Environment Waikato Technical Report 2005/14

Report on Soil Conservation and Waterway Protection in the Middle Waikato

A report prepared for Environment Waikato and the Project Watershed Subcommittee for the Middle Waikato

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2 February 2005

Document #: 974390

Environment Waikato
REGIONAL COUNCIL

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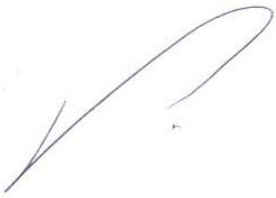
Bruce Peploe Initials  Date 14/4/05

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Executive summary

Twelve properties were included in a study about soil conservation and waterway protection in the Middle Waikato area.

Farmers were interviewed to find out about the work they had done, their initial motivations and the farm benefits they had gained. They were also asked about any environmental benefits they observed as a result. Information was gathered about costs and the issues farmers had faced as well as lessons they had learned. A further aim of the study was to assess whether the current grants offered through Project Watershed and other schemes are justified, and set at a rate that reflects the balance of private and public benefit.

Farmers were asked open questions on these topics, so their responses reflect what was on the top of their minds. They were not asked to answer yes/no as to whether any of the following applied to them, though some prompts were used. Based on this, the following conclusions were reached:

Motivations and benefits

1. Most of the farmers in this study said they were motivated by a responsibility to be good stewards of their land and water resources and protect them for the future.
2. The majority also expected significant on-farm gains from fencing out riparian areas as a result of better pasture utilisation, less stock losses and ease of mustering. Where stock previously drank from natural water, troughs were associated with improvements in animal health.
3. Many farmers also appreciated the amenity value of a well-protected waterway, including plantings and more bird life (these tended to be a different group than those who said property value improvements were a key benefit of this sort of work).
4. Several farmers said they would prefer to see a clean, grazed streambank, but felt a responsibility to keep cattle out of the water due to the impact on water quality or public perception. Trade and consumer image were mentioned as a motivation by a small number of those interviewed.
5. Farmers commonly believed that property value increases due to this sort of work, but for most, this was not a major benefit or motivation for doing it.
6. Farmers did not believe there was much gain to them from preventing streambank slumping, and some said they had lost significant grazing in retiring riparian areas. However, the impact of streambank slumping on water quality was acknowledged.
7. Farmers generally had not seen improvements in the clarity of their main waterways, but did observe less soil loss and cleaner water coming off steep areas in trees. They also noted more stable banks and run-off being filtered by swamps and riparian strips.

Issues

8. Weeds in streamside areas were a problem, especially blackberry. However, for those retiring steep areas and planting timber crops, there could be a significant decrease in spending on pasture weed control compared to keeping these areas in pasture.
9. Some farmers expressed frustration that in spite of their work to protect water quality, what was happening upstream impacted negatively on waterways.
10. Where willows were removed, stream flow and streambank erosion increased, but farmers expected this to be a temporary situation.

Views on grants

11. Most of those interviewed thought the grant was needed to get this sort of work done, and there was a general feeling the grant was set at about the right rate. Some concern was expressed about administration costs and rising rates. However most farmers were positive about the support they got from Environment Waikato.

Ideas for encouraging others

12. The most effective way to encourage others was seen as direct contact, especially farmer-to-farmer approaches. There was support for targeting certain streams and having a local farmer invite people to a meeting to try and get a collective effort.
13. There was also some support for getting positive publicity out, both to encourage other farmers and also to counter the negative publicity in the media about farming.

Background

Project Watershed is a rate-funded grant scheme that assists landowners to carry out work for the purposes of soil conservation and better management of rivers and streams in the catchment of the Waikato River. It is administered by Environment Waikato (the Regional Council) and operates alongside other programmes such as Clean Streams (a region-wide grant scheme drawn from an investment fund and focused on water quality).

Subcommittees of Council made up of representative farmers and relevant agencies help to set work targets and advise on implementation of Project Watershed for specific areas of the catchment. This report was commissioned to assist the Project Watershed Subcommittee for the Middle Waikato zone in evaluating the pilot work done to date under the scheme and in planning future levels of work.

The purpose of the study was to explore the work farmers had done, what had motivated them to do this, and the benefits they had noted (including benefits to themselves, their farms and the environment). The study also sought to find out about issues and costs and the types of support farmers had found most useful. This included discussing the level of grant (currently 35% for most work done) and whether this reflects the balance of private and public benefits from this type of work.

This study forms one part of the overall evaluation. The other parts are a report on environmental monitoring data and a review of relevant scientific research done elsewhere in the Region.

How this study was done

This work was conducted under contract to Environment Waikato (EW). An initial briefing was held with EW staff to scope out the study and research questions. This was followed by a meeting of the sub-group of the Project Watershed Subcommittee for the Middle Waikato that has been guiding the evaluation of the pilot work done so far. This group met to refine a draft question schedule and approve the list of farmers to be approached.

Selecting farmers

Initially, ten properties were selected by EW staff and members of the sub-group for interviews around the Little Waipa and Pokaiwhenua Streams and Karapiro and Arapuni Lakes. Two names were also suggested from the Whitehall area. One of the farmers was too busy to take part, and an extra farmer from Whitehall was included on the advice of another interviewee from that area. In the end, twelve interviews were conducted, covering the range of locations, different farm types and with a variety of works on the property (see Results section for a summary of works done, or Appendix 1 for detail). Among the twelve properties were three where extensive work had been done without grant assistance.

The questions and interview process

Interviews were conducted on farms, involving either one farmer or a farming couple. Interviews were semi-structured (i.e. a conversation with a series of broad questions to cover during the interview and a range of prompts to check on matters that did not arise spontaneously). Written notes were taken of farmers' responses.

The interviews were designed around the following questions:

- What work has been done on the property and what grants have been accessed?
- What were your initial motivations for doing this work?

- What have been the benefits to the farm operation or you as a farmer?
- What environmental, water quality or off-site benefits have you noticed?
- What costs were involved and were there ways you minimised costs?
- What issues arose?
- What sort of support from Environment Waikato or others was useful in this process?
- What is your view of the grants on offer, and how well does the grant rate reflect the benefits to the farmer vs the wider public?
- What do you think is the best way to bring other farmers into this sort of work, and would you be interested in being part of further publicity about it?

(See Appendix 2 for the full question schedule used.)

Farmers also volunteered information about the lessons they learned in the process, their future plans and other farm management practices they had in place to protect soil and water resources and native habitat.

Interviews took between 1.5 and 3 hours (the longer times were where the farm was toured to view the works in question). Farmers were very generous with their time at what was a busy time of year in the farming schedule (November-early December).

How information was analysed

Notes from each interview were typed into a table under the broad question headings and returned to each individual farmer either by email or post for checking. Information from each question category was then pooled for analysis and a draft report prepared for comment from the evaluation sub-group.

The points from the pooled set of information are presented in this report (without identifying farmers), ordered by how frequently each point was raised. Some discussion is included with each set of results along with quotes from the interviews. Case studies, or farmers' examples to illustrate certain points, are also in boxes throughout the report.

Results

The following results are reported under the general headings relating to the purpose of the study.

Works done

Table 1 and photographs below show the range of types of work done on the property. Farmers had accessed different sorts of grants, including Project Watershed, Clean Streams and New Works (see detail in Appendix 1). In some cases, previous work had been done through the original catchment schemes, which began under the Waikato Valley Authority.

Photo 1 Removing old willows

Photo 2 Fencing streams

Photo 3 Creating riparian filter areas to trap sediment from pasture or cropping areas

Photo 4 Retiring steep areas

Photo 5 Choosing appropriate land uses based on contour

Photo 6 Poplars to stabilise gully heads and eroding areas

Photo 7 Planting gullies and riparian areas

Photo 8 Slip rehabilitation - requiring retirement and diversion of water from top

Table 1 Summary of work done on farms (for detail see Appendix 1)

Location	Number/ type of farms	Range of works done
Arapuni 4 farms	1 dairy with replacement stock 1 drystock 1 drystock with cropping 1 mixed (leased)	▪ Removing old willows ▪ Retiring ponds and dams ▪ Retiring streams and gullies ▪ Reticulated water systems ▪ Fencing steep areas and planting timber trees ▪ Slip rehabilitation and diverting water to prevent further erosion
Karapiro 1 farm	Drystock and cropping	▪ Fencing lake and rivers ▪ Planting native trees beside waterways ▪ Retiring erodable faces
Little Waipa 1 farm	Dairy	▪ Fencing river and planting native trees ▪ Slip rehabilitation and creating flax wetland below slip
Pokaiwhenua 3 farms	1 dairy grazing and cropping supplement (leased) 2 converted from forestry for dairy or dairy run-off	▪ Fencing river and gullies and planting natives and some specimen trees ▪ Removing old willows ▪ Pasture development leaving steep areas in trees ▪ Creating ponds ▪ Retiring eroding areas ▪ Clearing old pines and planting natives
Whitehall 3 farms	2 drystock 1 dairy with replacement stock and cropping	▪ Retiring streams from cattle only (sheep able to graze) ▪ Retiring streams and gullies from cattle and sheep and planting flax/ kanuka ▪ Retiring streams from cows and planting exotics ▪ Reticulated water systems ▪ Retiring steep areas and planting timber trees/ natives ▪ Planting poplars by streams/ tracks/ culverts

In addition to the works done, many farmers volunteered information about other management practices they used to reduce their environmental impact. These included:

- Careful timing of fertiliser
- Applying only as much fertiliser as each paddock needs – according to soil tests and the potential production from that area
- Not applying fertiliser at tops and bottoms of sidelings or around troughs and gateways since cows transfer fertility there anyway
- Not applying fertiliser in some small paddocks near streams (fertiliser flown on and these paddocks narrow and steep, so keep well away)
- Having a stand-off pad for wet weather and spreading cows around the farm in winter
- Design of the yard so run-off is directed to paddocks, not waterways

- Pest control in bush areas, fencing and covenanting bush and urupa (burial sites)
- Changing stock type on the farm to protect soil e.g. from dairy heifers back to ewes; breeding Jersey into a dairy herd since lighter cows will do less soil damage
- Running sheep only in steep paddocks, at certain times of year or where stream is unfenced
- Using electric fencing to protect boggy or steep areas when cattle or bulls are grazing
- Realigning internal fences so the contour within the individual paddocks is of the same type (ie flat, easy rolling versus steep sidelings or hill country)
- Shifting stock before any damage to soil or pasture (using pasture residual to decide)
- Direct drilling crops to improve soil structure
- Growing crops to spell pastures and protect pasture soils from pugging
- Monitoring water quality with a water testing kit twice a year.

Photo 9 A paddock where stream is unfenced is grazed with sheep only

Photo 10 Contour fencing helps protect soil and manage grazing efficiently

Motivations

The main motivations reported by farmers for wanting to undertake this work are in Table Two below. (Italicised phrases are farmers' own descriptions).

Table 2 Main motivations for doing this work on farms

Motivations	Raised in interview	Total times raised
A sense of personal responsibility as a farmer to look after water quality/ keep the lake or river clean, leave things in a good state for next generation	2 3 4 5 6 8 9 10	8
Wanting to intensify stocking rates and needing unsafe areas retired to do so; wanting farm systems that are easy to work and efficient to graze; separating out land types - *'maximum production from best land, maximum protection for rest'*	2 4 5 7 8 10 11	7
Visible erosion, soil loss, run-off, unstable banks - *'cows making a mess'*	1 2 3 10 12	5
Keen on the environment generally, appreciating the stream/ lake	3 5 8 9 10	5
Enjoying native plants and birds	4 8 9 10 12	5
Being raised with the idea of looking after bush, planting trees, or fencing steep areas/ keen on gardening/ family tradition or connection as a child	1 9 10 11 12	5
Recreation interest (water-skiing, rowing, fishing, duck-shooting)	2 5 8 11	4
Flooding caused by willows/ potentially threatening farm tracks	3 5 10	3
Concern about trade/ non-tariff barriers/ overseas consumers' perception/ Quality Assurance - *'want to be ahead of the game if dairy farmers ever get accredited'*	3 5 12	3
Wanting to take advantage of grants while they are available	3 7	2

Wanting to counter negative perception of farmers/ urban people's attitudes - *'publicity by Fish & Game'* and *'fear of draconian regulations'*	3 12	2
Aesthetic improvements and consequent rise in value of property	5 8	2
Influenced by Environment Waikato staff member	6 10	2
Offered to do work as part of a consent process (in one case had already begun doing work anyway)	5 11	2
Willows blocking stream/ causing bank erosion	5 10	2
Unsightliness of willows	10	1
Weeds in steeper areas where stock opened up the soil	3	1
Seeing other farmers doing this work/ planted areas looking good	1	1
Influenced by seeing/learning about degradation overseas	8	1

This table shows that there was a dual set of key motivations for farmers – wanting to be responsible stewards of their land and protect water quality (8 out of 12 interviews), and seeking the farm benefits of efficient grazing through better fencing (7 out of 12). Many of the farmers had a personal interest in the environment or a connection to a particular water body through childhood experience or recreational pursuits. Often there was a family interest in gardening or planting trees. Protecting the reputation of farming and market access were mentioned by three farmers as a motivation, with improved property value mentioned by only two. Interaction with Environment Waikato staff or the consents process had also sparked this work for four farmers.

While these farmers were selected because they have done work and were therefore an interested group, they also expressed some views about what held them back.

A number of farmers with mixed stock types had only fenced for cattle or had not fenced streams in paddocks where they ran only sheep. This was due to the cost of sheep-proof fencing and the lower impact of sheep on stream banks and water quality. In one case, areas completely retired were seen as unsightly ('another roadside area') so sheep were used to graze and keep vegetation down.

Several farmers said they found grazed river banks aesthetically pleasing but couldn't countenance having cows in the stream 'piddling in it or breaking the bank' or 'cameras taking pictures of cows in streams and showing them to overseas consumers'. In on case, having a stream bank grazed by sheep was part of a deliberate plan for aesthetic appeal.

One farmer also said that fencing in steep country (particularly for sheep) was difficult and expensive due to the need to bench the fence line. Fencing in hill country could also cut off stock flow or cause cattle to run down a steep fence line causing more erosion.

In light of the cost and practicalities, it was pointed out that there was a need to focus on areas where water quality impacts arise so that work would be cost-effective. For example, one farmer said that monitoring during rainfall events in their catchment had indicated it was not necessary to fence out steep areas where there was a wide apron at the base of the hill that trapped sediment before it reached the stream.

Case Study: Getting more from the pasture between the fences

One motivation for many of the farmers interviewed to erect riparian and retirement fencing was to use it as part of farm subdivision. Once a solid fence is in place carrying the electric wire around the boundary of grazed areas, internal fences and temporary electric wires are easily put in place. One farmer said it was a 'no-brainer' to be given an incentive to do something that improved the farm anyway and he couldn't believe that more people weren't taking it up.

Farmers commented that as fences went up, their grazing options expanded. In one instance, sturdy new fences around gullies, sidelings and riparian margins along with internal subdivision allowed for smaller paddocks. Then enabled the farmer to switch from grazing extensive beef cows to intensive finishing cattle. This was advantageous as the economic return from raising beef cows was significantly less than that from finishing cattle. This fitted with a general shift in livestock policy following farm development. Steeper hillsides can now support intensive high performance sheep, while the easier cultivable land supports a variety of land uses with an emphasis on finishing livestock. He says his 'stretch' target is to ultimately achieve 550-600kg product output per hectare, over double the previous output. His goal for hill country is 300-400kg product output, and for easier cultivable land 750-1000 kg product output. This is achieved by secure fencing coupled with reticulated stock water, improved pasture and forage crop production, and appropriate high performing stock.

Another farmer put a fence up beside the waterway 'on good finishing country' with the expectation that pasture which used to go rank in spring could be better utilised and stocking intensity could increase. He expected to raise the stocking rate in the well-fenced area from five sheep per hectare to ten. With each sheep worth around $100, this would give a $500/ha gain, or $5500 increase in income each year over the 11 hectare area. This would be achieved gradually and require spending on fertiliser and weed control in addition to the fencing. However, cattle could then also be brought into the paddock over spring for a further production gain, with an eventual increase in annual income of perhaps $10,000 from this area, for a one-off initial outlay of $7000.

While both of these fencing programmes were only recent and production increases are yet to be realised, it was a common theme that farmers were motivated to fence areas so they could intensify grazing and achieve more efficient pasture management.

Photo 11 A gully retirement fence allows more intensive grazing

Benefits

The benefits of this sort of work can be classified as on-farm (or private) benefits and off-site (or public) benefits. However, many farmers said they benefited themselves from looking after their natural resources because of the aesthetic appeal and pleasure from having well looked after streams and bush areas with native birds. They saw some of these 'public' benefits of an improved environment as 'farmer benefits' also. Table Three shows the main benefits they identified. Table Four shows additional, but less important benefits to them.

Table 3 Main benefits to farmers from doing this work

Main benefits to farmers	Raised in interview	Total times raised
Not losing stock or having to pull them out	1 4 6 8 9 11 12	7
With solid fences and electric fence right around paddock can intensify stocking, run different stock types/finishing stock, have more efficient grazing management, do cell/block grazing, leave stock in for longer, graze it out and get better feed quality	2 4 7 8 9 12	6
Easier to muster – don't need to inspect swamps/gullies or count stock; cows can't cross stream	4 5 7 8	4
Clean trough water has stock health benefits (less liver fluke, stock drink more, can deliver copper and magnesium in troughs)	4 5 7 12	4
Aesthetic/amenity benefits – looks better, nice stream/ trees, picnic spots	1 4 10 11	4
Native birdlife	1 4 9 10	4
Property value improvements	5 7 8 11	4
Separating out flat land can use it for supplement, cropping etc, and truck fertiliser on	7 10 11	3
Spend less inputs on poor land (less weed control, fertiliser)	1 3	2
Not worrying about hillsides/ erosion/ cattle making mess	1 3	2
Spacing troughs in hill paddocks gives more even grazing pattern; allows subdivision/ feeding out hay in winter	7 12	2
Timber crop/ trees a better financial proposition on poor land	4 11	2
Game birds	10	1
Shade and shelter for stock	1	1
Retain soil resource for long-term productivity	8	1
Willow removal reduced flooding	10	1
Flax may be useful as alternative worm control treatment	4	1

Table 4 Secondary benefits to farmers from doing this work

Secondary benefits to farmers	Raised in interview	Total times raised
Property that looks good has higher value/ is easier to sell	1 2 3 10 12	5
Value of trees/ commercial tree harvest	3 6 11	3
Visitors/ B&B guests walk, take pictures - '*town people like it*'	1 9	2
Satisfaction from how it looks/ being in nicer environment	2 12	2
Not letting cattle trample boggy edges stops swamp expanding	8 12	2
Cows cleaner when they come into shed	5	1
If cows excluded upstream will be less weed dislodged that catches on irrigators	5	1
Animal welfare – not losing lambs in blackberry	7	1
Better informed, know who to contact at EW to answer questions	9	1
More ducks	11	1
Poplars provide a bit of fodder when they blow over	12	1

There was a wide range of farm benefits identified. Principle among them was that fencing out riparian and steep areas prevented stock loss and improved subdivision for better grazing management. By retiring steep areas and separating out the flat land, farmers had fewer worries in managing grazing and more options for their flatter land, where they could concentrate their inputs for greater gain.

Photo 12 Separating out steep land gives more options for land use in flat areas

Other benefits identified by four of the twelve farmers were easier mustering and better animal health from supplying trough water, which also improved grazing patterns. Notably, aesthetic benefits and more abundant bird life got four mentions as main benefits for farmers, and were more significant than the value of trees as stock shade and shelter (one mention). This reflects the fact that an interest in the environment was

among the motivations cited above. Those who said bird life was a main benefit were a different group from those who raised gains in property value as a main benefit.

While nine of the twelve farmers believed property value increases as a result of this sort of work, only four of them saw this as a major benefit. For the others, this was of secondary importance. Similarly, the commercial value of timber was only a primary benefit for two farmers although several others had extensive areas planted in trees. Preventing loss of streambanks to erosion was not seen by any farmers as a benefit to them as they did not rate the amount of grazing land lost from streambank slumping as significant. Retaining productive soil was only mentioned by one farmer.

Case Study: Adding to the value of the property

While the majority of farmers spoken to were sure that this sort of work improved property values, it can be hard to find solid evidence of this.

One of the farmers had had a recent valuation, which featured a photograph of the stream and noted 'the vegetation forming a filter, native plantings well managed.' The streambank retirement was clearly seen as a plus by this valuer.

While forestry values fluctuate, farmers with well-tended timber stands saw these as another form of investment and farm product diversification.

There was a general feeling that farms with attractive trees sell better. One farmer said she watched the papers and 'the first photo you see in the real estate ads is the driveway, all nicely planted up with trees'. Farmers talked about properties which had been sold for more than what the land was worth for grazing, due to the amenity value of plantings. One example given by two different farmers was a drystock farm near Putaruru that sold for $10000/acre because it was 'nicely planted'. Another farmer had been in the process of trying to buy a neighbour's farm and had the bush area valued. He was given a range of values from the bush being worth nothing to having the same value as the pasture.

One of the properties in this study had just been sold, so the new owners were contacted to ask whether the soil conservation work had influenced their decision. The new owner said their principle motive was finding the right size of farm that could take all the young stock for their dairy farms. However, they believed in fencing streams and creeks, and had done so on their other properties. She said they 'preferred to see trees than broken banks' and would rather have a farm that looks nice, seeing mature trees as 'definitely a bonus'. This buyer thought that attractive farms certainly 'fetch a better price' and contribute in some way to the decision about whether to buy or not.

The judgement of one farmer who owned several properties and closely observed the farm sales market was that while location and contour were the main determinants of price, a well-protected stream was a small but growing factor. Another farming couple believed that having some amenity value was particularly important to sell bigger farms. She said that before they did their soil conservation plantings, the steep faces were what grabbed your attention when you visited the farm. Retiring those faces and planting them in trees made the farm look gentler overall, and 'easier on the eye'. Therefore, planting steep areas could raise a farm's value by influencing a buyer's perception of its contour.

Photo 13 Production trees can add value to a property

Environmental and public benefits

Farmers were asked about any benefits they had observed to water quality or the wider environment, in addition to any on-farm benefits. Table Five shows their responses.

Table 5 Water quality and environmental benefits from doing this work

Water quality/environmental benefits	Raised in interview	Total times raised
Streambanks stabilised or protected/ bank vegetation recovered/ less bank damage in rainfall events	1 2 5 7 10 12	6
Trees/ grass under trees on steep slopes or in gullies or slips controlling erosion/ soil staying in place; water coming out of gullies/ hillsides looks cleaner	1 3 6 9	4
Riparian areas, retired swamps and ponds filtering and trapping sediment off pastures and cropping areas	2 5 11 12	4
No improvement or getting worse – affected by what is happening further up/ intensification of farming	1 2 5	3
Stream flowing faster without willows and eroding banks/ corners	3 8 9	3
Water quality improved in last ten years by controlling industrial/ effluent discharges	9 11	2
Shading of stream better	4 12	2
Water clarity in streams improved after doing this work	6	1
Water clarity has been maintained despite intensification	3	1
More vegetation in swamps	4	1
Careful grazing management preventing opening up of pasture and topsoil loss from paddocks	8	1
More ducks or game birds	3	1
Removing mature trees prone to falling over has stopped soil loss	9	1
Poplars ineffective at stopping bank erosion	12	1

There was only one report of improved water quality in waterways following stream protection work. (Two others attributed improved water quality to better controls over dairy shed effluent or industrial discharges.) However, farmers observed what was happening on the land and vegetation beside waterways, and assumed there would be a benefit for the water. The most often cited improvement (6 of the 12 interviews) was bank recovery following fencing, which could be achieved without any planting in the retired area. Many farmers (total of 8 comments) also observed that either retiring erosion-prone areas or creating riparian filters resulted in less soil loss and cleaner run-off. The importance of more stream shading was picked up by only two farmers, both of whom had been part of a Landcare group looking into aspects of water quality.

Photo 14 Fenced wetlands can create filters for run-off

Several farmers (3 of the 12 interviews) said that the water quality was getting worse in terms of weed growth and/or visual clarity. This was attributed to people upstream not doing similar work to them and the general intensification of farming. Another three farmers reported a short-term increase in streambank erosion after willow removal.

In addition to the responses above, farmers made some observations about the general condition of their waterways. One farmer had looked for invertebrates in the Mangare Stream and found indicators of good water quality, though he noted the stream carried a high sediment load during floods. Several farmers had seen koura and eels. Farmers in Whitehall said that some of the streams in their district were not rocky-bottomed so there was always sediment present. Streams were used by farmers' families for swimming and fishing, by the public for fishing and gathering watercress, and in one case by a commercial eeler. The lower Pokaiwhenua and the lakes were used for kayaking and water sports. Duckshooting was another recreational pursuit that benefited from these farmers' work.

Case Study: Slow progress?

One farmer spoken to was involved in a Streamcare initiative, working with interested neighbours to fence and plant the stream banks. Out of 26 farms on the river, 13 people are now doing some work, with 5 fully fencing the stream. However, he estimated that those five who have fully fenced the stream equate to only 20-25% of its length; while the rest might add up to another 10% - so around 70% is still unfenced after seven years' effort. All those doing work are getting a grant except for one property at the top, who he says have 'done a really good job' without the grant. He has not observed any improvement in the water quality over this time, and thinks it has actually deteriorated with the overall intensification of farming in the catchment.

Photo 15 Stream fencing - work in progress

Costs

Detailed information on the scale of work done is set out in Appendix 1. This section reports on farmers' comments about initial and ongoing costs and how they saved money.

Table 6 Time involved and ongoing costs

Work needed	Example of what it cost/ how long it took
Fencing	▪ 2 days to put up 500m of 2-wire electric fence along a stream, cost $2/m ▪ sheep-proof fence cost $12-14/m
Buying natives	▪ 12500 trees were bought for one property at a cost of $38000
Planting	▪ two people planted 500m of streambank in a day ▪ one man spent 4-6 weeks splitting flaxes and planting out in a hill country gully system ▪ two people spent 2 weeks planting 12500 trees
Releasing natives	▪ one farmer spent 2-3 days 4-5 times a year to hand release 1ha of natives ▪ one farmer released plants once in the first year, taking one day to do 500m of streambank
Weed control in retired areas	▪ one farmer annually spends $2500 for a contractor to spray 6km of water frontage plus $1000 on chemicals for his own maintenance spraying in these areas ▪ one farmer spends a day in summer spot-spraying weeds along 1.5km of streambank ▪ once a year in autumn, 2 people take an afternoon to spot spray Escort on willow regrowth along 1.5km of stream bank
Willow clearing	▪ a digger took 4 days to clear willows from 200m of stream
Establishing commercial pine trees	▪ the purchase, preparation, planting and initial releasing for a pine block cost one farmer around 43c/tree
Installing reticulated water	▪ one farm spent $20003 on a new water system ▪ one farmer got a digger in for a day to extend water pipe into new paddocks following stream fencing
Culverts for crossings	▪ one culvert cost $1500
Animal pest control in planted area	▪ one farmer spent $60 on bait for bait stations

Farmers claimed many of these costs as tax-deductible expenses (apart from establishing a pine crop which is a capital cost; ongoing pruning was claimed as maintenance). Two-wire fencing has proven adequate to exclude cattle and is a low-cost option that many farmers do themselves – so much so that several farmers did not bother to claim the grant for this. However sheep-proof fencing is more expensive and some farmers felt the cost was not justified for the minor impact sheep were having on the waterway. Planting native trees is also a significant cost. Weed control is discussed in a later section (Issues and Key Lessons).

Saving on costs or increasing value

Farmers saved on costs or increased the value of their work by:

- Using temporary hotwire/polywire fencing where there were no permanent fences
- Fencing for cattle only (less expensive than sheep-proof fences)
- Using 5-wire, 2 electric to exclude sheep on steeper banks (found sheep don't go through but grass does grow up and short out wires)
- Using waratah standards for around swamps and seepages that can be driven in with a hand rammer (saves on installation cost)
- Using second hand posts and old wires
- Felling existing mature timber trees for sale and for use (fence posts and gates)
- Doing fencing, planting and/or pruning themselves

- Ensuring pines are pruned well, on time
- Certifying the silviculture work done on pine tree blocks
- Acquiring plants from friends, splitting existing flax, transferring seedling natives from under the bush or growing plants themselves (and selling plants to others)
- Getting help planting from family or environmental and recreational groups
- Planting less densely to stretch plants and also for better fishing access
- Using goats for weed control under eucalyptus trees (the farmer found that goats don't eat eucalypts)

Photo 16 Growing trees for planting and for sale

Loss of grazing land behind retirement fences was a cost that farmers considered. Some farmers preferred to fence in straight lines for easier, less costly fencing. Others favoured more angles, following the contour to keep good grazing land. Some farmers said the grazing loss was significant, especially on easier contour land near streams where they had allowed a wide riparian strip. One dairy farmer had retired 8ha of riparian land. Another reported that his sharemilker was unhappy with the extent of the area retired. Others had fenced much closer to the stream to avoid loss of grazing. One dairy farmer estimated that retiring a 0.75ha area prone to slipping meant losing around 8 tonnes of feed annually, equivalent to 640kg milk solids. (This land was only half as productive as his flat dairy paddocks).

Around flood-prone streams or steep-sided gullies, farmers had to fence further away and create wider margins. However, one hill country farmer said keeping the fence 'on clean ground' made sense in terms of stock flow during mustering, to prevent weaker sheep from dropping down the sides of gullies.

Photo 17 A generous riparian margin

For steeper country, farmers said they saved on weed control and fertiliser for the retired areas, which had previously taken a disproportionate amount of farm working expenses. Since those areas were poor grazing land anyway and the better pasture could then often carry higher stocking rates, the ongoing cost in retiring these areas was seen to be neutral. One farmer said he would retire 10% of the farm and another farmer 20% of his grazed land without any reduction in income.

Photo 18 A farm with 20% of grazing area retired (steep, boggy and streamside areas) without loss of production

Case Study: Fencing that pays for itself

For most hill country farms, more subdivision brings major benefits in terms of efficient pasture utilisation and opportunities for block grazing. However, some of this gain may be achieved by fencing only one side of a waterway, so if the creek or gully runs through a paddock, can fencing both sides be justified?

One hill country farmer interviewed has retired several large gully systems and the swampy fingers draining into them. To save money on buying trees, he planted these areas with flax split from bushes elsewhere on the farm. He looks at the economics this way. If he were subdividing the paddock for farm improvement, he would be fencing one side anyway (outlaying half of the total cost to fence both sides). Through the grant, Environment Waikato meets another third of the cost. This leaves only a sixth of the total cost as extra outlay to the farmer to have both sides fenced. 'Take into account that at muster you can see the whole paddock and don't have to walk down and look in every swamp in a driving rain and wind with raincoat and leggings on and you don't have to count stock through the gate because they can't get lost. Once you don't have to pull stock out or lose stock in the swamps, the remaining sixth could well pay for itself in two years or so – after all, every cattlebeast lost in a swamp costs $6-800 to the farmer.'

Photo 19 Planted gullies on a hill country farm

Issues and key lessons

In addition to the costs listed above, farmers identified issues associated with this sort of work. These are listed below with some notes on the lessons they had learned.

- Weed control
  - Blackberry is a big concern – best to spray out for two autumns after fencing, then plant in second winter. Can chip out when small.
  - Privet, barberry and regrowth willows are all a problem.
  - Need to release trees. Don't plant more than you can look after and manage.
- Tree selection
  - Seek local knowledge, local trees, local farmer advice
  - Lusitanica cypress don't do well in windy areas – plant plenty of them to allow for selection of final crop trees

  - Alders do best in a block, not a row
  - Don't plant gums by water
  - Poplars are prone to blowing over in wind and can shade out grass underneath when mature, exposing soil to erosion.
  - Use pioneer species first - flaxes, cabbage trees, toetoe, manuka do well close to the river. The Clean Streams book has good lists of pioneer species for other sites. Kahikatea slower growing but can get bushy. Totara grow OK, leave matai and miro for later on. Frost took out akeake on one site. Hebes did well in a sandy area.
- Other issues with trees and planting design
  - Mature pines in LINZ areas along the lake blow over onto fences.
  - Slips have taken out some trees planted on some farms.
  - Power pylons are a nuisance – planting is not allowed 65m either side so those hills have to be grazed even when you would rather retire them.
  - Putting shade trees near streams is an issue since stock will camp under them.
  - Don't plant too densely or trees will crowd each other out and push against fences. Plant at 2, 3 or even 5m spacings. Birds will tend to bring more seedling trees.
  - Don't block access for fishers – leave space near corners and pools. Leave a track by the fence and put stiles in or hosepipe on wires so the fence doesn't get wrecked.
  - Do worst bits first to get the most benefits. Do areas you see every day so you get pleasure from them.
  - Think about the final size of trees when you plant – don't block views.
  - Avoid evergreen trees like blocks of pine where they will shade races in winter.
- Fence placement and design
  - Don't fence too close to banks that might erode, especially after clearing willows (stream takes a while to settle down).
  - Don't put fence too close to steep banks where stock can jump off.
  - Fence away from flood zones on clean ground.
  - Design of fence in flood prone areas – use big posts on corners (#2) and light posts to anchor it (#3/4) and lots of polyrods. Use light wire (15 gauge) that will break in a flood. Tape can be used instead of wire on crossings to break easily in a flood.
- Willows need to be stacked carefully and dirt shaken out for them to burn.
- Rabbits have eaten some plants.
- Where grazing only sheep to prevent bank damage, get some pasture deterioration (sheep selective grazers and won't graze rank pasture).
- Finance a big impediment for erecting sheep fencing.

Some farmers found controlling regular pasture weeds was not a major issue since rank grass tended to grow thickly in these areas. Others had problems with thistles. One farmer allowed sheep to graze under cattle fences and found they were effective at controlling weeds and did minimal damage to streamside areas. Woodier weeds like blackberry, privet, gorse and willow were a concern for most of the farmers interviewed.

Case study: Spending less on weeds

Many farmers talked about issues controlling weeds, especially blackberry in retired areas. But for at least one of those spoken to, spending <u>less</u> on pasture weed control was a primary motivation for retiring and planting up steep areas on his farm.

This farmer had retired 40 out of 487 hectares (8% of the farm) and planted commercial pine crops in those areas. Prior to doing this, he said that cows grazing those faces opened up the soil, creating ideal conditions for weed growth. After planting these areas, he went from spending $30,000/year on weed control on the farm to spending the same amount over three times the area as he bought a neighbouring block and started sharemilking a third farm the same size. Effectively, he now spends a third of what he previously spent on controlling pasture weeds on the home farm.

Photo 20 Planting pines on steep areas of this farm saw weed control costs drop to a third of previous levels

Assessment of grants

The question was posed to those interviewed as to whether the current grant rate adequately reflected the balance of private and public benefit from this work.

Table 7 Farmers' comments on grants

Comments on grants	Raised in interview	Total times raised
Grant helps because finance the biggest issue/ some people won't do it without grant/ gets it done faster/ prioritises this sort of work	1 3 4 5 6 7 8 9 12	9
35% about right/ reasonable/ reflects public benefits	1 2 4 6 7 8	6
35% generous because it is a farmer's responsibility/ improves the farm/ can be justified on basis of farm benefits	2 5 12	3
Grant not biggest driver but helps/ a carrot to get people started/ see EW prepared to put money in so think they should too	3 9 10	3
Should be compulsory (but could still offer a grant to assist)	2 5	2
Concern about amount of administration associated/ rates paid	3 12	2
Need to have EW staff out in the field/ doing something positive	3 4	2
Don't think water systems should get a grant	4 12	2
Definitely a public benefit, especially with lakes; bank erosion is not a problem to farmer but is problem to the stream	8 12	2
Target certain catchments for Project Watershed and work proactively there	10	1
If government legislates for public access, they should pay the lot	2	1
Good to have urban people contributing	3	1
Weed control should be farmer's responsibility	4	1

Grant should have a time limit - *'sunset clause'*	5	1
Grant rate should be higher where people get together to do work (higher public benefit) e.g. clearing willows right along a stream	5	1
Could have extra incentives/ proactive approaches to people on highly visible roadways	8	1
Rate should be 50:50 because farmers lose grazing, have to spend money on weeds/ water systems, and money is tight starting out	10	1
Set grant rate at point where you get uptake of available resources	11	1
Limiting resource is time, not money; farmers just need to recognise there is an issue and that there are farm benefits	12	1
Philosophically opposed to subsidies	12	1

The most common response was that a grant was needed because without it many people would not do the work or would not get it done as quickly. In this sense, farmers were more focused on the pragmatic issue of what it takes to get work done, rather than the philosophical debate about where the benefits lie.

Photo 21 Keeping water clean - a farmer's responsibility?

Farmers said you could argue over the rate and some of them knew of higher grant rates in different regions. Having said this, the grant rate of 35% was felt to be about right by half of those interviewed, with only one person saying it should be higher (50%) and three others saying it was generous. Some were undecided due to the difficulty in quantifying benefits. The public benefit was recognised, but so was a farmer's responsibility and one person said that the forestry sector asked why farmers should be singled out for assistance. Two farmers felt that excluding cattle from waterways should be compulsory, but that a grant could still be in place to assist farmers. Many farmers believed that grants would be phased out and rules put in their place and there was some support expressed for this.

Given that most of those interviewed had accessed grants, it is not surprising that there was wide support for having a grant in place. Even those who had not accessed a grant could see some argument for having it. Having said this, one of those farmers thought that the amount of administration involved in allocating and then accounting for the grant made it too expensive. He referred to the Lake Taupo schemes where half

the total cost was spent on staff time and administration. 'I can't see the sense in ratepayers paying two dollars to Environment Waikato to get one dollar back in grants'.

Others who were asked about the staff time involved generally were supportive of having EW staff out in the field to keep an eye on things. They thought that it was even more beneficial having them involved in positive work. Referring to Sue McConnochie, an EW staff member, one farmer said 'you have to have the Sues out there to monitor – whether they are there to monitor a project or the damage being done.'

Only two farmers commented on the size of Environment Waikato's rates bill (one of them saying that now it was separated out, farmers noticed it more). 'Everyone understands the need for Project Watershed and Clean Streams but the perception is that EW is huge and growing'.

Useful support

Farmers were asked what kinds of support were useful for them in doing this work and specifically, how valuable they found Environment Waikato advice and support.

Table 8 Useful types of support

Types of support	Raised in interview	Total times raised
Environment Waikato staff support and advice [note, people were specifically asked how helpful EW's support had been. If they elaborated on what was helpful their response is recorded here]	3 4 5 6 7 8 9 10	8
Fonterra/ Clean Streams Accord	1 3 10	3
Farm Environment Awards	3 4 10	3
Landcare/ Streamcare group	1 4 12	3
Gordon Stephenson giving advice or contacts	2 9 11	3
Local nursery with a good source of trees/ advice on planting	1 11	2
Fish & Game/ other group to donate/ plant trees; Tony Nooyen	2 3	2
South Waikato Environmental Initiatives Fund	2 9	2
Clean Streams booklet	2 9	2
EW water quality monitoring	3 8	2
Neighbourhood meeting (ringing everyone along the stream)	3 8	2
Other local farmers	4 9	2
Farm Environment Awards publications	1	1
Magazines featuring trees e.g. Tree Grower	1	1
Reading in farming papers e.g. Exporter	3	1
NZ Landcare Trust assistance in organising meetings	9	1

Support from Environment Waikato was commonly seen as useful. (Note, the large number of responses in this category should be seen in light of the fact that farmers were prompted to talk about this with a direct question about the value of EW support.) Apart from help with grants, the types of EW support seen as helpful included:

- encouragement and planning support, measuring up and preparing estimates
- assistance with sourcing trees/ coordinating and getting plants to a Streamcare group,
- sorting out problems with stacking willows so they would burn,
- ideas about how to stabilise structures and dams,
- advice on what to do about mature trees causing problems,

- assistance with organising neighbourhood meetings and Landcare group process (including turbidity tubes to isolate sources of run-off in rainfall events).

Two people said they hadn't thought about doing this sort of work until they had contact with an EW staff member.

Farmers were generally positive about all staff they dealt with, from the catchment scheme days through to the present. The only complaints were that one staff member had been 'in too much of a hurry', and that there was high staff turnover requiring several visits by new staff members to catch up. In general, staff were felt to be 'the right people' with an understanding attitude, and prepared to spend time discussing things and building relationships, which was viewed as critical. One farmer contrasted this with the consent compliance monitoring staff (Resource Use Group) who he said would not meet him on-site to discuss issues, but inspected the site themselves and then sent him a letter about non-compliance.

Farmers had other suggestions for Environment Waikato. A couple of farmers thought that EW's approach was too soft on farmers or not proactive enough, particularly in areas that are highly visible from the road. They thought farmers there could be approached and asked if they were aware of the grants available or even offered a low interest loan on the balance. However, EW was cautioned not to put 'the wrong spin' on things and try and get streams returned to pristine condition or promote ten-metre riparian strips in hill country where the only flat land is by streams. One farmer also said that the Landcare group's process had been too 'facilitative' when EW could have supplied more expert information. There was also a request that the Mangare Stream be monitored as well as the Pokaiwhenua since results would show up faster in this smaller catchment with a higher proportion of local people getting involved. Any monitoring results should be shared with local landowners. Another farmer wanted EW to provide more proactive support for animal pest control in planted areas. Finally, there was the suggestion that a clear vision was needed about managing the existing lakeside areas that are not in private ownership and contain mature trees, since trees fall over and blackberry encroaches on fences. This farmer favoured these areas being densely planted in natives.

Photo 22 Mature pines from the old schemes can create a problem (far bank) - should the vision be for native plantings (near bank) instead?

The work of other organisations were also recognised, notably the Farm Environment Award Trust, which was cited as useful by both entrants and non-entrants. Help from the New Zealand Landcare Trust was also acknowledged by members of a Streamcare group.

Several farmers said they had not sought technical advice from Environment Waikato, but had looked for local expertise. Advice from Gordon Stephenson was singled out as being very influential. In addition, one farmer mentioned the network of advisors he used in his farm development including agronomists, accountants and lawyers.

Encouraging other farmers

Farmers were asked for suggestions about how to interest others in doing this sort of work, and specifically whether local media coverage or a publication focused on the Middle Waikato would help. Table Nine shows their responses.

Table 9 Ideas for encouraging other farmers

How to encourage other farmers	Raised in interview	Total times raised
Personal touch, proactively advise people what to do, get trees to them – targeted visits to people up priority streams – what's being done, what needs doing, then hold neighbourhood meetings – need to be phoned by a local farmer/ group led locally	3 5 6 8 10 11	6
More publicity - highlight those doing it well/ key messages - *'tell them if we protect the waterways we can concentrate our efforts on the better land'*. Publish data on property values, what you gain for little cost and saving tax, availability of grants.	7 9 10 11 12	5
Reading about it not effective	1 3 8	3
Take it quietly, tread warily, don't tell people what to do – carrot, not stick, talk about it between farmers, chatting informally	3 9 10	3
Group visits to farms that have done work e.g. a group of local farmers to visit or hold a day for Farm Forestry, Treecrops, Maori Land Trusts	4 6 8	3
Make it compulsory/ people will move when they have to (Fonterra or EW)	2 9	2
Seeing things in place, seeing what neighbours are doing	1	1
Farming women can be an influence on their husbands	5	1
Make it a condition for consents	5	1
Get people to actually look in the river, up and down the catchment	5	1
Video on how to look after rivers	5	1
EW to get actively involved in Farm Monitor groups and pay to demonstrate some work as part of the process; put numbers to it – *'lend a helping hand as a partner without hijacking the process'*	8	1
Run workshops on relevant local topic e.g. willows	9	1
Provide cheap supply of local plants	9	1
Address soil conservation issues in industry or bank seminars on development/ converting forestry land	10	1
Address in agriculture training courses for young people (AgITO)	1	1
Awards	10	1

Overall, personal contact was favoured, especially targeted at particular streams to foster a group approach. Several farmers said that they had been influenced by a

neighbouring farmer arguing that the assistance wouldn't be there forever, and that soon this sort of work would be compulsory, so it was better to do it now on their own terms with grant assistance. One Streamcare coordinator rang every single farmer along the stream every year to ask how many trees they wanted, even those who had never planted any.

Two farmers felt this work should be compulsory, while two others said that it should be left up to farmers to do it, with the grant to encourage them.

While five out of twelve supported more media coverage, three people questioned if farmers are really influenced by this. Some of those interviewed said they had already been featured in publications for various reasons. One farmer thought it was important to get more positive news out there, not so much for farmers but for urban people, to correct the negative reputation of farmers caused by other publicity. If more publicity were sought, suggested channels were:

- South Waikato News (for around the lakes)
- Cambridge Edition (for Whitehall) or the joint quarterly magazine publication with the Matamata and Morrinsville papers
- Waikato Times
- More in the Fonterra publications
- Exporter
- Farmers' Weekly
- FEA style of publication
- Sent out with EW rates notices etc.

Photo 23 What will encourage farmers to fence streams - positive publicity or direct approaches?

Conclusions

The following are some of the conclusions that can be drawn from this study:

Motivations and benefits

1. Most of the farmers in this study said they were motivated by a responsibility to be good stewards of their land and water resources and protect them for the future.
2. The majority also expected significant on-farm gains from fencing out riparian areas as a result of better pasture utilisation, less stock losses and ease of mustering. Where stock previously drank from natural water, troughs were associated with improvements in animal health.
3. Many farmers also appreciated the amenity value of a well-protected waterway, including plantings and more bird life (these tended to be a different group than those who said property value improvements were a key benefit of this sort of work).
4. Several farmers said they would prefer to see a clean, grazed streambank, but felt a responsibility to keep cattle out of the water due to the impact on water quality or public perception. Trade and consumer image were mentioned as a motivation by a small number of those interviewed.
5. Farmers commonly believed that property value increases due to this sort of work, but for most, this was not a major benefit or motivation for doing it.
6. Farmers did not believe there was much gain to them from preventing streambank slumping, and some said they had lost significant grazing in retiring riparian areas. However, the impact of streambank slumping on water quality was acknowledged.
7. Farmers generally had not seen improvements in the clarity of their main waterways, but did observe less soil loss and cleaner water coming off steep areas in trees. They also noted more stable banks and run-off being filtered by swamps and riparian strips.

Issues

8. Weeds in streamside areas were a problem, especially blackberry. However, for those retiring steep areas and planting timber crops, there could be a significant decrease in spending on pasture weed control compared to keeping these areas in pasture.
9. Some farmers expressed frustration that in spite of their work to protect water quality, what was happening upstream impacted negatively on waterways.
10. Where willows were removed, stream flow and streambank erosion increased, but farmers expected this to be a temporary situation.

Views on grants

11. Most of those interviewed thought the grant was needed to get this sort of work done, and there was a general feeling the grant was set at about the right rate. Some concern was expressed about administration costs and rising rates. However most farmers were positive about the support they got from Environment Waikato.

Ideas for encouraging others

12. The most effective way to encourage others was seen as direct contact, especially farmer-to-farmer approaches. There was support for targeting certain streams and having a local farmer invite people to a meeting to try and get a collective effort.
13. There was also some support for getting positive publicity out, both to encourage other farmers and also to counter the negative publicity in the media about farming.

Appendix 1: Work done and grants accessed by farmers interviewed

Location and Description	Types of Work Done	Scale of Work and Grants Accessed* (PW = Project Watershed CS = Clean Streams)
Whitehall Sheep and cattle	▪ Fenced parts of main Karapiro stream and two side streams from cattle – 2-wire electric ▪ Installed water system ▪ Planted some poplars on banks	Total stream length is 3km but not all fenced Most of work done with no grant (one grant through Landcare group)
Whitehall Dairy farm – milking cows, calves/ heifers, crops for cows	▪ Where steep, fence gullies and hillsides – 3-wire electric fencing ▪ Planted big gullies with pines, small ones with other timber trees ▪ Poplars beside tracks, culverts ▪ Fenced bush, planted natives ▪ Fenced streams, planted alders	5-6000 native trees bought 20% of farm retired No grants accessed apart from one year through Whitehall Landcare Group
Whitehall Dry stock – cattle, sheep, dairy grazers (plus lease next-door farm)	▪ Fenced gullies and wetlands – mainly 2-wire with posts at 7m spacing, some 8-wire with posts at 3m spacing. Some streams done one side only so far. ▪ Planted flaxes and kanuka	Aim to eventually take out 10% of farm 35% CS grant for fencing and for some planting time (used own plant material) – other work done at own cost
Karapiro Drystock – steers and sheep Cropping - maize for silage (sold off-farm)	▪ Father fenced length of Waikato River and put in water supply ▪ Fenced Little Waipa – 9-wire but on steep banks 5-wire, 2-electric ▪ Planted native trees ▪ Fenced off erodable sidelings between river terraces	1500m fencing, 500 plants Total of 2.9ha retired in riparian areas 35% PW grant for fencing/ some trees
Little Waipa Dairy farm	▪ Removed willows (along with other farmers on stream) ▪ Fenced stream (one side) -1-wire or 2-wire electric ▪ Planted natives ▪ Diverted water from slip, retired slip and planted specimen trees ▪ Retired wet area below slip and planted flax	1.6km of stream fenced 1000 native trees planted Wet area retired 50mX10m 3.5km willows removed with neighbours 50% PW grant for willow removal. 35% CS grant for fencing. Did 4 years' planting with no grants (trees from South Waikato Environmental Initiatives Fund/ Fish & Game).
Arapuni Dairy farm– 900 cows in 3 herds + all dry stock for dairy farms (sharemilks neighbour's farm)	▪ Removed willows ▪ Fenced and planted existing ponds ▪ Fenced sidelings, planted pines ▪ Put in dams to catch effluent ▪ Fenced stream and planted willows on neighbouring farm	Five ponds retired, two dams built 40ha planted in pines 35% CS grant for fencing/ willow planting on neighbouring farm; 50% PW grant for willow removal

Arapuni Dairy and drystock (Maori Trust block, leased to 3 different neighbours)	▪ Retired creeks, gullies and lakefront – 7-wire + 1 electric, posts 5m apart with battens ▪ Planted timber trees in good areas ▪ Put in a water system	6km of waterways fenced, 3.5km along lakefront 53ha in production trees Previous grant for fencing under old scheme, 35% PW grant for current work on slips
Arapuni Drystock - sheep and beef	▪ Lakefront fenced previously ▪ Slip rehabilitated previously ▪ Fenced stream (no planting); put in culvert and troughs	35% CS grant for fencing; earlier work done under old scheme
Arapuni Drystock – sheep, bulls, beef cows	▪ Previous owner benched around a small gully to divert water ▪ Fenced above large gully – 8-wire with electric outrigger	2km of fencing 35% grant; (CS and PW)
Pokaiwhenua Drystock (leased for dairy grazing and supplement)	▪ Fenced main river frontage (fixed and extended work done before) ▪ Planted willows on river ▪ Fenced 2 gullies feeding into river and planted amenity trees ▪ Planted top of eroding area and diverted water around it ▪ Sawn willows and painted stumps ▪ Cleared mature pines near river and replanted natives	4-5000 native trees planted 35% PW grant for gully fencing 35% CS grant for planting of 1200 trees
Pokaiwhenua Dairy farm, being extended to other side of creek through conversion of forestry block	▪ Retired Pokaiwhenua river with wide riparian margins – 2-wire ▪ Planted native trees in riparian areas, oaks around duck ponds ▪ Steep slopes in pines ▪ Willow removal	12500 native trees planted + 700 oak trees around 2 ponds Pine areas 26ha on original farm; 20 ha of the total 67ha on new block left in trees Mix of PW and CS grants
Lichfield Conversion from forestry. Replacement dairy stock, beef, dairy cows in winter	▪ Tributary of Pokaiwhenua fenced – 3-wire electric ▪ Planted natives along creek ▪ Willow removal	3km of stream fencing, 8ha of riparian area retired; 2000 natives planted 0.5km of willows removed 50% grant for willow removal 35% grant for other work – PW and CS

* Some farms received a mix of Project Watershed and Clean Streams grants. Steep slopes retired for soil conservation or the treatment of eroding areas next to streams were generally funded under Project Watershed while other stream and wetland retirement was funded under Clean Streams

Appendix 2: Question schedule for interviews

Questions for interview with Middle Waikato farmers
This purpose of these interviews is to hear their perspectives on soil conservation and riparian work. We want to get a general idea of:

a) what the person has done on their property
b) why they decided to do this
c) what environmental/river benefits they identify
d) what farm benefits they identify, and
e) the scale of costs involved and any cost-saving tips

The interview will be semi-structured, i.e., a conversation, using these questions as a guide. Prompts can be used to elicit more details

Intro

- This work is being promoted by Environment Waikato, with advice and input from the Middle Waikato Subcommittee for Project Watershed (representative property owners, local authorities, agencies).
- Project Watershed has been underway for nearly three years now and we are putting together some information on what some farmers in the Middle Waikato are doing, how much it is costing and what the benefits are.
- This will be useful for the subcommittee to plan future work and budget allocation for this sort of activity.
- I will take note of the information you give, and check back with you before anything is published, to make sure you are happy with it.
- The information you provide will be used in a report to the subcommittee.
- Depending on how you feel, there could also be the potential for some publicity about local examples of soil conservation work (e.g. leaflet/ stories in local paper).

Questions

1. Can you tell me a little about what you have done to manage streams/river or do soil conservation on the farm?
Prompts: Could ask questions re: when, fence type/materials, scale (how many metres), planting, alternative water, crossings, stock type they run.

2. Why did you choose to do this? (Main reasons, motivations, anticipated benefits)
Prompts: What made you first think of it? Have your reasons or motivations changed?

3. Have you noticed any other benefits – either on-farm benefits or wider benefits?
Prompts: Environmental? Economic? Practical? Aesthetic? Animal welfare? Can you put a dollar value on any? Less stock loss/ easier mgmt? Bank protection/ erosion - less soil loss? Water quality? Wildlife? Pumps? Do you think that what you have done affects your property value? Improved relationships with EW staff? Gained new information or insights?

4. Do you recall what the initial costs were?
Prompt: Were there ways you saved money? What was the influence of grants? Did you do any work without grant assistance?

5. Have there been ongoing costs or problems?
Prompts: Maintenance issues? Weeds? Grazing lost? Access for fishers. Can you put a dollar value on any of these? Are there things you would do differently with hindsight?
Were any of the costs directly offset by benefits now or in the future?

6. What sort of support from EW or others was most useful to you?

7. What is your overall assessment of the value of this sort of work to you? To the public?

Closing

- Thanks for their time - anything else they want to add?
- Repeat how information will be used and opportunity to check it first
- Confirm contact details (theirs), supply mine in case they want to follow anything up.
- Find out if they would be willing to be featured in local publicity.