

Mahurangi Land Restoration Programme

Mahurangi West Sub-catchment Action Plan 2022



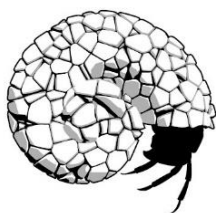
The purpose of this plan is to describe the unique environment, land use, and risks in the Mahurangi West Sub-catchment and link these to the actions and milestones achieved to engage the community and reduce sediment loss, across this sub-catchment and the wider Mahurangi Harbour Catchment.

The Mahurangi West Sub-catchment Action Plan forms part of a series covering the sub-catchments of Mahurangi Harbour, produced under the Mahurangi Land Restoration Programme (MELR). This plan does not in any way serve as an action plan to give effect to the National Policy Statement for Freshwater Management, including Te Mana o te Wai.

Published June 2023



This sub-catchment action plan has been prepared for Auckland Council by Adaptive Environmental Consulting.



Adaptive
Environmental Consulting

Ko au te awa Mahurangi, ko te awa Mahurangi ko au – I am the Mahurangi river, the Mahurangi river is me.

The river is of huge importance to Ngāti Manuhiri who used it as a highway, a food source, and a spiritual home. Our uniqueness and identity as Ngāti Manuhiri is expressed in all the things that we do, that we can see, touch, and hear. Our cultural footprint is underpinned by Manuhiritanga and how we express that through our tikanga and kawa. One of our responsibilities and obligations as Mana Whenua Kaitiaki is to actively protect and enhance Ngā Taonga for the use and benefit of future generations as acknowledged in our governance and management protocols. The name Mahurangi was taken from Motu Mahurangi, an island at the mouth of the Waiwerawera River - important in Ngāti Manuhiri traditions.

At some point in time, the name was re-used to refer to the entire coastal region. Generational occupation is also reflected by the other numerous place names and landmarks that dominate the wider area e.g. Waihē (inner Mahurangi River), Motu Kororā (Saddle Island), the island pā of Maunganui (Casnell Island), Motu Kauri (Grant's Island), Puhinui (the waterfalls at Warkworth), and Pukapuka, a kāinga and now the site of a Cemetery which remains at the head of the harbor.

“Ko te iti ō Waihē, he puta kino nui” - Even though Waihē (the disputed waterway) is not large, it has been the cause of great trouble.

The area known today as Warkworth is traditionally called Puhinui after the waterfalls at the head of the Mahurangi River in the centre of town. The Puhinui Falls are wāhi tapu, being of significance to Ngāti Manuhiri. Further south of the falls along the awa (river) are waka landing sites used by the people as they travelled inland from the coast, to kāinga, cultivations or through travel. Many Ngāti Manuhiri tupuna are associated with or known to have occupied this wider area.

The Mahurangi River flows southeast from Puhinui and into the inner Mahurangi Harbour which is known to Ngāti Manuhiri as te Waihē. Te Waihē is navigable for over 10 kilometres inland up to the waterfalls at Warkworth and was a main route inland with several known waka landing sites along the banks. The river itself and the falls are both wāhi tapu. The awa is known to be the resting place of a taniwha, Waawaia, who is a kaitiaki and protector of this wai and of Ngāti Manuhiri.

Historically this inland area was forested (kauri) and was utilized for many resources i.e., snaring forest birds; gathering fruits and berries for food or rongoā (medicine); trapping and gathering tuna (eels), koura, kākahi (freshwater mussels) and waterfowl from the Mahurangi River and its tributaries; felling trees for waka; and harvesting flax for weaving. New sites within Ngāti Manuhiri rohe (tribal area) are still being uncovered today.

Kourawhero (Red freshwater Crayfish) were a valued mahinga kai (cultivated food) species and considered a delicacy by Ngāti Manuhiri. In the past, they were a staple food item in that area. Kourawhero were found in abundance and greatly prized.

Introduction

The MELR is a co-governance project developed by Auckland Council in partnership with the Ngāti Manuhiri Settlement Trust. The project goal is “to increase the mauri of the Mahurangi Harbour and its waterways by achieving measurable reductions in human induced sediment from rural land management activities”.

Catchment Description

The Mahurangi West sub-catchment (Mahurangi West) is situated along the western coastline of the Mahurangi Harbour. It is one of six sub-catchments that form the wider Mahurangi catchment that centers around Te Waihē - the Harbour (Map 1).

Mahurangi West covers 3,192ha from Hepburn Creek in the north to Huawai Bay and Jamieson Bay in the south. (Map 2).

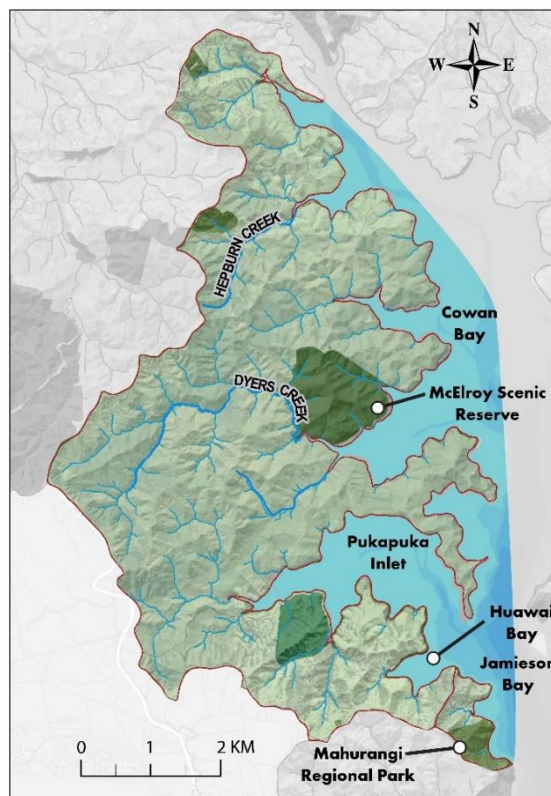
The average summer to winter temperatures range from 18.5°C and 10.8°C, respectively and the catchment receives approximately 1,432mm of rainfall annually. Elevation ranges from sea-level at the harbour margin to 181m at Cowan Bay Road. The catchment is dominated by steep slopes with 50% of the land ≥ 25 degrees.

Mahurangi West has 74km of permanently flowing streams and 43km of harbour margin. The steep, coastal environment supports approximately 341km of small, seasonal waterways. The main streams and inlets in the catchment are Hepburn Creek, Cowan Bay, Dyers Creek and Pukapuka Inlet.

Map 1 – MELR Sub-catchments



Map 2 – Topographic Map of Warkworth SC



Bedrock, Soils and Slope

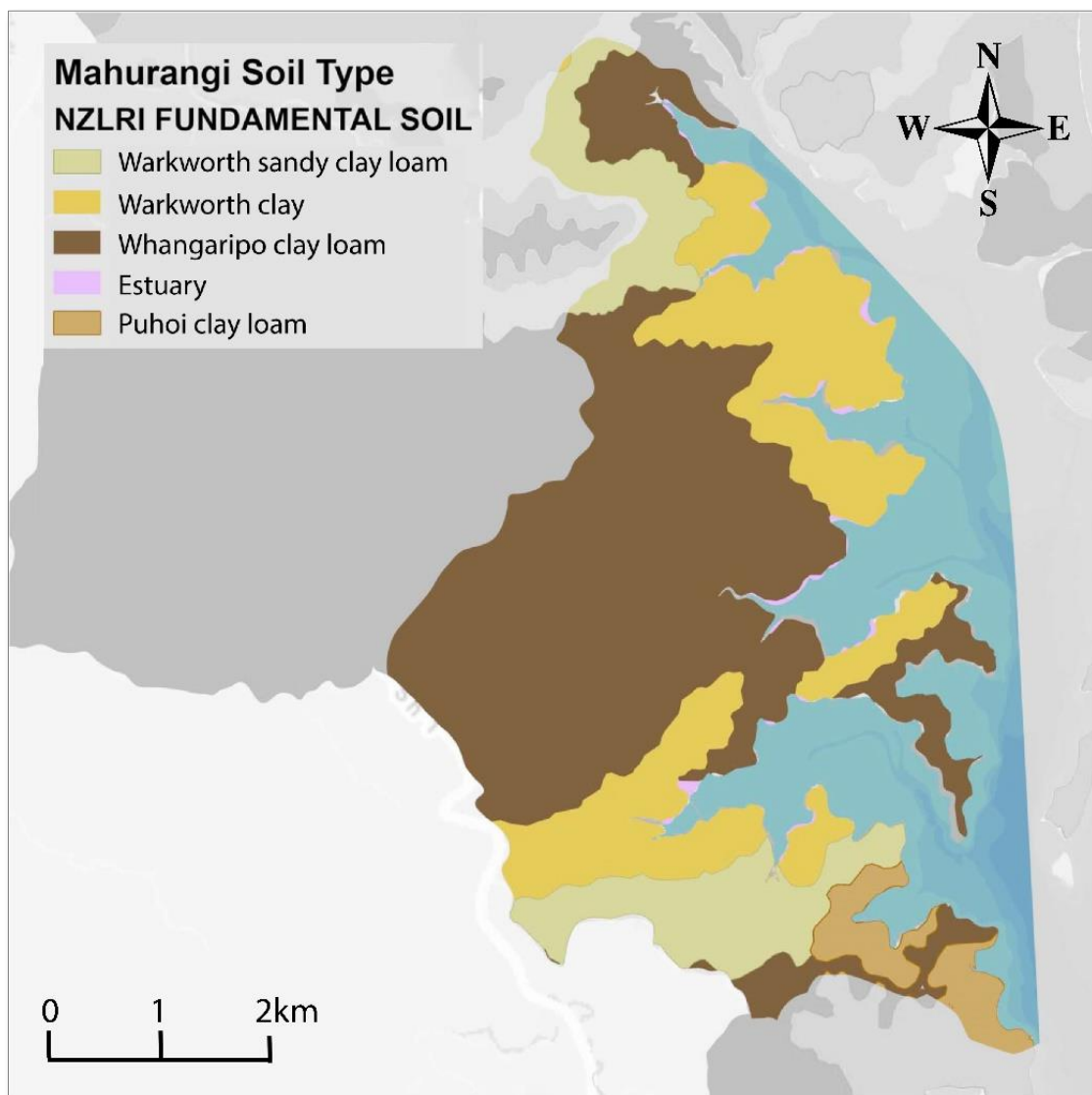
The catchment is dominated by Waitemata interbedded sandstone and siltstone (97%) and some limestone (3%). The rocks are relatively young and of marine origin, formed between 11.6 to 5.3 Ma during the late Miocene period. These rocks are classed as weak bedrock and are subject to gully and slip erosion.

The main soil types are Whangaripo clay loam (55%), Warkworth Clay (26%), Warkworth sandy clay loam (15%) and Puhoi clay loam (4%). The soil types are

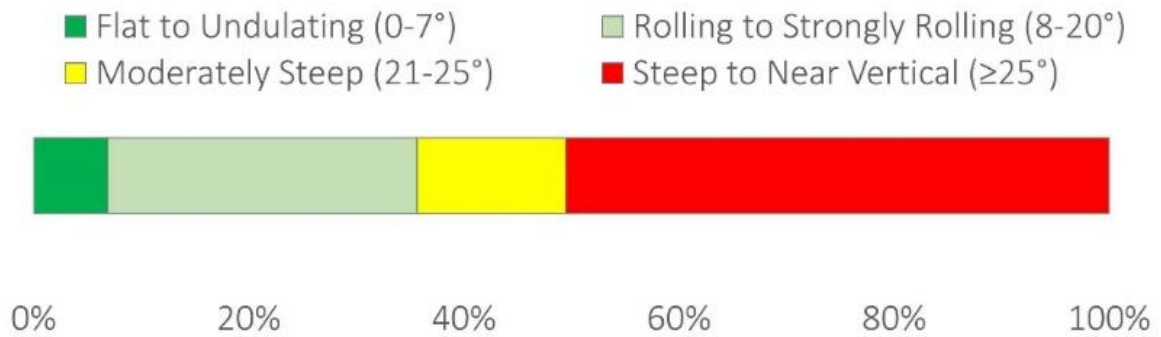
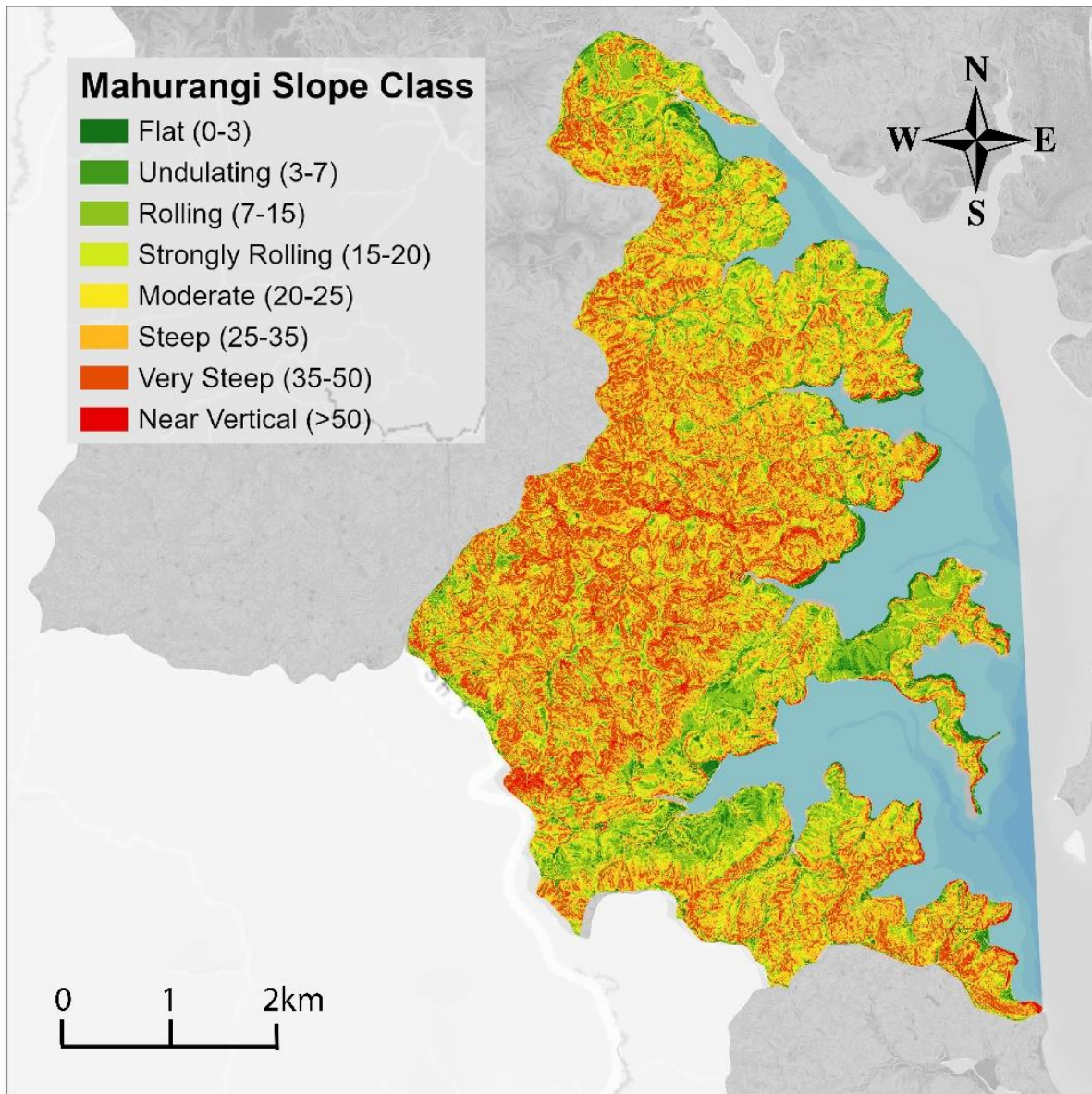
predominantly strongly weathered and poorly drained and as such can become waterlogged and prone to pugging (Map 3).

The catchment is steep with just over half the catchment (51%) classed as steep to near vertical land (≥ 25 -35 degrees) and 14% class as moderately steep (20-25°). Twenty nine percent of the SC is classed as rolling to strongly rolling (7-20°) and 7% is classed as flat to undulating (0-7°), representing the more productive agricultural land in the catchment (Map 4).

Map 3 – Soil Type

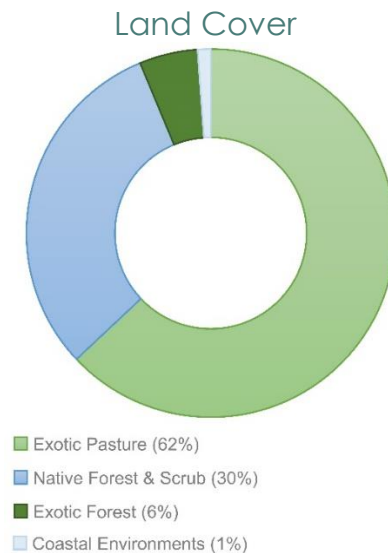


Map 4 – Slope

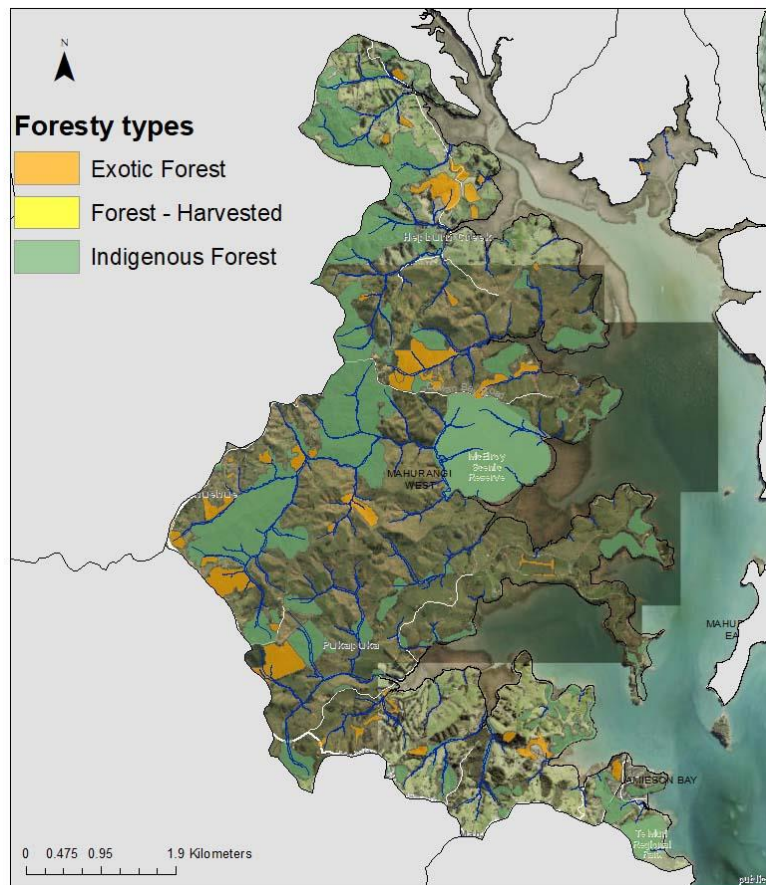


Land Use

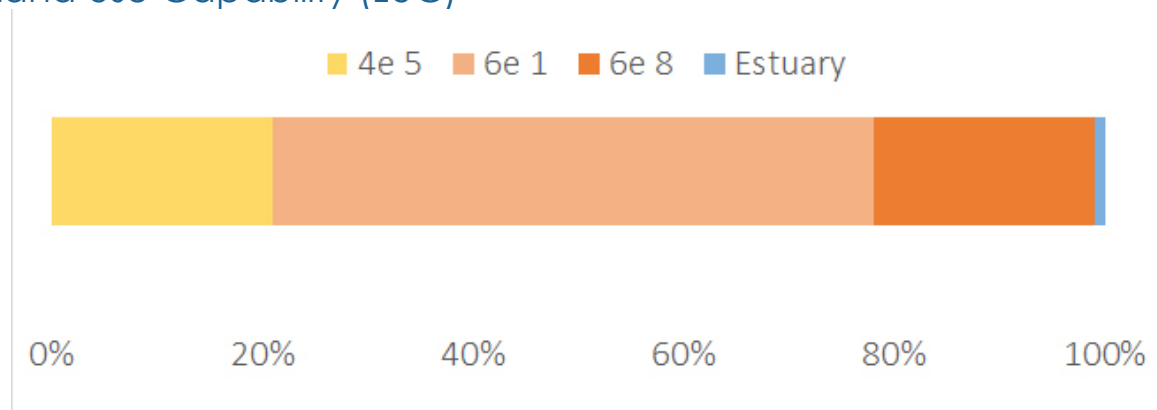
Drystock farming (sheep and beef cattle) is the main land use in the catchment and the dominant land cover is exotic pasture (1,985ha) accounting for 62% of the total catchment area. Mahurangi West has significant areas (1,035ha) of indigenous forest cover, covering approximately 30% of the total catchment area. Exotic forests cover 191ha, accounting for 6% of the sub-catchment area. There are no harvest forest sites identified in Mahurangi West (Auckland Council, 2021).



Map 5 – Location of Native and Exotic Forests in Mahurangi West



Land Use Capability (LUC)



LUC land use limitations table

Source: Harmsworth (1996)

LUC Class	Arable cropping suitability†	Pastoral grazing suitability	Production forestry suitability	General suitability
	1	High	High	High
2	↓ Low	↓ Low	↓ Low	
3				
4				
5	Unsuitable	↓ Low	↓ Low	Pastoral or forestry land
6				
7				
8	Unsuitable	Unsuitable	Unsuitable	Conservation land

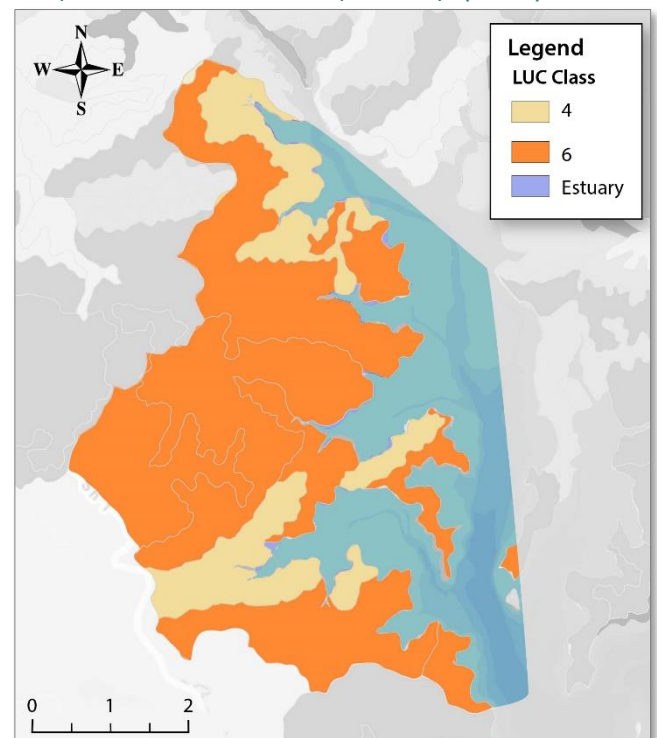
↓
Increasing limitations to use
↓

Managing land sustainably and within its natural limitations allows the productive potential of the land to be realised whilst simultaneously reducing erosion and maintaining healthy waterways and ecosystems. Land use capability (LUC) is an assessment of the productive potential and limitations of the land, based on rock and soil type, slope, erosion type and severity and vegetation cover. It comprises eight classes of land (1 to 8) with higher numbers indicating greater land use limitations, see the LUC limitations table below (Harmsworth, 1996).

The dominant land use capabilities in Mahurangi West are 6e1 (57%), followed by 6e8 (21%) and 4e8 (21%). The remainder is classed as estuary (1%) (Auckland Council, 2021). Moderate erosion risks are associated with the

above three LUC classes, including gully, tunnel gully, earthflow, sheet and slip erosion (Harmsworth, 1996).

Map 6 – Land Use Capability (LUC)



Key Catchment Risks and Restoration Actions

Based on the local geology, slope, climate and land use the main contaminant risk in Mahurangi West is sediment. Land use and management practices have the potential to either mitigate or exacerbate contaminant

loss. In particular, controlling livestock access to waterways, retiring and planting riparian margins and steep, erosion-prone slopes and having well designed and maintained farm infrastructure (water troughs, stream crossings, tracks and laneways) are key actions to target sediment loss.

Monitoring in Mahurangi West

Long-term monitoring of intertidal benthic communities in three inlets on the Mahurangi West coastline – Cowan Bay and Dyers Creek (since 2005), and Jamieson Bay (since 1994) – reflect a decline in intertidal benthic health (BHM) in relation to an increase in sediment mud content (Drylie, 2021). Current intertidal BHM scores are Fair (C band) at Dyers Creek and Jamieson Bay and Poor (D band) at Cowan Bay.

Freshwater macroinvertebrates have been monitored at two sites in Dyers Creek since 2007 – Pasture and Forestry. Freshwater invertebrates are widely used indicators of ecological health

because they respond predictably to physical and chemical changes in their environment. The Macroinvertebrate Community Index (MCI) was developed in New Zealand as a monitor tool for streams and shallow rivers. Current freshwater MCI scores are Fair (C band) at the Pasture site and Good (B band) at the Forest site (Chaffe, 2021). Differences between the two sites are largely attributed to stream habitat as reflected by Stream Ecological Valuation Scores (SEVs). SEV scores range from 1 to 0 with higher numbers reflecting more pristine habitats (Neale et al., 2015). The SEV score is higher at the Forest site (0.78) than the Pasture site (0.63). There are no discernible trends over time for MCI at either site. At the time of writing no freshwater quality monitoring data was available for Mahurangi West. A summary of monitoring results are presented in Tables 1 and 2 and Map 7.

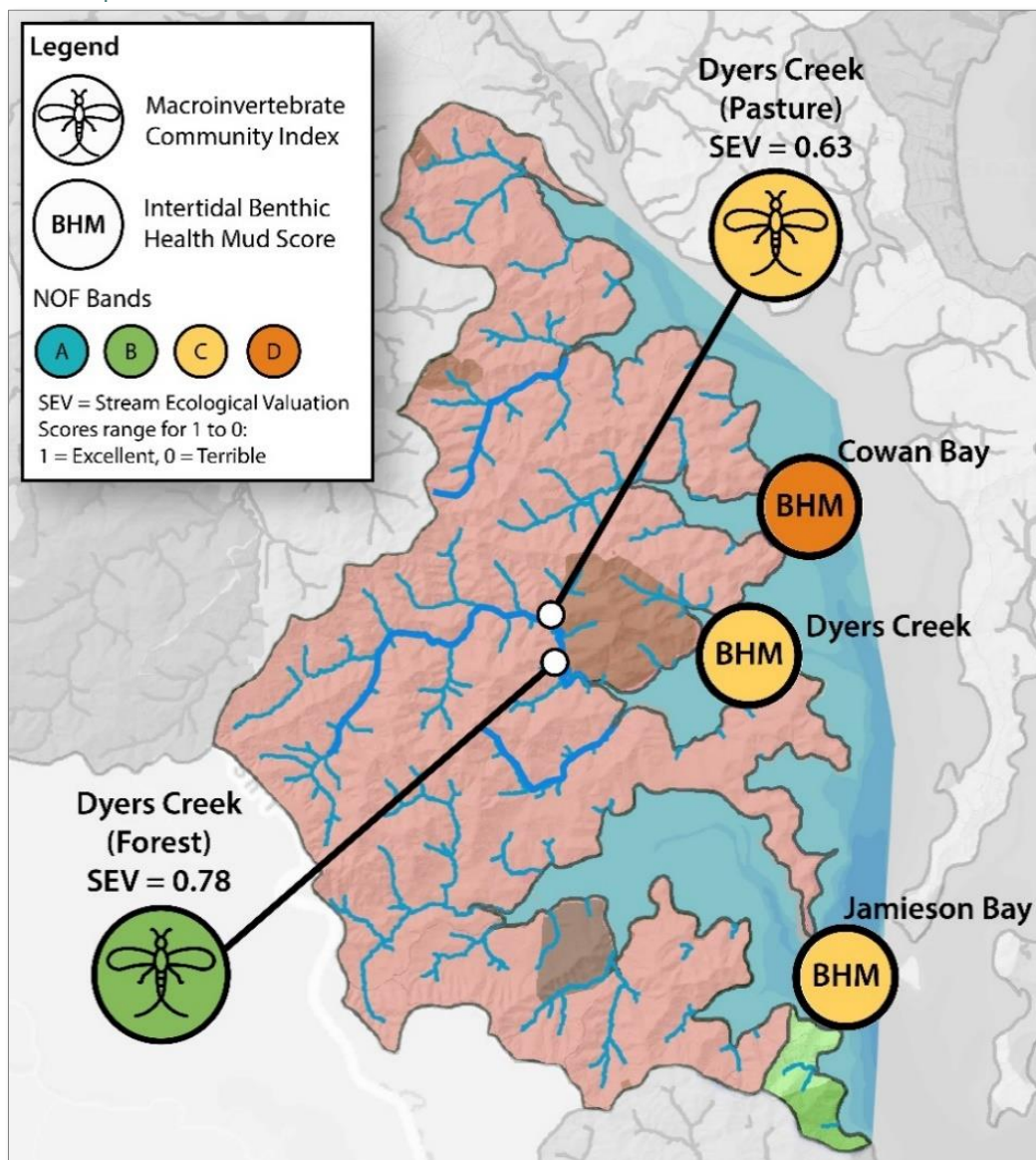
TABLE 1. AUCKLAND COUNCIL STATE OF THE ENVIRONMENT MONITORING – FRESHWATER INVERTEBRATES

Site Name	Year First Sampled	Number of Taxa	% EPT Taxa	Freshwater Invertebrate (MCI)	
				5-year Median (2015 – 2019)	Attribute Band
Dyers Creek Pasture	2007	27	29.6%	99.2	C
Dyers Creek Forest	2007	27	43.4%	119.3	B

TABLE 2. AUCKLAND COUNCIL STATE OF THE ENVIRONMENT MONITORING – STREAM ECOLOGICAL VALUATION (SEV)

Site Name	Main Land Cover	Upstream Catchment Area (km ²)	Overall SEV Score out of 1	
			Median (2015 – 2019)	Grade
Dyers Creek Pasture	Rural, Pasture (50%) Native Forest (42%)	6	0.63	Good
Dyers Creek Forest	Rural, Pasture (48%) Native Forest (45%)	6.7	0.78	Good

Map 7 – Current Health of Freshwater & Intertidal Environments



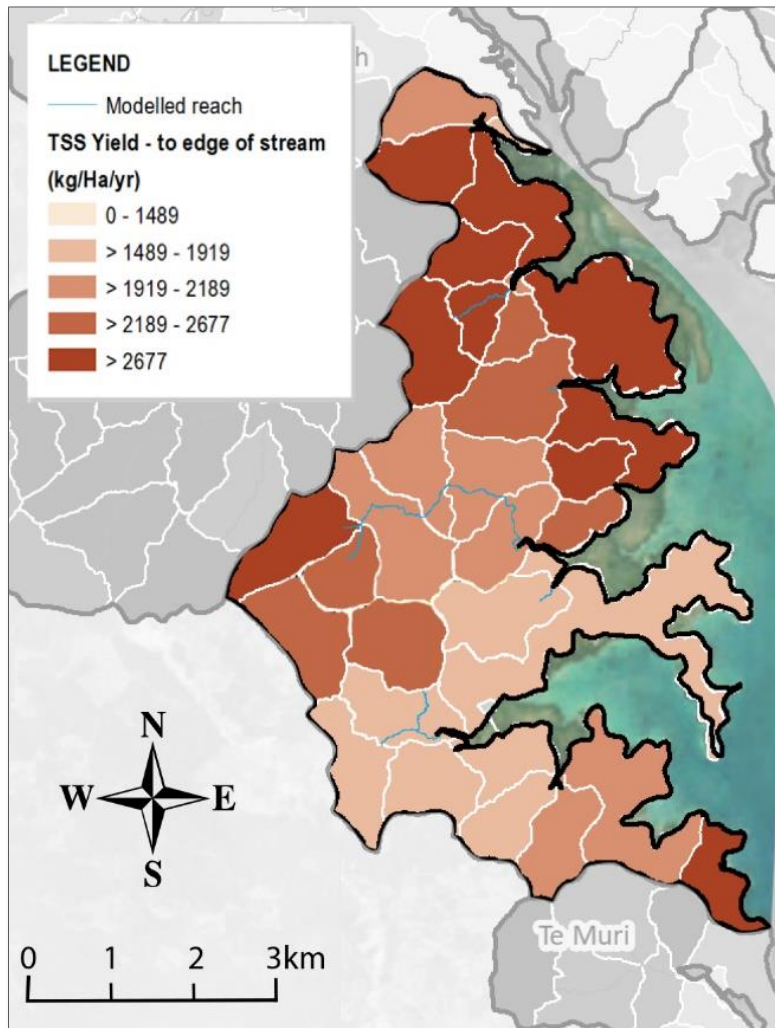
Freshwater Management Tool

The Freshwater Management Tool (FWMT) has been designed by Auckland Council to support decision-making, community engagement and integrated catchment management throughout the Auckland region. The tool can estimate contaminant loads by processing information on landscape characteristics, rainfall, river flow and freshwater monitoring data. Sediment yield across Mahurangi West is estimated to be greatest (>2,677 kg/Ha/yr) along the coastal headlands

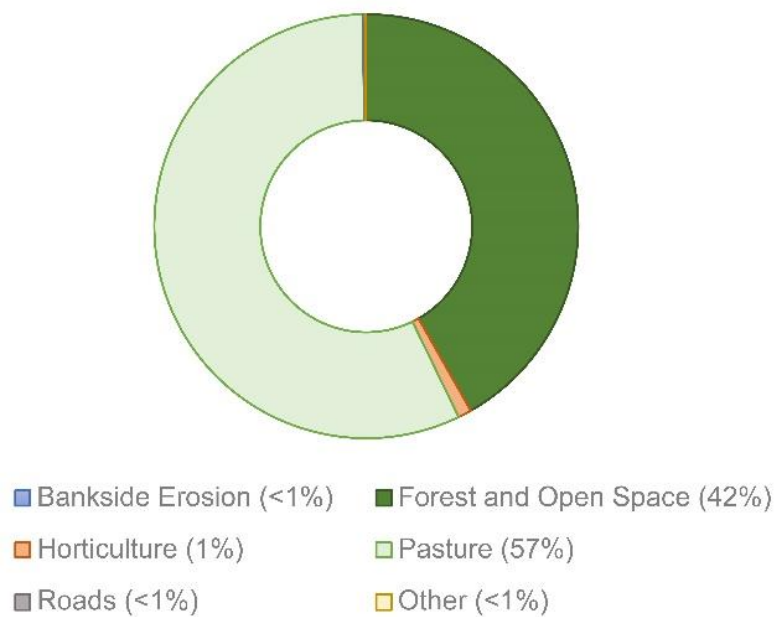
adjacent to Hepburn Creek, Cowan Bay, Dyers Creek and Jamieson Bay. Higher loads are also predicted at Pohuehue, near the headwaters of Dyers Creek.

Mahurangi West has the highest estimated average annual sediment yield (1,068 tonnes/km²/yr) of all sub-catchments surrounding the harbour. In relation to land cover pasture accounts for the highest sediment contribution (57%) followed by forests and open space (42%).

Map 8 – Estimated Sediment Yield Across Mahurangi West



Estimated Average Annual Sediment Load by Land Cover (Tonnes/year)



What Are We Doing About It?

The MELR team is working with mana whenua, private landowners and the wider council family to identify positive actions to reduce sediment loss and enhance the mauri of the entire Mahurangi catchment. Key actions being taken include:

- Excluding livestock from waterways, erosion prone gullies and slopes.
- Establishing permanent native vegetation cover.
- Protecting and enhancing natural wetlands.
- Funding alternative stock water supply on farms.
- Retiring critical sediment source areas on farms.
- Removing barriers to native fish migration.
- Implementing a catchment-wide monitoring programme to track our progress and learn as we go.

Cultural Monitoring and Tikanga Māori

Relates to the mauri of the awa and its taonga species. Acknowledges the natural rhythms of maramataka and

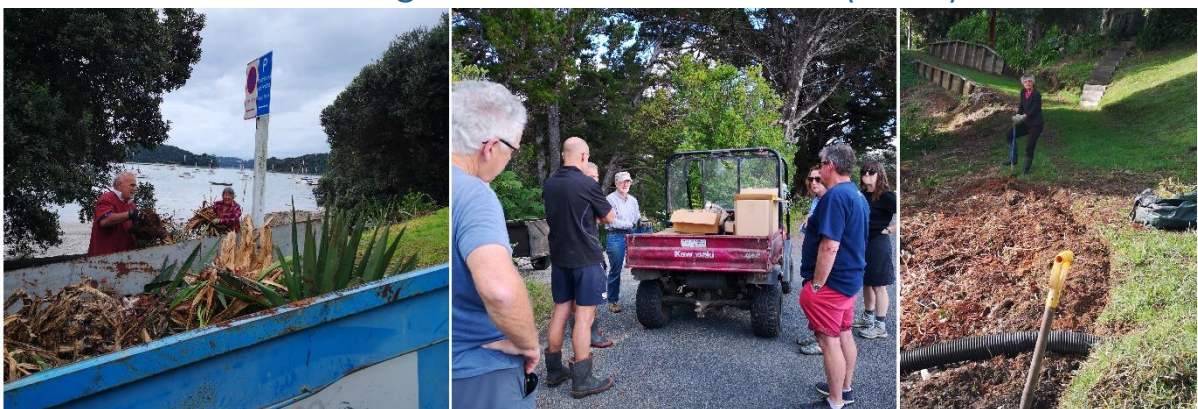
mahinga kai. Weaves together knowledge from pūrākau and te ao mārama with scientific methods by applying the appropriate scientific tools and methodologies.

Landowner and Community Engagement in Mahurangi

As of 30 June 2022, 206 landowners had been engaged across the wider Mahurangi catchment with 32 landowners receiving additional advice or support to identify restoration opportunities. Seventeen funding applications were signed, and 7 restoration projects were completed. Nine community groups/schools have been supported through planting days across the wider Mahurangi catchment.

On private land the MELR Programme has contributed to the retirement of 4,100 m of stream and 19 ha of land, within which 73,670 native plants have been planted. On public land the MELR Programme has contributed to the full retirement of 1,000 m of stream and 5 ha of land, within which 23,447 native plants have been planted.

Local Legends – Mahu West Pest (MWP)



Group vision: Recruit, Train, Equip, Motivate and Support a sustainable long-term community team of volunteers.

Mahu West Pest is a volunteer group based on the Mahurangi West peninsula and Hungry Creek. They have their sights set on controlling invasive plants and animals and re-establishing pockets of healthy native bush and thriving wildlife across 3,500ha. Formed in 2020, MWP now has seven hubs with coordinators at Hungry Creek, Pukapuka, The Bullock Track, Jamieson Bay and Opahi Bay. They collaborate with The Forest Bridge Trust and Mahurangi Regional Park to widen pest control efforts. We caught up with MWP to learn more about the group and the work they do.

Q. What environmental changes have you seen since starting Mahu West Pest

There's been a noticeable improvement in the health and diversity of native plants like Puriri and an increasing number and diversity of bird species recorded during the bird counts we run across Mahurangi peninsula.

Q. What achievements are you most proud of for Mahu West Pest

- Achieving goals for laying and monitoring trap lines across 7 areas spanning 3,500ha.
- Over 200 households receive our monthly eNewsletter. Connecting with others via social media, our blog and website.
- Removing invasive plants and planting native plants at Opaheke Point and Jamieson Bay Esplanade Reserve.
- Working with the Auckland Council and other conservation organisations to protect land and enhance biodiversity.
- Working with the Mahurangi Land Restoration Project to protect waterways and remnant lowland forest.

Q. What inspires you to protect waterways and what benefits have you observed from doing this work?

Our aim is to work with landowners and others in our community to enhance, protect and restore all catchments on the peninsula that exit to either the Mahurangi Harbour or to the Te Muri estuary to meet the primary goal of sediment reduction. Lack of sediment control to date has led to the spoiling of the Mahurangi Harbour's water quality, and the degradation of flounder beds (Huawai Bay) and ongoing harm to shellfish beds and shellfish farming.

Q. How has getting involved with the MELR project helped your group achieve its goals?

MELR has been fully supportive by arranging site visits and providing advice and support on our grant applications. A grant through MELR has enabled the purchase of over 3,000 plants for Opaheke Point.

Q. What's your top tip for engaging with rural landowners in your sub-catchment?

Our experience is that most landowners want to enhance their living environment. The problem is lack of knowledge, resources and leadership. If a landowner sees a well-organised program that solves these problems, they are happy to engage.

Q. Do you have any advice for other community groups who wish to do similar work in the Mahurangi catchment?

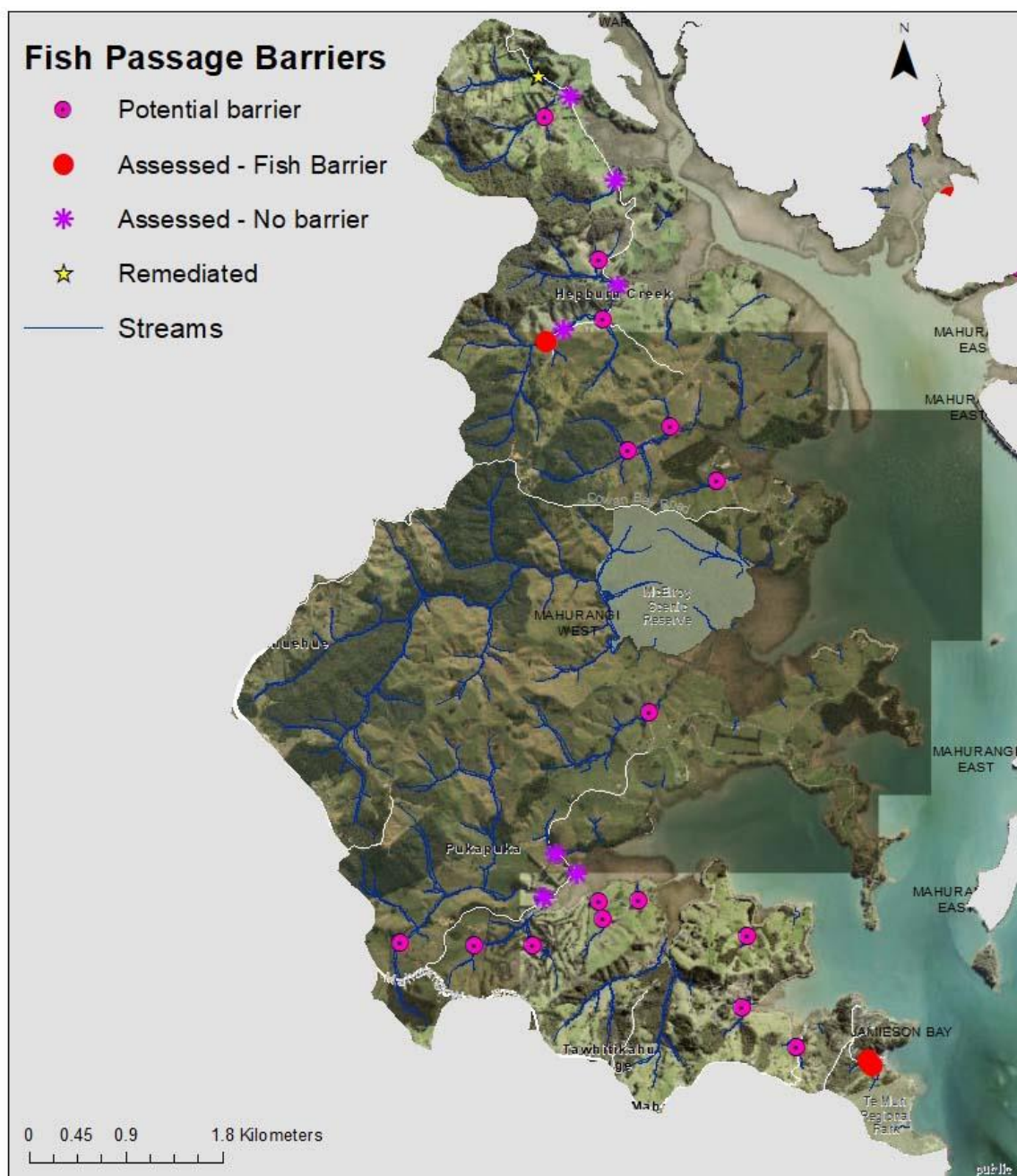
Create a group thinktank of dedicated locals. Get organised and go to the wider community with a well thought out plan. Use various means to connect with people, like regular meetings, community events and network with other conservation and pest control groups and organisations.

Removing Barriers to Native Fish Migration

Many of our native freshwater fish species migrate to marine environments to complete their life cycle. Navigating their way up or downstream can be hampered by structures like perched culverts, weirs or undersized pipes with high velocity water flow can act as barriers, preventing fish migration.

A desktop analysis was conducted in 2022 to determine potential barriers to native fish migration. In total 27 potential barriers to fish migration were identified, 9 have been inspected from the ground, 2 were assessed as being barriers to fish, 7 were assessed as not being barriers to fish and 2 barriers have been remediated (Auckland Council, 2021).

Map 9 –Potential Barriers to Native Fish Migration



Targeted Monitoring of Sediment Impacts and Actions Under the MELR Programme

Sediment impacts and actions will be monitored in Mahurangi West under the MELR programme. Actions implemented under the MELR programme are linked to the programme goal and focus primarily on rural land management opportunities.

Programme Goal

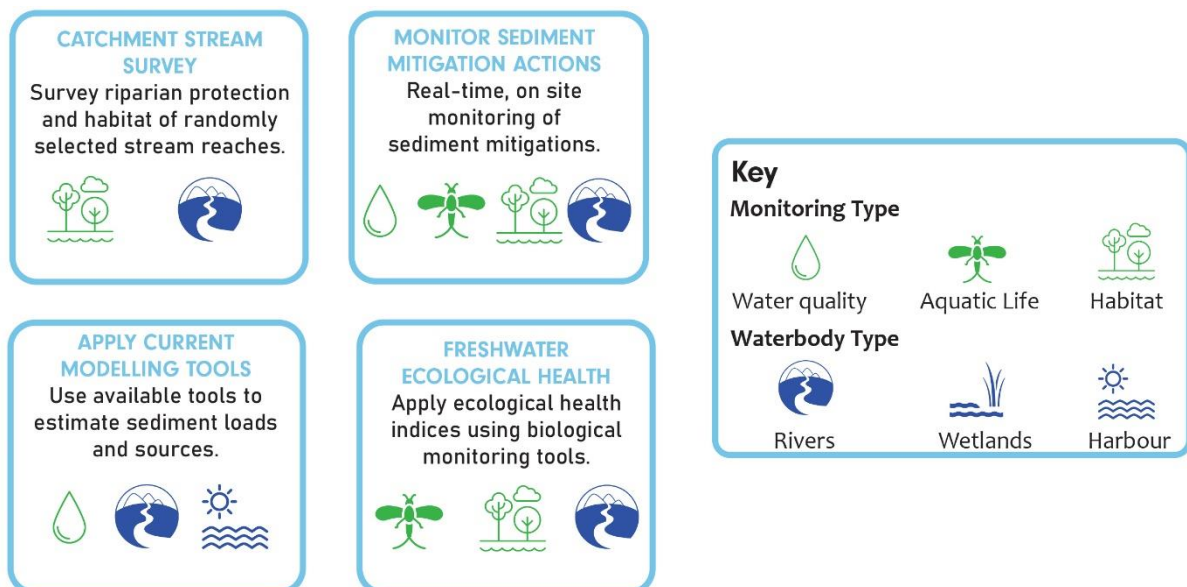
To increase the mauri of Mahurangi Harbour and its waterways, by achieving measurable reductions in sediment from human related activities such as rural land management and urban development, forestry and roading. The programme goal builds on earlier work in the catchment implemented under the Mahurangi Action Plan (MAP).

Research Questions

To determine if sediment actions implemented in the Mahurangi catchment are achieving measurable reductions in sediment derived from rural land the following research questions have been identified:

1. Is there evidence that sediment actions implemented prior to the MELR programme have reduced erosion and/or sediment transportation rates in the catchment?
2. Are sediment mitigation actions implemented during the MELR programme contributing to a reduction in erosion and/or sediment transportation rates in the catchment?
3. To what degree is bank erosion contributing sediment to the Mahurangi Catchment?

Monitoring Approach & Tools



Actions – Completed Across the Entire Mahurangi Catchment as of 30 June 2022

Actions	Milestones – by June 2026, unless otherwise stated	How we're tracking	Who is involved
Rural private and public land <ul style="list-style-type: none"> Landowner engagement Riparian protection and Riparian planting Community group engagement Regional Parks 	<ul style="list-style-type: none"> 90% of landowners are engaged At least 90% of community groups and Regional Parks are supported to undertake activities that assist the reduction in sediment loss in the catchment 45km of new riparian fencing is constructed with a minimum setback of 3m 250,000 native plants have been planted. 	<ul style="list-style-type: none"> 206 Landowners contacted 17 Funding agreements signed 7 Projects completed 18 Landowners have completed the engagement survey 5,500 m fencing complete 19.3 ha of land protected 73,670 native plants have been planted 4,100 m waterway protected. 100% of community groups have been engaged 25% Regional Parks are supported 75% of Schools are being supported 	<ul style="list-style-type: none"> Landowners Community Groups Auckland Council Ngāti Manuhiri Settlement Trust
Unsealed roads	<ul style="list-style-type: none"> Launch a pilot project using Environmentally Sensitive Maintenance to manage stormwater on up to 500m of unsealed road 	<ul style="list-style-type: none"> Pilot project launched on Ridge Rd towards Scotts Landing. to reduce the amount of sediment entering the harbour. 	<ul style="list-style-type: none"> Auckland Transport MERRA Auckland Council Ngāti Manuhiri Settlement Trust
Small construction sites	<ul style="list-style-type: none"> 100% of small construction sites in the catchment will be compliant with existing regulations to prevent sediment loss from sites 	<ul style="list-style-type: none"> 192 sites have been assessed by compliance officers 62% are compliant 	<ul style="list-style-type: none"> Auckland Council Ngāti Manuhiri Settlement Trust
Forestry	<ul style="list-style-type: none"> 100% of forest landowners in the catchment will be engaged to improve harvest practices 		<ul style="list-style-type: none"> Forestry Landowners Auckland Council Ngāti Manuhiri Settlement Trust
Māori outcomes and cultural monitoring	<ul style="list-style-type: none"> A co-governance agreement is formalized with Ngāti Manuhiri Settlement Trust A cultural monitoring programme is developed and implemented 		<ul style="list-style-type: none"> Auckland Council Ngāti Manuhiri Settlement Trust
Sediment Action Plan & Monitoring Framework	<ul style="list-style-type: none"> A Sediment Action Plan is finalised by 2023 A monitoring programme is implemented to measure the effectiveness of sediment actions 	<ul style="list-style-type: none"> Sediment Action Plan is underway A catchment wide monitoring and evaluation plan has been drafted Monitoring programme has been implemented. 	<ul style="list-style-type: none"> Auckland Council Ngāti Manuhiri Settlement Trust

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