



Erosion

- The sloping banks of hill country streams are particularly vulnerable to erosion. Stock damage to stream banks and vegetation along the stream margin will increase the risk of erosion. Set permanent fencing far enough back that bank erosion is prevented and to allow for changing directions in streams. ecan.govt.nz/publications/General/HillCountryStreams.pdf. The principles apply for Otago conditions.
- Plant trees on slopes where there is the greatest risk of erosion. Consider using long-term productive species for areas with large weed burdens and minimal profitability.
- Adjust cultivation practices and timing to minimise soil erosion from wind and water.
- See ORC Factsheets 2 – Sediment in water and 5 – Stock access to waterways.
- For details of Land and Environment Plans (LEPs) see www.beeflambnz.com/farm/environment/land-and-environment-planning-toolkit/

Riparian Management

- Ensure riparian margins are sufficiently wide to adequately filter sediment from any run-off.
- Determine how your waterway behaves in full flow to avoid losing plants during floods. This will help you decide where to put fences and what to plant. www.dairynz.co.nz/media/1569771/riparian-mgmt-otago.pdf
- Identify areas on your farm where runoff or erosion occur most frequently and have the greatest effect on water quality. This includes seeps, springs, swales, gullies, eroding banks, boggy areas, and wet soils. These should be prioritized for fencing and planting.
- The Kakanui Riparian Planting Guide can be downloaded from the www.landcare.org.nz/Regional-Focus/Christchurch-Office/Kakanui-Catchment-Project
- See ORC Factsheet 5 – Stock access to waterways.

Biodiversity

- Manage or retire bogs and swampy areas.
- Carrying out fencing to protect bush will stop stock damage and improve farm management by removing areas that are generally difficult to muster.
- Protecting native bush can help preserve streams and protect water quality. ecan.govt.nz/advice/your-business/farming/Pages/native-bush-biodiversity.aspx. The principles apply for Otago conditions.
- When grazing and fire are absent and a seed source is nearby, natural regeneration of native plants will succeed gorse and broom so planting may not be needed. ecan.govt.nz/publications/General/UsingNativesCanterburyEo472.pdf. The principles apply for Otago conditions.
- Check your eligibility for local funding and grant schemes for biodiversity projects. Contact ORC Community Education and Liaison staff for more information 0800 474 082.

Good Management Practices

Project website: www.landcare.org.nz/Regional-Focus/Christchurch-Office/Kakanui-Catchment-Project

FROM THE KAKANUI FOR THE KAKANUI



There are many positive outcomes from adopting good management practices on farm: water quality will be either maintained where it is good and improved where this is required; you will be much more likely to comply with the water quality provisions in the Otago Plan; and your operation is likely to gain economic benefits because of improvements in pasture growth and quality, for example.

The sections included here are suggested and recommended practices for achieving optimum land management.

Winter Intensive Grazing

- When choosing paddocks to plant winter feed crops, look where possible for areas at lower risk of pugging and compaction, with no significant tile and mole drains, drains, or waterways.
- For intensive winter grazing, leave a vegetative strip not grazed from the edge of drain or waterway to capture P and sediment runoff.
- Graze from top to bottom of the paddock if it's sloping. Graze lower-lying areas and those closest to waterways last. Avoid leaving stock on during wet periods, for long periods, or concentrated on small sections of the crop. www.dairynz.co.nz/farm/farm-systems/southern-wintering-systems/wintering-system-review/
- As soon as possible, replant the grazed area in a crop/pasture that will use up the residual N in the soil.
- See ORC Factsheets 2 – Sediment in water and 5 – Stock access to waterways.



Cropping

- Adjusting crop rotations maximises use of residual nitrogen in soil.
- Adjusting cultivation practices and timing may minimise N loss. Managing periods between cropping where soil is exposed can reduce the risk of erosion, overland flow, and leaching.
- Using a paddock history, conducting soil tests (including deep soil N tests) and using cropping calculators will help you decide what type of fertiliser to apply and when before planting pasture and crops.
- For all cultivation adjacent to a waterway, leave a vegetative strip to prevent sediment and runoff from phosphate going into water. See ORC Factsheet 2 – Sediment in water.
- Cultivate along contours (rather than up and down the slope) where slopes are greater than 3° of steepness.
- Use placement tools e.g. GPS guidance, crop sensing, where possible.
- Use decision making calculators such as Overseer to ensure efficient fertiliser planning.



Infrastructure

- Tracks that go through waterways can be a major source of pollution and negatively impact the quality of water on farm. The new water quality provisions in the Otago Water Plan make it easier to install bridges or culverts and thereby reduce the harmful effects of pollution on water quality. See ORC Factsheet 6 – Bridges and culverts.
- Maintain stock races and direct water running off them away from waterways and into paddocks through the use of cut-offs.
- Putting in troughs will attract stock away from streams.
- Ensure well-heads are protected from contamination.
- Reduce the risk of storm damage to buildings and infrastructure by trimming or removing large trees.
- The Dairy NZ Smart Water Use resources information focuses on using water as efficiently as possible and reducing water loss. www.dairynz.co.nz/environment/water-use/smart-water-use/





Sediment and Bad Bugs

- Excessive sediment causes water quality, drainage and flooding problems. Direct run-off from bridges and races into paddocks and away from waterways.
- When disturbing land (including stock and mechanical disturbance), you must put in place measures to control sediment runoff into waterways. If you have a lack of effective control, you will be in breach of the water plan's prohibited activity rules.
- Exclude stock from waterways, drains, and wetlands to prevent livestock damaging banks and defecating in water. Otherwise sediment, nutrients, and bacteria may enter the waterway, reducing water quality. www.dairynz.co.nz/environment/land-and-nutrient/waterways/
- Prevent erosion and movement of sediment and runoff into waterways by use of conservation tillage, filter strips, sediment retention ponds, cut-out drains and planting critical source areas. Use the method that best suits your situation. www.landcare.org.nz/files/file/177/in-channel-sediment-traps-2002.pdf.
- Test discharges to waterway or test the waterway leaving the property to determine the potential for sediment or E.coli. See ORC website - A guide to water quality rules.
- See ORC Factsheets 2 – Sediment in water and 5 – Stock access to waterways.

Nitrogen

- Set nitrogen (N) application rates and timing to match crop growth cycles and soil moisture conditions, taking into account when all sources of nutrients are applied.
- Don't apply N when soils are below, 6degC, are at field capacity, or are severely compacted.
- Ensure equipment used for N application is suitably calibrated and Spreadmark standards are used. Use GPS for precise application and recording (proof of placement).
- N leaching from urine can be reduced through appropriate paddock selection and grazing within specified time limits as part of an overall grazing regime.
- Reduce N leaching from fertiliser through the use of crop calculators to determine crop requirements and timings, and apply using Spreadmark certified spreaders.
- Reduce Mineral N leaching through the use of minimum tillage. www.dairynz.co.nz/environment/land-and-nutrient/nutrient-management/
- Calculate annual load of N to groundwater (leaching) using latest Overseer 6 version and compare against the Otago Water Plan rules prior to 2020. See ORC website – water quality summary.
- Test discharges to waterway and compare against water plan rules; or test the waterway leaving property to determine amount of N leaving. Use results to investigate and fix problems. See ORC website - A guide to water quality rules pdf.

Phosphate

- Maintain optimum Olsen P levels of 20-35 by soil testing annually and monitoring phosphate trends.
- Ensure P application is suitably calibrated and well-maintained. Application of superphosphate is not recommended when soils are near field capacity or if rain is forecast for within the next 7 days.
- Maintain clear separation between paddocks, races and waterways when applying P. Use riparian planting as a buffer. The plants act as a filter, slowing down runoff and catching sediment and P.
- Use slow release Reactive Phosphate Rock (RPR) to reduce P runoff.
- Apply the form of phosphate fertiliser that is best suited for the purpose and timing of your application.
- Avoid set stocking wet paddocks and use restricted grazing of forage crops in wet conditions. See ORC Factsheet 2 – Sediment in water. www.landcare.org.nz/files/file/1250/Rich%20McDowell%20ECan%20P%20losses%20Feb%202014.pdf
- Store and load fertiliser to minimise risk of spillage, leaching, and loss into water ways.
- Test discharges to waterway or test the waterway leaving the property to determine the amount of P leaving. See ORC website - A guide to water quality rules.

Hot Spots

- Locate silage stacks at least 50m from surface water and ensure that any leachate is directed to pasture or the farm's effluent system. See ORC Factsheet 4 – Silage and compost.
- Recycle plastic waste from the farm including chemical containers and baleage/silage wrap. www.agrecovery.co.nz/programmes/chemical-disposal/
- The ORC Air Plan prohibits burning of a number of materials including most plastics and agrichemicals. See ORC website for brochure – Outdoor burning in Otago.
- Locate any offal or rubbish pits where the risk of leachates entering ground or surface water is minimal. See ORC website for brochure – Landfill and offal pits.
- Note that it is prohibited to discharge any contaminant to water that produces a nasty odour, or an obvious oil or grease film, scum, or foam.
- The Dairy NZ Farm Enviro Walk toolkit helps dairy farmers identify environmental issues on farm and develop opportunities to deal with these www.dairynz.co.nz/environment/land-and-nutrient/farm-enviro-walk/

Irrigation

- Design, calibrate and operate irrigation systems to minimise the amount of water needed to meet production objectives. www.irrigationnz.co.nz/news-resources/irrigation-resources-or-www.dairynz.co.nz/environment/water-use/irrigation-efficiency
- Undertake tests to show that the system performs to desired specifications for: application depth; and application uniformity using bucket test or another commissioned test.
- Regularly assess soil moisture buried sensors, tapes, a hand held probe or scheduling service.
- Adjust return period and/or application depth adjusted according to evapotranspiration, soil moisture, crop requirements and rainfall. www.irrigationnz.co.nz/news-resources/irrigation-resources/ see Guidance on Water Management during the season. pdf
- Carry out daily checks for excessive runoff/ponding and ensure irrigator problems and issues are fixed. <http://irrigationnz.co.nz/wp-content/uploads/Operation-and-Maintenance-Manual.pdf>
- If you have an issue and can't resolve it yourself, contact your irrigation water supply company for help and advice. www.noic.co.nz/environment

Effluent

- A number of prohibited activity rules in the water plan apply to effluent management. These rules do not allow effluent to be applied direct to a waterway, to saturated soils, to land if it results in ponding, to land if it flows overland to a waterway, to any bore or soak hole, or to land within 50m of a waterway. See ORC Factsheet 3 – Effluent management.
- Effluent should be spread evenly across the area to ensure it does not exceed 200 kg/ha/ yr. Nutrient levels in effluent on paddocks must be tested and the results recorded. www.dairynz.co.nz/environment/effluent/
- Regularly test the effluent system to ensure that effluent is being applied uniformly at a measured depth (bucket test works well) and that there is no ponding or runoff.
- Ensure sufficient storage is available to enable effluent and wastewater to be stored when soils are saturated.
- Ensure the entire effluent system is well maintained, monitored and recorded. Staff are trained and immediate action, (fix, clean-up & future proof) is taken.
- Ensure that effluent is spread over an area calculated to maximise the use of effluent nutrients.
- Effluent storage systems are compliant with Regional and District Plan rules. See ORC website - A guide to water quality rules pdf.

All ORC Factsheets and 'A guide to water quality rules' can be found at www.orc.govt.nz/Publications-and-Reports/Regional-Policies-and-Plans/Regional-Plan-Water/Water-Quality-Rules-Plan-Change-6A/ or by clicking on links in the electronic version of this poster which can be downloaded from www.landcare.org.nz/Regional-Focus/Christchurch-Office/Kakanui-Catchment-Project

