

BRIDGING THE RIPARIAN DIVIDE: ONLINE RIPARIAN MANAGEMENT PLANS FOR DAIRY FARMS IN NEW ZEALAND

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Improving riparian management can be an effective mitigation for soil and nutrient loss to waterways from dairy farms (Naiman and Decamps, 1997; Quinn, 2009; Wilcock et al., 2013). Riparian management can be defined as the management of waterway margins for water quality through stock exclusion and enhanced bankside vegetation cover, whether of grass, shrubs or trees. The New Zealand dairy industry is committed to improving riparian management on-farm to contribute to community desired water quality outcomes. This is given effect in the Sustainable Dairying: Water Accord riparian target where the aim is to have 100% of all dairy farms with accord waterways to have a riparian management plan by 31 May 2020.

It is estimated that 70% of dairy farms in New Zealand or 8500 farms in total have Accord-defined waterways. These are permanent waterways of a metre or more in width, and 30 cm or more in depth. Delivery of 8500 riparian plans in four years is a significant undertaking and will require support from the rural professional sector. Until now, the dairy industry (and many regional authorities) has lacked a riparian management tool that was simple and easy to use and allowed for a relatively large number of plans to be produced in a short period of time. It was also difficult for people who were not necessarily experts to build riparian plans.

The “Riparian Planner” has been co-developed by DairyNZ and Landcare Research to deliver a simple yet effective tool that farmers and their advisors can use. DairyNZ provided practical and scientific knowledge of effective riparian solutions on-farm. Landcare Research provided expertise to create the automated guidance and user-functionality needed to make the tool and the process fast and painless.

A key part of the process was identifying the gaps or barriers to planning on-farm. These included a lack of planning tools and support as well as insufficient understanding of what actions to pursue, where, in what order and over what timeframe. There was strong feedback supporting an online tool which linked into existing resources. Input was sought from farmers, rural professionals, regional council land management teams and academic experts to create a flexible, user-driven and comprehensive online tool for building farm riparian plans nationwide in four easy steps.

The Riparian Planner has four steps to create a riparian plan. Firstly the plan is given a title and the farm is located using a supply number as shown in Figure 1. The supply number centres the dairy shed on an aerial map however it is also possible to zoom into a farm if a supply number is unknown.

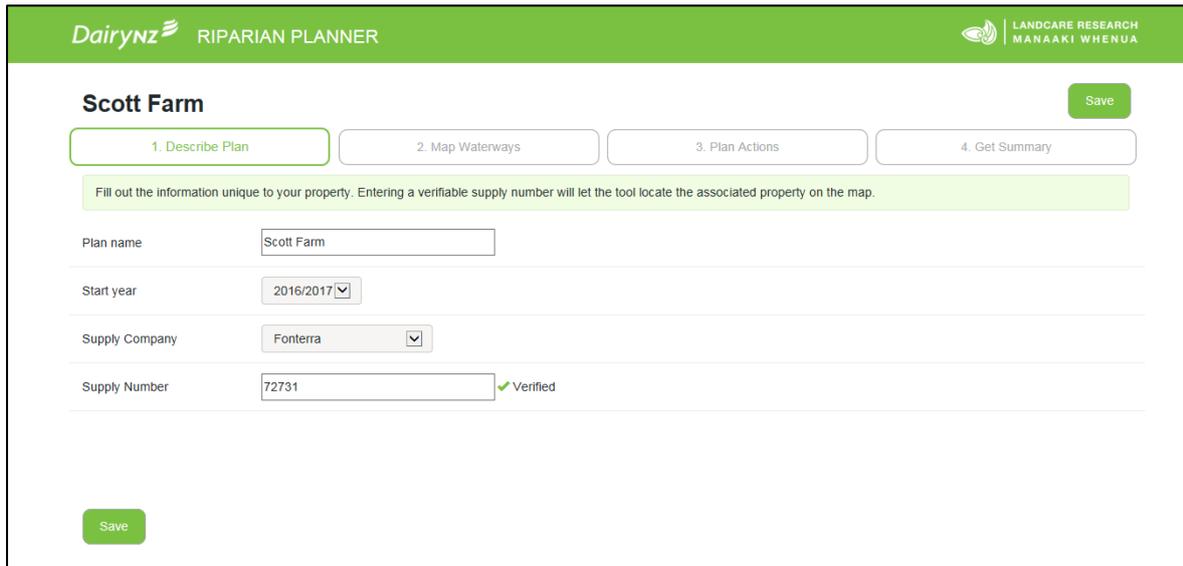


Figure 1: Screen shot from the Riparian Planner of Step 1. Describe Plan. The plan has been named after the farm and the supply number verified.

In Step 2: Map Waterways, web mapping tools are used to capture and describe waterway information. Stream, rivers and drains are mapped as a line as seen in Figure 2 and the default assumption is both sides will be managed. Larger waterbodies such as ponds and lakes are also mapped as a line, however it is assumed only the outside of the waterbody is managed. Wetlands and Critical Source Areas are mapped as a polygon and it is assumed the entire area will be managed.



Figure 2: Screen shot from the Riparian Planner of step 2. Map Waterways. The editing panel is shown on the right.

An editing panel opens for each mapped waterway as shown in Figure 2. In this panel the user describes several elements of the waterway feature including: whether or not it is an accord waterway as defined in the Sustainable Dairying: Water Accord; the state of stock

exclusion and crossings; what the existing vegetation type is; and whether there is the presence of erosion or weeds. The average width of the riparian zone is described and is then split into grass margin, lower bank zone and upper banks zone.

The answers given in the mapping step guide the rows that occur in Step 3: Plan Actions. The user can explore different options, timings and costings which enables them to tailor the plan to a farm's environment, budgets and time constraints. Several actions show up on every waterway by default as they are considered essential to successful riparian management. These are: Site preparation, Ongoing maintenance and Other costs. Other actions will occur depending on how the waterway was described. These actions are: fencing, plantings and crossings. Figure 3 shows the actions that are available for the Main Drain that is mapped in Figure 2.

		2016/2017 Total: \$1,050 Plants: 0		2017/2018 Total: \$600 Plants: 182		2018/2019 Total: \$1,200 Plants: 182		2019/2020 Total: \$1,200 Plants: 182		2020/2021 Total: \$900 Plants: 128	
Action	Estimated total cost										
<p>1. Describe Plan 2. Map Waterways 3. Plan Actions 4. Get Summary</p> <p>Fill in the boxes below to plan costs, actions and effort per year for each waterway. For further information on how to carry out riparian planting please refer to the information and downloadable guides found on Planting Waterways. Edit the planning costs to change the default plant and fencing costs used in the calculations.</p> <p>Edit planning costs</p>											
Main drain											
- Planting here may not be necessary. Grass does an excellent job of filtering run off.											
Site preparation	\$200	\$ 200	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Planting	\$3,690	Plants	Plants	Plants	Plants	Plants	Plants	Plants	Plants	Plants	Plants
		0	182	182	182	182	128				
		\$ 0	\$ 1000	\$ 1000	\$ 1000	\$ 1000	\$ 700				
		56 plants for the upper bank zone; 126 for the lower bank zone.		56 plants for the upper bank zone; 126 for the lower bank zone.		56 plants for the upper bank zone; 126 for the lower bank zone.		40 plants for the upper bank zone; 88 for the lower bank zone.			
Ongoing maintenance	\$700	\$	\$ 100	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200
Other costs	\$350	\$ 850	\$ -500	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
		Note 10 Poplar poles at \$8.50-erosion	Note \$500 funding from Rotary for plants	Note	Note	Note	Note	Note	Note	Note	Note
Total Expenditure		\$1,050	\$600	\$1,200	\$1,200	\$1,200	\$900				
Plants Required		0	182	182	182	182	128				

Figure 3: Screen shot from the Riparian Planner of Step 3. Plan Actions. Showing the actions for the waterway allocated over time

The final step in the Riparian Planner is to produce a summary of all the actions and costs. This can be viewed either as an overview of all the waterways as shown in Figure 4 or by year. This can be printed along with a pdf report, a map of the farm with all the waterways highlighted and a regional plant list. The plan is kept alive online and can be revisited at any time to track progress or edit should circumstances change.

1. Describe Plan		2. Map Waterways		3. Plan Actions		4. Get Summary	
Review and download a summary of your plan with a map included. You can also print a tailored plant list. For further information on how to carry out riparian planting please refer to the information and downloadable guides found on Planting Waterways.							
Download report		Print plant list					
Overview		By Year		Plant List		Map	
Waterway	Actions						
	Action	Estimated total cost	Allocated cost	Start	Finish		
<input checked="" type="checkbox"/> Main drain <i>Accord River Or Stream - both sides managed - predominantly grass</i>	Site preparation	\$200	\$200	2016	2016		
	Planting (100%)	\$3,690	\$3,700	2017	2020		
	Ongoing maintenance	\$700	\$700	2017	2020		
	Other costs	\$350	\$350	2016	2016		
				2016: 10 Poplar poles at \$8.50-erosion 2017: \$500 funding from Rotary for plants			
Total		\$4,940	\$4,950	2016	2020		

Figure 4: Screen shot from the Riparian Planner of Step 4. Get summary. The Overview tab selected. The plan can also be viewed by year or as a map. A regionalised plant list is also available.

Farmers and consultants are supported through the creation of their riparian plans. Hints and prompts are included throughout and existing DairyNZ and regional council resources should be utilised alongside the tool. Resources, including how-to videos, are available on the DairyNZ website dairynz.co.nz/waterways. Free training is being extended to dairy farm advisors nationwide throughout 2016 (please email riparianplanner@dairynz.co.nz to register). The tool is being introduced to farmers through these trained key advisers as well as at several farmer events including South Island Dairying Events and the National Fielddays.

The Riparian Planner improves planning by breaking riparian management down into achievable, farmer-agreed actions. While water quality problems are complex, the Riparian Planner simplifies and speeds up the process of effective riparian management on-farm. It is an innovative new tool and will help dairy farmers and the dairy industry to achieve their Sustainable Dairying: Water Accord target. The Riparian Planner is available on the DairyNZ website now dairynz.co.nz/riparianplanner.