Lochiel Farm Environment Plan

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Total Ag Ltd

Contents

Background

Lochiel is a 3523 ha drystock farm situated on McCutchan road, Glenn Murray, managed by Kim and Evelyn Robinson.

Predominately sheep and beef, it also incorporates a cattle wintering Pad.. It would fit into class 3-4 in the Beef + Lamb NZ Economic Farm Service survey.

This report takes the property through an FEP as developed by Beef + Lamb NZ. It will look assess the risks regarding 4 contaminants:

1. Phosphorous
2. Nitrogen
3. Sediment
4. Faecal Bacteria

The plan will then assess the property in terms of its Land Management Units (LMU's), look at critical sources areas (CSA's) and develop responses to the challenges and opportunities for each unit.

There will also be a draft nutrient budget to assess the risk of N Loss to waterways.

Farm Details

Farm Name	Lochiel
Address	McCutchan Rd, Glen Murray
Legal Description and Farm identifier	
Sub catchment and Priority	Whangapae Priority 1
Owners (If held in Trust identify all Trustees/Directors)	Lochiel farmlands Ltd
Leaseholders	
Phone	
Mobile	
email	
CEO	Kim and Evelyn Robinson
Phone	
Mobile	
email	
Responsibility for implementation	Kim Robinson
Resource Consents for Property (If Held)	

Farm System

Sheep

10500 Perendale x Coopworth ewes, and 4300 replacement hoggets are wintered.

Ewes are mated in March and start lambing in August, with mean lambing the end of August. Docking percentage is 125% in the mixed age ewes and 115% in the two-tooths.

Weaning and shearing are planned for the 1st of December annually, weather permitting, and a first draft of lambs 28kg+ are sent to works. There is a second draft after Christmas and another in Feb. Only replacements are wintered on farm. Shearing occurs twice a year, typically December and May/June.

Sheep are fed pasture year-round, with the hogget's sometimes cleaning up the Lucerne crop in autumn.

There are 160 breeding rams on farm.

Cattle

Lochiel owns 1600 breeding cows but only 420 of these are run on Lochiel, the remainder are grazed off farm.

The bulls go out on the 9th of December for the entire mob and those in calf on first cycle are kept. Calving starts on the 14th of September with generally an 86-88% calving percentage.

140 replacement heifers are mated as R2's and those falling pregnant in the first two cycles are kept which leaves around 115 in-calf replacements.

Weaning is carried out in March when all progeny from 1600 cows are returned to the farm. Calves are sex drafted at weaning. The heifers are weaned onto the Forsters block and then come into the feedlot in about July/August of their 2nd winter. They are generally between 340-380kg when they enter the feedlot. They are killed between 480-500kg, and they spend about 80 days on the feedlot.

Steers are wintered on either fodder beet or pasture, and then move to the feedlot in March at a minimum weight of 360kg and average of 420kg. It then takes 90-130 days to reach their target weight of 620kg which means they are in the feedlot between 90-130 days.

Trade cattle, predominately R1 and R2 steers, are purchased between August and Christmas and are finished on either grass or in feedlot – the goal is to manage 50:50.

There are 70 breeding bulls, both on-farm and on grazing blocks.

Feedlot

The feedlot is situated next to the cattle yards. The floor is stabilized clay covered with 12 inches of lime chip and sits level. There is a three-meter concrete apron either side of the lot where stock eat. This is scraped every 7-10 days into sumps at either end of the lot. The scrapings are mixed with water and stirred then spread on to the drive country.

The remainder of the lot has straw added and this is cleaned down to lime chip annually and put through the muck spreader and spread onto crop paddocks. Occasionally the chance is taken during the year to clean the pad when animals are removed, and this muck is stockpiled and stored on grass.

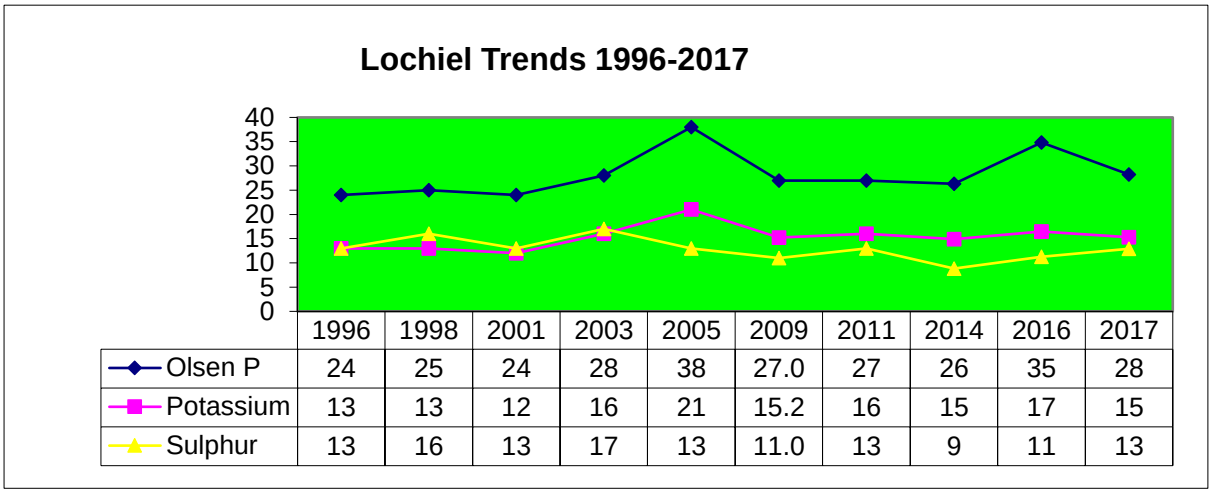
The feedlot is totally fenced off and there are plantings along both sides of the building. Roof water is captured in (6)3 0,000L tanks and used to water the feed pad. Any water overflowing from these tanks is filtered through the wetland below and is only ever roof water.

Cropping

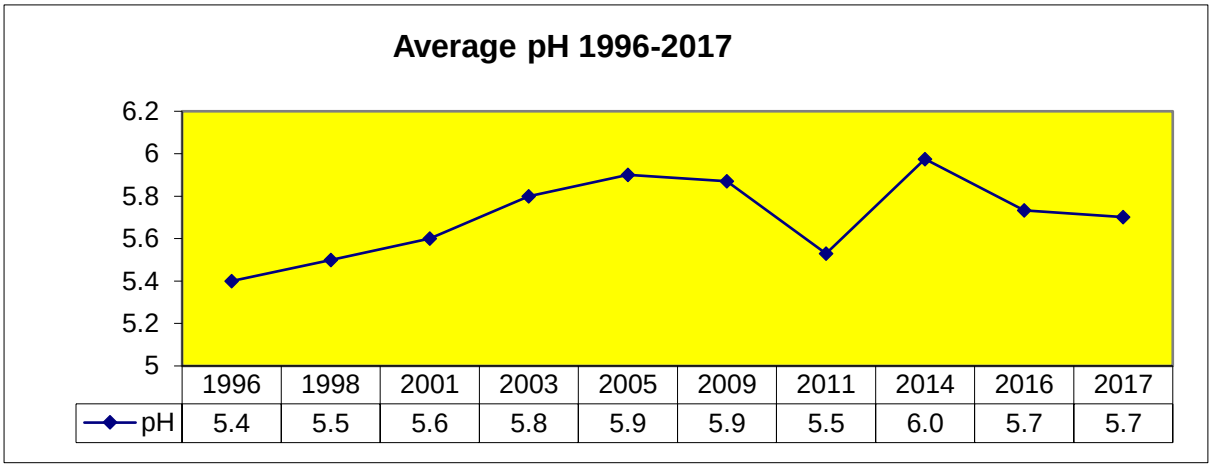
All cultivation is carried out on slopes of less than 10 degrees. There is no evidence of setbacks from fences but there are no waterways close to the crops. 17ha of Fodder beet is grown and grazed as a fodder crop and 17ha of Lucerne are grown as cut and carry for the feedlot.

Fertiliser use

Soil tests have been carried out annually in the last two years and on average 2 yearly prior to that. Olsen P levels sit at an average of 29 over the last 3 years and pH at 5.8, these are at optimal status for this type of land.



	1996	1998	2001	2003	2005	2009	2011	2014	2016	2017
Olsen P	24	25	24	28	38	27.0	27	26	35	28
Potassium	13	13	12	16	21	15.2	16	15	17	15
Sulphur	13	16	13	17	13	11.0	13	9	11	13



	1996	1998	2001	2003	2005	2009	2011	2014	2016	2017
pH	5.4	5.5	5.6	5.8	5.9	5.9	5.5	6.0	5.7	5.7

Fertiliser is applied annually in the spring/early summer period.

Critical source areas (CSA) identified

As you would expect in a property of this size, there are a substantial number of critical source areas. The majority of these have already been addressed and mitigated through a low stocking rate intensity, a lower grazing intensity, pole planting, and targeted grazing of steeper slopes with sheep vs cattle.

Silage bunkers

There are three large concrete bunded silage bunkers however there appears to be a little slipping below the bunker closest to the cattle yard – which has caused the concrete to slump a little. This will need addressing going forward. Leachate from the bunker closest to the feedlot needs to be filtered – presently flowing over concrete onto grass – good idea to plant flaxes and sedges along this border to encourage filtering of any excess leachate. Or bund bunker so leachate is contained. There is a filtered wetland further down the gully that needs maintenance to make it fully effective.

Cattle yards

The cattle yards also show evidence of leachate flowing out and into grass/swamp below. This area should be fenced off and planted with flaxes etc to help filter the leachate, so it is not flowing directly downhill into the waterway below. This also goes through the gully system that the silage bunkers do (see above).


Sheep yards and woolshed

The sheep yards are covered and water from woolshed and covered yards is collected through downpipes and is channelled to a grassed area. The side of the yards slope a little and then drop off quite significantly about 10 metres from the fence. This area is currently covered with plantings but would benefit in the long term from some form of riparian planting to encourage filtering of water that runs off.



Satellite yards in 500 block

There was quite a bit of silt built up against the bottom-side fence of the holding yard, which shows the amount of run-off coming off the yard needs addressing. There is a stand of trees planted below the yard which will help with erosion and filtering, but it would also be worth planting some sedges and filtering type plants along under this boundary or building this area up so that the downhill flow of sediment is reduced.

Streambank erosion and Koi carp

The Opuatia stream runs through the flats on the northern end of the property. It is a silt bottom stream and appears highly degraded due to the presence of koi carp. The Mangatia, which runs into the Opuatia, shows very little evidence of koi carp and is crystal clear, with small native fish present in large numbers. The Mangatia has been fenced and planted. Koi carp can generally only get into the Mangatia during flood and the difference in water quality from one stream to its tributary is extraordinary.

Corner of Opuatia stream where koi carp was seen, note lack of clarity of water

Koi carp

Mangatia stream

There is also less evidence of riverbank erosion as you move up the stream toward the boundary, with obvious vegetation growing right down to the water's edge. The photo below shows an unfenced stream, and the presence of vegetation shows that cattle are not grazing the riverbank. This would suggest that cattle are managed and fed well to avoid streambank damage. There is presently a programme underway to finish the fencing of the Opuatia (2018). Note flooding occurs frequently and fence design and maintenance is an ongoing issue.

Clarity of water improves as you move up the Opuatia

Pole planting

Extensive planting has taken place with established poplar plantations and newly planted poles evident over much of the property. There are also stands of native which have been fenced off. There are first and second-generation planting and smaller areas of third generation plantings over the entire property. Lochiel is in its fifth and final year of their planting plan. All plantings have been well thought out, with some thinning out of older stands having occurred. The pole plantings present on the farm are a credit to management and their commitment to soil conservation.



Limestone – shallow soil

There are areas of very shallow limestone in the hills, especially in the 52, 500 and Back LMU's which would require careful handling to avoid soil loss and erosion. There is very little evidence of erosion and soil loss over these blocks, and these areas are managed well. The steeper shallower slopes have lots of tag which would suggest very light grazing.


Gorge

The gorge is potentially a very wet area, which would benefit through the wetter months with extensive grazing of a smaller class of animal, such as sheep and R1 cattle. There is a small creek running down one side of the gorge, but it is unlikely fencing off this stream will

be of much benefit as stock don't appear to enter the stream or access its banks as they are quite steep and there are crossings at the top and bottom of the valley.

Flats

The flats across the Opuatia can flood badly during the wetter months and are sheep only. The flats can be pumped, but not when there are has been large amounts of rain. There are good stands of riparian planting, both established and new, and shelter belts along the flats. One side of the Opuatia is fully fenced and the other side is currently being fenced.

Manuka and native stands

There are stands of Manuka leading down to the gorge which could be fenced off to maintain integrity of hillsides. The regional council is currently funding the retirement of areas of land, it might be worth approaching your WRC land management officer to tap into this funding. There are quite a few native stands over this property which would benefit from this as well, to enable them to regenerate without stock pressure.

Tracking

There are several tracks, especially those in the Beauford Lodge block which need upgrading and cut-offs added on sloping tracks to avoid run off and big gouges forming in races. There are areas where silt traps have been created which is very positive to see.

Native fish in waterways

There are small native fish and water snails observed in most of the creeks and streams on the farm away from the Opuatia. Further up the Opuatia in the Beauford lodge block, the waterway becomes clearer as you move up it and there were shoals of Inanga present.

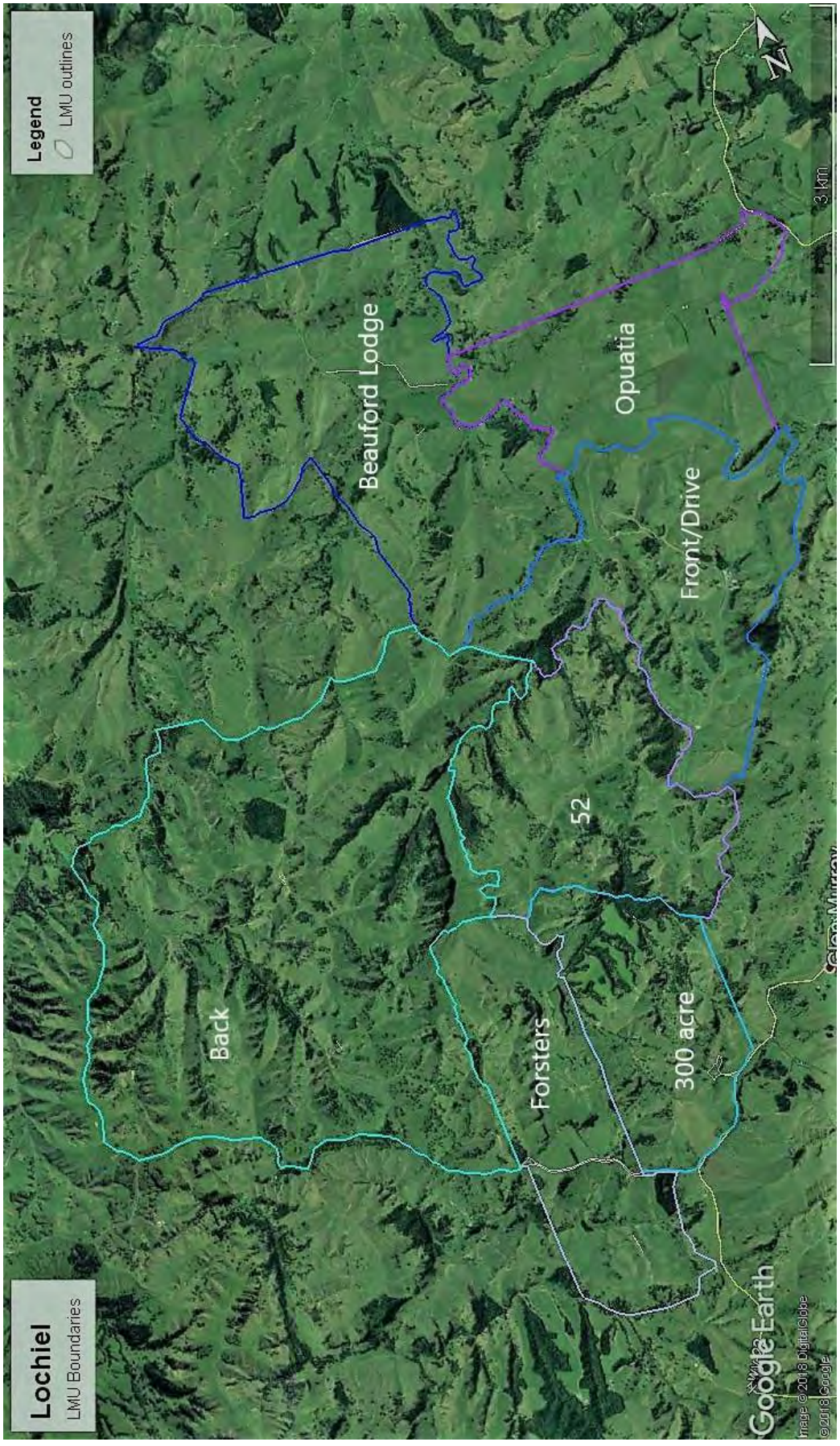
Land Management Units

The farm is run as 7 land management units (LMU). These are Beauford Lodge, Back, Flats, Opuatia and Front/drive, 52, 300 acre and Forster's.

LMU	***Description***	***Strengths***	***Weaknesses and risks***	***Uses and management***
1.Beauford Lodge	Easy rolling to rolling country	Good fertility, good contour	The plains flood	Grazes both sheep and cattle, primarily younger stock
2. Back	2832 acres. Bigger country	Strong country holds well. Glen	Need to ensure plenty of food	Bigger paddocks, cows

		Murray silt loam	available in winter as it can get pugged.	and ewes run here. Cows set stocked in winter, ewes lambed here
3. Flats	730 acres. Flat and gentle rolling country surrounding Opuatia stream	Flat good fertility. Flats can be pumped in lighter rainfall	Can flood heavily.	Engine room if season goes right
4. Opuatia/drive		Summer safe. Well fenced, good water. Fenced off wetlands which filter this side of farm. Ash soils	Heavier country, can be damaged in winter	Fattening country
5. 52		Good strong country. Close to infrastructure	Steeper country with shallow soils	Cows set stocked through here in winter and ewes lambed here
6. 300 acre		Ash country at top, good fertility. Allows for Lucerne crops.	Hardest country on property	Mainly hogget's run here, ewes and cows go through occasionally
7. Forsters	360ha/ Good country	Good contour and shelter. One block of trees fenced off	Rougher block. A little bit of moving ground	

Map


Legend
LMU outlines
Lochiel
LMU Boundaries
Beauford Lodge
Opuatia
Front/Drive
52
Forsters
300 acre
Back
N
3 km
Google Earth

Risk assessment

Phosphorous

There is a small amount of stream bank erosion evident along the Opuatia stream and would be primarily due to the presence of the large population of Koi carp. This will be addressed as new technology, and funding becomes available to tackle the pest, as they are highly prolific breeders living in a near perfect ecosystem. It will take more than the effort of one farm to control them.

There are 34ha total which are used for Fodder beet and Lucerne. The Lucerne is a cut and carry crop so bears little risk of losing sediment. The fodder beet is fed to the cattle in situ, and is fed in a manner to avoid runoff, with good buffer zones.

The farm consists of a many different topographies, ranging from flat to steep. The majority of the farm would be considered rolling to steep.

The river flats tend to flood in large rainfall events. Smaller flooding can be controlled by pumping out of the flats.

Erosion and Sediment

The risk is assessed as low to medium. There is a little evidence of erosion over the farm, and most of the slips have been addressed with strategic poplar and willow plantings and the fencing off the steeper blocks. Grazing intensity is carefully managed on the steeper slopes with evidence of tag left on the hills, demonstrating under-grazing of steeper slopes. There are one or two major slips evident over the property which are the product of exceptional storms in 2017 and early 2018. One of the slips has already grown over and the paddock has been lightly grazed with no evidence of further slipping or bare ground opening up. The second more recent slip also shows no evidence of stock grazing with long grass and plenty of vegetative cover still present over much of the slip.

Hillside affected by heavy rain event in 2017

Hillside effected by heavy rain event in early 2018

Nitrogen

A Draft Nutrient budget utilising Overseer 6.30 has been completed.

(kg/ha/yr)	N	P	K	S	Ca	Mg	Na
Nutrients added							
Fertiliser, lime & other	3	26	48	27	57	5	0
Rain/clover N fixation	51	0	3	6	4	9	39
Irrigation	0	0	0	0	0	0	0
Supplements	7	1	5	1	1	1	0
Nutrients removed							
As products	9	2	1	1	3	0	0
Exported effluent	0	0	0	0	0	0	0
As supplements and crop residues	0	0	0	0	0	0	0
To atmosphere	22	0	0	0	0	0	0
To water	14	3.1	27	45	111	25	54
Change in farm pools							
Plant Material	0	0	0	0	0	0	0
Organic pool	14	16	1	-13	0	0	0
Inorganic mineral	0	5	-10	0	-95	-4	-5
Inorganic soil pool	1	1	38	0	42	-8	-9

The property is not yet Soil mapped with S Maps. When this becomes available it will affect the loss of N to Waterways, as the soil types utilised are Allophonic and brown soils.

Due to the high fertility and stocking rate the potential to lose N to waterways is quite high. However, this is manged by being able to drop the stocking rate (especially in winter) by utilising a feed pad.

Faecal Coliforms

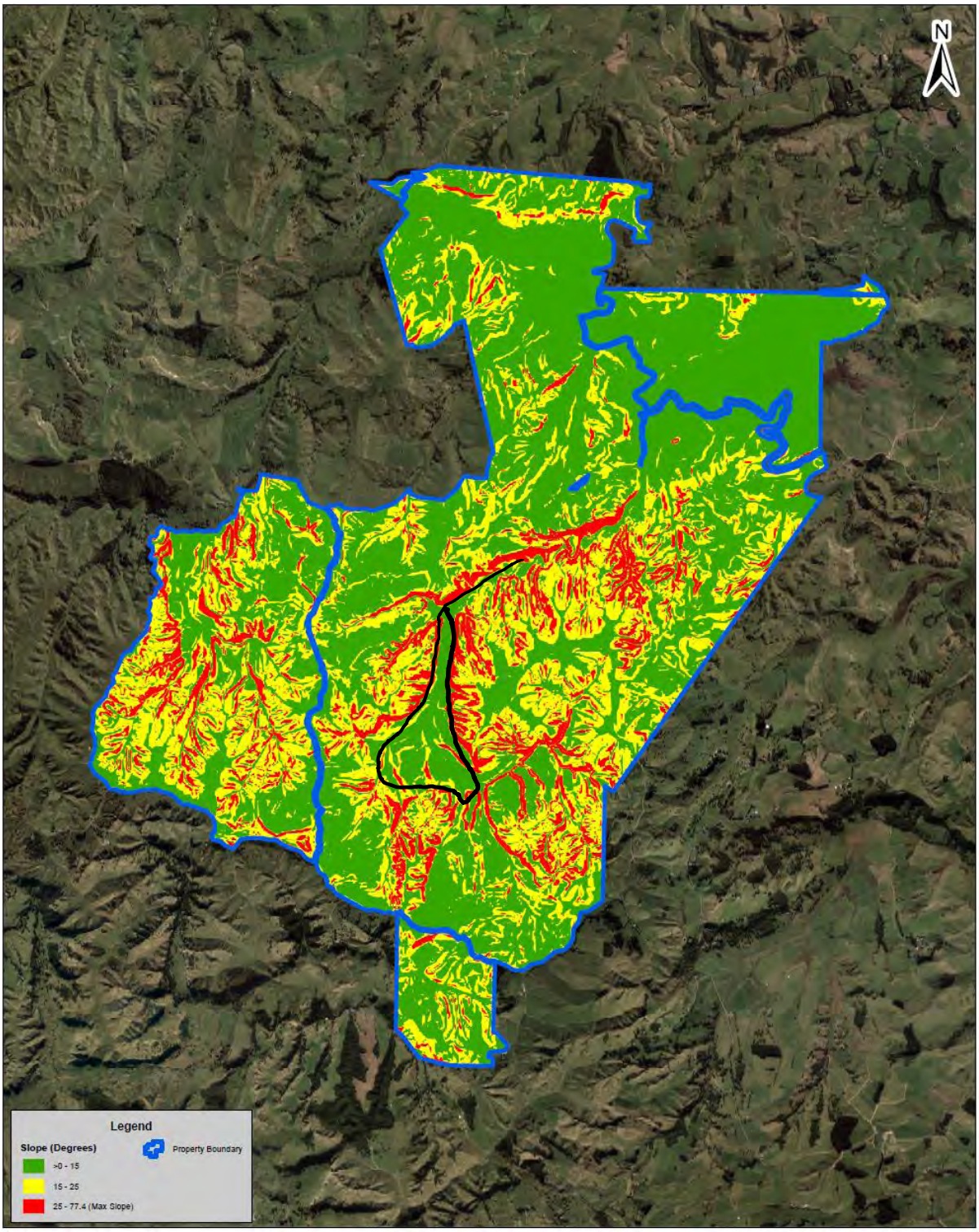
Much of the farm is reticulated with little need for stock to access natural waterways for drinking water.

There are man-made stock crossings in all paddocks in the form of bridges and culverts and little evidence of stock crossing in through waterways. The photo below shows an unfenced stream without a crossing – the right-hand side of the creek is un-grazed and has been for some time and the stream acts as a natural barrier. You can also see a fork at the top left of the photo with crossing and grazed pasture on other side.

The Opuatia stream is in process of being fenced either side to encourage filtering of flood water and to enable planting on either side of the stream.

Fencing

The property is of varied contour. Apart from the flat areas most paddocks contain slopes greater than 25° and would be difficult to fence. As a mitigation there is 3 separate water systems on the property with troughed water to almost every paddock.



The slope map above confirms the nature of the property.

However, a plan should be formulated to identify the at-risk areas and look to retire these. The two gorges are very prominent (drawn in black) in this map and the areas above the gorge have flatter paddocks in them. These could be fenced to exclude stock, as the water quality is outstanding coming out of the 300 block and Forsters as judged by the native snails.

Contaminant Summary

The two contaminants of concern are sediment and faecal bacteria. Nitrogen and phosphorous is at low risk assessment so no specific responses are targeted for these.

These can be mitigated by stock policy monitoring and adjustment.

There are some infrastructure solutions to these as well with targeted fencing riparian planting and

Action Plan

Area	Issue/risk	Significance	Response	Timeframe
Nutrient management				
	Fertiliser use	M	time to avoid wet weather	Ongoing
	Effluent from feedpad	M	Continue with application of solids to land; ensure no run off	Ongoing
Soil management				
	Erosion control	M	Continue to plant sidlings and manage according to steepness and likelihood of slipping	Ongoing
	Avoid pugging	H	Keep heavier animals off at risk soil during wetter months, use a lower stocking rate during wetter months	Ongoing
Wetlands, riparian management and stock exclusion				
	Stock exclusion	L	Fence off remainder or Opuatia, also it's tributaries on the Beauford lodge block	Ongoing
	Riparian planting of waterways	L	Continue with efforts at planting fenced waterways	Ongoing
	Fencing off stands of manuka and other natives	L	Fence off larger blocks of native and Manuka	Ongoing
Land use and grazing management				
	Stock class for land type	H	Continue to match stock class to landscape	Ongoing
	Cropping setbacks	L	Include a 3m setback around edge of crops to encourage filtering	When planting
Biodiversity				
	Maintain freshwater fish and snail presence	H	Continue with current management practises, as there seemed to be an abundance of freshwater organisms present	Ongoing
Pest management				
	Goats	L	Reduce goat population and maintain	Ongoing
	Possums	L	Continue with possum management	Ongoing
	Koi carp	H	Enter into discussion with council as to how can control Koi carp	Ongoing
Offal pits, runoff from stockyard, tracks, races and rubbish dumps				
	Cattle yard runoff	H	Plant area below cattle yard to filter run off	By Dec 18
	Sheep yard run off	H	Fence off and plant area next to woolshed where run off occurs	By March 19
	Satellite yard run off	M	Lift fence back up, plant below fence and possibly level that area so less run-off occurs	By March 19
	Water on tracks and races	M	Turn water off races where it is becoming a problem to avoid deep gouges down races and runoff of sediment from tacks into waterways	As soon as possible