and back to the south, hugging the reclaimed areas. The invasion of the clear sandy area and the beach strip is well underway. (Circled) This photo is dated 1999, and visual inspection of these bays and beach show that the invasion has continued and these will soon be dense mangrove beds. Again, changes in land use and extensive planting should have reduced sediment run-off.



Cattle no longer have free access to the water's edge.

White sandy beaches are a scarce and valued resource in the Kaipara Harbour. Soon there will be hardly any left.

January 2005

Otairi Creek – the future of our estuaries?

Aerial Photo – 2002



Mangroves have invaded this estuary right to the headwaters. The occupation is complete and now the mangroves at the headwaters have died and the area is rapidly turning to solid land on which cattle once more are starting to graze. This further reduces the flushing effect and presumably this reverse invasion (of dead mangroves into living areas) will continue so that what was an estuary with a free flowing stream will soon be a reclaimed valley.