

ACTIVITY	WATER QUALITY BMP'S (BEST MANAGEMENT PRACTICES)	RESOURCES
<p>FERTILIZER USE</p> <p>Goal – to keep soil nutrients at optimum levels for land use while minimising losses and costs.</p> <p>2002 Statistics data shows usage of fertiliser for each agricultural sector as follows:</p> <ul style="list-style-type: none"> Forestry – 0.01 Tonnes/ha Sheep - 0.18 Tonnes/ha Beef – 0.23 Tonnes/ha Grain – 0.75 Tonnes/ha Dairy – 0.81 Tonnes/ha 	<p>Planning</p> <ul style="list-style-type: none"> • Use a nutrient budget to account for all nutrient inputs, including re-used stock wastes. • Use soil and plant tissue analysis to adjust fertilizer rates to plant needs. • Application of fertilizer is permitted by rules 36.5.2 and 36.5.3 of the Tasman Resource Management Plan (TRMP). Check you comply. <p>Storage</p> <ul style="list-style-type: none"> • Place fertilizer storage and loading sites more than 50 metres from open water. • Contain any spills and clean up. <p>Application</p> <ul style="list-style-type: none"> • Use Fertmark registered fertilizer to ensure and low levels of impurities in product. • Use Spreadmark accredited companies to apply fertilizer to ensure accurate application. Use GPS and GIS technology for precise application and record keeping purposes. • Do not apply fertiliser when wind speed exceeds 15 km/hr. • Utilize positive wind direction to avoid drift into buffer zones or open water. • Avoid applying fertilizer to saturated soils or when tile drains are running. • Avoid applying near or into waterways and troughs, or to places where stock provide fertility such as gateways, stock camps. <p>After application</p> <ul style="list-style-type: none"> • Avoid surface run-off by not irrigating heavily for two weeks after application and not applying fertiliser before forecast high rainfall events. • Schedule irrigation to meet plant requirements to minimize leaching losses • Use riparian strips (streambank vegetation), existing wetlands or constructed wetlands to capture sediment and nutrients flushed from the land by rainfall. 	<ul style="list-style-type: none"> • OVERSEER available free from www.AgResearch.co.nz. • Making dollars and sense of nutrient management www.dexcel.co.nz • Code of Practise for Nutrient Management, 2007 plus Nutrient Management Plan Template www.fertresearch.org.nz • Getting smart with Nutrients NZ Farm Environment Award Trust www.maf.govt.nz/sff/about-projects/search/04-037/index.htm • Chapter 36 Tasman Resource Management Plan, Tasman district Council. www.tdc.govt.nz • Using nitrogen: what is best practice? K Cameron et al, South Island Dairy Event 2005. www.side.org.nz/Papers
<p>NITROGEN (N)</p> <p>Potential for losses to air (volatilization), and to water from applied fertilizer and any stock waste. Recent research has concluded greatest pastoral farm N losses occur from urine spots</p>	<p>Planning</p> <ul style="list-style-type: none"> • Avoid total N inputs greater than 150 to 200 kg/ha/yr • Avoid late summer or autumn cultivation of pastures. • Avoid application in mid to late autumn to fallow land unless there is a cover crop. • Reduce individual N application amounts on soils where <ul style="list-style-type: none"> - groundwater lies under permeable sediments (e.g. gravels), - or water table is high - or there is subsurface mole and tile drainage • Use a low volatility N fertilizer especially if applying N at rates above 30 kg/ha : CAN (1% loss on average at 30kgN/ha) <DAP (5%)< Urea (11%). 	

	<p>If using urea</p> <ul style="list-style-type: none"> • Keep individual applications of N to a maximum of 50 kg/ha. (Research reports losses to air from urea of 12% at 30 kg/ha, 17% at 50 kg/ha, 25%at 100kg/ha.) • When using urea light irrigation after application to wash urea into soil is reported to reduce losses to air to 1%. • Consider using urease inhibitors (eg SustainN) when applying urea to slow down conversion of urea to the more volatile ammonium carbonate. <p>Application</p> <ul style="list-style-type: none"> • Apply N when soil temperatures is above 6 °C at 10 cm depth at 9.00am as it's warm enough for plants to grow and take up nutrients. • Apply N to pasture at least 25mm high. • On severely compacted soils, use soil aeration techniques prior to application. <p>Capturing nitrogen in urine spots</p> <ul style="list-style-type: none"> • Use nitrification inhibitors (which slow down conversion of ammonia in the urine to nitrate by nitrifying bacteria in the soil) to reduce leaching of nitrate from urine spots. Application required in May and August after grazing for best results. Reported reduction in nitrate leaching of up to 60% in grazed pasture systems from May post application through to end of September. Also reported reduction in cation leaching by 50% and nitrous oxide emissions by 75%. 	
<p>PHOSPHATE (P) Potential for losses greatest for soluble phosphate (Olsen P) during fertiliser application and greatest for soil associated P as a result of soil erosion.</p>	<p>Planning</p> <ul style="list-style-type: none"> • Apply P in summer when low rainfall is expected, but avoid applying during a drought until after rain has promoted re-growth. • Use a low solubility P fertilizer (RPR < Serpentine super< super phosphate) when soil pH < 6.0 and annual rainfall is > 800 mm. • If using a high solubility P fertilizer apply it in split dressings if the single application rate would exceed 100 kg P/ha. • Use split dressings - if high rainfall or irrigation likely, <ul style="list-style-type: none"> - on very sandy soils - when slope is greater than 25 degrees • Don't exceed optimum soil Olsen P level for your land use. <p>Application</p> <ul style="list-style-type: none"> • Apply P to pasture at least 25mm high. • On severely compacted soils, use soil aeration techniques prior to application. <p>Post application</p> <ul style="list-style-type: none"> • Avoid irrigating for two weeks after applying P. • Minimize risk of soil erosion on farm as P is lost with sediment. 	

PASTURE MANAGEMENT AND STOCK MOVEMENT

Goal – to manage stock on farm to reduce impacts on water quality. Nitrogen, Phosphorous and disease causing microbes including *Campylobacter*, *Cryptosporidium*, *Giardia* and *salmonellae* are of particular concern. (NZ is reported to have one of the highest rates of infection for these diseases in the world.)

Stock management

- Keep livestock out of waterways, bogs, seeps and wetlands.
- Exclude stock from grazing saturated soils in autumn and winter.
- Bridge or culvert dairy herd crossings. Check with TDC to see if resource consent required.
- Provide alternative water in stock troughs, shade and shelter to encourage stock away from waterways.
- Use stand-off pads during autumn/winter for cattle.
- Control runoff from stock tracks, sheep/cattle yards and races, directing it away from open water

Pasture management

- Permit vegetation to grow in open drains as this can achieve a 40 to 100% reduction of *E.Coli* in 25 to 150 metres respectively.
- Limit potential for soil erosion through:
 - Conservation tillage and contour cultivation.
 - Maintaining pasture sward.
 - Filter strips or swards across slopes.
 - Riparian plantings for stream bank protection.
 - Planting slopes vulnerable to slips.
 - Cut-off drains for stormwater control.
- Maintain soil structure by avoiding over cropping, treading damage and soil compaction from machinery.
- Monitor soil health using Visual Soil Assessment (VSA).

Silage production

- Make silage at high dry matter so it has less leachate.
- Silage pits should be sealed and leachate collected and re-applied to top of silage in the pit or applied to land away from water.
- Discharge of leachate from a silage pit to water is likely to require resource consent under the TRMP, check with TDC.

Other tools to reduce stock impacts

- Use riparian strips to re-capture sediment, nutrients and microbes flushed from the land into surface and subsurface flows by rainfall. [Shading effects of riparian strips also help to keep stream temperatures low, reducing potential for algal growth and reduced oxygen levels. Elevated temperatures and reduced oxygen concentrations can stress instream fauna.]
- Use existing wetlands and/or constructed wetlands to capture sediment, nutrients and microbes in surface and subsurface flows.

- Clean Streams. A Guide to Managing Waterways on Tasman – Marlborough Farms. www.tdc.govt.nz
- 'Best management practices to mitigate faecal contamination by livestock of NZ Waters' from NZ Journal of Agricultural Research, 2007, Vol.50 267-278 www.rsnz.org
- Growing Greener Grass: A guide to good pasture management. NZ Farm Environment Award Trust. www.maf.govt.nz/sff/about-projects/search/04-037/index.htm
- Winning Margins: Waterways on Farms. NZ Farm Environment Award Trust. www.maf.govt.nz/sff/about-projects/search/04-037/index.htm
- Visual Soil Assessment method. Landcare Research. www.landcareresearch.co.nz/research/soil/vsa
- Chapter 36 Tasman Resource Management Plan, Tasman district Council. www.tdc.govt.nz

STOCK WASTE MANAGEMENT

Goal – to manage collected stock wastes to reduce impacts on water quality. Nitrogen, Phosphorous and disease causing microbes including *Campylobacter*, *Cryptosporidium*, *Giardia* and *salmonellae* are of particular concern.

Solid manure, offal, dead stock

- Hot compost any collected solid stock waste for re-use under cover away from surface or groundwater. This reduces risk of spreading disease causing microbes and spread of weed seeds in manure. The discharge of leachate to land from composting operations of up to 50 cubic metres is permitted by rule 36.1.9 of the TRMP. Check you comply.
- Locate offal pits and away from surface or groundwater. The discharge of leachate to land from offal pits is permitted by rule 36.1.10 of the TRMP. Check you comply.
- If burying individual dead stock locate the pit away from surface water or groundwater.

Collection, treatment and re-use of liquid organic wastes (effluent)

- Collect and re-use liquid waste from stand-off pads, dairy shed, silage pits as fertilizer for suitable areas on the property. (Ensure potassium levels are safe for stock.)
- Treat liquid stock waste in a sealed (clay lined) two stage anaerobic/aerobic or advanced pond system large enough to match stock numbers in foreseeable future to reduce disease causing organisms before application to land.
- Minimize amount of water added to stock waste at source to reduce storage needs and improve treatment.
- Apply treated waste to land appropriately –
 - Avoid applying stock waste to wet or mole tile drained land when drains are flowing.
 - Provide storage for stock waste to allow deferred application to soils when they are not saturated.
 - Graze prior to application.
 - Don't graze for at least 10 days afterwards to minimize animal health risks.
 - Apply effluent at a low rate well below the infiltration rate of the soil to prevent surface ponding.
 - Select most suitable areas on farm for application –consider soil drainage class, permeability and slope.
 - Match application volume to soil moisture deficit.
 - Prepare an irrigation schedule
 - Keep records of volume applied and where to for nutrient budgeting/fertilizer purposes.
 - Regularly maintain pumps and irrigation equipment
 - Train staff
- Discharge of dairy shed effluent to land is permitted by rule 36.1.3 of the TRMP. Check you comply.
- Discharge of up to 5 cubic metres per day of waste from housed stock (including birds) or waste from stock or bird processing activities is permitted by rule 36.1.3 of the TRMP. Check you comply.
- Any other discharge is likely to require resource consent, check with TDC.

- A guide to managing farm dairy effluent Tasman/ Marlborough. www.tdc.govt.nz
- Chapter 36 Tasman Resource Management Plan, Tasman district Council. www.tdc.govt.nz

EARTHWORKS, ROADING AND TRACKING

Goal – to manage earthworks, roading and tracking to reduce risk of erosion and impacts on water quality. Good initial design avoids the need for expensive maintenance in the long term.

Planning and design

- Design earthworks to match soil type, geology, topography, climatic conditions and use.
- Minimize tracking to reduce soil disturbance, compaction and erosion.
- Fish passage must not be impeded by structures.
- Design roading and tracking to keep machinery out of waterways and riparian margins.
- Avoid earthworks within 5 metres of permanent waterways except at designated crossings or water access points.
- Divert road/track runoff away from crossings using berms, cutouts, culverts or flumes.
- Tasman District Councils rules for land disturbance and roading are set out in parts 18.6 and 18.10 of the TRMP. Check you comply with permitted activity rules or apply for resource consent(s).

When crossing waterways

- Install correctly designed waterway crossings.
- Place crossings where waterway banks are solid and beds stable.
- Minimise machinery operating in the bed of the waterway when constructing bridges/crossings.
- Decommission temporary crossings once replaced.
- Avoid in-channel work during fish spawning season.
- Use fords for infrequent vehicle use, and in waterways that have hard streambeds, low flows and low in-stream values.
- Consider using bridges or low level crossings on larger waterways.
- Building consent required for any bridge where fall height exceeds 1 metre.
- Bridge structures will need to be approved /certified by a civil/structural engineer.

When carrying out earthworks

- Install appropriate water and sediment controls to prevent runoff flowing directly into waterways such as sediment traps, cut-off drains, culverts, socks, flumes as work progresses.
- Maintain water and sediment control structures in effective operating condition as long as needed.
- Operate along the contour to minimise runoff being concentrated down cultivated lines. If unavoidable, limit downhill runs to a maximum continuous length of 50 metres.
- Stabilise earthworks appropriately as soon as practicable.
- Do not incorporate slash or organic material into steep fill batters.
- Undertake work in suitable weather for site conditions.

FOREST PLANTING AND HARVESTING

Goal – to manage forest planting and harvesting to reduce risk of erosion and impacts on water quality.

Planning and design

- Do not plant where harvesting will not be possible without serious adverse effects.
- Select felling and extraction techniques to minimize effects
- Use extraction techniques that suspend the butt end of the log.
- Carry out any earthworks, roading or tracking necessary for harvest so they have time to stabilise before use.
- Use appropriate methods such as directional felling to minimise the amount of woody debris

- NZ Environmental Code of Practice for Plantation Forestry Parts one to Five Version 1. NZ Forest Owners Association.
<http://www.fitec.org.nz/cop/Contents.htm>
- Clean Streams. A Guide to Managing Waterways on Tasman – Marlborough Farms.
www.tdc.govt.nz
- Chapter 18 Tasman Resource Management Plan, Tasman district Council. www.tdc.govt.nz
- Low impact Tracks and Races. A guide to good track and race design and maintenance. NZ Farm Environment Award Trust.
www.maf.govt.nz/sff/about-projects/search/04-037/index.htm

- NZ Environmental Code of Practice for Plantation Forestry Parts one to Five Version 1. NZ Forest Owners Association.
<http://www.fitec.org.nz/cop/Content.s.htm>

	<p>deposited in streams.</p> <ul style="list-style-type: none"> • Undertake work in suitable weather for the site conditions. • Planting of plantation forests is permitted by rule 17.4.8 of the TRMP. Check you comply. <p>Riparian setbacks and management</p> <ul style="list-style-type: none"> • Rule 17.4.8 And 17.5.8 of the TRMP require planting setbacks of 10 metres from the bed of any river or stream greater than 3 metres average bed width in Rural Zones 1 and 2. • When planting leave a minimum horizontal riparian setback of 5 metres each side of all permanently flowing streams. • Increase riparian setbacks where topography, in stream values, sensitive boundaries or future harvesting complications indicate there is a need. • Avoid harvesting trees in water channels, floodways or riparian areas <p>Managing slash</p> <ul style="list-style-type: none"> • Remove slash and wood debris for ephemeral (intermittent) streams where flood flows have the potential to mobilise the debris and cause damming, erosion or property damage downstream. Use debris traps at strategic locations downstream if this is not possible. • Debris traps usually require resource consent. Check with the TDC to see if consent is required. • Use slash racks to protect culverts when slash build up is expected to be a problem. • Align slash windrows along the contour of sloping land and within broad valley floors to help trap sediment. <p>After harvest</p> <ul style="list-style-type: none"> • Remove all rubbish from the forest and dispose of correctly. • Decompact landings by ripping after use if not required in the future. 	<ul style="list-style-type: none"> • Chapter 17 Tasman Resource Management Plan, Tasman district Council. www.tdc.govt.nz
<p>AGRICHEMICALS</p> <p>Goal – to manage agrichemical use to reduce risk of contamination of soil or water.</p>	<p>Planning, storage and handling.</p> <ul style="list-style-type: none"> • Agrichemicals applications must be planned, supervised and undertaken by trained personnel with an approved handler certificate. • Follow recommendations and guidelines of the Agrichemicals Standard NZS8409:2004 • Store agrichemicals appropriately. • Store away from waterways and wells. • Time use of agrichemicals to get maximum effect. • For larger applications such as aerial applications use GPS to accurately define boundary of application area. • Follow manufacturers label recommendations. Have material safety data sheets available for all agrichemicals used. • Application of pesticides to land, water and air is a permitted activity subject to conditions in rules 36.6.2 and 36.6.3 of the Tasman Resource Management Plan. Check you comply. 	<ul style="list-style-type: none"> • Agrichemicals Standard NZS8409:2004 • Agrecovery programme www.agrecovery.org.nz Freephone: 0800 (agrecovery) 247326 • Chapter 36 Tasman Resource Management Plan, Tasman District Council www.tdc.govt.nz

	<p>Application</p> <ul style="list-style-type: none"> • Use appropriate protective equipment. • Apply in suitable weather for the site conditions to prevent spray drift. <p>After application</p> <ul style="list-style-type: none"> • Disperse any residual chemical over the target area at or below standard concentrations – do not dump in a concentrated quantity over a small area. • Triple rinse empty containers and use wash water as part of spray operation – do not dip into waterways. • Return containers to Agrecovery depot for recycling. Two operating in Tasman (Mariri Resource Recovery, Motueka, Mon-Sat 9-8 Sun1-4. Beach Rd Transfer Station, Richmond, 7 days 8-5). 	
<p>FUEL AND OIL</p>	<p>Storage</p> <ul style="list-style-type: none"> • Fuel storage systems must conform to the Hazardous Substances and New Organisms (HSNO) Regulations and associated Codes of Practice. • Have an emergency response plan for fuel and oil incidents • Storage of fuel and oil should be in a location where an accidental spill cannot enter a waterway. • Stationary tanks (not wheeled tankers) should have secondary containment (bunding) where storage capacity is > 1000 Litres. • Pipes, seals and fittings should be in good condition, leak free and regularly inspected. <p>Use and disposal</p> <ul style="list-style-type: none"> • Machinery should be regularly checked for fuel and oil leaks. Repair, use drip trays to collect leakage in meantime. • Waste oil should be collected and disposed of to an authorised disposal/recycling facility. • Never deliberately release waste oil onto soil. 	<ul style="list-style-type: none"> • ERMA's Code of Practice for the Management of Existing Stationary Container Systems up to 60,000 litre capacity. www.ermanz.govt.nz/consultations/cop9draft2.pdf
<p>HUMAN WASTE</p>	<ul style="list-style-type: none"> • Domestic sewage from dwellings on property should be treated through designed septic tanks or similar. Discharge to land should be through a soakage field that complies with the NZ Code of Practice for on-site domestic wastewater management AS/NZS 1547:2000. • Discharge of up to 2000 litres per day of domestic wastewater to land is permitted by rule 36.1.4 of the TRMP. Check you comply. • Discharge of 2000 litres of greywater is permitted by rule 36.1.6 of the TRMP. Check you comply. • The discharge of human waste from a long drop toilet is permitted by rule 36.1.7 of the TRMP as long as it does not serve a dwelling. If you have one, check it complies. 	<ul style="list-style-type: none"> • Chapter 36 Tasman Resource Management Plan, Tasman District Council Rule No 36.1.4. www.tdc.govt.nz • On-site domestic wastewater management AS/NZS 1547:2000. Standards NZ. www.standards.co.nz
<p>NON-BIODEGRADABLE REFUSE</p>	<ul style="list-style-type: none"> • Non-biodegradable wastes such as paint cans, old wire, used fuel oil and filters, old machinery should be recycled if possible or disposed of appropriately off property. Contact TDC to find out best disposal method. 	<ul style="list-style-type: none"> • NZ Environmental Code of Practice for Plantation Forestry Parts one to Five Version 1.NZ Forest Owners Association. http://www.fitec.org.nz/cop/Contents.htm

