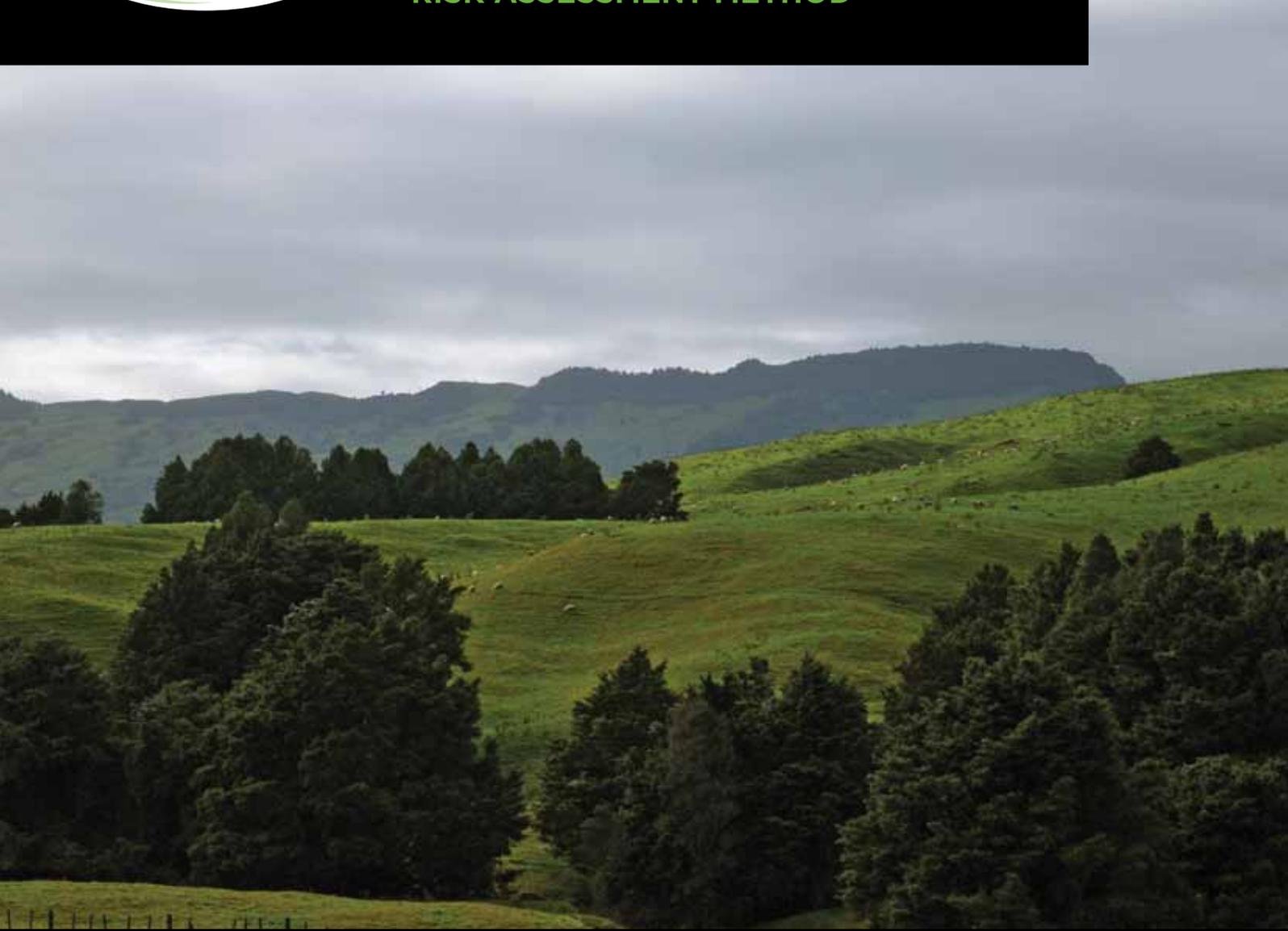




LEVEL 1



**LAND AND ENVIRONMENT
PLAN GUIDELINES**
RISK ASSESSMENT METHOD



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steps

ASSESSMENT

What is the issue?
How serious is it?

RESPONSES

What can be done?

PLAN

What, how, where,
when, how much?

IMPLEMENT

Carry out activities,
monitor and record.

REVIEW

Review progress annually.

Risk assessment method

These guidelines provide a step-wise approach to risk assessment of land and environment issues commonly found on sheep, beef and deer farms. Issues to be considered include phosphorus-loss, soil erosion, faecal bacteria, nitrogen-loss, productive capacity and the on-going health and sustainability of your farm's soil-plant system.

Instructions

Successfully building a risk-based LEP involves:

- Identifying key issues and their degree of risk.
- Coming up with responses to any issues identified as having an elevated risk.
- Summarising responses as a plan, including a ranking of priority, cost estimate, and an activity timetable.
- Regular review of progress.

This LEP should be reviewed annually to assess progress, carry over any incomplete activities, and to consider new issues if and when they arise.

Contact your local Beef + Lamb New Zealand Extension Manager for assistance or further information about Land and Environment Planning (regional offices are provided on back page).

By completing this entry level LEP you will be joining the growing number of farmers using good management tools to future-proof their farms.

Water quality (phosphorus)

Phosphorus (P) can lead to algal blooms and eutrophication. Risk increases when soils are bare, P concentrations are high, and runoff is significant.

You can assess your farm's P-loss here:

1) P-loss

- **Do current Olsen-P levels exceed optimum levels on any part of the farm? YES / NO**

Optimum levels for sheep and beef are 20-25 (sedimentary soils), 20-30 (ash soils), and 35-45 (pumice soils).

- **Do you practice conventional cultivation or intense strip grazing? YES / NO**

Both practices can expose large areas of bare soil. P-loss risk is highest on sloping and hilly land.

- **Is more than half of the farm rolling, hilly or steep? YES / NO**

Steeper slopes tend to generate higher rates of runoff.

- **Are dominant soils poorly drained, clayey, hydrophobic or slowly permeable? YES / NO**

There is a greater chance that these soil types will create higher runoff rates. Hydrophobic soils are coarse-textured soils that dry out and become water repellent (some sandy and pumice soils).

- **Do you farm in a high rainfall area, or an area subject to high rainfall intensities? YES / NO**

Runoff is strongly related to rainfall amount and/or intensity. High rainfall is >1500 mm/yr.

If you answered YES to one or more questions, then your farm may have an elevated level of risk.

2) Responses

Now you can write down how you will manage P-loss risk on the response plan. Some suggestions include:

SUGGESTIONS:

- Maintain Olsen P at optimum levels.
- Avoid direct P-fertiliser application to open water or water channels.
- Avoid strip grazing and cultivation of steeper slopes.
- Use slow release P-fertiliser (e.g. RPR).
- Avoid super-phosphate application in high-risk months (June - Sept).
- Avoid over-grazing pastures that are prone to drying out.
- Leave ungrazed vegetated buffers beside waterways to filter run-off.
- Adjust the buffer width for slope.

Erosion

Common erosion types include wind, slip, slump, earthflow, gully, tunnel gully, stream bank, and even silt deposition associated with flooding. You will already know if erosion is an issue for your farm. The important question is how much of a risk is future erosion?

You can assess erosion risk for your farm here:

1) Farm erosion risk

- **Negligible (no risk) YES / NO**

- Visual evidence of any erosion is hard to find
- Only a very small area of the farm is affected
- Highly unlikely to have a major erosion event even in the worst of storms

- **Slight risk YES / NO**

- There is visual evidence of past erosion (scars, slumps, exposed soil)
- The area affected is reasonably noticeable, or it represents a small area of hard to manage erosion
- A major erosion event could impact on production and/or threaten infrastructure, but it would be rare and recovery would be quick

- **Moderate risk YES / NO**

- Evidence of erosion is obvious
- A sizeable portion of the farm is potentially at risk (e.g. several large hill slopes)
- A major erosion event is a definite threat to production and/or infrastructure, and recovery time would be significant

- **Severe risk YES / NO**

- Ongoing erosion is a characteristic of the farm
- Evidence of erosion is extensive
- A major erosion event would threaten production and infrastructure, to the point where it could threaten long-term business viability

If you answered YES to any risk other than NEGLIGIBLE, then you should consider protecting your farm from future erosion events.

2) Responses

You can write down how you will minimise erosion risk on your farm on the response plan. Some suggestions include:

SUGGESTIONS:

- Space planted poplar-poles on hill slopes at appropriate densities.
- Retirement from grazing of the worst affected areas, particularly those with marginal production value.
- Afforestation of worst areas provided access for harvesting will be feasible.
- Construct containment structures for certain erosion types (e.g. debris dams).
- Strategic tree planting to protect key infrastructure (fences, tracks, buildings, public roads).
- Design or locate tracks, fences, etc. in a way that minimises the risk of erosion damage.
- Engage a regional council officer or similar specialist for advice.
- Stabilisation trees such as willows to prevent stream bank erosion.
(Not grey willow or crack willow as these are unwanted organisms and are pest plants)

Water quality (faecal bacteria)

Elevated levels of faecal bacteria in freshwater are a public health hazard. Sources include stock defecation into water, and faecal material being washed from pasture to streams via runoff.

You can assess your farm's faecal bacteria risk here:

1) Faecal bacteria risk

- **Do stock have open access to streams or other natural waterbodies? YES / NO**

Direct deposition to water is a key source of faecal bacteria. Cattle, in particular, may show a defecation reflex triggered by standing in water. Deer are also attracted to water for wallows.

- **Do cattle and/or deer make up more than 20% of total stock units? YES / NO**

Sheep and goats are less attracted to waterbodies and do not tend to stand in, or wade through, waterbodies and streams.

2) Responses

Now you can write down how you will manage faecal bacteria on the response plan. Some suggestions include:

SUGGESTIONS:

- Exclude stock from at-risk streams with fences or other methods.
- Consider installing culverts or bridges at stock crossings.
- Provide alternative sources of stock water in each paddock e.g. troughs.
- Consider strategic vegetated buffer areas where runoff converges.
- Consider riparian buffer strips around water bodies particularly for intensively farmed areas.



Water quality (nitrogen)

While dryland sheep and beef farms leach less nitrogen than more intensive farming systems, the large area of land in sheep, beef and deer production means that total nitrogen loss is significant. Elevated nitrogen concentrations are a major cause of water quality problems such as algal blooms, eutrophication, and nitrate toxicity (worst case).

You can assess your farm's nitrogen loss risk here:

1) Nitrogen loss risk

- **Is your farm's stocking rate higher than 18 su/ha? YES / NO**

Higher stocking rates mean more urine patches, which are the key source of N-leaching in pastoral grazing systems.

- **Do cattle make up more than 20% of total stock units? YES / NO**

Compared with sheep, cattle urinate greater amounts, and they are more likely to urinate in the same general area.

- **Is your farm located in a high rainfall area (>1500 mm/yr)? YES / NO**

Leaching generally occurs when rainfall exceeds evapotranspiration and soil-water storage capacity is full (saturated).

- **Are brought-in supplements or N-fertilisers used? YES / NO**

N-fertiliser has little adverse impact unless applied excessively (>50 kg N/ha/application or >150 kg N/ha/yr) or during winter. However, more feed grown and being eaten will result in higher N concentrations in the urine .

- **Is soil type shallow and/or very porous (e.g. sands, gravelly soils)? YES / NO**

Water and dissolved N drains more quickly through shallow or very porous soils.

- **Is cropping a significant enterprise (e.g. a mixed cropping farm)? YES / NO**

Cropping can result in extreme N-leaching depending on cultivation methods and fertiliser policies.

If you answered YES to the first question, or YES to two or more of the other questions, then your farm may have an elevated risk.

2) Responses

Now you can write down how you will manage N-loss for your farm on the response plan. Some suggestions include:

SUGGESTIONS:

- Avoid winter applications of nitrogen-based fertilisers or when heavy rain is forecast.
- Avoid excessive N-fertiliser rates (>50 kg N/application or >150 kg N/ha/yr).
- Ensure other nutrients are non-limiting (maximise N-uptake opportunity).
- Consider switching to urease-treated urea if you currently use fertiliser-N.
- Undertake a comprehensive nutrient analysis using Overseer Nutrient Budgets.
- Ensure that areas of high animal concentration (e.g. yards) discharge effluent runoff to land rather than to waterways.

Productive capability

Protecting the soil-plant system is an important component of Land and Environment planning.

You can assess how you are managing the productive capability of your land:

Productive capability

- **Are current nutrient levels (P, K, S, Mg) below optimal for any part of the farm? YES / NO**

Full pasture production potential cannot be realised if nutrient status is limiting.

- **Do you undertake soil testing every 2-3 years using the same transect lines? YES / NO**

Monitoring soil fertility consistently is important for optimal and sustained production. Guessing nutrient requirements increases the risk of under- or over-fertilising, both of which can represent a substantial cost.

- **Do you graze significant numbers of cattle and/or deer on wet soils, or practice intensive grazing methods when soils are wet (e.g. strip grazing)? YES / NO**

Pugging is the silent saboteur. It can result in a 50% drop in pasture yield and an 80% drop in N-fixation by clovers. Recovery can take more than a year.

- **Is there a risk that invasive pasture weeds (e.g. ragwort, thistles) can cover greater than 5% of your farm's total pasture area? YES / NO**

Pasture weeds can be toxic, physically dangerous, disease-related (scabby mouth), or just an outright nuisance. Significant infestations replace pasture and reduce stock carrying capacity and production.

- **Do you have a particular problem with pasture pests? YES / NO**

Porina, grass grub, clover root weevil, rabbits and other pasture pests can consume or damage tonnes of potential pasture yield, often at critical times.

The full scope of productive capability cannot be covered in this entry level LEP. However, it is a useful starting point for considering how well these concerns are being managed. What can be done to avoid these problems (particularly seasonal weeds and pests)?

2) Responses

You may already know how best to respond to these concerns. But if there is room for improvement, then you can write down how you will manage productive capability on the response plan.

SUGGESTIONS:

- **Direct response such as:**
 - Managing stock off wet soils in winter
 - Developing a weed control strategy
 - Developing a soil testing strategy
 - Using cattle to manage grass grub
 - Have an immediate and aggressive response policy to any new weed
- **Engage the help of someone with special experience or expertise**
 - Local or neighbouring farmer
 - Fertiliser rep
 - Farm advisor/consultant
 - Regional council rep
- **Search for ideas. Many excellent resources are available as books, fact sheets or internet resources:**
 - www.beeflamb.com
 - www.fertresearch.org.nz
 - www.lgnz/lg-sector/maps/index
 - Your regional council

Other issues

Your farm may have other important environmental issues not covered in this entry level LEP. A response plan is provided if you would like to include these. Some examples include:

SUGGESTIONS:

- Protecting indigenous forest remnants
- Soil contamination (DDT, old dips, old dosing strips)
- Wetland protection or restoration
- Flooding
- Other pests (possums, wildfowl, etc.)
- Chemical storage, use and disposal
- Protecting or enhancing stream, river or lake areas
- Shade and shelter for stock
- Managing farm waste
- Irrigation and water use efficiency
- Greenhouse gases



Bringing it all together

Consider the risks and issues you have covered in this workbook. Summarise your responses to each risk or issue on the response plan template. Rank each in terms of priority. Elaborate your responses so that they are SMART. SMART stands for Specific, Measurable, Achievable, Relevant, and Time-bound. An example is given for erosion.

| RESPONSE PLAN | | | | Year: | |
|---|---|--|---|---|--|
| PRIORITY | ISSUE | RESPONSE | COST | TIME FRAME | PROGRESS |
| Rank each response in order of priority | Detail the issue of concern | Specify your response to minimise or manage the issue | Estimate cost | Time-frame to be completed within | Tick when completed. Carry over if not |
| 2 | Erosion in far corner of Sam's Paddock | Plant 120 poles @ 10 metre spacings. Use Kawa poplar because of disease resistance | 120 poles @ \$4/pole 120 sleeves @ \$3.80 per | 50 poles this year (2013) 70 poles in 2014 | |
| 1 | Steers pugging the wet part of the flats in winter | Test using the lane as a stand off area when really wet. Check the tile drain outfalls and make sure they're clear. | nil | Winter 2013 | |
| 1 | Offal hole fills with water. Must be getting into the water table. | Fill in current hole and have a new one excavated near the pine shelterbelt on the top terrace. Find out about cost. | \$800? | Cost estimate by Jan 13 Excavate Feb-Mar 13 | |
| 3 | Unfenced wetland | A) Fence off the wetland from the main paddock (70 metres) approx \$700 for fencing. B) Plant some native trees and flaxes. C) Find out if Ducks Unlimited would be interested. D) Find out if the regional council can help. | Approx \$700 for fencing. Need to find other costs from DU or council. | Contact DU & council Jan 13 Look to fence late Feb 13 Plant natives | |

4) Implement, monitor, review and register

- Implement each response according to your priority and timeline.
- Monitor and record all your achievements.
- Remember to review and reassess each year.
- Register your completed plan at LEP@beeflambnz.com. This way you can be sure to receive the latest news on LEPs and be notified of the latest modules on topics such as Keeping Stock out of Waterways, Phosphorus and Sediment Management, and Nutrient Budgets.

Congratulations on designing a Land and Environment Plan specifically for your farm.

For full integration with farm business planning you can refer to this LEP when making decisions about farm development and financial planning.

Other LEPs

Level 2 LEPs

Level 2 Land and Environment Plans look at your farm's land and soil resources, develop Land Management Units (LMU), use LMUs as the basis for nutrient budgeting, strengths and weaknesses analysis, and yield gap appraisal. LEP 2 summarises opportunities for more sustainable farming as a three year response plan.

The aim is to produce a LEP that can be audited and used as part of a quality assurance programme or used to meet regional council requirements.

Level 3 LEPs

Level 3 Land and Environment Plans build on the work done in LEP 2, but with greater emphasis on specifications and methods used by professional farm planners. This includes a paddock scale inventory describing land resources, an Overseer® budget prepared by a qualified operator, and increased emphasis on monitoring to measure how the farm environment is improving.

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