Upper Mōtu River Project

Contents

1 Upper Mōtu River – Values

1.1 Aquatic Ecosystem Values

Excerpts from Gisborne 2016 State of the Environment Report


Motu Conservation Site

MOTU RIVER AQUATIC ECOSYSTEM SURVEYS

Te Whakamātautau Pūnaha hauropi o te awa o Mōtu

The Motu River covers a catchment area of 700 km² in the Gisborne region. A survey on the upper catchment was conducted over the summer of 2015/2016, this survey included fish surveys, macroinvertebrate and periphyton monitoring, and habitat assessment.

There have been no previous fish surveys completed in the upper Motu catchment identifying the presence or absence of fish species. Fifty fish surveys (night spotlighting) were completed in December 2015 in the upper catchment, above Motu Falls. Surveys were conducted both in the main stem and tributaries of the Motu River. Over the five nights of surveying two fish species were found, brown trout *(Salmo trutta Linnaues)* and Long finned eel *(Anguilla dieffenbachia)*. The long finned eel is ranked under the New Zealand Threat classification system as 'At risk- declining'.


Phormidium found in the Motu River


Periphyton survey being completed on the Motu River

PHORMIDIUM CYANOBACTERIA IN THE MOTU RIVER

During the summer surveys, Phormidium was found in the Motu River. Phormidium is a Cyanobacteria that under favourable conditions can form thick dark brown, leathery mats on the substrate of river and stream beds.

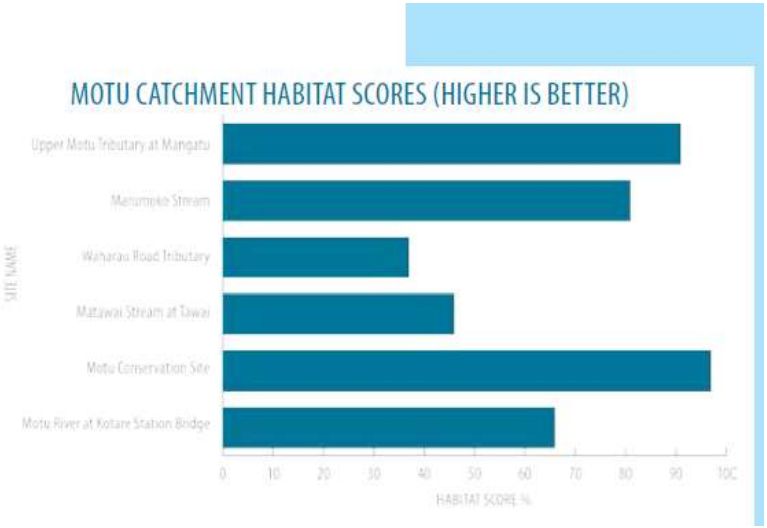
Phormidium produces natural toxins which at high concentrations is a threat to both humans and animals if present in drinking water or if water is used for recreational use. Dogs and livestock are particularly susceptible.

Many sections of the Motu River had low densities of Phormidium, with the highest levels found in the river between Matawai township and Motu school.

Phormidium is a native Cyanobacteria which is found in a wide range of river environments. There are national guidelines for monitoring and communications around Phormidium. Now that we know that it is present in the Motu River, regular monitoring will be undertaken and signs installed if there is a health concern.

HABITAT SURVEYING IN THE MOTU RIVER

Habitat surveying was undertaken over summer 2015/2016 to help understand minimum flow requirements to maintain the habitats and species present in the river. The two highest scoring sites are located in indigenous forest with others located in extensive pastoral farmland.



1.2 Recreational Values

	Access map **Access map with topography** **LINZ topographic maps: 1:50,000 (260 series)**
Check conditions	View the **MetService weather forecast** for Whakatane.
Upper reaches	**Above Motu Falls** The upper reaches are really the only easily accessible section of the river to the angler. The upper reaches flow through a mixture of open farmland and bush country. Much of these headwaters her over open land however and holds a good population of trout (and an even larger population of eels). The river will quickly discolour after heavy rain but will clear very quickly. Consequently, trout are not hard to spot and so 90% of the fishing is to sighted fish. It does offer excellent dry fly and nymph water is well is offering plenty of opportunity for spinning. It is a remote river and is protected by a National Water Conservation Order. **Access** These upper reaches can be reached from the small settlement of Matawai on State Highway 2. Much of the river is over private farmland and so permission must be sought from the landowner before crossing their land.

Murray Downie:
Fly Fishing in New Zealand

1.3 Community Values

Excerpt from: *Matawai Township Plan 2011*

A healthy river to share

The Motu River is an important economic, educational and recreational asset for our communities. Many of the things we are proud of and that attract visitors to the area are related to our wild and natural environment. We want to protect it. Our young people are actively involved in learning about our river system and we will work with them and with our neighbours to restore riparian planting. We can have a big impact on water quality in the Motu River.

What are our key goals?

- To work together to restore the health of the Motu River through good land use practices.
- To minimise any costs to individual landowners of restoration works.

What are our priority projects?

• Research riparian management options for Motu River including external funding available.	GDC/Community
• Establish a Motu River landowners group to oversee riparian transformation.	Community
• Restore riparian areas of the Motu River upstream of the Motu Falls.	Community/Landowners

conservation quorum

GISBORNE DISTRICT COUNCIL

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Issue No. 63 | Autumn 2011

Water conservation: bottom up at Motu

The Motu River is one of the district's most pristine river environments. Flowing from the Raukumara Ranges northwards to the Bay of Plenty, the Motu is a designated wild and scenic river that forms one part of the nationally significant ecological haven that is the Motu area. The area's isolation and the presence of the Motu and Whinray Scenic Reserves make Motu a prime candidate for conservation initiatives, a fact not overlooked by locals who are taking numerous steps to ensure the health of their river is preserved.

Motu School Eel Survey

For the past five years, the staff and students of Motu School have been conducting an annual survey of the eel population of the Motu River. The initiative was prompted when local Department of Conservation representatives pointed out the threatened nature of the species. Previously unaware of this fact, staff at the school saw an opportunity to contribute to the conservation of the species in their local river.

The project started in 2007 in conjunction with senior students from Wainui School. Students and parents were involved in all aspects of the survey, from making their own hinaki (eel trap) to deciding which methods would be used to carry out the survey. Eels are caught, weighed and measured in February each year and the results are compared to get a trending picture of the eel population of the river.

Figure 1: Summary of Results

Year	Heaviest Weight	Length	Lightest Weight	Length	Total Caught	Over 1kg	Under 1kg
2008	2kg	85cm	300g	46cm	88	14	74
2009	2.5kg	76cm	300g	45.3cm	58	9	49
2010	1.4kg	75cm	200g	45cm	47	2	45
2011	3.5kg	85cm	200g	41cm	72	31	41

Water conservation: bottom up at Motu

Continued from front page

The project was fortunate to have the support of Mr Ian Ruru, a local marine scientist with experience on previous eel projects, who helped the students to identify parts of the eels and learn some interesting facts. In the initial year of the project, Mr Ruru estimated the age of one of the larger female eels as being around 70 years old. To validate this, the eel was dissected to retrieve its otolith (a small bone in the ear which scientists can use to tell the age of the eel). Surprisingly, the eel was found to be approximately aged at 30 years old which was nearly half the originally estimated age. From similar samples it was concluded that the eels are growing well in this river system which suggests a healthy waterway.

The results of the annual survey are published in the school newsletter and have generated a lot of interest amongst parents. School principal Paul Cornwall suggests that this filtering-up effect is where the true value of the project lies. As well as being a valuable learning tool for students and creating a useful data set, the project has had a flow-on effect into the local community. The knowledge gained from the project has lead to more sustainable practices around the taking of eels and use of the waterways.

Above: Fencing at Waitangirua.

An example of this is the local eeling competition, which used to be an annual event with the aim of catching the biggest eel. Through the project it was learnt that the largest eels are the breeders and are essential to the continued survival of the species. This has led to the eeling competition being cancelled.

Above: Measuring an eel.

Motu School now intend to take their river monitoring one step further and plan to set up a water quality monitoring programme with the aim of backing up the results of their eel study. They want to be able to show through scientific methods, that the Motu River is healthy and be able to monitor any changes in water quality. Parameters such as clarity, conductivity and pH will be used to monitor the health of the river. The hope is that this further knowledge of the state of the river and what affects its quality will encourage further local ownership of river issues and prompt local landowners to take further steps to ensure their land use activities do not compromise the quality of this important waterway.

Fencing and Riparian Planting

Pastoral farming is a fundamental part of the Motu community and a major land use along stretches of the river. In the past, stock in rivers, as well as runoff and erosion caused by general farming activities have been identified as sources of pollution in the river. In a bid to limit their impact on the river and employ more sustainable land management practices, local farmers are fencing major waterways and planting up river banks.

Above: Pole planting and fencing at Motu.

At present, most of the fencing consists of single wire temporary fencing on the river bank which stops stock crossing the waterways. The challenge facing more permanent fencing comes from the constantly changing shape of the river. Severe erosion of the river banks means that whole fences are frequently washed away in major rain events making it difficult for farmers to permanently fence waterways.

2.0 Upper Mōtu River – Pressures

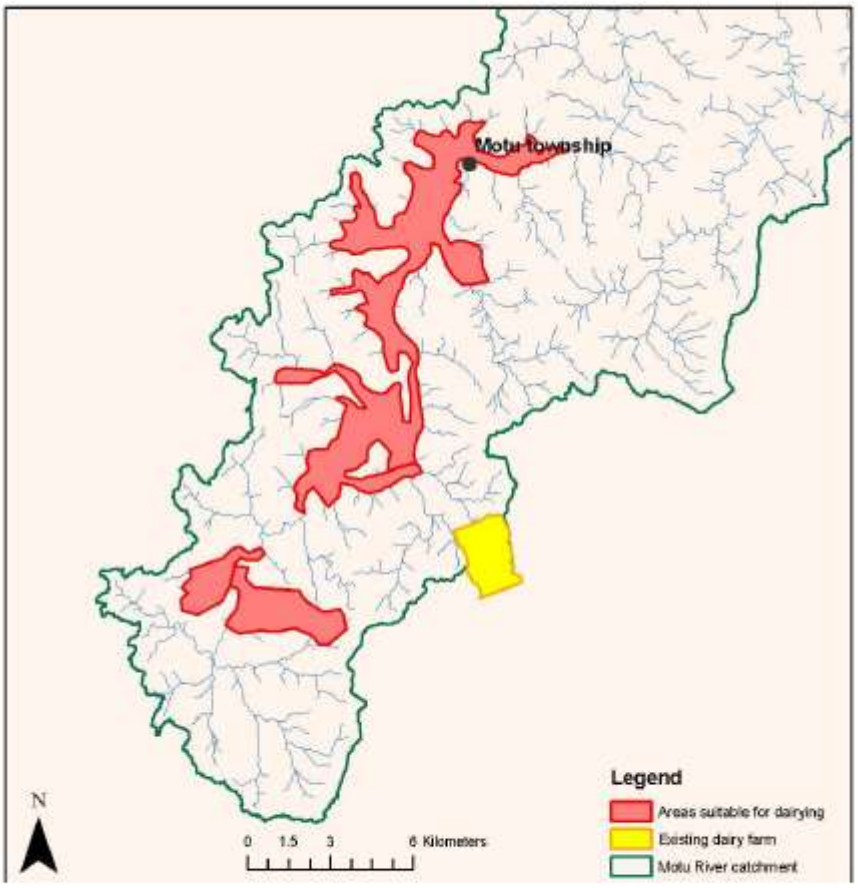
2.1 Farming Pressures

Excerpts from: *Ballentine and Davies-Colley 2009 Recommendations for water quality monitoring of a new dairying area – Upper Motu Catchment. NIWA Client Report: HAM2009-168*

The Motu river basin, with its combination of a suitable humid climate and fertile soils on floodplains bordering the river, is the most likely area in the district for dairy development. The Motu River is designated a wild and scenic river and is subject to a Conservation Order. It is a highly regarded trout fishing and rafting river, attracting many tourists annually. It is also home to the Whinray Reserve, the only area in New Zealand where weka and kiwi co-exist. There is an urgent need to implement prevention measures to protect the rare and unique ecological systems in the area, and to protect the quality of waters in anticipation of likely land use changes.

A range of Best Management Practices (BMPs) have been suggested to mitigate pollution from dairying, including: careful management of the timing and location of grazing to avoid soil damage, good effluent management (preferably 'deferred' irrigation to land when soils are unsaturated), exclusion of cattle from water contact by bridging of crossings and fencing of all waters and wetlands, and riparian planting to 'buffer' streams from dairy land pollution.

With widespread adoption of such BMPs, it is possible that dairying in the Motu River catchment could avoid the water quality degradation that has been witnessed in other parts of New Zealand. Gisborne District has the opportunity to learn from experience gained elsewhere and to work with farmers and others to ensure that water quality is maintained or improved despite the intensification inherent in dairy conversion.



Map of the Upper Motu catchment showing current areas of dairying (outlined in yellow) and potential future areas of dairying (outlined in pink).

Comparison of *P* and RSKSE values derived from trend analysis for 1989-2007 and 1989-2009 using data from NRWQN site GS3. Statistically significant increasing and decreasing trends (when $P < 0.05$) are highlighted in bold.

	1989-2009		1989-2007		Changes in 1989-2009 trends when compared with 1989-2007 trends
GS3	*P* value	RSKSE	*P* value	RSKSE	
Temperature	0.38	0.16	0.15	0.31	
DO%	0.71	-0.01	0.33	0.04	
Turbidity	0.3	0.56			
pH	0.76	0.00			
Conductivity	0.94	0.01			
NO_x-N	0.07	0.78	0.78	0.18	
TN	**0**	**1.89**	**0**	**1.44**	**Stronger increasing trend**
DRP	**0**	**1.57**	**0**	**1.88**	**Weaker increasing trend**
TP	**0**	**1.87**	**0**	**1.68**	**Stronger increasing trend**
Clarity	**0.03**	**-0.53**	**0.89**	**0**	**Significant decreasing trend**

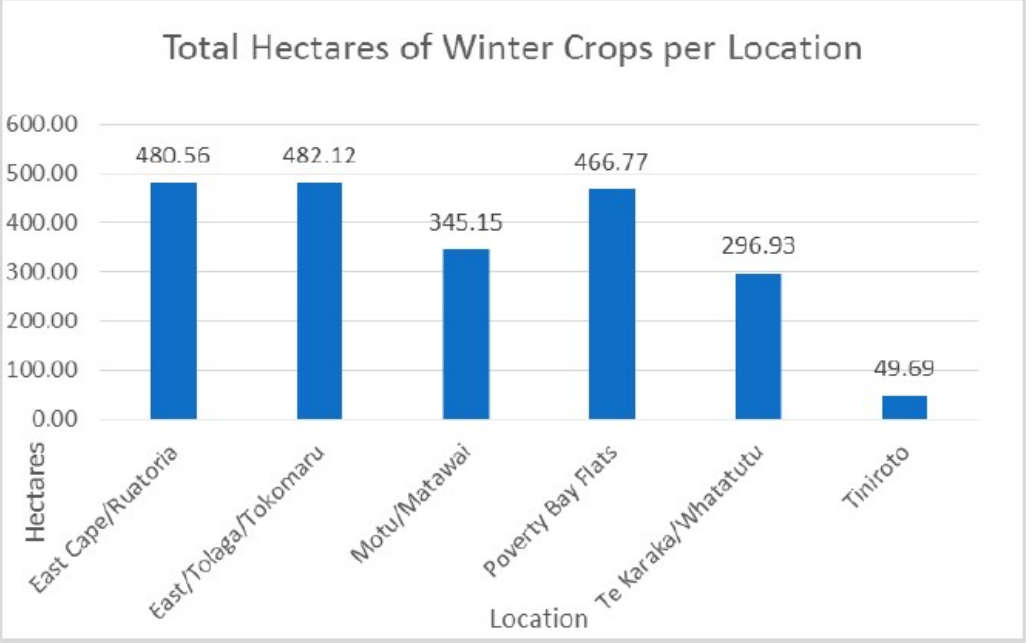
Table 4: BMPs suitable for mitigating direct pollution of water from dairy farming [adapted from Collins et al. (2007)].

BMP	Description	Rationale
Bridging/culverting of stream crossings	Stream crossings on dairy raceways are bridged or culverted to isolate the dairy cattle from water.	Dairy cattle 'loiter' in streams during crossings, and cause a disproportionate amount of faecal pollution.
Fencing of streams, drains and other water bodies	Fencing prevents livestock access to water.	As above. Exclusion by fencing eliminates direct pollution.
Riparian buffers	Ideally the riparian buffer is suitably planted with trees and shrubs, although a grass buffer (maintained by light grazing - by sheep) should also be effective.	Fenced riparian buffers help reduce pollution by (i) removing the source of direct pollution, (ii) protecting vegetation and soil in riparian zones and stream banks, and (iii) providing an infiltration zone for trapping pollutants.
Fencing of wetlands	Fencing of wetlands, particularly small in-channel or near-channel systems, to exclude livestock.	Livestock damage vegetation and defecate while in wetlands, which makes these systems sources of microbes, nutrients and sediment.

: Motu River at the Kotare Bridge monitoring point looking upstream (under fairly high flow conditions). Note the high turbidity.

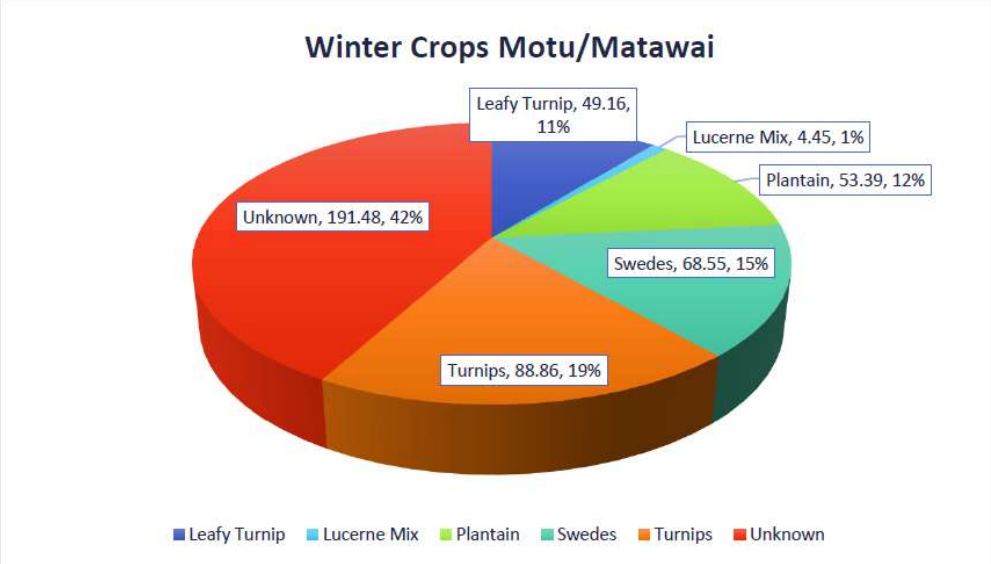
Excerpts from Gisborne District Council 2015 and 2016 Winter Crop Surveys

2015 Winter Crop Survey



Fodder crops and breakfeeding on Upper Mōtu Terraces – note upper terrace is also planted in fodder crops

2016 Winter Crop Survey



(note total 455.89 ha of winter crops planted in 2016 compared with 345 ha in 2015)

Fodder crop for breakfeeding adjacent to the Mōtu River

2.2 Stock Truck Effluent

Current locations of Stock Truck Effluent Disposal Facilities (sites in yellow). Note Gisborne city has the only site in the Gisborne Region

2.3 Septic Tanks

Age of Septic Tanks in Mōtu/Matawai

Motu On-site Wastewater				
TANK TYPE	2002-2011	1998-2002	pre 1998	NO DATA
Septic Tanks	0	0	0	11
Advanced Treatment	0	0	0	0

Matawai On-site Wastewater				
TANK TYPE	2002-2011	1998-2002	pre 1998	NO DATA
Septic Tanks	2	0	4	26
Advanced Treatment	2	0	0	0

3.0 Research Projects

3.1 Social Research – What are the factors that has made the Rere project so successful at engaging landowners to take action to improve water quality? (Weave Limited)

MEMO

7 April 2017

To: Lois Easton, Acting Group Manager Environment and Regulatory Services

Gisborne District Council

From: Rachael Trotman (Director of WEAVE Ltd)

RERE WATER QUALITY IMPROVEMENT PROJECT – INITIAL SOCIAL RESEARCH FINDINGS

A Ministry for the Environment (MfE) funded social research project on the Rere Water Quality Improvement Project is capturing the approach taken to this project and interviewing those involved (local farmers and landowners, Beef and Lamb, University of Waikato, Gisborne District Council - GDC, AGFirst and MfE), to see what they think of its approach, strengths, lessons and areas for improvement.

Key findings to date are as follows.

There has been high engagement by farmers/landowners in this project, with all 21 approached completing voluntary Farm Environment Plans (FEPs). Three agreed to be case study farms trialling different methods and eight undertook water quality monitoring on their farms.

Reasons for this high engagement include GDC and Beef and Lamb coming to the community and asking farmers what can be done to address ecoli contamination in the river (ie listening and asking rather than telling and taking an 'expert' view); strong community connection to the river; providing expertise via the AGFirst person doing the FEP work with farmers; plus a funding incentive via a small GDC grants fund set up specifically to support water quality improvement actions in Rere.

Other strengths include positive media creating a sense of success for this project and goodwill towards farmers (in a context where farmers can feel blamed by the wider community for environmental issues); engaging respected community members and 'movers and shakers' early, thus convincing others to take part; farmers seeing a range of options rather than just fencing to improve water quality; and a responsive, enabling approach by GDC and Beef and Lamb, which included holding the three community meetings locally, two on people's farms. Technical research undertaken alongside this project on best value for money methods to reduce ecoli on sheep and beef farms also engaged local farmers.

This model can be replicated in other communities with the following ingredients: treating farmers as experts and asking their advice; going to farms and seeing the issues up close; skilled facilitators and a collaborative, enabling attitude by agencies involved; engaging respected locals early on; offering valued information and incentives such as funding; and using FEPs to plan and implement action.

This model can also generate local enterprise opportunities to support planting, fencing, other stock exclusion options and seed saving, sharing and nurseries. Farmers also want support to access poles and undertake water reticulation. Asking farmers what success would look like and providing tangible 'results' or evidence of positive change as the project goes along also supports success.

3.2 E.Coli Reduction Model

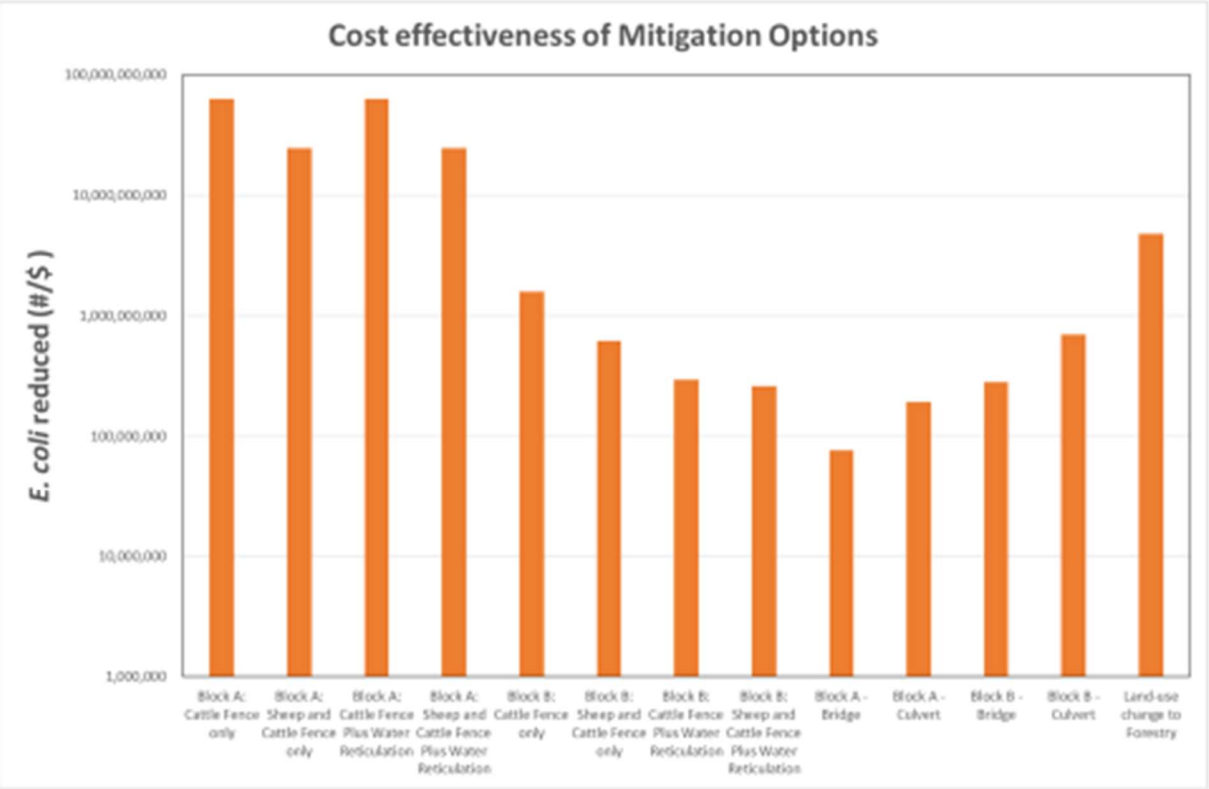
Example of application of E.coli reduction model application to case study farms in Rere catchment

QUESTIONNAIRE

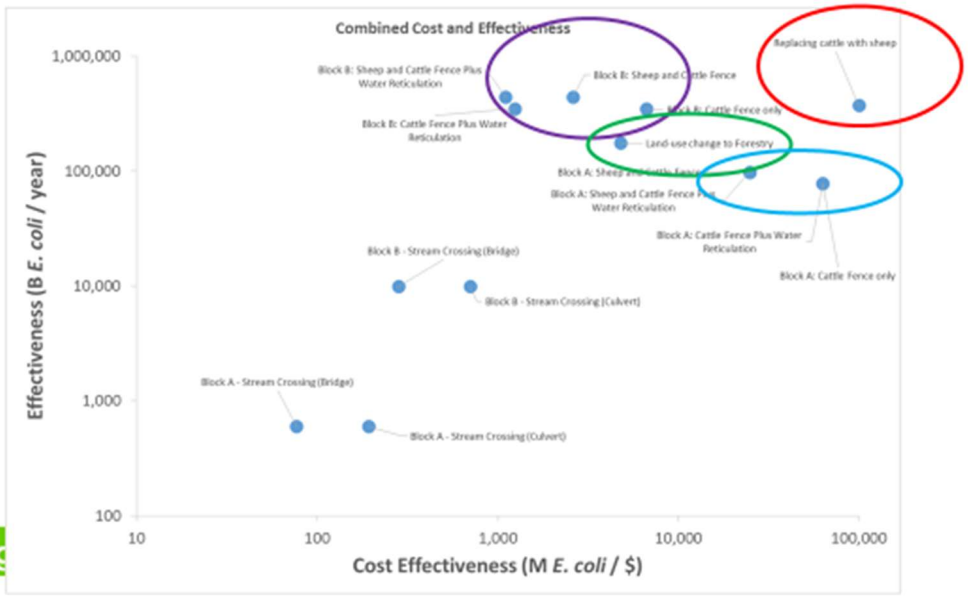
Description	Total Farm	Flats	Hill (other)
Area	ha	ha	ha
Sheep numbers		different stocking rates?	different stocking rates?
Cattle numbers		different stocking rates?	different stocking rates?
Stocking polices?		winter crop grazing next to stream?	no cattle for 4 months from May through Aug
Length of stream on property (estimate)[1]		km	km
Proportion of stream fully fenced (% or numbers of paddocks)		7 paddocks, 3 fenced for cattle only, 1 fenced for sheep and cattle	Or 10% fenced
Estimated cost to fence one side of a stream		$ / km for cattle only fence. $ / km for sheep and cattle fence	$ / km for cattle only fence. $ / km for sheep and cattle fence
Proportion of paddocks with off-stream stock drinking water?		7 paddocks, 4 with reticulated water supply	35 paddocks, 8 with stream as only stock drinking water source
Cost to provide off-stream reticulated stock drinking water		$ to reticulate the flats	$ to reticulate the hill country
Number of Stream crossings		2 fords and 1 bridge	5 fords and 3 culverts
Frequency of crossing use		Mob of 100 cattle 8 times per year, mob of 700 sheep 12 times a year...	Mob of 100 cattle 8 times per year, mob of 700 sheep 12 times a year...
Costs to install bridge or culverts		$ per bridge, $ per culvert	$ per bridge, $ per culvert

agresearch

MITFORD – COST EFFECTIVENESS



MITFORD FARM RESULTS



CONCLUSIONS

Relative effectiveness

Stream fencing >> Stream crossings

Replacing cattle with sheep and land-use change to forestry very effective

Cost effectiveness

(1) Replacing cattle with sheep
(2) Stream fencing
(3) Land-use change
(4) Stream crossings

Distance?

Start at the bottom of the catchment

Start at the bottom of your farm

agresearch

4. 0 Letters of Support

ACTIVATE
TAIRĀWHITI

27 March 2017

Harriet Roil
Water Quality Science Officer
Gisborne District Council
7 Kahutia St
Gisborne 4010

Dear Harriet,

RE: Support for the freshwater improvement fund proposal Motu Catchment Improvement project

We are pleased to support the Gisborne District Council with their application for funding from the Ministry for the Environment to conserve and improve the Motu River catchment.

The region is about to undertake a major investment in developing its tourism industry. Market research confirms that our key point of difference is our world class water environment. The Wharekopae River is internationally reknown for its Rere Rockslide, Rere Falls and Champagne Pools all of which play a key role in attracting visitors to our region.

As the economic development agency for the region we recognize the value and importance of maintaining and improving our region's water quality. We support the proposed *"Motu catchment improvement project"* and would be willing participants in the project, assisting with activities such as assessing the economic impact of the proposed improvements and working with stakeholders to manage their use of the resource.

The Motu Catchment has significant value ecologically, as a fishery, and host to a successful kiwi and weka population with a number of significant conservation areas. We see this project as an opportunity to further improve on these successes, and expand the range of what we are able to achieve. As such we lend our full support to the Gisborne District Council in their application for funding.

Yours sincerely,

Steve Breen
Chief Executive
Activate Tairawhiti
steve@activatretairawhiti.co.nz
027 362 9149

Activate Tairāwhiti | 06 867 2640 | www.activatetairawhiti.co.nz | 46 Childers Road, Gisborne | PO Box 800, Gisborne 4040, New Zealand

27 March 2017

Harriet Roil
Water Quality Science Officer
Gisborne District Council
7 Kahutia St
Gisborne 4010

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Yours sincerely,

J Johnson

Mark & Jane Johnson

Matawai School
Where the hills are high and the sky is the limit

27 March 2017

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Gisborne 4010

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Yours Sincerely

Glenn Knight

Glenn Knight
Principal
Matawai School
p: (06) 862 4813
m: 021 881 466
e: principal@matawai.school.nz

Waiapu Anglican Enviornment Justice and peace network Eastland

Holy Trinity Church

P O Box 235

Gisborne.

27 March 2017

Harriet Roil
Water Quality Science Officer
Gisborne District Council
7 Kahutia St
Gisborne 4010

Dear Harriet,

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Yours sincerely,

Frances White

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Yours sincerely,

Paris King

Gisborne Anglers' Club Inc.

P.O. Box 1318, GISBORNE

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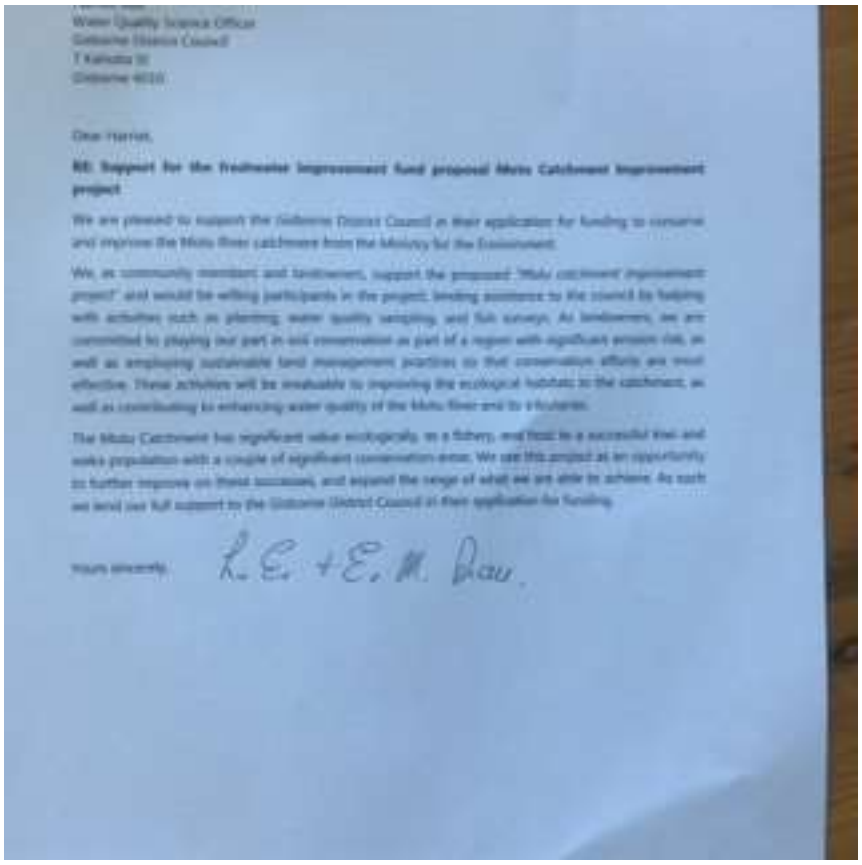
Yours sincerely,

(Sandy)
for Gisborne Anglers.
Federation of Freshwater Anglers



Water Quality Science Officer
Gisborne District Council
7 Kahutia St
Gisborne 4010

Dear Harriet,

RE: Support for the freshwater improvement fund proposal Motu Catchment improvement project

We are pleased to support the Gisborne District Council in their application for funding to conserve and improve the Motu River catchment from the Ministry for the Environment.

We, as community members and landowners, support the proposed 'Motu catchment improvement project' and would be willing participants in the project, lending assistance to the council by helping with activities such as planting, water quality sampling, and fish surveys. As landowners, we are committed to playing our part in soil conservation as part of a region with significant erosion risk, as well as employing sustainable land management practices so that conservation efforts are most effective. These activities will be invaluable to improving the ecological habitats in the catchment, as well as contributing to enhancing water quality of the Motu River and its tributaries.

The Motu Catchment has significant value ecologically, as a fishery, and host to a successful iwi and wahi population with a couple of significant conservation areas. We see this project as an opportunity to further improve on these successes, and expand the range of what we are able to achieve. As such we lend our full support to the Gisborne District Council in their application for funding.

Yours sincerely, L.E. + E.M. Rau.

5.0 Project Manager CV

Harriet Roil – Water Quality Science Officer

- Rere project

Assisted and investigated the wate
the knowledge in the area to s
Communicating with landowners a
with monitoring programmes and n

- Baseline research for cat

To inform and understand knowled
for the upcoming catchment plans
monitoring sites, evaluating test
organisations to gain more data.

Harriet graduated from Canterbury University with a BSc in Ecology and Environmental Science in 2012. Harriet specialises in freshwater ecology and water quality monitoring, and is working extensively across Gisborne to understand more about the state of the regions freshwater. Harriet has designed and implemented the first biomonitoring, state of the environment programme in the Gisborne region and manages the water quality monitoring programme for the Gisborne District Council. Harriet also works with the wider science services teams to provide information for consents, the managed aquifer recharge (MAR), water quality projects, enhancing fish

the New Zealand Freshwater Science Society and the New Zealand Hydrological Society and Surface Water Integrated Management group.

Project management skills

Completed project management training in house GDC

Work History

Gisborne District Council – Gisborne

Water Quality Science Officer (2015 to Present)

Taranaki Regional Council - Stratford

Environment Officer (2013-2015)

Project Experience

- Inanga spawning project

One of the leaders of the project team that implemented the $65,000 of MfE funding for the Inanga spawning project in the Waipaoa catchment. This included Iwi relations, preparing panting plans, monitoring spawning habitat, implementing habitat enhancement plans, development of an education resource for schools, community engagement, monitoring of outcomes, report writing.

- Development of regional freshwater monitoring programme

Project lead for the design and implementation of the Gisborne region biomonitoring programme. GIS spatial analysis was completed for the region and site selection and ground truthing based of various environmental factors. Implementation involving managing summer students, teaching monitoring methods to staff members, landowner and community communication, set up of a data recording systems and analysis of data, report writing and communication of results.

- Wainui Stream enhancement project

Project lead for the background monitoring research required to identify the issues and influences on the water quality in the Wainui catchment. Including community relationships, managing volunteers, communicating results using various media, consolidating results, report writing. The next steps for this project is to implement a wetland concept at the top of the catchment.