Makarewa Headwaters LUCI Ag Catchment Study

ABOUT THE PROJECT

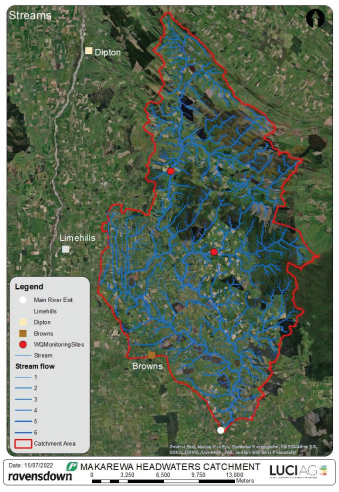
The Makarewa Headwaters Catchment Group engaged Ravensdown Environmental to model nitrogen (N), phosphorus (P) and soil losses from the catchment to help look at possible ways to reduce agricultural contaminant losses within the catchment and to better understand the drivers to these losses.

They did this across six farms, using OverseeingFM and the LUCI-Ag farm modelling to inform catchment modelling, as well as predicting land use across the rest of the catchment using aerial photos, Land Information New Zealand – NZ Property titles, Manaaki Whenua – Land Cover DataBase, and Manaaki Whenua – Land-use intensity.

The predicted values for average sheep/beef/deer farms in the catchment (e.g. fertiliser inputs, soil test results and relative stock units were then calculated using average values from selected sheep and beef farms and checked against Beef and Lamb's "Otago, Southland: Sheep and Beef quintile analysis and forecast". To predict the average catchment dairy farm, the results were averaged against Overseer results for 10 other dairy farms in the Southland region. The remaining results (e.g. exotic and indigenous forest, Manuka and/or Kanuka) were based off standard LUCI-Ag values.

The modelling helped identify areas that could be prioritised for N, P and soil loss mitigation actions, which have been tested via LUCI-Ag scenario modelling to assess their likely impact.

As with all modelling, these results are indicative and are being used as a guide.



The Makarewa Headwaters Catchment covers the Lora and Otapiri Gorges water catchment area east of State Highway 96. It includes the landscapes where the Otapiri, Lora and Makarewa streams rise.

WHAT THE LUCI-AG CATCHMENT MODELLING TOLD US

The intensity of the farm system impacted the N-load

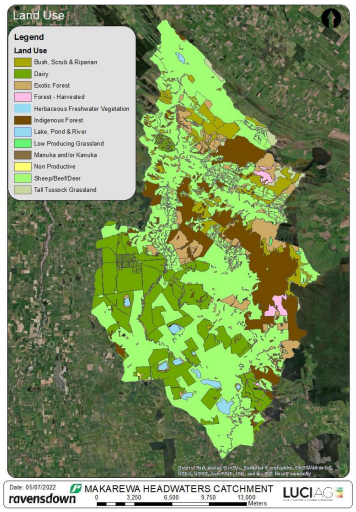
- Dairy farms had the highest N-load areas, particularly when on the free draining Brown soils (compared with the poorly draining Gley soils)
- Sheep/beef/deer farms generated lower N-loads than dairy farms
- The lowest N-loads were generated under native or exotic forestry

The intensity of the farm system impacted the P-load

- The highest P-load areas were on farmed sloped dairy land underlain by Pallic or other slower draining soils

Soil losses are directly impacted by land use and topography

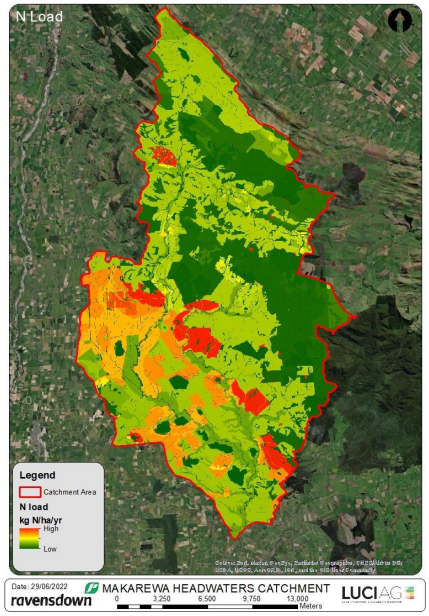
- Higher soil losses are associated with harvested forest on steeper topography

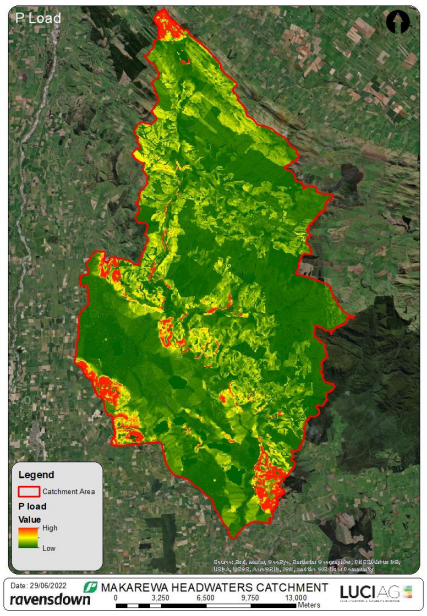


WHAT MITIGATIONS ARE AVAILABLE?

Waterway fencing has a big impact on N and P losses

- Individual farm reports (LUCI-Ag modelling) highlighted that fencing off waterways resulted in significant reductions in N & P losses of 5-28% and 4-70%, respectively
- The modelling highlighted that increased fencing resulted in over 50% of waterways having reduced P-concentrations, with over 1-in-5 waterways having a reduced P concentration of over 10%
- With increased fencing, the modelling also showed over 33% of waterways saw reduced N-concentrations, with over 13% of waterways showing a reduced N concentration of over 10%
- Other additional benefits of fencing/ riparian planting including biodiversity gain and providing shade to waterways which reduces water temperature and excessive plant growth





Land-use impacts on N and P

- In a catchment scenario, 990 ha of low slope scrub land was intensified, and 990 ha of steeper farmed land was retired (>25deg land, and >15deg dairy). This change in intensification, along with retiring steeper land, resulted in reduced catchment instream P loss by 9%
- Individual farm reports showed that retiring land around streams can offset N & P losses from the intensification of better land

Intensive Winter Grazing (IWG) mitigations

To reduce environmental losses from IWG, the following options are available:

- Avoid sloped land and steeper slopes, which increase run off risk
- Replant the paddock as soon as practically possible
- Catch crops (e.g. Oats or Italian ryegrass) reduce losses from winter grazing or potentially under sowing in pasture species with forage crops.
- Ground cover increases plant N and P uptake and physically holds the soil together, reducing N, P and sediment losses
- Avoid planting (leave in pasture) and grazing of critical source areas
- Avoid grazing close to waterways/drainage
- Graze paddocks strategically, e.g. graze slope downwards allowing the rest of the crop to act as a buffer zone for longer
- Place supplementary feed and troughs in areas away from critical source areas, waterways, ponding
- Back fencing can reduce stock movement and soil damage
- Reducing mob size
- Selecting appropriate paddocks to winter graze and having a winter grazing plan
- Minimise cultivation (minimum tillage and direct drill) when establishing the crop

You can learn more about the Catchment Group and read the full report at
www.thrivingsouthland.co.nz/makarewa-headwaters.

Makarewa Headwaters Catchment Group

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