Cropping

- Crop rotations adjusted to maximise use of residual N in soil.
- Cultivation practices and timing adjusted to minimise N loss. Manage periods of exposed soil between crops to reduce the risk of erosion, overland flow and leaching.
- Paddock history, plant and deep soil N tests and soil test results and decision support tools assist with efficient fertiliser planning.
- For all cultivation adjacent to a water body leave a vegetative strip to prevent sediment and P runoff into the water.
- Cultivate along contours (rather than up and down the slope) where slopes greater than 3°.
- Use placement tools e.g. GPS guidance, crop sensing, where possible.
- Test the nutrient levels in soils before planting pasture and crops.
- Soil test results and decision support tools like AmaizeN assist with efficient fertiliser planning.

Hot Spots

- Silage stacks are located at least 50m from surface water and any leachate is directed to pasture or the farms effluent system. http://ecan.govt. nz/advice/your-business/farming/Pages/ silage-effluent-wrap-disposal.aspx
- Plastic waste from the farm is recycled.
- Any offal or rubbish pits are sited to minimise risk of leachates entering ground or surface water.

Infrastructure

- Tracks that go through waterways can be a major source of pollution. Putting in bridges or culverts. May help the operation of the farm and the waterway.
- 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.
- Well-heads are protected from contamination.
- The risk of wind damage to buildings and infrastructure is reduced by trimming or removing large trees.

Good Management Practices

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

WORKING FOR OPIHI WATER

Irrigation

- Design, calibrate and operate irrigation systems to minimise the amount of water needed to meet production objectives. http://irrigationnz.co.nz/news-resources/irrigation-resources/
- Tests show that system performs to desired specifications for: Application depth; and Application Uniformity using bucket test or commissioning test).
- Soil moisture is regularly assessed using: buried sensors or tapes or hand held probe or scheduling service.
- Prevent border dyke irrigation outwash getting to waterways by recycling / irrigation management.
- Return period and/or application depth adjusted according to ET, soil moisture, crop requirements and rainfall. http://irrigationnz. co.nz/wp-content/uploads/34448-Smart-Info- Flyer.pdf
- Daily checks for excessive runoff/ponding and irrigator problems and issues fixed. http://irrigationnz.co.nz/wp-content/uploads/ Operation-and-Maintenance-Manual.pdf

Nitrogen

- N application rates and timing set to match growth cycle of crop and soil moisture conditions, taking into account all sources of nutrients are applied.
- Nitrogen is not applied when soils are below 6oC, are at field capacity or are severely compacted.
- Equipment used for N application is suitably calibrated and Spreadmark standards are used.
- GPS is used for precise application and recording (proof of placement).
- Urine N leaching can be reduced through appropriate paddock selection, grazing time and grazing regime.
- Fertiliser N leaching can be reduced through the use of crop calculators to gauge need, precision application to ensure appropriate application and timing.
- Mineral N leaching can be reduced through the use of minimum tillage.
- www.dairynz.co.nz/media/1237817/reducing-nitrogen-loss.pdf

Phosphate

- Keep Olsen P at agronomic optimum, usually 20-30, using soil testing.
- Equipment used for P application is suitably calibrated and well maintained.
- P application separation distances from waterways are maintained. Use riparian planting as a buffer between paddocks, races and the water. The plants act as a filter, slowing down runoff and catching sediment and P.
- Superphosphate is not applied when soils are near field capacity (through soil moisture monitoring or hole digging?) or if rain forecast within next 7 days.
- Use of slow release RPR reduces P runoff.
- Avoid set stocking wet paddocks and use restricted grazing of forage crops in wet conditions. www.landcare. org.nz/files/file/1250/Rich%20McDowell%20 ECan%20P%20 losses%20Feb%202014.pdf
- Store and load fertiliser to minimise risk of spillage, leaching and loss into water. bodies.

Sediment and Bad Bugs

- Exclude stock from significant waterways, drains and wetlands to prevent livestock damaging banks and defecating in water, that add sediment, nutrients and bacteria and reduce water quality. www.dairynz.co.nz/environment/land-and-nutrient/waterways/
- Reduce erosion and movement of sediment and runoff into waterways by use of conservation tillage and planting critical source areas.
- Retain sediment on the land before it gets to waterways by filter strips and sediment retention ponds. Excessive sediment causes water quality, drainage and flooding problems. www.landcare.org. nz/files/file/177/in-channel-sediment- traps-2002.pdf
- Direct run-off from bridges and races into paddocks and away from waterways.

Biodiversity

- Manage or retire bogs and swampy areas.
- Fencing to protect bush will stop stock damage and also improve farm management by taking out areas that are generally difficult to muster.
- Protecting native bush can help preserve streams and protect water quality. http:// ecan.govt.nz/advice/your-business/ farming/Pages/native-bush-biodiversity. aspx#native-bush
- 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. http://ecan.govt.nz/publications/General/UsingNativesCanterburyE0472.pdf

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 to prevent bank erosion and to allow for changing stream meanders. http://ecan.govt.nz/publications/General/HillCountryStreams.pdf
- Plant trees on greatest erosion risk slopes. Consider long-term productive tree species for areas with large weed burdens and minimal profitability.
- Cultivation practices and timing is adjusted to minimise soil erosion (wind & water).

Winter Intensive Grazing

- If possible select paddocks with lower risk of pugging and compaction, do not have significant mole and tile drains, drains or waterways to plant winter feed crops. www.dairynz.co.nz/farm/
- For intensive winter grazing leave a vegetative strip not grazed from edge of drain, stream, river, or lake to capture P and sediment runoff.
- Graze from top to bottom of paddock if sloping. Graze lower lying areas and areas 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 grazed area in a crop/pasture that will use up the residual N in soil.

Riparian Management

- Riparian margins are of sufficient width to adequately filter sediment from any run-off.
- To avoid losing plants in floods, determine how your waterway behaves in full flow. This will help you decide where to place fences and what to plant. www.dairynz. co.nz/environment/land-and-nutrient/ waterways/
- 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.
- Environment Canterbury land management advisors can help develop riparian plans tailored to your farm. It is free, call 0800 324 636.

Effluent

- Effluent is spread evenly across the area ensuring it does not exceed 200 kg/ha/yr. Nutrient level of effluent is tested and paddocks are recorded. www.dairynz.co.nz/ environment/effluent/tools/
- The effluent system is tested regularly to ensure it is applying effluent in a uniform manner with a measured depth (bucket test) and there is no ponding or run off.
- Sufficient storage is available to enable effluent and waste water to be stored when soils are saturated.
- The system is well maintained and monitored. Staff are trained and immediate action, (fix, clean-up & future proof) is taken. www.dairynz.co.nz/media/195210/4A-Farmers-Guide-To-Managing-Farm-Dairy-Effluent.pdf
- Effluent spread over a suitable area to maximise the use of effluent nutrients.
- Effluent storage systems are compliant with regional and district plan rules.

NZ LANDCARE TRUST NGĀ MATAPOPORE WHENUA

Ministry for Primary Industries Manatū Ahu Matua

Sustainable Farming Fund

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