

RESTORING AND RECONNECTING A RURAL FRESHWATER ECOSYSTEM AND SENSITIVE COASTAL ENVIRONMENT USING A COMMUNITY-LED 'MOUNTAINS TO SEA' APPROACH

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Abstract

Living Water's mountains to sea project objective is to implement catchment scale freshwater management that demonstrates the restoration of a lowland threatened ecosystem. The focus is on catchment management that will lead to enhancement of the Pūkoro Mirānda estuarine environment and RAMSAR wetland. Potential benefits of this programme include biodiversity enhancement (especially the benefits to migratory birds), benefits to farmers and benefits to the Firth of Thames (including improved water quality outcomes).

To achieve this goal, Living Water is working with the Western Firth Catchment Group Trust (WFCGT) to develop and test processes, tools and activities designed to enhance landowner's engagement in catchment activities, build on the initial foundations of catchment group activity, and accelerate positive environmental change.

Context

Pūkoro Mirānda is located on the Western side of the Firth of Thames in the Waikato region of the North Island (Figure 1). It is an important site for bird life with annual migrations of Bar-tailed Godwits, nearly half the world population of Wrybill plus another 39 different migratory birds. White banks of shells line the Mirānda coast, known as cheniers, these are a vital part of the shorebird's habitat. These shell banks have built up the coastal plain since the last ice age. The 8500 hectare intertidal area from Kaiāua to the Waihou River has RAMSAR status as a wetland of international significance. international migrant bird breeding site (Figure 2).



Figure 1: Location of Pūkoro Mirānda

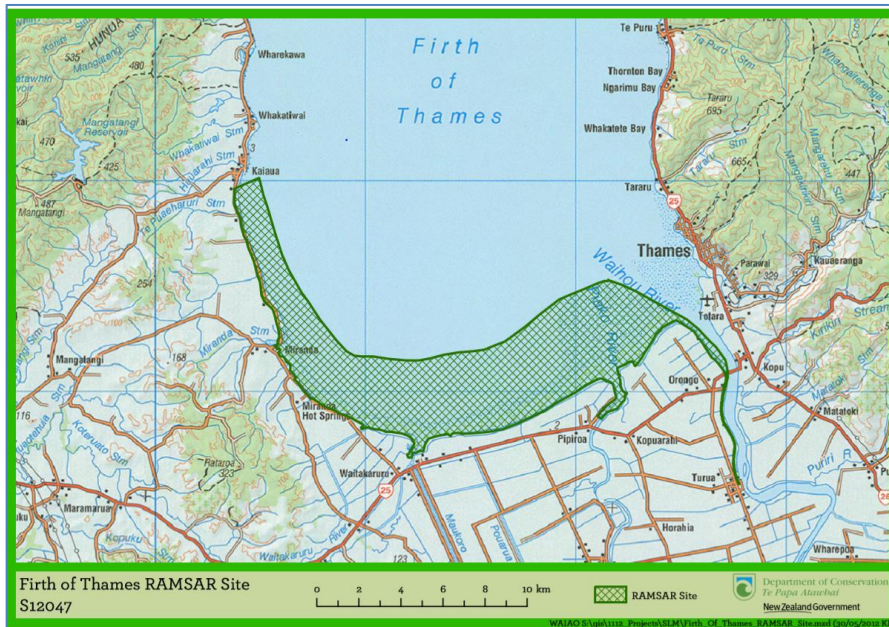


Figure 2: Firth of Thames Ramsar Convention wetland

Over the last one hundred years shorebird habitat at Pūkoro-Miranda has been significantly modified, degraded, and reduced in size. Water quality has declined due to increased levels of suspended sediment. Much of this has been caused by various productive land uses in the catchment and the highly modified hydrology and drainage system that has been put in place to reduce inundation and flooding for landowners in the lower catchment(<https://www.livingwater.net.nz/catchment/pukorokoro-miranda/>)

Western Firth Catchment Group Trust (WFCG)

The Waikato Regional Council ran a series of workshops across the Western Firth community during 2014 to promote their services and begin the process of updating their regional plan. The bottom line for many was this would result in increased regulation and increased rates.

Landowners could see that as well as a changing regional picture there were national pressures coming on landowners to reduce the impacts that land-based industry was having on water quality and receiving environments (Ministry for the Environment. 2013).

Landowners were concerned that a top down approach led by the Regional Council would not provide the opportunity for the landowners to lead engagement on water quality improvement. A group of concerned landowners met and decided that more could be achieved from the grassroots. There was a collective desire from catchment landowners to ensure they are “Leaving land better than when we found it” Many challenges had to be overcome during the establishment of the Western Firth Catchment Group Trust(WFCGT) including:

- Getting a group understanding of the issues take time
- Setting up charitable trusts take time
- Funding helps early engagement and momentum
- Individual concerns around who pays
- Multiple land-owners have different priorities and level of initial engagement
- Finding the hooks that will engage people is not always obvious.

Living Water

The Living Water Project, a 10 year partnership between Fonterra and the Department of Conservation, had also been working with landowners from 2013 in the wider Pūkoro Miranda area. That programme of work had become concentrated in the smaller area of the Pūkoro and Miranda Streams Catchment, with a focus on restoring and reconnecting a rural freshwater ecosystem and sensitive coastal environment using a community-led ‘mountains to sea’ approach. .

Living Water had already done a lot of analytical and survey work in these sub catchments upstream of the RAMSAR bird sanctuary. This work included a Catchment Condition Survey and the development of a catchment restoration mapping and prioritisation tool. This information provided a strong science based foundation for decisions on where and why to place interventions that improve freshwater. Along with a collaborative mindset of the two programmes, this has helped the Western Firth Catchment Group Trust (WFCGT) to lead the engagement with landowners and accelerated the implementation of projects on farms.

Tools used in the Community led “Mountains to Sea Approach”

Catchment condition survey

A full review of the physical attributes within the catchment was undertaken. This allowed a quantitative view of the natural resources and condition of those resources. While the survey allowed a stocktake of wider resource condition, focus was on stock exclusion and vegetative condition of natural areas, wetlands and waterways. This survey provided a benchmark of the current condition, and highlights where work and future investment could be prioritised

The tool allows a graphic representation/map to be created that is very useful when explaining the big picture to landowners and enhances any presentation to potential funders of projects.

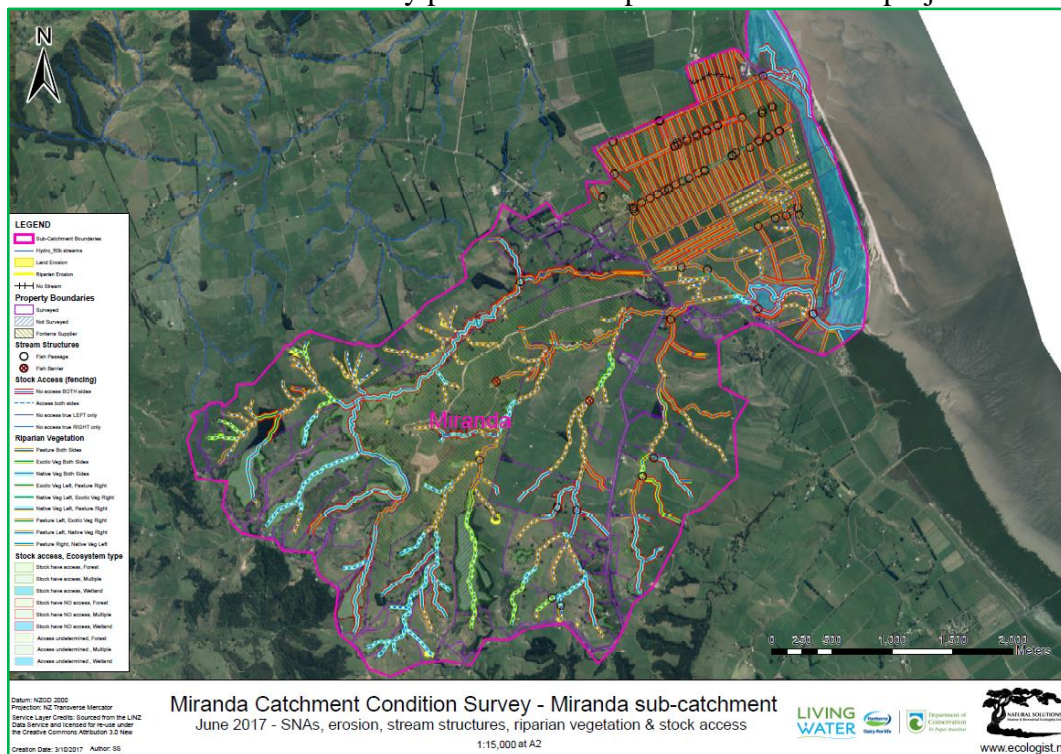


Figure 3: Overview of the Catchment Condition Survey.

Prioritisation tool

Development of a method for prioritising actions at the catchment scale, along with a monitoring plan for establishing baseline conditions and assessing progress towards agreed outcomes. It creates the next level of information for landowners, agencies, and funders. A specialist consulting firm used existing data on catchment values and threats to develop the prioritisation tool that highlights areas and actions to focus on within the catchment for the greatest benefit. The tool generates maps that provide a visual overview across a number of threats to water quality and biodiversity.

Table 1: Prioritisation tool maps were developed for

Catchment Values	
Biodiversity	Water Quality
Habitat	Hydrology
Catchment Threats	
N generation	Streambank sediment generation
P generation	Lowland soil degradation
E. coli generation	Upland soil degradation
Hillslope sediment generation	Modified hydrology
Weed Infestation	Stock Access
N generation	Fish Passage

Each map provides a visual aspect of where a specified threat is being generated in the catchment, allowing landowners to target activities and resource where the risk and benefit is greatest. For example, in Figure 3, nitrogen risk is coming from the flatter and lighter soils where intensification of livestock is higher

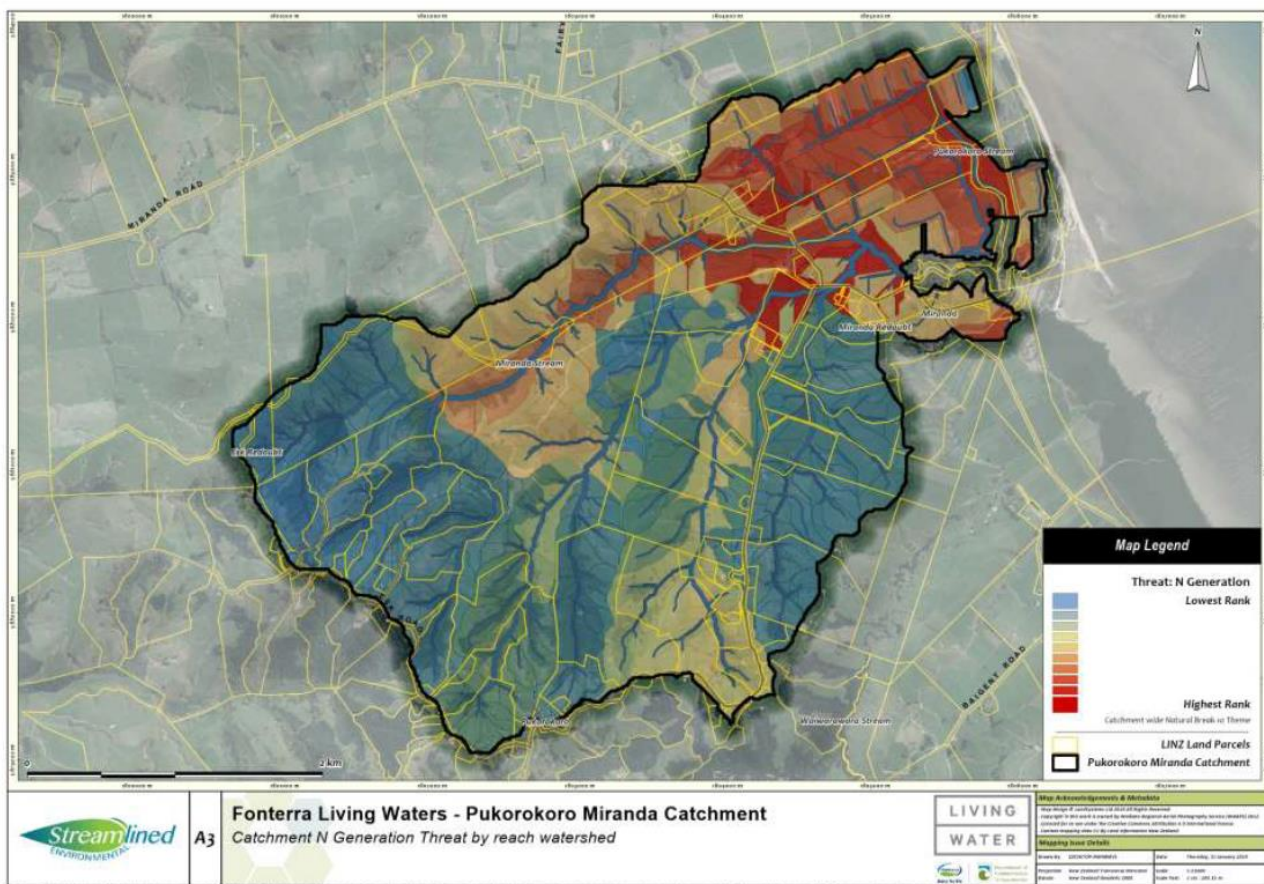


Figure 3 Prioritisation mapping output for Nitrogen generation

Water testing

Monitoring of the impact of our work is critical to demonstrating success, failure, or where improvements are needed. A stream water testing programme has been set up and implemented by Ecoquest, a local tertiary environmental education provider. Three streams are being tested: a control stream, a fully planted stream, a fenced stream and a work in progress stream and will focus on the trends and differences between these streams. These will show differences over time between the management of the streams and the quality of their water. The results will be used to engage with the community and to build a picture over time of the water quality improvement that is being achieved through the actions of the landowner.

Farm Environment Plan (FEP)

A specific version of an FEP was developed with the catchment group to first test with the major landowners in the catchment. The process included the use of the maps from the prioritisation tool and the catchment survey to help to determine the places to work, provide action and advice to transition farms to GMP, while leveraging the benefits of work already completed to date. The FEP Plan was developed to be as engaging as possible. Collective information from the Farm Environment Plans is used to aid the coordination of funding, resources and man-power to undertake the actions that funding is available for to enable catchment objectives to be achieved

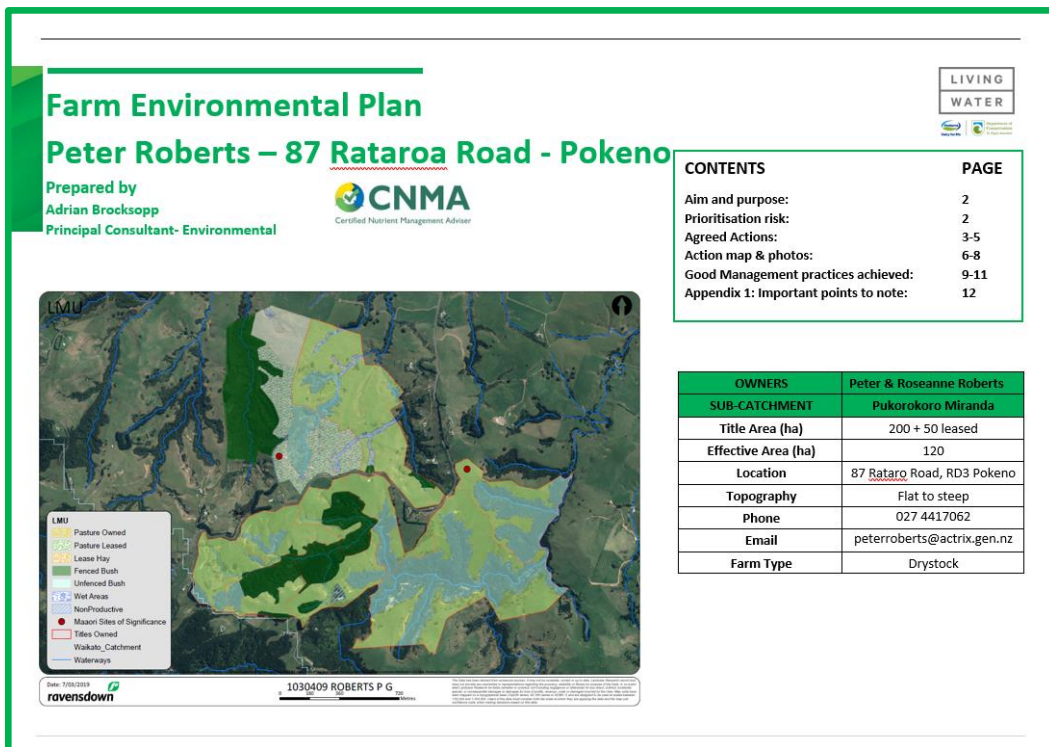


Figure 4: Farm Environment plan example

Purpose of Farm Environmental Plan

The purpose of this plan is; to document the agreed actions to be undertaken, to mitigate identified risks where contaminant losses may be occurring on the property. The document provides an action plan for remedial solutions, investigation of actions, with timelines and responsibility to ensure effective action

Goals – Project

Living Water has set a goal to demonstrate: restoring and reconnecting a rural freshwater ecosystem and sensitive estuarine environment using a community centred 'mountains to sea' approach.

Goals – Farmer

To have good production from the land while leaving the land in a better environmental position than when we bought the property. To work more constructively with the environment where I farm

Prioritisation risks identified

Risk maps are only currently available for the area in the Pukorokoro Miranda Catchment

Threat to Values	Level of Threat	Risk Area	Mitigation options
Hillslope sediment generated	Medium - High	Rolling to Steep land in proximity to water courses	Fence and retirement, with planting or natural regeneration
Streambank sediment generated	Low	At peak flows lower down the catchment	Bank Planting and effective protection of wet seep and sediment traps to manage flows
Total N generated	Low - Medium	Property Stocking Rate	Appropriate stocking rates, especially in cell grazing situations
Total P generated	Low - Medium	Run off from effective farm areas	Ensure optimum Phosphate fertility
<i>E. coli</i> generated	Low - Medium	Run off from effective farm area and direct stock access to water waterway	Stock exclusion and appropriate set backs
Stock access to waterways	Low - Medium	Stock access to waterways and Ephemeral Waterway	Temporary or permanent exclusion
Fish passage impedance	Medium - High	Barriers to fish passage such as culverts and stock crossing	Minimising barriers along main stems of water courses
Weed infestation	High along	n/a	n/a
Riparian habitat	Medium - High	Upper reaches of stems with easier stock access, and increased contaminant risk	Pest control, Reducing contaminants, riparian enhancement and improved fish passage
Lowland soil degradation	Low - High	Pugging in wet periods	Strategic grazing
Upland soil degradation	High	Run-off from hillsides	Retirement of risk areas

Roberts; Farm Environmental Plan; v2.0
5 March 2020, Adrian Brocksopp

Figure 5: Farm Environment Plan Purpose and Risks identified

Agreed Actions

Location (see map)	Risk Rating	Planned action	Why?	Proposed timeline	Who is responsible?	Evidence
17	Low - Medium	Install water reticulation to back of farm	Enables waterways to be fenced off as stock have an alternative water source	March 2019	Peter Roberts	Site Visit
N/a (where required)	Low - Medium	Planting of trees across sideling's	To provide stock shelter and slope stabilisation	On going	Peter Roberts	Site Visit
18	Medium - High	Fence and Plant off slip risk area	Minimise sediment entering water course through bank stabilisation	July 2019	Peter Roberts	Site Visit
19	Low - Medium	Install sediment traps where crossing and culvert is already in place. (Install taking into account fish passage requirements)	Capture sediment loss in high flow events to minimise sediment entering the water course	July 2019	Peter Roberts/Living Waters	Site Visit
20	Low to medium	Fence off wetland	Reduce waterway contaminant from stock access to Un fenced Bushed	July 2019	Peter Roberts	Site Visit
21	Low	Complete Riparian Planting Plan	Enable planning of agreed planting programme	July 2019	Peter Roberts/Adrian Brocksopp	View Plan
22	Low - Medium	Fence off waterways (part 1)	Reduce waterway contaminant from stock access unfenced waterway	July 2019	Peter Roberts	View Plan
23a +b	Low - Medium	Fence off wet areas	Reduce waterway contaminant from stock access to Un fenced Bushed	July 2019	Peter Roberts	Site Visit
6	Low - Medium	Fence off waterways (part 2 lease)	Reduce waterway contaminant from stock access unfenced waterway	July 2019	Peter Roberts	View Plan
10	Low - Medium	Fencing off stream (with future land retirement and forestry planting in mind)	Reduce waterway contaminant from stock access unfenced waterway	July 2019	Peter Roberts	Site Visit
16	Low	Fence of Pond and install water trough	Improve water quality of stock drinking water	July 2019	Peter Roberts	Site Visit
5	Low - Medium	Fence off waterway	Reduce waterway contaminant from stock access unfenced waterway	July 2019	Peter Roberts	View Plan
n/a	Low	Undertake robust soil testing programme	Opportunity to tailor fertiliser applications to optimise growth and minimise losses	Dec 2019	Peter Roberts/ Advisor	Site Visit

Roberts; Farm Environmental Plan; v2.0
5 March 2020, Adrian Brocksopp

Figure 6: Farm Environment Plan Agreed Actions

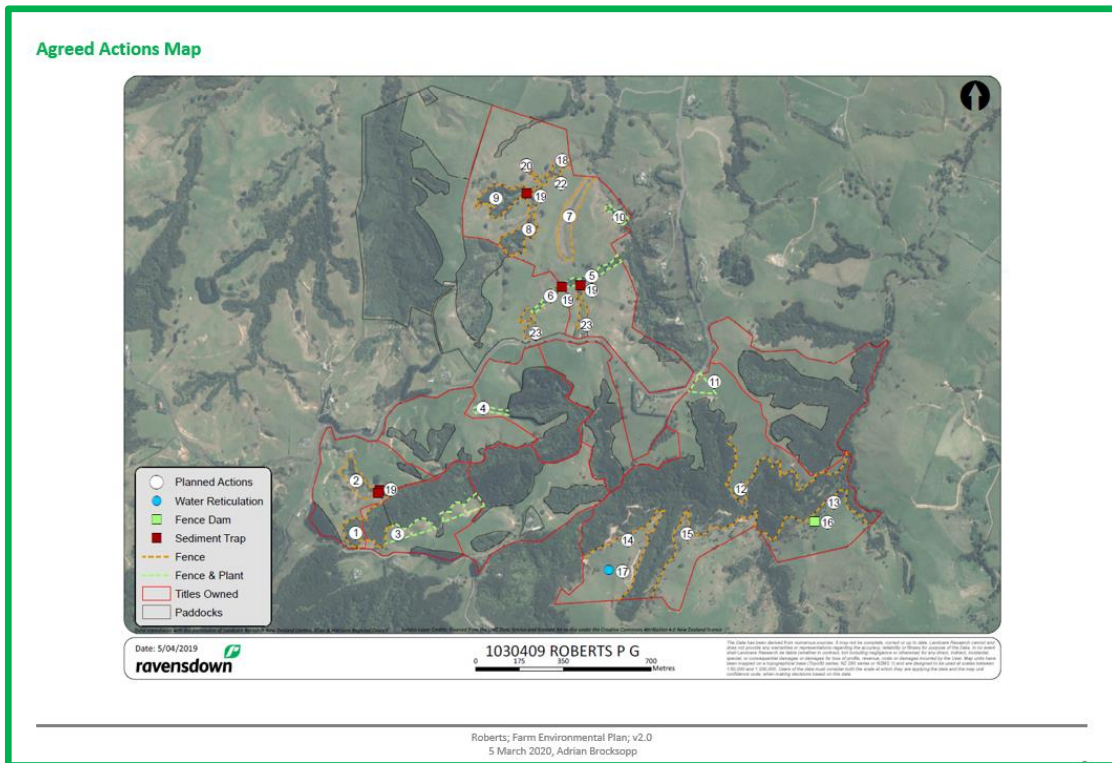


Figure 7: Farm Environment Plan Agreed Actions Map

Mitigation measures to reach outcomes 1: Sediment traps and detention bunds

The FEP provides the process to discuss and create projects with the landowner. Reducing the level of sediment coming off the land was agreed as one of the catchment priorities. A number of silt detention bunds have since been installed with their effectiveness being monitored.



Figure 8: Example of sediment trap.

Mitigation measures to reach outcomes 2: Poplar Planting

Reduce sediment run off and preventing land slippage in the steeper parts of the catchment was highlighted throughout the prioritisation mapping exercise and the Farm Environment Plan process. Planting poplar poles is a proven method and the opportunity arose to purchase and plant 1660 poles in the autumn of 2019.



Figure 9: Pole ready for planting in Autumn 2019

Mitigation measures to reach outcomes 3: Predator Control

It was highlighted by the group that to protect the increasing biodiversity being created through fencing, land retirement and riparian planting, that improved predator control would be needed.

WFCGT and Living Water have created a catchment wide predator control plan to create a predator free “forest to firth environment”. A very successful field day was hosted by WFCGT which generated a large buy in from the local community. Achievements from the field day were:

- Gathered contact details for attending landowners
- Put the landowners in touch with a very experienced predator trapper to advise them on where to put traps to best effect on their land
- Provided information to help landowners complete their own trapping
- Supplied traps to catchment landowners to get them started
- Provide information on funding opportunities for planting on their land
- Updated community on catchment issues, stream quality, and activities completed to date
- Provided landowners with a practical way for them contribute to a healthier environment



Figure10 & 11: Images from predator control community day

Lessons Learnt

There have been many challenges along the way. The solutions and outcomes have moulded the direction, decision making, and pace of change within the catchment. Some of the key challenges and steps are summarised below:

- Setting up charitable trusts take time and while having official processes and structures may seem over the top, they are important to ensure transparent decisions are made and project momentum continues
- A good Memorandum of Understanding (MOU) for the trustees can prevent a project being hijacked by strong participants and individual agendas changing the direction
- Funding engagement and momentum comes from action on the ground and is a great way to help engage with the wider catchment
- Landowners have different priorities and levels of engagement that needs to be taken into account

- Find the “hooks” that will engage to gain momentum. In our case, the predator control programme has drawn in many landowners who would otherwise not participate. Nobody likes their fruit trees been eaten
- Ways to grow our footprint of activities will need to be developed, e.g. planting of the streams and fencing will be a priority. The aim is for this to be undertaken by creating stream catchment subgroups who take responsibility for their area but under the umbrella of the larger organization of WFCGT who will assist with funding and advice we have learnt from Living Water.

Summary

Activities completed by the Western Firth Catchment Group Trust (WFCGT) with the support of Living Water will lead to enhancement of the Pūkorokoro Miranda Streams, the estuarine environment, and the RAMSAR wetland.

This has been achieved by Living Water working in partnership with the WFCGT to co-develop processes, tools and activities designed to enhance landowner’s engagement in catchment activities, build on the initial foundations of catchment group activity, and accelerate positive environmental change.

To date the activities undertaken by the WFCGT have helped to increase awareness and engagement with the catchment landowners and provide physical evidence of the actions . Over time the monitoring programme will help monitor the positive impact that the project is having.

The project has also shown that there is an increased awareness and appetite to commit to actions around waterway and land management. Engaging all landowners increases their awareness and understanding of the issues and opens the door for further activities and catchment wide funding applications.

This partnership has shown that the “Bottom up” community led approach will be successful with support. The challenges we have faced include keeping the enthusiasm and momentum within the group by providing regular information and getting various members of the community responsible for specific areas like predator control, planting, and communication.

The project is not just about the process and the content; it is also about people. Use the skills of people in your community group. We have all sorts of talented people ranging from lawyers to web site designers to environmentalists all who have something to contribute.

Any landholder who does not leave his land better than when he got it is a miner not a farmer. Most of the community is conscious of what we are leaving behind for the next generation.

References

Ministry for the Environment. 2013. Freshwater reform 2013 and beyond. Wellington: Ministry for the Environment.