Factors Effecting the Implementation by Landowners of Riparian Management Policies

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Abstract

The results of this project are intended to assist social agencies using educational or economic incentives, to promote voluntary adoption by farmers of riparian management policies. Farmers attending workshops in Taranaki in April 1998 were surveyed to identify the criteria they used to select their preferred riparian policies and reject others. Farmer use of decision criteria was analysed using the Analytical Hierarchy Process and its results compared with their likelihood of using the policies.

The riparian management policies included in the study were: permanently excluding livestock, planting timber trees, planting conservation trees, excluding fertilisers, excluding chemicals, or doing nothing distinctive. The farmers most preferred the planting of conservation trees in riparian areas to the other policies. Their policy preferences were highly correlated ($r = 0.76$-0.96) with policy benefits, but appeared unrelated to the results of the cost benefit analysis. Further research is needed into farmer decision making on their riparian management before a decision model can be developed that satisfactorily explains farmer behaviour.

Introduction

New Zealand waterways have been considerably modified by agricultural land-uses (Parminter, 1995). Some of the changes may be considered to be beneficial e.g. those resulting in increased eel habitat; others may be considered detrimental e.g. greater in-stream nitrate levels. Policy agencies have also begun to associate agricultural land-use with human health problems. For instance in a recent government newsletter it was stated, “Runoff from pastures appears to be a significant [pathogen] problem in the Waikato” (Ministry for the Environment, 1998). Making changes to their management of riparian areas is one way that farmers could reduce the impact of agricultural land-use upon nearby water quality. In this study, the riparian area was considered to be the stream bank area affected by waterway dynamics (e.g. flooding). If there was any uncertainty expressed by the study participants about what area was to be included in the riparian area it was taken as land up to 10 meters away from the banks on either side of a waterway.

This study represents one part of the Catchment Management Programme at Whatawhata Research Centre which deals with waterway issues within whole catchment management (Thorrold and Parminter, 1998). Another part of the programme has identified seven policies that could be used by farmers as part of their riparian management (Table 1). Many farmers are already aware of the need for them to use these sorts of riparian policies. In a survey by Rauniyar (Rauniyar and Parker, 1998) “slightly more than one third [of farmers] considered tree planting to be ‘important’ for providing a riparian strip to protect waterways.”

The way that farmers set their preferences for riparian policies was the subject of this project. It was intended that the information would assist researchers to learn from the results of farmers' experiences, and incorporate technical improvements in the development of future riparian technologies. The study would identify those factors influencing farmers' preferences for selected riparian management policies, and these would be used to build a model that would predict farmers' likely use of such policies.

Table 1. Catchment Management Programme Riparian Management Policies

Riparian Management Policies	Policy Description
Permanently Excluding Grazing	excluding all livestock from riparian areas
Seasonally Excluding Grazing	excluding cattle in particular seasons (e.g. winter) from riparian areas
Planting Timber Trees	planting and managing trees suitable for timber production, but with the option of continuing some grazing
Planting Conservation Trees	permanently planting native or introduced trees suitable for soil stabilisation, with the option of continuing grazing
Excluding Fertilisers	excluding all fertiliser (chemical or organic) from the riparian area
Excluding Chemicals	excluding all pesticides from the riparian area
Preserving Wetlands	preserving wetland areas alongside waterways

The Analytical Hierarchy Process (AHP), (Saaty, 1996) was developed to improve the efficiency of decision making when complex issues were involved, by assisting people to organise their thoughts and judgements (Saaty & Vargas, 1994, p11). The general AHP process involves structuring a decision in a hierarchy with three levels to cover a problem, its goal, choice criteria, and decision options. After the hierarchy has been constructed for a problem, the relative importance of each criterion is determined by comparing their importance relative to each other using a ratio scale. The next step is to compare how well the options fulfil the criteria using a similar method of comparison (ibid., p13).

The AHP enables financial and non-financial decision criteria to be combined into a single problem solving process. It provides an alternative to utility theory which uses fixed interval scales, and to linear programming. The decision maker is asked to carry out simple pairwise comparison judgements of criteria which can be financial or non-financial, and quantitative or qualitative. The judgements on a ratio scale, are then used to develop priorities for ranking decision alternatives. This process may be able to assist policy agencies to overcome the limitations of economic models that are restricted to only objectively derived decision criteria.

Decision makers have generally used the AHP to assist them with making decisions themselves, although sometimes a facilitator has also been involved in laying out the problem and it's means of resolution. This study was an unusual application of an AHP because it compared the results of the respondents' analyses with their own assessments of their likely behaviour.

Methods

To identify attitudes held by farmers towards the selected riparian management policies, a number of surveys were used.

(1) Interviews of sixty King Country and Hawkes Bay farmers identified the criteria they associated with using or not using the Catchment Management Programme's riparian management policies. The interviews also included a measure of each respondent's preference for the various riparian management policies. The interviews, carried out in July 1997, used semi-structured questioning.

(2) Surveys were carried out at two Taranaki workshops to evaluate the comparable importance of the criteria already identified to riparian decision making. The questionnaires included sections on basic demographic and psychographic information (Parminter and Perkins, 1997) (see Appendix A). There was also a question on the likely use of each of the riparian management policies.

(3) Various models of farmer decision making about riparian management policies were developed from the results of the surveys. Regression analyses were carried out using the collected demographic and psychographic data, as well as the decision criteria. Simultaneous equations were applied using the decision criteria. Additional evaluation of the relationships between the decision criteria and farmers' use of the management policies was carried out by vector analysis using the Analytical Hierarchy Process. The results of the decision models were then correlated with the respondents' own scores for their likelihood of use as an indication of how well the models might predict actual farmer behaviour.

The AHP analyses required the construction of the decision hierarchy referred to in the introduction. For this, we had a decision goal to: "select the best riparian management policy", the criteria were selected from those defined in step 1, and their level of importance from the survey carried out in step 2.

During the course of the study, two modifications were made (these are described further in the sections on results and discussion). The farmers identified a different list of criteria for selecting riparian management policies from their list of criteria for rejecting the same riparian management policies. To account for this, the AHP was employed to calculate a form of benefit-cost ratio. The AHP results were evaluated by comparing the benefit model, the cost model, and the calculated benefit-cost ratio with farmers' likelihood of use. The survey in step 2 also identified that only some farmers had a logically structured relationship between their evaluation of the criteria, and their evaluation of the riparian management practices. The results from these farmers were analysed separately as Group 1 data, and compared to the other farmers referred to as Group 2. The weightings in the AHP study were derived only from Group 1 farmer results.

Results of Taranaki Workshop Surveys

Demographics

A total of 64 people (33% of them women) were at the two workshops in Taranaki, and answered the surveys (Table 2). Most of the people involved were farmers (80%), and of these 80% were dairy farmers, the rest were mainly sheep and beef farmers. The average farm size was 130 hectares, and they had a range of from 3 to 660 hectares. All of the farms included waterways of some sort. The average width of these waterways was 6 meters. The goals are listed in their order of importance. The most important goal for the farmers was to

be "building a valuable farming business". The goal of "being in balance with nature" was ranked fourth by the farmers with 46% including it amongst their first four farming goals.

Table 2. Demographic and Psychographic Data for Taranaki Workshop Respondents

Items	Total
Number of survey forms completed	64
Number of female respondents	22
Number of farmers	44
Number of lifestylers	6
Number of non-farmers	14
Number sheep farming	8
Number cattle farming	16
Number dairy farming	39
Number with farm forestry/woodlots	14
Other	6
Farm area	130
Average number of waterways	5-7
Width of waterways (average meters)	6
Time spent farming (median years)	21-30
Goal of "building a valuable farming business" ranked in the top three (% of respondents)	85%
Goal of "maximising farm profits" ranked in the top three (% of respondents)	56%
Goal of "paying off farm debts" ranked in the top three (% of respondents)	46%
Goal of "being in balance with nature" ranked in the top four (% of respondents)	46%
Goal of "providing future opportunities for my children" ranked in the top five (% of respondents)	62%
Group I (number of respondents)	21
Group II (number of respondents)	43

Decision Criteria for Riparian Management Policies

The ten most important criteria, both for selecting the most preferred riparian policies and the least preferred riparian management policies are listed in decreasing order of priority in Table 3. The respondents were offered a list of criteria to choose from that included linguistic opposites of each concept (e.g. *decreases animal losses* and *increases animal losses*). Despite this, the list of criteria for selecting riparian management policies contains largely different concepts from the list of criteria for rejecting riparian management policies.

The most important selection criteria (i.e. those criteria associated by farmers with their most preferred riparian policies) were based upon reducing the effect of waterways upon livestock farming profitability, and improving in-stream values. The most important rejection criteria were linked to the demands of extra decision making, management, and extra work for individual land owners.

Table 3. Farmer Use of Criteria for Selecting or Rejecting Riparian Management Policies

Selection Criteria		Rejection Criteria	
Criteria	Number of Respondents	Criteria	Number of Respondents
decreases animal losses	46	increases weed problems	35
reduces bank damage	40	increases labour (physical work)	34
simplifies management	31	increases maintenance (organisation)	29
improves water-life	30	wastes land	22
reduces slips and erosion	28	complicates management	21
reduces contaminating chemicals	28	reduces income	19
conserving wildlife	26	increases costs	19
improving land utilisation	25	destroys wildlife habitats	12
decreases animal stress	21	reduces management flexibility	9
reduce sediment	19	reduces farm viability	8

Further evaluation of the decision criteria required a measure of their importance in decision making. In Table 4 the number of Group 1 farmers who had selection criteria in common are shown as weightings for the AHP analyses. In Group 1, 95% of the respondents had *decreases animal losses* as common selection criterion, but only 19% had all five selection criteria (including *decreases animal stress)* in common. In this Group 52% had *increases weed problems* as a rejection criterion, but only 14% had all five rejection criteria in common. No other combination of criteria were common to more than 15% of the Group. These results were used to decide the relative importance of each of the criteria used in the decision model.

Table 4. Weightings for AHP Analysis of Decision Criteria

Selection Decision Criteria	Weightings
decreases animal losses	20
reduces bank damage	13
improves water-life	10
reduces slips and erosion	7
decreases animal stress	4
Rejection Decision Criteria	Weightings
increases weed problems	11
increases labour	8
increases maintenance mgmt	6
increases farm costs	4
complicates management	3

Analyses and Decision Models

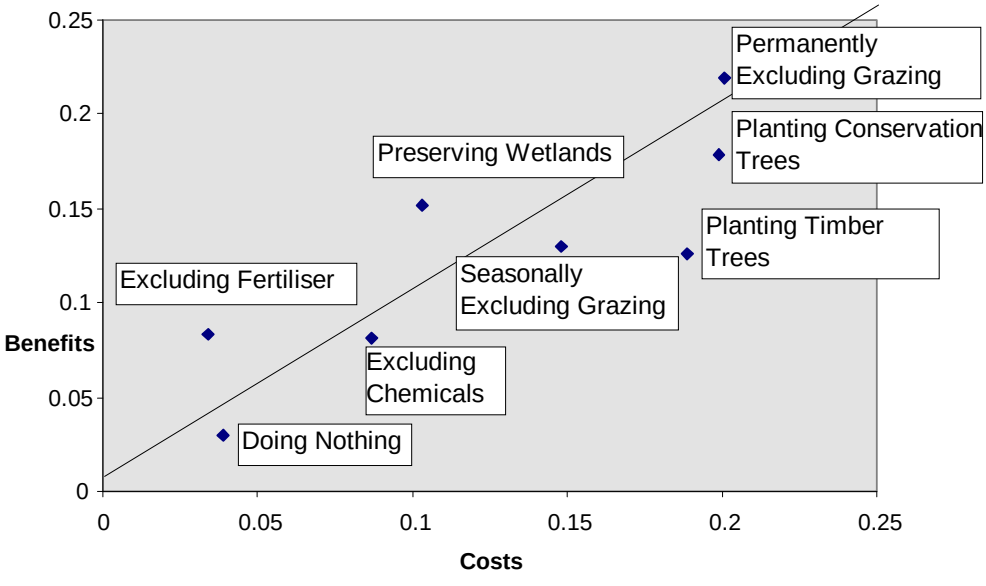
In Table 5 is shown predicted and "likely" farmer behaviour, the former using the AHP based upon vector analyses of the survey results. In the table (in the column of farmer priorities) is shown the contribution that each criterion was expected to make to evaluating the benefits and costs of each of the policies. They have been calculated as described by Saaty (Saaty, 1972).

Decreases animal losses (priority = 0.369) and *reduces bank damage* (priority = 0.244), together determined over half of the final preferences based upon the benefits of each policy. The least important criterion was *decreases animal stress*, it was only 19% as important as *decreases animal losses. Increases weed problems* and *increases labour* requirements determined over half of the final synthesis of cost scores for each policy. The least important cost criterion was *complicates management*, which was only 26% as important as *increases weed problems*.

Permanently excluding grazing scored highly (>0.2) for high priority criteria, whereas, planting conservation trees scored highly for low priority criteria. The scoring for excluding chemicals or fertiliser, and doing nothing was similar, except that excluding chemicals or fertiliser were both considered by the respondents to have a beneficial effect upon *water-life*.

Permanently excluding grazing had high scores for most of the cost criteria. Planting both conservation trees and timber trees had high scores against *increases labour* in the cost column, which was a high priority cost criterion. Excluding chemicals and fertiliser scored very similarly on the cost criteria as doing nothing, although excluding chemicals had a greater score for *increases weed problems*. The Benefit-Cost ratio expresses the net advantage for each of the policies. The ratio was calculated from the synthesised values for policy benefits and costs also shown in Figure 1.

Figure 1. A Comparison of the Costs and Benefits of the Riparian Management Policies



The diagonal line across the graph indicates where costs and benefits would be equal

Table 5. Farmer Preferences for Riparian Management Policies

Farmer Decision Criteria	Farmer Priorities	Riparian Management Policies							
Benefits		Permanently Excluding Grazing	Seasonally Excluding Grazing	Planting Timber Trees	Planting Conservation Trees	Excluding Fertiliser	Excluding Chemicals	Preserving Wetlands	Doing Nothing
decreases animal losses	0.369	0.274	0.151	0.13	0.161	0.047	0.04	0.167	0.03
reduces bank damage	0.244	0.238	0.149	0.124	0.199	0.061	0.06	0.126	0.042
improves water-life	0.184	0.16	0.102	0.09	0.156	0.154	0.156	0.159	0.024
reduces slips & erosion	0.13	0.208	0.12	0.153	0.204	0.081	0.077	0.142	0.015
decreases animal stress	0.073	0.16	0.108	0.193	0.215	0.052	0.057	0.172	0.044
Preferences based upon benefits		0.219	0.13	0.126	0.179	0.083	0.081	0.152	0.03
Costs									
increases weed problems	0.345	0.183	0.155	0.169	0.183	0.025	0.129	0.114	0.042
increases labour	0.248	0.196	0.131	0.211	0.211	0.053	0.059	0.1	0.04
increases maintenance	0.189	0.239	0.154	0.202	0.181	0.026	0.087	0.074	0.036
increases farm costs	0.124	0.217	0.127	0.179	0.245	0.045	0.052	0.09	0.045
complicates mgmt	0.094	0.204	0.172	0.212	0.221	0.02	0.02	0.129	0.021
Preferences based upon costs		0.201	0.148	0.189	0.199	0.034	0.087	0.103	0.039
Preferences based upon Benefit/Cost Ratio		1.08	0.88	0.67	0.9	2.44	0.93	1.48	0.77
Actual (Group I) likelihood of Use		7.5	5.8	5.7	7.6	5.3	4.1	6.7	2.9
Actual (Group II) likelihood of Use		6.6	5.4	6.6	7.3	6.3	5.5	7.0	2.0

The policy calculated to provide the greatest returns to farmer investment was excluding fertiliser, that policy was 50% more advantageous than the next most advantageous policy of preserving wetlands.

Below the Benefit-Cost ratios in Table 5, are the actual average scores for the likelihood that the respondents would use each of the riparian management policies. For both sub-groups, planting conservation trees was the policy most likely to be used. Excluding fertiliser was one of the least likely to be used policies. Both of these policies differed markedly between their calculated net advantages to the respondents and their actual likelihood of use.

The association between the predicted results of farmer decision making and their likelihood of use score, was explored further using the correlations shown in Table 6. In the table, increasing the benefits of the riparian policies was strongly associated with increasing their likelihood of use (r = 0.76-0.96). It was also associated with increasing costs. The Benefit-Cost ratio had a poor relationship with likelihood of use (r = 0.09-0.27).

Table 6. Correlations Between Decision Criteria and Riparian Policy Selection*

	Group I likelihood of use	Group II likelihood of use	Benefits	Costs	Benefits/Costs ratio
Group I likelihood of use **	1.0	0.86	0.96	0.76	0.09
Group II likelihood of use	0.86	1.0	0.76	0.58	0.27
Benefits	0.97	0.83	1.0	0.84	-0.09
Costs	0.84	0.77	0.85	1.0	-0.52
Benefits/Costs ratio	0.43	0.41	0.42	-0.1	1.0

** In the top half the results include the results for the policy of excluding fertiliser which has not been included in the bottom half*

*** Group I represents those participants with logically structured relationships between their criteria and their scores for likelihood of use, Group II participants had unstructured relationships*

Excluding fertiliser was the policy with the greatest inconsistency between its advantages and its likelihood of use. By not including the results to excluding fertiliser, the correlation between the calculated Benefit-Cost ratio and likelihood of use was increased substantially, although it still remained relatively low.

The results of applying regression analyses and simultaneous equations are still not complete, and will be reported at a later conference.

Discussion

Preferred Riparian Management Policies

In a previous study (Parminter et al, 1998) of mainly sheep and beef mixed livestock farmers, planting conservation trees was one of the most preferred riparian policies. In this study of mainly dairy farmers, planting conservation trees was again one of their most preferred policies. The farmers considered that conservation trees could be planted in areas that would otherwise be susceptible to slips and erosion (and lead to more waterway sediment). They could also decrease animal stress by providing shelter and shade for livestock, and fodder in a drought. Planting conservation trees scored highly in this study on these criteria. Farmers' use of conservation trees could be limited by being associated with *increasing farm costs*, and *complicating management*. Planting conservation trees scored highly on these cost criteria, and also for *increasing weed problems*, and the amount of farm *labour* required.

A policy of excluding chemicals from the riparian area was the least preferred policy, although it did score highly for *improving water life*. Excluding chemicals was considered to *increase weed problems*, although the presence of weeds could in some cases reduce the risks of erosion. Excluding chemicals and it's associated weed problems also had a major cost of increasing the amount of *maintenance* management required. The previous survey in the King Country and Hawkes Bay had not ranked the option of excluding chemicals so low in farmer preferences, but mixed livestock farmers may not be so dependent as dairy farmers upon using herbicides in riparian areas.

In the previous survey (ibid.), the most preferred riparian policy was to plant timber producing trees. The most common reason given for this was so that the trees could make the riparian area commercially productive. However, in this study, having an income earning riparian policy was not a significant criterion. Overall timber trees scored in a similar fashion (but lower) as conservation trees, but were not considered to make as large a contribution to *increasing water-life*. Respondents considered timber trees to have similar but lower costs than conservation trees, except that more *maintenance management* for them was expected.

The Criteria Used by Farmers for Riparian Decision Making

This study has highlighted that decision criteria used by farmers for riparian management policies reflect not only the direct attributes of each of the policies, such as the area they require, or their costs, or income; but also criteria dependent upon the context in which they are applied. An example of a contextual criterion is the effect of a policy upon *livestock losses*. In an area where livestock can become trapped in a river or "bogged" in a wetland beside a waterway, this criterion may be important, but if those conditions do not exist, it may be lower priority. The direct attributes of management policies can be determined and measured by the designers of the policies. Contextual attributes of policies may be identified by studies of system interactions, but their importance can only be measured in relation to each context in which they are intended to be used.

Most of the respondents in this study were livestock farmers, and so the selection criteria of importance to them was not only the effect of the policies upon natural resource management, but also their effect upon farm livestock and animal production (i.e. *animal losses*, and *animal stress*). The rejection criteria included items that reflected the management burden upon farmers of making policy changes (i.e. effecting the *level of organisation required*, *complications*, and *flexibility*). These are items not often addressed by external agencies responsible for developing new resource management policies.

Decision Making Processes

It could be considered that the responsibility for evaluating policy options rests entirely with the decision makers concerned (Ministry for the Environment officials, pers. comm.), and that decision makers will make their decisions by applying decision criteria in a logically structured way. In this study, only 32% of the respondents (those in Group I), selected criteria and applied them in a way consistent with their ratings of the management policies. Some survey error would have resulted from those respondents (11%) who had difficulty in using a matrix to compare the riparian policies with the selected criteria (Parminter and Tarbotton, 1998) and who failed to complete all their answers to this section. However most of the respondents in Group II may simply have not compared and contrasted alternative riparian policies before (Parminter et al, 1998), and so would not have had any prior experience in testing their own process of evaluation. Most of the decision criteria selected by this Group though were still consistent with those also selected by the people in the logically structured decision making group (I). Some differences were that many more of the unstructured decision makers included *simplifies management* and *reduces waterway contamination* in their selection criteria (compare Tables 3 & 4). More people in the unstructured group also included *complicates management*, and *wasting land* and *reducing income* in their rejection criteria. To assist unstructured decision makers, riparian policy alternatives should be provided with clear decision making guidelines that include the criteria important to decision makers (Parminter and Tarbotton, 1998b). Decision making criteria and decision processes should be expected to evolve over time as people gain more experience in resolving particular management problems.

It is important that policy agencies are able to identify whether policies are not being implemented because farmers have not thought through a logically structured decision making process, or because the same policies lack any advantages to decision makers. This project is not yet at a stage that it can assist policy agencies with determining whether the first of these conditions exist, although it has established its effect upon increasing the level of inconsistency in decision making.

Modelling Decision Making and Benefit-Cost Ratio

This study found a high correlation between the scores for the beneficial criteria and respondent preferences for different riparian policies. Scores for the costs criteria were also positively correlated with farmer preferences, so greater costs meant more preference. These results for the costs criteria are counter intuitive, but overall they do suggest that farmer riparian preferences are determined more by their recognised benefits rather than their costs.

When the Benefit-Cost ratios were calculated, the policy of excluding fertiliser had scored so well in cost criteria that this produced the best ratio. However excluding fertiliser from riparian areas was not a preferred riparian policy by respondents. The Benefit-Cost ratio was overall, poorly correlated with farmer preferences for the riparian policies. Previous research (Parminter et al, 1997) on farmer adoption of single production technologies has shown that rejection criteria can be very influential on farmer decision making, but that the mechanism of influence could be quite complex to unravel. The results of the current study may indicate a need for further research on the role of rejection criteria. Particularly their interaction with selection criteria to result in an overall measure of preference able to be compared between management policies.

The AHP may provide a suitable tool for analysing farmer decision making, but a suitable protocol needs to be developed for this purpose. In particular, further research is needed to

link decision criteria to the decision "problem", and to widen the possible criteria that can be included. Previous qualitative research (Parminter et al, 1998) has indicated that riparian management goals can vary quite widely, e.g. from utilisation of waste land, to building in-stream habitats. The purpose for making a decision and how important the results of a decision may be to the decision maker, will probably effect the criteria used in decision making (Saaty and Vargas, 1994, p13).

The criteria selected may also differ between farming enterprises or waterway types. Some additional criteria may be specific to certain policies (e.g. the example of income earning and planting timber trees used above) rather than being general across all policies.

Conclusions

- Farmers in the Taranaki workshops preferred planting conservation trees, and permanently excluding grazing to other riparian management policies
- Farmers used criteria associated with animals and their production as well as resource management to evaluate the benefits of riparian management policies
- Criteria included those directly associated with policy attributes, and those resulting from their applied contexts
- There were different criteria chosen for selecting policies to those for rejecting policies
- Farmers included several management criteria amongst their reasons for rejecting riparian management policies
- About 50% of farmers had unstructured decision processes not logically related to their riparian policy selection
- The Analytical Hierarchy Process provides a way of combining financial and non-financial information together in a form of cost-benefit analysis but its use in a model for predicting farmer preferences requires further development.
- At the conclusion of the project, a future paper will explore the experience obtained in applying the AHP to resource management problems, and provide recommendations for its future use.

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APPENDIX 1: Examples from the Taranaki Riparian Management Survey

SECTION A

Please complete questions 1 - 7 by filling in the gaps provided or ticking or circling the most correct answer. Where you have more than one property, answer for the property with the most waterways

1. Occupation:
Circle the category that applies

Farmer Part-time Farmer Non-farmer

If you a nonfarmer, proceed to question 7.

2. Your total farm area? _____ha OR _____acres

3. Farming type?
Circle all categories that apply

Sheep Cattle Deer Goats Dairy Cows Farm Forestry/Woodlots

other: _____

4. Number of permanent waterways (including open drains) on the property or against its boundary?

None 1-2 3-4 5-7 8-12 more than 12

5. Width of the widest waterway?_____ meters OR _____ feet

6. Do you use any waterway as a source of water for any irrigation? Yes No

7. Length of time that you have spent employed in the farming industry?
Circle the category that best applies. *If this does not apply to you, put NA.*

<20 21-30 31-40 41-50 51-60 61-70 >70 years

1. Your gender?
Circle the appropriate category Male Female

Selecting Riparian Management Practices

The following two tables will help us evaluate the criteria farmers use to select riparian management options. The first table considers reasons why you WOULD use a riparian management practice. The second table considers reasons why you WOULD NOT use a riparian management practice.

There are no right or wrong answers.

Across the top of each table are a number of management practices suitable for riparian areas. Down the left of each table are a number of Criteria for using or not using the management practices.

- ***In table1*** *tick only 6-10 criteria that you consider to be the most valuable for farmers like you in deciding to use a riparian management practice. Make your ticks in the same box as the criterion is named. It may help to think about the practice that you would be most likely to use while you do this.*
- *Score ALL the management practices for how well they fulfil each of the criterion you ticked. Enter the scores in the empty boxes. Use a scale of 0-8 where zero (0) indicates no effect on the criterion, and use eight (8) when it has a great effect. If that management practice would have a negative affect upon that criterion, then just put an* ✕ *in the box instead.*
- *For example, if you selected "reduces labour requirements" as an important criterion you might consider that "permanently excluding grazing" will reduce the farms labour requirements a lot and therefore give that square a score of "6".*

SECTIONS D & E_N
Table 1. Criteria for Using ...

Management Practices

Criteria	permanently excluding grazing	seasonally excluding grazing	establishing timber trees	establishing conservation trees	excluding riparian fertiliser	excluding riparian chemical control	protecting wetlands	doing nothing
reduces labour requirements								
simplifies management								
increases flexibility								
eases animal movement and mustering								
reduces weed problems								
decreases drain cleaning								
improves land utilisation								
increases income								
increases costs								
decreases maintenance								

The table is incomplete and provides an example only.