

Interim Kaihu River Management Plan

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INTERIM KAIHU RIVER MANAGEMENT PLAN

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INTERIM KAIHU RIVER MANAGEMENT PLAN

EXECUTIVE SUMMARY

INTERIM MANAGEMENT PLAN

This Plan sets out policies for managing the existing Kaihu River Management Scheme for the next three to five years. It provides for:

- continuation of the channel restoration and maintenance work that the Kaipara District Council has been undertaking on the lower four kilometres of the river through to its confluence with the Northern Wairoa River;
- maintenance of the river channel, including the control of Manchurian ricegrass and giant rush, and regular excavation of accumulated sediment between Rotu Bottleneck and Dargaville;
- removal of obstructions within the river channel and reshaping of any spoil heaps that may be obstructing flood flows within the reserve at Rotu Bottleneck;
- control of streambank erosion on the outside of bends and excavation of accumulated sediment from the inside of bends in the channel between Mamaranui and Rotu Bottleneck;
- clearance of log jams and fallen trees between Kaihu and Mamaranui;
- removal of willows and accumulated gravel that is reducing the capacity of the channel for 400 metres upstream and downstream of Woods Road Bridge, Kaihu.

The map on page [six](#) defines the catchment area of the Kaihu River. Section 1 is the lower river, downstream of Parore Road Bridge to the Northern Wairoa River confluence. Section 2 is the river between the Rotu Bottleneck and Parore Road and Section 3 is the currently maintained section of river between Waihue Road and the Rotu Bottleneck. Section 4 is the length of river between Ahikiwi and Waihue Road within which it is proposed fallen trees be removed and Section 5 is the Kaihu River from about Kaihu to Ahikiwi.

As from 1 July 2007, it is proposed that the above works will be funded by way of a targeted differential a Land Area-based rate across the whole of the Kaihu River catchment with the differential determined according to the level of benefit received or the extent to which the way land is managed increases the need for the scheme. In addition, there will be a uniform annual charge across all rateable units within the rating area in recognition of the indirect benefit residents receive from the scheme. In recognition of the benefit provided by the scheme to the urban areas of Dargaville-Mangawhare, a lump sum contribution is proposed to be made from the Dargaville stormwater management rate.

For the year 2006-2007, the work will continue to be funded from a Land Value Rate struck across the whole Kaihu River catchment. This rate, which will remain at the 2005-2006 level for 2006-2007, will raise approximately \$45,000 exclusive of GST. It will be struck and collected by Kaipara District Council and paid in installments to the Northland Regional Council.

Over the next three years, 2006 to 2009, the Northland Regional Council will carry out investigations to determine the impact of existing stopbanks, spoil heaps and the railway embankment, the impact of floodgates, the role of ponding areas and options for increasing the level of protection provided by the scheme. The findings of these investigations and a more comprehensive Draft Management Plan will be published for further consultation by the Northland Regional Council before 30 June 2009. These investigations, the preparation of reports and a more comprehensive management plan will be funded by the Northland Regional Council from its Land Management Rate, a rate based on Land Value across all rateable land in Northland.

During this interim period, any new applications for resource consents to construct stopbanks or in any way change the flood regime are likely to be opposed.

KAIHU RIVER FLOOD MANAGEMENT SCHEME LIAISON COMMITTEE

The Kaihu River Flood Management Scheme Liaison Committee has assisted the Northland Regional Council in preparing the Draft Kaihu River Management Plan. This Committee, a subcommittee of the Council's Landcare Committee, comprises:

- a Northland Regional Councillor;
- a Kaipara District Councillor who, in particular, represents the interests of the urban area of Dargaville-Mangawhare;
- an iwi representative;
- three landholder representatives, one from the upper catchment, one from the floodplain downstream of Waihue Road, Mamaranui, and one from the floodplain upstream of Waihue Road.

Under its Terms of Reference, contained in Appendix 1, this Committee will also assist the Council to implement the Interim Management Plan.

It is proposed that a Memorandum of Understanding will be adopted between the Northland Regional Council and the Kaipara District Council in respect of management of the Kaihu River and flood risk in the Kaihu River Valley. In addition to other matters, the Memorandum will provide for the ongoing services of the Liaison Committee. A Draft Memorandum of Understanding between the Northland Regional Council and the Kaipara District Council is being negotiated between the two Councils.

PROCESS FOLLOWED IN ADOPTING THE INTERIM KAIHU RIVER MANAGEMENT PLAN

The adoption of a River Management Plan under the Soil Conservation and Rivers Control Act 1967 is a non-statutory process. That is there are no procedures set down in law for adopting a river management plan. The Regional Water and Soil Plan for Northland, however, declares work associated with flood control schemes to be a controlled activity and requires the preparation of a management plan to support applications for resource consents. The Local Government Act 2002 also requires the Council to consult with the community and with local iwi when proposing to undertake significant activities and when proposing to transfer the management of a water body from one council to another.

The Draft Interim Kaihu River Management Plan was publicly notified on 28 February 2006 and submissions invited until 31 March 2006. Over 100 submissions were received and the Regional Council appointed commissioners who conducted hearings

on 11 August and 19 September 2006 at which submitters spoke in support of their submissions.

In respect of the rating policy proposed from 2007-2008, the Council is required to follow the procedures set out in the Local Government Act 2002. Details of the rating policy are contained in a Statement of Proposal that will be publicly notified and submissions invited in March-April 2007.

The Northland Regional Council took over the management of the Kaihu River Scheme on 1 July 2006.

Kaihu Plan

1.0 INTRODUCTION

- 1.1 **INTERPRETATION** – In this document, the terms “river management” and “land drainage” have the following meanings:

River management – *Managing the river in a way that reduces the risks to human life, buildings, infrastructure, access and primary production from river-generated flooding and erosion.*

Land drainage – *Management of the level of the soil watertable to enable the optimisation of primary production.*

While land use in the Kaihu River valley benefits from a community land drainage scheme and a river management scheme, this management plan deals only with the management of the Kaihu River and floodwaters generated by the river. Some of the major drains, which are maintained by the Kaipara District Council under the Kaihu Land Drainage Scheme, complement the river management scheme by clearing ponded floodwater from the land.

1.2 GOAL OF THE INTERIM MANAGEMENT PLAN

A simple document that sets out the community aspirations, agreed management options, performance standards and funding regime for the management of the Kaihu River and its floodplain.

1.3 OBJECTIVES

The Interim Kaihu River Management Plan sets out the guidelines under which the landholders and residents of the Kaihu River catchment, the Kaipara District Council and the Northland Regional Council will manage the Kaihu River and its floodplain. The Plan sets out to:

1. Reduce the threat to residential development in the settlements of Kaihu, between Kaihu and Ahikiwi, and in Dargaville-Mangawhare.
2. Reduce the sediment load in the Kaihu River by controlling streambank erosion on the Kaihu River and its tributaries.
3. Remove accumulated gravel, blockages, fallen trees or trees in danger of falling into the river, and control streambank erosion on the Kaihu River between the confluence of the Waima River and the Mangatu Stream, and Waihue Road (Mamaranui).
4. Maintain the Kaihu River channel between Waihue Road and the confluence of the Kaihu and Northern Wairoa Rivers in Dargaville according to agreed performance standards.
5. Establish a funding regime for the reinstatement and ongoing maintenance of the Kaihu River Management Scheme.

6. Over the next three years, 2006 to 2009, the Northland Regional Council will carry out investigations to determine the impact of existing stopbanks, spoil heaps and the railway embankment, the impact of floodgates, the role of ponding areas, and options for increasing the level of protection provided by the scheme.

2.0 PROPOSED INTERIM MANAGEMENT PLAN 2006 - 2009

Section 1 - Parore to Northern Wairoa River

1. Develop and maintain an effective channel in the Kaihu River, by machine cleaning accumulated sediment and spraying infestations of ricegrass and giant rush, to within a range of plus 5% or minus 10% of the (1950s) design channel dimensions of the Kaihu River Scheme.
2. The Kaipara District Council will be responsible for constructing and maintaining any protection works required for the Dargaville township.

Section 2 – Rotu Bottleneck to Parore

3. Maintain an effective channel in the Kaihu River, by machine cleaning accumulated sediment and spraying infestations of ricegrass and giant rush, to within a range of plus 5% or minus 10% of the channel dimensions as at July 2006.

Section 3 – Waihue Road, Mamaranui, to Rotu Bottleneck

4. Maintain an effective channel in the Kaihu River between Mamaranui and Rotu Bottleneck to within plus 5% and minus 10% of the channel dimensions as at July 2006.
5. Control streambank erosion by protecting the streambanks as and where required and by removing sediment as it accumulates on the banks on the inside of bends.
6. Remove any obstructions within the river channel and reshape any spoil heaps that may be obstructing flood flows within the reserve at Rotu Bottleneck;

Section 4 – Ahikiwi to Waihue Road, Mamaranui

7. Remove willow blockages and fallen trees from the river channel.
8. Control streambank erosion by removing gravel or encouraging the removal of gravel as it accumulates in the channel.
9. Inspect the river annually to check for unwanted willows and poplars, removing these as required.

Section 5 – Whatoro to Ahikiwi

10. Remove willow blockages and fallen trees from the river channel

11. Manage the gravel resource in the river for 300 metres upstream and 200 metres downstream of Wood Road, by harvesting gravel and armouring the riverbanks, to help control streambank erosion and to prevent overflows.

Throughout the Floodplain

12. Establish a minimum floor level for buildings based on a 1:100-year (1% A.E.P.) flood level plus a 300mm safety margin.
13. Adjoining landholders must enable access by Council or Council contractor's vehicles and machinery along the riverbanks by providing gates or removable fences.
14. Stock shall be excluded from the riverbanks by at least a single-wire electric fence and grazing of the fenced bermland shall be with consent issued under the Kaipara District Council Bylaw.
15. The removal of gravel from the Kaihu River is included in the resource consents issued by the Northland Regional Council for the Kaihu River scheme and any person wishing to extract quantities of gravel greater than allowed as a permitted activity under the Regional Water and Soil Plan for Northland may do so by seeking consent from the Northland Regional Council.
16. The disposal of spoil, debris and logs removed from the river channel shall be the responsibility of the owner of the land from which the material originated, where such persons can be determined.

3.0 KAIPARA DISTRICT COUNCIL BYLAW

While having statutory responsibility for soil conservation, and river and floodplain management under the Soil Conservation and Rivers Control Act 1941, the Northland Regional Council has only severely restricted bylaw-making powers under the Local Government Act 2002. Should the Regional Council, as the scheme manager, wish to make a bylaw to control activities that may threaten the integrity of the stopbanks along the Kaihu River or the efficiency of the scheme, the Regional Council must either:

- request that the Kaipara District Council transfers its bylaw-making powers to the Regional Council, or;
- the two Councils jointly promote and administer a bylaw made by the District Council.

The preferred option is for a jointly administered bylaw, enabling the District Council to use it to protect its land drainage schemes and the Regional Council to protect the flood management scheme. The Kaipara District Council already has a bylaw, adopted by the Hobson County Council and re-adopted by the District Council. It is proposed that the matter of reviewing and promoting a jointly administered bylaw will be included in a Memorandum of Understanding between the two Councils.

4.0 PROPOSED WORK PROGRAMME AND INDICATIVE COSTINGS

The objective of this Interim Management Plan is to restore the lower river, downstream of previous ricegrass and sediment removal, to the design dimensions of the 1950s scheme. This work will be spread over two construction seasons, 2007-2008 and 2008-2009.

Between 2006 and 2009 and as funding permits, maintenance will be undertaken on the Kaihu River channel between:

- within the Rotu Bottleneck; and
- the Rotu Bottleneck and the marae in Station Road, on alternate sides each year; and
- Mamaranui and Rotu Bottleneck in 2007-2008.

During this same period, major blockages will be removed from the river channel between Kaihu and Mamaranui, and gravel and willow blockages will be extracted from the river through Kaihu.

The estimated costs of these items of work excluding GST (based on past work) are:

Initial machine clean of both sides of the Kaihu River from the downstream limit of past cleaning (Curac boundary) to the Northern Wairoa River confluence	\$25,000 each side	\$50,000
Spray ricegrass on lower section of river prior to initial cleaning	\$10,000 each side	\$20,000
Annual maintenance of lower section (spray both sides and machine clean alternate sides each year)		\$15,000
Machine clean from Curac boundary to Bottleneck	\$21,000 each side	\$42,000
Spray ricegrass between Curac boundary and Bottleneck – each spraying		\$26,000
Machine clean/maintenance Waihue Road to Bottleneck every third year		\$20,000
Remove obstructions from the channel and re-shape spoil heaps within Rotu Bottleneck		\$10,000
Trim and remove blockages immediately up and downstream of Wood Road Bridge, Kaihu		\$10,000

Trim trees and remove blockages between Ahikiwi and Waihue Road, Mamaranui	\$20,000
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5.0 PROPOSED ANNUAL WORK PROGRAMMES

2006-2007

With only \$45,000, it is proposed to:

- spray one side of the lower river (Northern Wairoa to Curac)	\$10,000	
- machine clean one side Curac to Bottleneck	21,000	
- spray ricegrass between Curac and Bottleneck and clear blockages from Kaihu to Mamaranui	<u>14,000</u>	
		\$45,000

2007-2008 (new rating provisions)

- Spray both sides NW River to Curac	\$20,000	
- machine clean one side NW River to Curac	25,000	
- spray Curac to Bottleneck	26,000	
- machine clean other side Curac to Bottleneck	21,000	
- remove channel obstructions within Bottleneck	10,000	
- removal of blockages, fallen trees and gravel management	<u>10,000</u>	
		\$112,000

2008-2009

- Spray both sides NW River to Curac	\$20,000	
- machine clean other side NW River to Curac	25,000	
- spray Curac to Bottleneck	15,000	
- machine clean other side Curac to Bottleneck	21,000	
- maintenance Waihue Road to Bottleneck	20,000	
- removal of blockages, fallen trees and gravel management	<u>5,000</u>	
		\$106,000

2009-2010

- Maintenance cleaning NW River to Curac	\$15,000	
- machine clean one side Curac to Bottleneck	21,000	
- spray ricegrass Curac to Bottleneck	26,000	
- manage gravel, clear blockages and fallen trees	<u>10,000</u>	
		\$72,000

Employment of contractors for works under the Management Plan will follow the procedures set out in the Northland Regional Council Tenders Policy.

6.0 SCHEME FUNDING OPTIONS

The Council is bound by the Local Government Act 2002, the Soil Conservation and Rivers Control Act 1941 and the Northland River Management Policy to, where feasible, ensure that those who benefit from river management works, or those who increase the need for such works, are primarily responsible for funding the work. Recognising these principles, the Council proposed the following three possible options for funding the management of the Kaihu River channel for the next three to five years.

6.1 Option 1- Status Quo, uniform Land Value Rate across whole catchment

While a simple method, it is considered unfair in that susceptibility to flooding is not the only determinant of land value.

It is acknowledged that development and use of land within the catchment for farming and production forestry does alter the rate of runoff during heavy rain and does increase the discharge of sediment into the river. That is, the way the land is used increases the need for channel maintenance and so landholders within the upper catchment should pay something towards the cost of maintaining the channel. Land Value alone is not considered a suitable method of measuring this exacerbator effect.

6.2 Option 2 - Differential Rating based on Land Value, but with differentials for the floodplain

This option could involve striking a rate based on land value and:

- retaining the existing rate in the dollar Land Value across the catchment area;
- applying a multiplier to the catchment rate for land generally on the floodplain;
- applying an even greater multiplier to land on the floodplain that is protected from ponding by stopbanks, floodgates, the railway embankment, or by roads.

Part of the argument in favour of this option is that there is an established rating area over which a Land Value-based rate has been struck each year for over 15 years. As noted in Option 1, this tends to unfairly penalise landowners who have a high land value but receive no direct benefit from the scheme. That is, the value of their land, and therefore the level of rating, is in no way related to the direct benefit it receives from maintaining the Kaihu River channel.

In addition, and in recognition of the indirect benefit received by all landholders within the catchment, a Uniform Annual Charge of \$11.25 per assessment, inclusive of GST, would be levied. "Indirect benefit" includes the convenience of less frequent disruptions to road access due to flooding.

For simplicity and to reduce the cost of rate collection, it is proposed that Kaipara District Council makes a lump sum contribution on behalf of the Dargaville urban area of approximately \$5,000, as is currently the case.

6.3 Option 3 - Differential Rating based on Land Area

The third option, and the option favoured by the Northland Regional Council, is to establish a funding structure for the Interim Kaihu River Management Plan involving targeted differential rating, based on land area. There will be two differentials on the floodplain (Classes A and B) determined according to the level of benefit received from the works.

In addition, all land within the Kaihu River catchment contributes floodwater and sediment to the river system, increasing the costs of maintaining the river channel. This option would involve levying an “exacerbator” rate across the balance of the rural land within the catchment, that is land that is not in Classes A and B on the floodplain. In all cases, the rates would be on a Land Area-basis, that is, so much per hectare.

In addition, and in recognition of the indirect benefit received by all landholders within the catchment, a Uniform Annual Charge will be levied. “Indirect benefit” includes the convenience of road access being disrupted less frequently by flooding.

For simplicity and to reduce the cost of rate collection, it is proposed that Kaipara District Council makes a lump sum contribution on behalf of the Dargaville urban area, as is currently the case.

7.0 FUNDING INVESTIGATIONS

As provided for in the Northland River Management Policy, a document ratified by all four Northland Councils, the Northland Regional Council will fund investigations into the impact of stopbanks, floodgates, spoil heaps and the railway embankment, the role of ponding areas and the general flood flow dynamics in the Kaihu River valley. This work will include recording flood flows, surveying and computer modelling. A computer model will be developed and calibrated against a number of flood events until the Council is satisfied that it understands the flood flow regime of the Kaihu River. A report will then be prepared outlining possible future options for managing flooding in the valley. This will include options ranging from simply maintaining the river channel to a comprehensive plan involving greater protection from flooding, managed ponding and soil conservation measures within the catchment to reduce the volume of sediment being generated within the catchment and having to be removed from the lower river channels.

In recognition of the regional benefits in reducing flood risk, the Regional Council will fund the surveying, investigating and planning work from its region-wide Land Management Rate, a targeted rate based on the Land Value of all rateable land in Northland. It is proposed to spend in the order of \$50,000 each year from 2005-06 to 2008-09, comprising both external and internal costs, in conducting these investigations.

8.0 DESCRIPTION OF KAIHU RIVER MANAGEMENT AREA

This Interim Management Plan, while considering the whole of the Kaihu River catchment, deals primarily with the management of a community river management scheme on the Kaihu River downstream of the confluence of the Waima River and the Mangatu Stream.

The Kaihu River catchment comprises 354 square kilometres on the western slopes of the Tutamoe Plateau and the old volcanic Aranga downland between Whatoro and Maunganui Bluff. Several major tributaries meet to form the Kaihu River immediately upstream of the small settlement of Kaihu, and the river then flows in a broad valley on the inland edge of former sand dunes and terraces that extend southwards from the Maunganui Bluff to the Northern Wairoa River to the tip of Pouto Peninsula. The floodplain and associated terraces of the Kaihu River extend for 29 kilometres between Kaihu and Dargaville and vary in width from 1.5 km at Mamaranui, reducing to 0.4 km at the Rotu Bottleneck and widening again to 1.0 km wide just upstream of Parore. The Kaihu River joins the Northern Wairoa River in Dargaville.

The river is joined by a number of small east bank (left bank when looking downstream) tributaries between Kaihu and the Rotu Bottleneck. These streams drain the western slopes of Tutumoe and the range of hills separating the Kaihu and Awakino Valleys. Sediment from the Kaihu River has trapped several right or west-bank tributary valleys draining the old dunes and sand terraces between the Kaihu Valley and the West Coast. Peat has accumulated in these swampy valleys. With drainage for farming, the peat has shrunk, creating basins in which water can pond for some time following heavy rain. Floodwaters from the Kaihu River spill out into these basins downstream of Waihue Road, Mamaranui.

9.0 RIVER MANAGEMENT ISSUES

The Northland River Management Policy notes that it is neither practical nor financially feasible to prevent all flooding in Northland. While improved river management can reduce the depth, duration and frequency of flooding, it is inevitable that land on floodplains will periodically be inundated. The overall goal for the Kaihu River Management Plan is to manage the river and the flooding from the river to avoid damage to buildings or threats to human life, to maintain road access and to optimise agricultural production.

- 9.1 Upper catchment** – Much of the upper catchment of the Waima River comprises rolling old volcanic hill country with deeply weathered soil. While steeper slopes are prone to slipping during high intensity rainstorms, the most common forms of soil erosion are streambank erosion and gullying. These two forms of erosion cause large volumes of sand, silt and red colloidal clay to be discharged into the river system. So too do overgrazing and pugging of these volcanic clay soils. The coarser material, sand and silt, is deposited on the berms of the river and on the inside of bends between Mamaranui and Rotu Bottleneck, causing the river to meander and erode the opposite bank. This accumulated material and the finer clay deposited in the tidal reaches of the Kaihu River between the Rotu Bottleneck and Dargaville must be periodically removed to maintain the capacity and alignment of the channel and to prevent streambank erosion.

- 9.2 Kaihu to Ahikiwi** – The Waima River flows within a narrow gorge until it joins with the Mangatu Stream to form the Kaihu River about 3 km north of Kaihu. In the 3 km between Kaihu and Ahikiwi, the river has formed distinct river terraces with floodwaters confined primarily to the lowest or most recent terrace. Coarse river gravel has built up in the bed of the Kaihu River, reducing the capacity of the channel and increasing the risk of an overflow in the settlement of Kaihu. In Cyclone Bola, the river overflowed both its banks, flowing around the Kaihu Hall, through the old railway station site, and across the football fields and in front of the Kaihu Hotel, and back into the river a few hundred metres downstream of Kaihu. The gravel load in the river needs to be managed for about one kilometre upstream of Kaihu and three kilometres downstream so as to maintain sufficient capacity in the channel to reduce the risk of an overflow amongst the houses.

For two kilometres downstream of Kaihu, the river is choked with willow (*Salix fragilis*) trees. These trees are obstructing the flow, diverting flood flows into the banks causing streambank erosion and accumulating gravel. During floods they collect debris, damming the flow and diverting the floodwaters out of the channel across the floodplain. Streambank erosion is threatening and causing slumping of State Highway 12 and affecting farmland and orchards on both banks of the river.

- 9.3 Ahikiwi to Waihue Road, Mamaranui** - Downstream of Ahikiwi, as far as the Rotu Bottleneck, the river floods out over a much wider floodplain on which there is clear evidence of a number of older river channels, showing where the river has meandered backwards and forwards across the floodplain. Sediment carried by the river has been deposited along the banks of these old channels, making this riverbank land higher than the surrounding floodplain and clear of water when the rest of the floodplain is inundated.

Poplar trees were planted along the banks of the Kaihu River in the early 1900s to control streambank erosion. Some of these trees remain but are becoming over-mature and need to be removed where they are at risk of falling across the river. Others have suckered where their roots have been exposed along the riverbanks and these new tree trunks are impeding the flow of water in the channel. The soil on the banks through this reach of the river is highly erodible so the removal of these poplars growing in the channel needs to be undertaken in a way that minimises the risk of erosion.

- 9.4 Waihue Road, Mamaranui, to the Rotu Bottleneck** – The Kaihu River Scheme was constructed in three stages. The section of river between Waihue Road and the Rotu Bottleneck, a point at which the floodplain narrows and the river begins to be influenced by the tide, was Stage 3 of the earlier scheme. Downstream of Waihue Road, the gradient of the riverbed reduces and the meander pattern of the river increases, so that as it approaches the Rotu Bottleneck, the river is following a very convoluted course, looping back on itself several times.

All trees have been removed from the riverbanks between Waihue Road and the upstream side of the wetland forest immediately upstream of the Rotu Bottleneck. Grass extends well down the banks of the river and when this grass becomes rank, it traps large volumes of sediment each time there is a fresh in the river.

Immediately upstream of the Rotu Bottleneck is a natural ponding area where the grade of the riverbed flattens, sediment is deposited and floodwaters are ponded between tides. There are still remnants of the original swamp forest vegetation in this area. It was the intention of the original Kaihu River Control Scheme that the river channel should remain relatively unmodified at the Rotu Bottleneck to impede the flow of floodwaters, so protecting the developed farmland downstream of this point and the urban area of Dargaville-Mangawhare. It is understood that there are obstructions within the river channel and spoil heaps within the Bottleneck Reserve that are impeding flow within the Reserve.

There are other stopbanks on the upstream bank of this old Kaihu River loop which have been authorised by way of resource consents. The effects of all of these stopbanks and the role of the ponding areas will be investigated between 2006 and 2009 so that recommendations can be made on their future management under a more comprehensive Kaihu River Management Plan.

- 9.5 Rotu Bottleneck to Parore** – Parore is at another narrow point in the valley, where the floodplain narrows to about 300 metres wide before widening again as it approaches the outskirts of Dargaville. The river through this 6km Rotu to Parore stretch has been slightly modified by being widened and straightened, and accumulated sediment has been dredged under Stage 2 of the former Kaihu River Scheme. Infestations of Manchurian ricegrass (*Zizania latifolia*) and giant rush (*Schoenoplectus californicus*) occur through this stretch, increasing the need for more frequent machine cleaning of the channel, both to remove the obstruction caused by the ricegrass and giant rush growing in the channel and the sediment trapped by this weed.

The material removed from the channel has been deposited in spoil heaps close to the riverbanks. Over time, the spoil heaps have in places been linked together to form stopbanks running parallel to the channel. The formation of these stopbanks is contrary to the original scheme design and has not been authorised under the Soil Conservation and Rivers Control Act 1941, the Water and Soil Conservation Act 1967 or the Resource Management Act 1991. Whereas the floodwaters from the Kaihu River previously spilled out across the full floodplain between the Rotu Bottleneck and Parore, they are now largely confined to the river and the narrow strip of bermland between the banks. The banks/spoil heaps may also be preventing water that has overflowed into the area between the river and SH12 from flowing back into the river. As noted above, these banks have been formed from spoil heaps and are neither well sited or of consistent height, neither are they complete.

Babylon Stream and Rotu Stream, both west (right) bank tributaries were also enlarged as part of the Kaihu River Scheme undertaken in the mid-1960s. These channels carry floodwaters that have spilled out of the Kaihu River and into the side valleys, back into the Kaihu River. They have stopbanks along their sides in some areas.

The old Donnelly's Crossing Railway embankment also acts as a stopbank through this section of the valley, restricting the spread of floodwaters from the

Kaihu River into the side valleys, and restricting the flow of these ponded floodwaters back into the Kaihu River.

- 9.6 Parore to the Northern Wairoa River** – The lower section of the river, included in Stage 1 of the original scheme, extends from Parore to where the river enters the Northern Wairoa River between Dargaville and Mangawhare. This reach was reconstructed and straightened in the late 1950s.

This lower section of the river is strongly influenced by the tide and sediment from the Northern Wairoa River has been deposited along the banks of both the Kaihu and Northern Wairoa River, making the adjoining land as high as or even higher than the bermland in the reach covered by Stage 2, between Rotu and Parore. Parore West Road crosses the narrow point in the valley on a raised embankment which helps to control floodwaters entering the lower valley. Parore Road has been raised since it was overtopped in the flood caused by Cyclone Bola and may now be acting as a dam.

The river through this reach is partially stopbanked on the east (left) bank, and an area of the floodplain immediately downstream of Parore Road Bridge and east of the river is protected by the Donnelly's Crossing railway embankment. The Kaipara District Council is currently undertaking improvements to the banks between Beach Road and the Northern Wairoa confluence, including the construction of stopbanks to fill gaps and low spots on both banks of the Kaihu River. Without this remedial work, there is a very real risk of a major Kaihu River flood entering Dargaville along Valley Road and Beach Road. There is also a risk of floodwaters spilling over the west (right) bank of the river, through Memorial Park and into the low-lying area of Mangawhare.

The banks of the river are heavily infested with Manchurian ricegrass and the channel with giant rush in this reach. Sediment deposited in this dense mass of foliage has to be removed at regular intervals between the Parore Bridge and some 4.0 km from the river mouth. Computer modeling to date indicates that the ricegrass and rush infestations in the lower 4.0 km of the river restrict the flow of water, causing a backwater effect as far as Parore. Clearing the ricegrass and accumulated silt benefits Sections 1 and 2 of the original scheme, that is between Rotu Bottleneck and the Northern Wairoa River confluence. Controlling ricegrass in this reach will lower the water level during floods and reduce the height of stopbanks planned to protect Dargaville and Mangawhare.

9.7 Conclusions

Management of flooding in the Kaihu River Valley involves both managing floodwaters and managing the sediment load of the river. There is a need to manage gravel in the river channels upstream of Ahikiwi to maintain capacity in the channels and so reduce the risk of flood overflows and of streambank erosion threatening dwellings in Kaihu. Soil conservation measures within the upper catchment will help to reduce the amount of silt carried by the river, which has to be regularly removed from the channel downstream of the Rotu Bottleneck.

Within the middle reaches of the river, from Ahikiwi through to the Rotu Bottleneck, fallen trees, accumulated gravel and the build-up of sediment on the

inside of bends can all increase the incidence of streambank erosion. Through this section, river management may involve little more than maintaining a stable channel, and accepting that floodwaters will periodically overflow the riverbanks. There may also be obstructions in the channel and spoil heaps within the Rotu Reserve that are raising flood levels above the Bottleneck and prolonging the duration of flooding above the Bottleneck.

Downstream of the Rotu Bottleneck, the river channel must be frequently maintained to remove fine sediment brought down from the upper catchment. Even with extensive soil conservation works in the upper catchment and a reduction in sediment load, this channel maintenance work will still be required.

The impact of ponding immediately above the Rotu Bottleneck and in several other areas on the floodplain is not well understood. Nor is the effect of stopbanks, floodgates, the railway embankment and roads, all of which prevent floodwaters flowing freely across the floodplain. During the three to five-year term of this Interim Management Plan, investigations will concentrate on the development of an understanding of flood flows and ponding on the floodplain. Future management options could well involve enhancement of ponding, both to store flood peaks and to encourage the deposition of sediment, so reducing the sediment load reaching the lower river.

Investigations will also cover the tidal effects in the lower river and options for improving the outflow into the Northern Wairoa River.

10.0 RIPARIAN MANAGEMENT

The major objective of this Plan is to reduce the impact of flooding on both primary production and on buildings in Kaihu, Dargaville and Mangawhare. In achieving these objectives, however, the Plan must have regard for the riparian management provisions of the operative Regional Water and Soil Plan for Northland, and the Northland Regional Action Plan of the National Clean Streams Accord. The form of the riparian management will vary from one part of the river system to another and, in some areas, optimum riparian management for flood control may conflict with optimum management for water quality and/or in-stream values. In implementing the Plan, the Regional Council will work with landholders, community groups and other stakeholders to develop riparian management regimes that protect stream banks from erosion, protect and enhance instream wildlife habitats and improve water quality, but still optimise flood flows in the streams and rivers and their berms.

- In the upper catchment of all tributary streams, the objective will be to encourage the establishment of dense and healthy streamside vegetation to traps sediment and control streambank erosion.
- Through the gorge areas on each stream, the Plan will encourage the exclusion of stock from areas of remnant bush, pest control measures will be encouraged and landholders encouraged to place the land under protective covenants.
- Between the confluence of the Kaihu River and the Mangatu Stream and Mamaranui, weed species such as wild ginger, and pampas grass in the river

channel will be controlled, and willow trees will need to be removed from within the channel where they are trapping sediment and gravel and blocking the river channel. So too will willow and poplar (or any other) trees that are obstructing flow in the channel. Landholders will be encouraged to exclude stock from the streams and immediate riverbanks.

- Downstream of the Rotu Bottleneck, the river flows in an artificial channel which must be cleared of accumulated sediment and weed. The primary function of the bermland in this stretch is as a floodway to efficiently convey floodwaters. The berms between any stopbanks and the river and the stopbanks themselves need to be carefully grazed to maintain a dense sward of grass but must not be overgrazed.

APPENDICES

- 1. Kaihu River Flood Management Scheme Liaison Committee Terms of Reference**
- 2. Memorandum of Understanding between the Northland Regional Council and the Kaipara District Council on the management of the Kaihu River (Yet to be negotiated)**

APPENDIX 1

KAIHU RIVER FLOOD MANAGEMENT SCHEME LIAISON COMMITTEE

Terms of Reference

- Reporting to:** The Landcare Committee of the Northland Regional Council
- Composition:** The Liaison Committee is a sub-committee of and appointed by the Northland Regional Council and shall comprise:
- One Northland Regional Councillor who will chair the meeting
 - One Kaipara District Councillor (who also represents the residents of Dargaville)
 - One member nominated by Te Roroa
 - One member nominated to represent Te Houhanga Marae
 - Three representatives of the ratepayers of the river catchment, one from each area:
 - Area 1 (Floodplain Rotu Bottleneck to Dargaville)
 - Area 2 (Floodplain Confluence of Whatoro and Mangatu Streams to Rotu Bottleneck)
 - Area 3 (Catchment area beyond the floodplain)
- Chairperson:** The Chairperson of the Committee shall be elected from amongst members of the Committee on an annual basis.
- Length of Term:** Appointments will be made for a term of three years, in sequence with the local government elections, or until earlier disqualification, death or resignation. Should any of the latter three events arise, replacement appointees may be made by the Northland Regional Council.
- Meeting Frequency:** As required, but no less than three times each year.
- Standing Orders:** Meetings will be run in accordance with New Zealand Standard Model Standing Orders (NZS 9202:2001).
- Objective:** To advise and make recommendations to the Northland Regional Council, via the Landcare Committee, on all matters pertaining to the development and implementation the Kaihu River Management Scheme.

Functions:

The Kaihu River Management Plan Liaison Committee is an advisory committee of the Northland Regional Council and has no delegated authority or specific powers. Its functions are to:

1. Provide a stakeholder forum for the development of policies and plans for the management of flooding within the Kaihu River catchment.
2. Enable stakeholders to participate in the ongoing management of flood control with the Kaihu River catchment.
3. Facilitate communications between the Northland Regional Council, which is ultimately responsible for the development and implementation of the Plan, and the residents and landholders within the catchment.
4. Advise the Northland Regional Council on all matters relating to the development and implementation of the Kaihu River Management Plan.

Specific tasks will include:

1. Assisting the Northland Regional Council to develop and adopt a Management Plan for the management of flooding and erosion within the catchment of the Kaihu River.
2. Annually reviewing the priority and order of works within the management plan, ensuring that works are being undertaken in the order set out in the Plan and to the standards specified in the Plan or, when necessary, recommending changes to the Plan.
3. Each year, reporting on performance against the past year's work plan and recommending to the Regional Council an annual works plan and budget for the forthcoming financial year.

