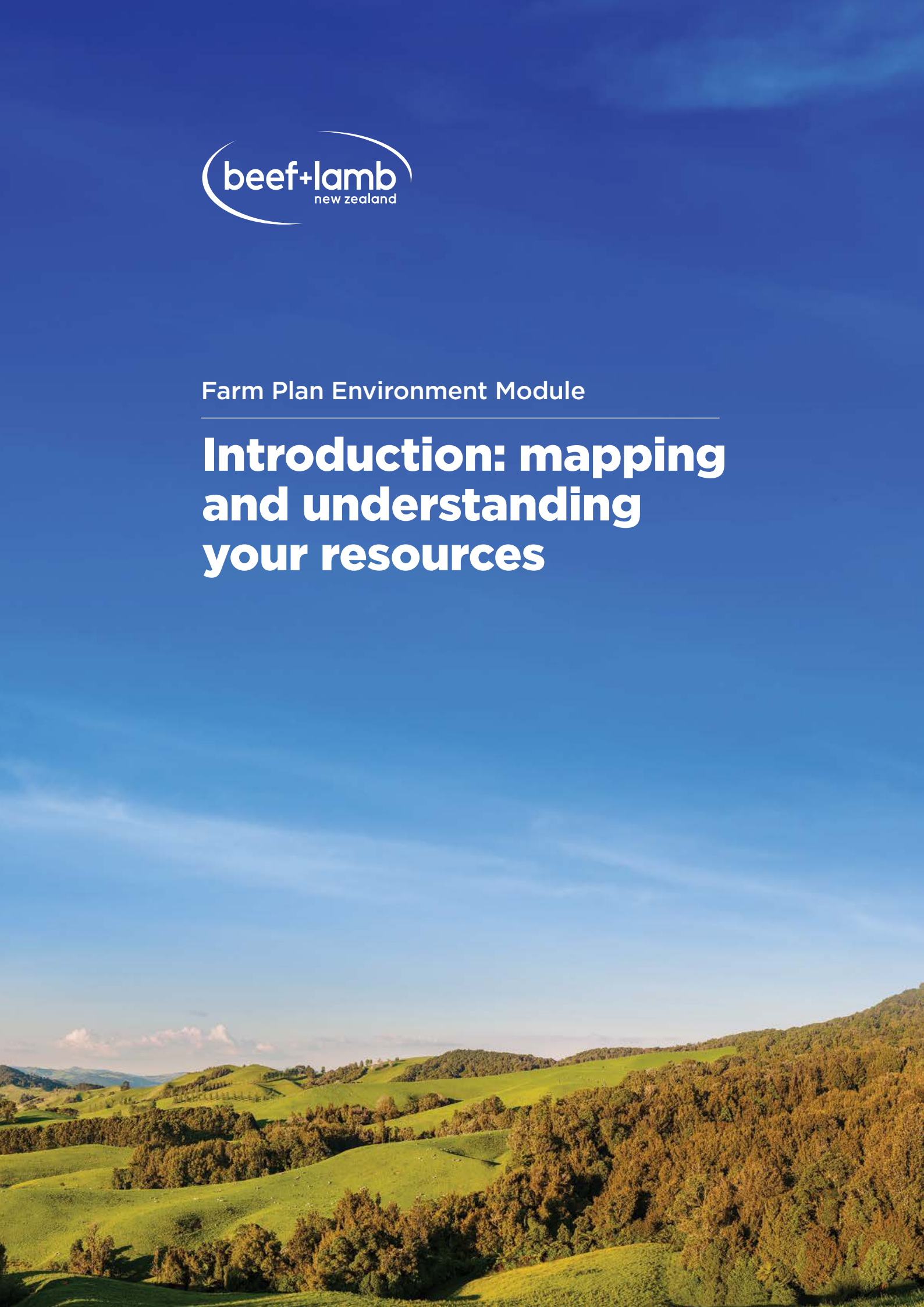
beef+lamb new zealand

Farm Plan Environment Module

Introduction: mapping and understanding your resources



The Farm Plan: Environment module was originally developed with the support of the Red Meat Profit Partnership.

B+LNZ Farm Plan: Environment Module - Overview

The B+LNZ Farm Planning programme supports farmers to understand their natural resources, assess and manage risk, and document action plans. It helps farmers build profitable and sustainable businesses and provides an evidence base to support New Zealand Farm Assurance Programme Plus (NZFAP Plus) and national regulatory requirements.

The B+LNZ Farm Plan - Environment Module is a process and range of tools to help enhance your understanding of your farms natural resources, make a plan to achieve goals, manage risks, and monitor your progress over-time.

It is made up of seven chapters:

- **Introduction – mapping and understanding your resources**
- **Managing soil health**
- **Freshwater ecosystem health**
- **Integrating native biodiversity**
- **Responding to a changing climate**
- **Waste and Chemical Management**
- **Forage cropping management (including winter grazing)**

The introduction chapter is foundational and is represented by the centre of the diagram and should be completed first. Each of the topic based chapters follow a common, iterative approach demonstrated by the outer circle of the diagram and builds on the foundational understanding of your natural resources.

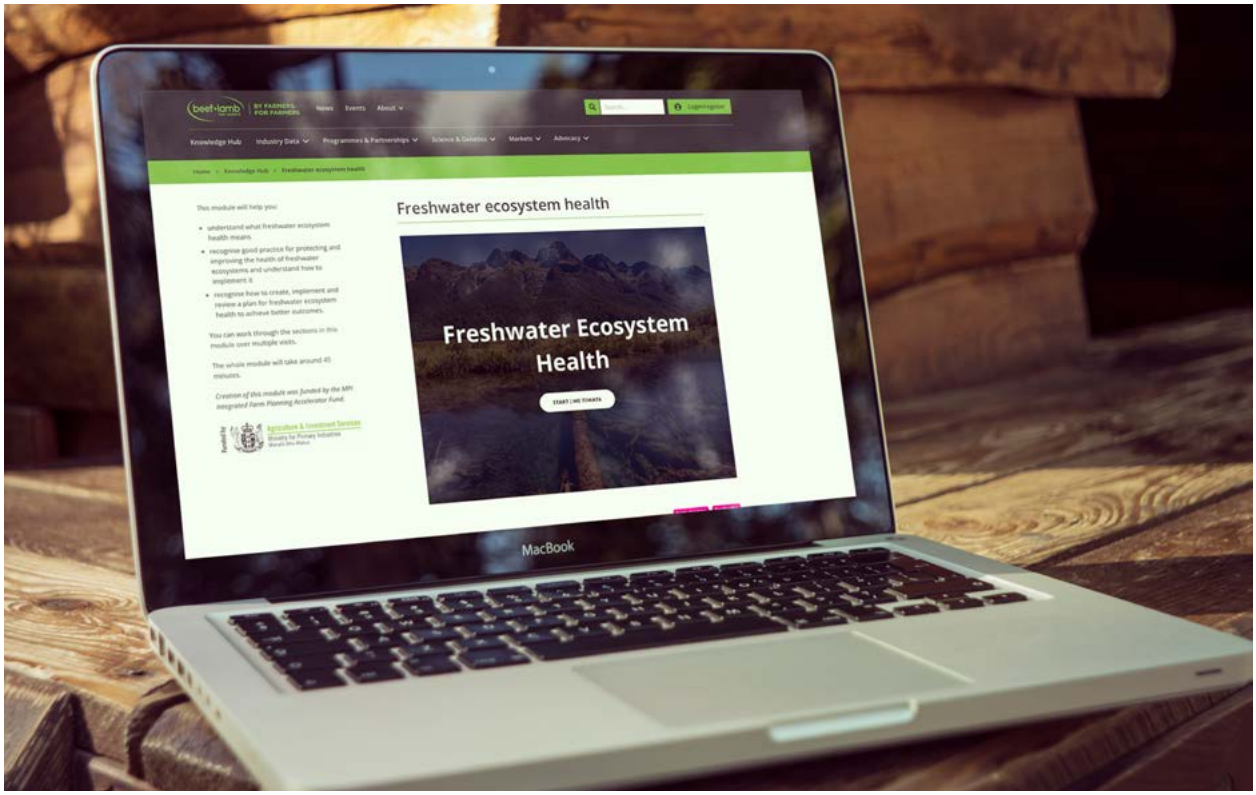
Each chapter is broken down into a series of steps to help **create** your plan and to keep it **active** – keeping an eye on and looking after your natural resources is a day to day part of managing a farm, just like keeping an eye on your stock, pastures, and finances.

Use the farm plan as a guide but you don't have to do it all at once or even in the order that is presented here. Start by taking stock of what plans and information you already have. You probably aren't starting from scratch. You may already have maps or information from your regional council or fertiliser company or some other third party. You may have plans or parts of plans from previous workshops you have attended or as part of an assurance programme or through a regional council programme or compliance requirement.

Each chapter includes information, examples, tools and templates to help guide you through the steps. Blank templates are provided as an option to record information either in hard copy or through editable PDFs downloaded from **beeflambnz.com/farmplan** or you can record in another form or via one of the online tools available – whatever format will make it easiest for you and your team to keep your plan a living document that is utilised and implemented.

Many of the actions you identify and document may be ongoing, and are, or will, become embedded as part of your day-to-day management. Other actions will be targeted projects to be completed over a period of time. It is important to capture all of these. Your plan will need to be reviewed and revised over time to meet the demands of your farm and farming system.

Each chapter also has an accompanying online learning module to help you work through the process.



Links or supporting resources mentioned in the chapter can be found at **beeflambnz.com/farmplan** or requested in hard copy by contacting **resources@beeflambnz.com**. There are also additional factsheets and other resources available there or through the B+LNZ Knowledge Hub.

Chapter Overview

This chapter is broken down into 5 steps outlined below. Each step includes background information as well as a completed example of any templates associated with that step.

Blank templates are included with hard copies of the resource or can be downloaded from **beeflambnz.com/farmplan**.

STEP 1 – Farm Information

Record key elements of your farm system and members of your farm team

Template OT1 – Farm Information

STEP 2 – Outline your Vision, Values and Goals

Outline your vision, values and goals for your farm business. You can also outline specific goals for each of the topics at this point or include them when you work through the subsequent chapters.

Template OT2 – Vision, Values and Goals

STEP 3 – Farm Mapping

Identify and map the listed farm features.

STEP 4 – Identify Land Management Units

Identify, name and describe Land Management Units for your farm

Template OT3 - Resource Chart

STEP 5 – Land Management Unit Assessment

For each Land Management Unit identified outline its strengths, weaknesses and any opportunities, management practices or conditions of use that are applied.

Template OT3 - Resource Chart

Additional supporting resources are available at **beeflambnz.com/farmplan** and on the B+LNZ Knowledge Hub.

STEP 1 – Farm Information

Describe your farm system

Outlining your farm system means that everyone using the plan will understand the context you are farming in. It also provides detail to be able to complete the risk assessments.

You should also include members of your farm team and their roles. Remember to include rural professionals and trusted advisors and any one involved with implementing the farm plan. This helps to share the load and ensure there is accountability for achieving outcomes.

In **Template OT1** describe your farm system and farm team as it is currently, recognising over time you may make changes. An example is provided below.

Farm Information

Farm Location (Region; District; Nearest Town)	*123 Anywhere Road, Everytown 9873*
Total Farm Area	*395ha*
Describe farm stocking policy	*Breeding ewes, sell lambs store, bull finishing*
Stock numbers	*1850 MA ewes, 450 ewe hoggets, 100 R2 bulls*
Lambing/calving dates	*Lambs: 20th August*
Replacement rate for breeding stock	*Sheep – 25%*
Mean weaning date	*Lambs – Early January*
Birth rate (lambs, calves, fawns weaned to ewes, cows, hinds mated)	*Lambing: 130%*
Amount of product taken off farm per year (e.g. stock, meat, wool, velvet, feed)	*Wool – 12, 800 kg* *Beef- 30, 000 kg (carcass weight)* *Lamb- 53, 500 kg (live weight)* *Mutton – 12, 000 kg (carcass weight)*
Crop types and area	*Kale – 14ha* *Summer turnip 10 ha* *Swedes - 4ha*
Supplement bought in	*Baleage- 50 bales*
Supplement made on-farm	*Hay – 100 large bales*
Farm Team Key contacts (name, contact details and role in implementing farm plan)	***Jane*** *– Manager – 021 234 XXXX - Explaining the plan to staff, making sure the work is completed on time and to required standard* ***John*** *– Farm worker - 021 234 XXXX - Making sure resources and stock are managed according to the plan* ***AgCulitvate*** *– Contractor - 021 234 XXXX - Making sure cultivation and planting occurs according to the plan* ***Joe*** *– Regional Council Land Management Advisor - 021 234 XXXX – support and advice with planting programme and potential funding opportunities*
Other	

Example OT1

Blank templates can be found in **Our Plan** section and at **beeflambnz.com/farmplan**

STEP 2 – Outline your Vision, Values and Goals

Write down your Vision, Values and Goals, for your farm business. You can record these in **Template OT2** in the "Our Plan" section, or in an existing business plan. An example is on the next page. Alternatively, the Red Meat Profit Partnership developed 'BizPlan', an online tool to create your Business Plan, and you'll find a link to it at **beeflambnz.com/farmplan**

By identifying your vision, values and goals, you can ensure that your farm plan supports you in achieving your vision while being true to your values. By identifying these it can help you develop a philosophy that underlies your farm management (e.g. high performance/ low-impact, low input, etc), and the general location and history of your property. They can also include some general comments on your management approach and/ or some of the key assumptions that underlie the management of your property.

The vision statement can outline how the farm's environment might be at some point in the future (perhaps in 50 years' time). A good way to think about this, is 'What do I want the person farming this land in 50-years' time to say about me?' Your values are your beliefs. Your vision and values will be personal to your farming business.

The online module on Business Planning outlines more about setting your vision and values. Go to **beeflambnz.com/farmplan** to find the link.

As you work through the plan, you will develop more specific goals and objectives on each of the topics. These will link back to your overall vision, values and goals. It can be useful to revise these goals from time-to-time. You can choose whether to have them in one place or contained in individual chapters or both.

Vision, Values and Goals

VISION: The overarching aspirations for the farm business. I.e. the big picture of where you want to be

- *Profitable environmentally friendly business that produces top quality meat for our community*

VALUES: Standards or Principles that are important to the farm business and its owners. Such as family ownership/involvement and being environmentally sustainable

- *Family ownership*
- *Environmentally sustainable*
- *Profitable*
- *Embrace new ideas and technology*
- *Share best practice ideas with the community*

OVERALL GOALS: The long-term (1 year, 2 year, 5 year and more) aims that you want to achieve. Should include business and personal goals.

- *Develop and implement succession plan to ensure ongoing family involvement and ownership by 2021*
- *Increase scanning by 25% within 3 years*

1. SOILS GOALS ST1

- *To maintain or improve the physical and biological condition of soils in order to minimise the movement of sediment, phosphorus and other contaminants to waterways, and maximise the growing capacity of the soil resources.*
- *To manage and assess the appropriate land use and grazing management for specific areas on farm in order to maintain and improve the physical and biological condition of soils and minimise the diffuse discharges of contaminants.*
- *To manage my stock and cultivation activities to limit damage to the soil structure*

2. FRESHWATER GOALS FW1

- *Secure safe drinking water for house and animals*
- *Safe swimming in the river*
- *Sustainable habitat for native fish and insects*

3. BIODIVERSITY GOALS BT1

- *To protect and enhance biodiversity assets on farm and within our community.*
- *To develop an effective pest and weed management strategy*

4. CLIMATE CHANGE GOALS CC1

- *To gain market recognition for products with low emissions*
- *To produce low emission and eco-efficient product valued by consumer*
- *Know my greenhouse gas emissions numbers and have a plan to manage them*
- *Be able to adapt and change to a range of changing climate scenarios*

5. WASTE AND CHEMICAL MANAGEMENT GOALS WC1

- *Reduce the volume of waste generated on farm and increase the proportion of waste that is reused or recycled*
- *Manage risk from contaminant sources such as fuel supplies, chemical mixing areas or fertiliser loading areas.*

6. FORAGE CROPPING GOALS FC2

- *Keep stock out of waterways with appropriate buffer areas*
- *Create a winter grazing plan each year*
- *Use strategic grazing techniques for wintering to minimise sediment loss*
- *Replant winter paddocks as soon as practical after winter to reduce nutrient and sediment losses*
- *Keep animals well-fed and in good condition*

Example

OT2

Blank templates can be found in **Our Plan** section and at **beeflambnz.com/farmplan**

STEP 3 – Farm Mapping

Mapping is an important step to help you and others understand your farm and where things are located. They can be a useful record of things or to help explain you farm and its components to other people. Maps can be used as a visual representation of your farm and show how things are spatially related. Maps can show specific features or groups of features on your farm.

Maps can take many forms, from hand drawn on paper or an aerial image, though to utilising specialised mapping software with layers such as GIS (Geographic Information System). There is no correct way, the key is finding a way that works for you and your farm business. A base map with your farm outline is a great way to start, especially if this is overlayed on an aerial, satellite or topographic map. This helps your identify key features on your farm.

Third parties such as councils or fertiliser companies may be able to provide you with base maps or maps of specific features such as soil type either in hard copy or as GIS layers.

Identify your farm features on a map (or series of maps)

Some farms will have maps with many resources already identified. Your circumstances and specific needs (such as assurance programmes or regulatory requirements) will determine what you need and want to have mapped. There are a lot of features to identify so if you are completing in hard copy ensure you have enough copies of your map so that they are not too cluttered. You can create different digital layers if you are doing this electronically.

Features you may need to identify on your maps:

Farm infrastructure

- ☐ Property boundaries (including note if leased or licensed)
- ☐ Fencing infrastructure (eg paddocks, raceways, riparian)
- ☐ Tracks, laneways, roads
- ☐ Buildings (e.g. houses, implement sheds, barns)
- ☐ Shearing sheds
- ☐ Yards, stockholding areas
- ☐ Stock crossing structures (eg. bridges, consented culverts, fords)
- ☐ Feed pads and feed lots, stand off pads, winter pads, loafing pads
- ☐ Silage and or any other conserved or supplementary feed storage areas
- ☐ Private drinking water and stock water supply points
- ☐ Frost protection (if applicable)
- ☐ Other

Waste and chemicals

- ☐ Sewage disposal systems/septic tanks
- ☐ Effluent storage and application areas (where applicable)
- ☐ Hazardous substance storage location(s) (eg. Chemical, fuel)
- ☐ Hazardous waste disposal site(s) including agrichemical washdown areas
- ☐ Nutrient application areas or blocks
- ☐ Contaminated sites (eg. Old sheep dips or farm dumps)
- ☐ Offal pits/dead stock disposal
- ☐ Waste or rubbish disposal sites

Land features

- ☐ Soil type(s)
- ☐ Slope (where > 3 degrees)
- ☐ Landforms (eg. Mountain land, Hill country, Alluvial/River flats, Alluvial fans, Terraces, Gorges, Steepland, Rolling hills, Spurs, Valley floors, Scarp slopes, Ridge tops, Swamps, Basins, Glacial moraine, Dunes, Flood plains (See step 4 for more information)
- ☐ Aspect (where > 3 degrees)
- ☐ Elevation
- ☐ Erosion prone areas including active or potential slips,
- ☐ Natural hazard areas or sites (e.g. areas prone to flooding, areas at risk of slips or rockfall)

Vegetation cover

- [ ] Native vegetation areas (such as native forest, shrubland, grassland)
- [ ] Exotic forestry plantations
- [ ] Woodlots
- [ ] Shelter belts
- [ ] Riparian vegetation or waterway planting areas
- [ ] Soil conservation or erosion control plantings
- [ ] Other woody vegetation
- [ ] Areas suitable for cropping
- [ ] Areas of other forages or crops
- [ ] Pasture renewal or regrassing programme

Water features

- [ ] Waterways and waterbodies (eg. wetlands, lakes, dams, springs, ponds, rivers, streams, creeks, intermittent, ephemeral)
- [ ] Drains (surface and/or subsurface) including end points
- [ ] Constructed water features (such as dams, ponds, raceways)
- [ ] Sediment traps and bunds, debris dams, soil conservation flumes and other built structures for resource protection
- [ ] Water crossing points (e.g. bridges, culverts fords and unformed crossings)
- [ ] Critical source areas (CSA) and overland flow pathways

Significant Areas and Sites

- [ ] Sites of indigenous cultural significance (such as pa sites, or Māhinga kai sites)
- [ ] Recreational sites (such as hunting, fishing, swimming or kayaking)
- [ ] Heritage sites (such as buildings or historic sites)
- [ ] Significant Natural Areas (SNA) these are identified in district plans (further detail will be provided with the National Policy Statement for Indigenous Biodiversity).
- [ ] Other significant sites or values areas (such as may be identified by district or regional plans, or by your local community) e.g. significant trees, geological preservation sites, landscape zones).

Monitoring sites

- [ ] Location of soil testing sites or transects
- [ ] Water monitoring or sampling sites
- [ ] Photo-point monitoring locations
- [ ] Any other monitoring sites

Irrigation infrastructure and areas (if applicable)

- [ ] Irrigation infrastructure, pumps and pipework
- [ ] Irrigation storage and raceways
- [ ] Areas with irrigation

Land management units (see step 4)

- [ ] Land Units OR
- [ ] Land Management Units (LMU) (See step 4 for more information) OR
- [ ] Land Use Capability (LUC)

A note about scale and professional resource mapping

All of New Zealand has been surveyed at the regional scale (1:50,000 and 1:63,360). While the level of detail in these maps is too coarse for farm management purposes, maps at this scale can be useful starting points for further investigation. Soil maps are available for most areas also at this scale. Land Resource Inventory (LRI) Worksheets and the NZ LRI database are available for all of New Zealand. Copies or extracts may be obtainable from local libraries, on-line through Crown Research Institutes such as Manaaki Whenua – Landcare Research, farm mapping companies, fertiliser companies, and regional councils.

When using these at a farm level it is critical to validate them and refine the detail so they better reflect differences within the farm. To demonstrate the difference in scale, 1:10,000 is one observation per hectare, whereas at 1:50,000 this is one to 25ha. A lot can change in 25ha!

B+LNZ encourages farmers to consider getting their farms mapped at farm scale (generally less than 1:10,000, but some farms are large enough to support a slightly lesser resolution (e.g. 1:20,000). This can be done by a soil conservation specialist and there are a number around New Zealand who do this. While there is a cost involved with this, it only needs to be done once, and provides an objective, enduring assessment and stocktake of your resource-base to ensure you are looking after resources and optimising land use within your farm business objectives.

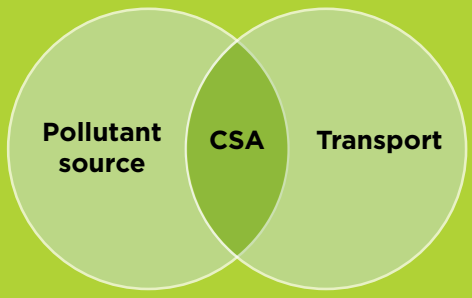
Understanding and mapping your Land Resource

Why is it important to understand and map the land resource?

The land resource is the foundation of New Zealand's pastoral farming system. By developing a detailed and documented understanding of land resources and mapping these, stock policies and land management uses can be appropriately matched to optimise performance while minimising impact's on natural resources. It also provides a foundation to assess future land use opportunities by helping understand the potential as well as the limitations of each area of the farm (or Land Management Unit).

What is a Critical Source Area (CSA)?

Critical Source Areas are areas in a paddock or on a farm that can contribute to relatively large amounts of nutrient and sediment losses to waterways. They are a landscape feature such as a gully, swale, or depression that accumulates runoff from adjacent land and delivers, or has the potential to deliver, one or more contaminants to one or more rivers, lakes, wetlands, or drains, or their beds (regardless of whether there is any water in them at the time).



Photos showing examples of Critical Source Areas

STEP 4 – Identify Land Management Units

There will be areas of your farm that are treated differently to other areas depending on a range of factors, e.g. productive potential, fertility, accessibility, vegetation cover, slope. Identifying these sub-areas of your farm can help you to manage them more effectively by having targeted actions and uses.

Often the different areas fall naturally into groupings of paddocks that have similar characteristics. There are a number of ways that you can either breakdown your farm or group similar areas together into Land Units to make overall farm management easier and more effective. Two of the main ways are through Land Management Units (LMU) or Land Use Capability (LUC).

What are Land Management Units?

Land Management Units (LMU) are areas of land that can be farmed or managed in a similar way usually because of underlying physical similarities, your farm infrastructure, or your intended use. They can represent a static snapshot of how land is currently used, or an insight into how land could be used if all physical limitations and opportunities were recognised and managed.

An LMU can be a single area or may be a number of discrete areas that are not necessarily physically connected but have similar underlying characteristics or are managed in a similar way.

Having a manageable set of LMUs can help you effectively manage your farm in a sustainable and productive way by matching your land resource with appropriate land use.

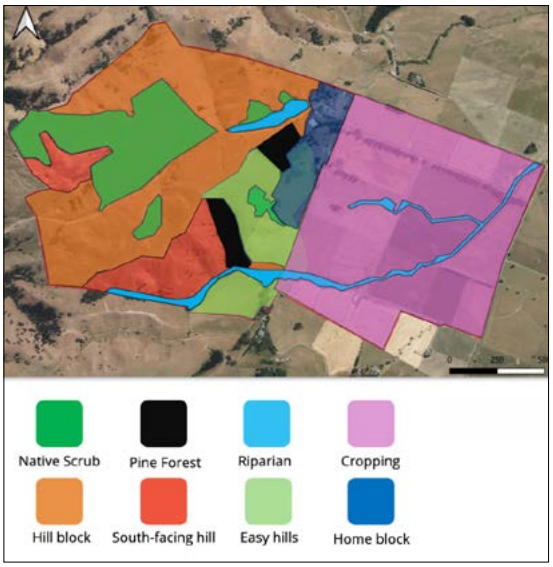


Figure 0.1 An example of a farm map with LMUs

What is Land Use Capability?

Land Use Capability (LUC) is a classification system that categorises land into classes according to its capacity and suitability to sustain productive land use long-term, taking into account the physical limitations of the land. In New Zealand eight land classes are recognised. The classes are broken down into sub-classes and units and are identified based on an assessment of physical factors including rock type, slope, soil, erosion, vegetation and climate. For more information about LUC go to **beeflambnz.com/farmplan**

Figure 0.2 An example of a farm map with LUC

How to define your own Land Management Units

If you already have LUC maps at a suitable scale and want to use them you can skip to **Task 4**, but you may still want to group together LUC units into a manageable set of LMUs. Continue reading if you want to define your own LMUs.

Use a new or separate base map, aerial photo or satellite image for identifying and creating your land management units. If you are using electronic maps create a new map or layer. Satellite images or aerial maps of your farm are particularly helpful for defining your own LMUs.

Task 1 - Identify Landforms

Use your existing maps or aerial photos and your own knowledge of your farm to divide the property into landforms (you may have already done this in step 3 as part of the land features mapping exercise). Start with the obvious, such as separating your flat land from your hills. You can then break your farm down into whatever landforms are significant features on your property.

- **Flats** – e.g. river flats, plains, terraces, valley floors, flood plains, basins
- **Hills** – e.g. easy hills, rolling hills, steep hills, ridges, spurs, gorges, dunes, mountain land, scarp slopes, glacial moraine, alluvial fans

Task 2 - Identify vegetation and water features

Identify distinctive features managed separately from the grazing area such as areas of woody vegetation or permanently fenced waterways. You may choose to map these as land management units.

Woody Vegetation

Identify areas of woody vegetation that are generally not grazed such as forestry plantations, native bush or dense scrub. You may have done this in Step 3 as part of the vegetation cover mapping exercise.

You can choose to keep different types of vegetation as separate LMUs or group them all together into one LMU. What makes sense for your property will depend on the management required for specific blocks. For example, a QEII trust block and a production forestry block are likely to be kept as separate LMUs.

Water features

Identify any areas water features (e.g. rivers, lakes, wetlands) and the areas adjacent to them (such as riparian plantings) that are not part of your grazed areas. These can form a LMU, or if the management of the areas is different they can be mapped as separate LMUs. You may already have maps from Step 3 as part of the water features mapping exercise.

Other significant non-grazed areas

Identify any other significant non-grazed areas on your farm where stock is generally not able to access or graze. These may be areas such as house blocks, steep gorges, protected areas or areas where stock have been excluded. You may choose to identify these as LMUs where appropriate.

Task 3 - Refine and Map your Land Management Units

Refine the landforms or features you identified in Tasks 1 and 2 into LMUs. You may wish to refer to the maps you created in Step 3. You can group together similar areas or split areas up, to identify a manageable number of land management units for your farm.

Focus on a single landform or feature and consider if there are areas within the landform or feature that you want to map as separate LMUs. You may want to consider other physical differences, characteristics and qualities such as:

- Slope and topography – Are there differences in slope or topography that you want to manage separately? Is it flat, rolling, moderate or steep hill country?
- Soil types and geology – Are there differences in soil structure, depth, texture, colour or drainage characteristics? Are some areas more susceptible to erosion, pugging or compaction?
- Pasture production – Are there variations in fertility within the landforms? Do you notice differences in pasture production?
- Other physical characteristics or qualities - Are there other differences you want to identify separately due to changes in things such as aspect, erosion risk, elevation, climate, flooding frequency, wetness or vegetation.

You may also consider the land use or management of various blocks (such as lambing blocks, beef unit or cropping blocks) in conjunction with your physical characteristics.

Repeat this same exercise for each landform or feature identified in Tasks 1 and 2.
By considering the physical characteristics of your farm and grouping or splitting areas that make sense to manage together, create a manageable set of land management units for your property and identify these on your map.

Task 4 - Name and Describe your Land Management Units

Once you have your Land Management units identified, give them a descriptive name which will make sense and be clear to you and others on the farm. For example, the name might incorporate things such as the dominant landform, location or what the areas is used for. This often helps others understand it as well. Once the LMU is named, it is important to give a more detailed description of the LMU.

When describing your land management units, you should consider the following characteristics (where applicable):

- landform
- soil types (eg, heavy soils versus free-draining soils)
- slope
- climate (especially rainfall)
- connectivity to water eg, (presence and location of fresh waterbodies and groundwater)
- critical source areas
- sites, species, or ecosystems of significance (natural, community or cultural)
- irrigation
- land drainage (surface and sub-surface)
- land use

Record the name and description of your land management units in the first two columns of the Resource Chart **Template OT3** in "Our Plan". An example is provided below. You will complete the remaining columns in Step 5.

Resource Chart

Land Management Unit	Description	Strengths	Weaknesses (or inherent vulnerabilities)	Opportunities, Management practices or conditions of use
1) River flats	*Flat, loam soils with alluvial deposits, waterway running through and critical source areas present, exposed to NW wind, no artificial drainage*			
2) Hills	*Pallic soils – shallow top soil, Moderate slope hill country, erosion prone, contains critical source areas*			
3) Easy Hills	*Pallic soils – moderate top soil depth, pan at 40cm, gentle rolling hills, erosion prone, adjacent to waterway, critical source areas present*			
4) South-facing hill country	*Developed mudstone with clay plan present, moderate slope hill country, susceptible to erosion, soil holds moisture in summer and winter, contains 3 identified critical source areas*			
5) Woody Vegetation	*Pallic soils – shallow top soil, Moderate slope, erosion prone, critical source areas present, Fenced blocks of pine trees for production forest and regenerating native bush*			
6) Waterways and Wetlands	*Areas of waterways and wetlands that have been fenced and planted*			

Example OT3

Blank templates can be found in **Our Plan** section and at **beeflambnz.com/farmplan**

STEP 5 – Land Management Unit Assessment

Carrying out an assessment of the strengths and weaknesses of your land management units or land units can help you to manage your farm in a way that can make your farm more productive and minimise your environmental losses. Some land management units may have conditions of use, that help you to target the management of these areas. There may be other management actions you apply to a particular area based on its strengths or weaknesses or it may present a new opportunity you wish to consider.

- A **strength** is a favourable land quality, that may make it more productive, easy to use or have lower environmental risks.
- A **weakness** is a not-so-favourable quality and could cause decreased production or lead to environmental losses. You may sometimes hear these referred to as 'inherent vulnerabilities'
- A **condition of use** is a restriction you have on an area from a management perspective (for example, not grazed by cattle in winter, heavy stock excluded when soils too wet, no multiple-bearing ewes to lamb here). It is also possible to have no restrictions of use for an LMU, if appropriate. The conditions of use may consider things such as weather, climate, stock management, physical conditions, time of year etc.

What is defined as a strength or a weakness depends on the management purpose being considered. It is ok for a particular factor to be a strength in some situations and a weakness in others. For example, stoniness may be a weakness for cropping, but it may represent a strength for winter grazing of cattle (to avoid pugging).

Examples of possible strengths:

- Free draining
- Deep topsoil
- Good soil moisture-holding ability
- High natural fertility
- Good soil structure
- Balanced soil texture (e.g. loam)
- Resistant to pugging
- Well aerated
- Optimum P, K, S levels
- Optimum pH
- Flat land
- Naturally sheltered
- Warm aspect
- Stable (no erosion)
- New pasture
- Good pasture quality
- Well sheltered by trees
- Artificially drained
- Low insect risk
- Low in weeds
- Good stock access to water
- Good machinery access

Examples of possible weaknesses:

- Poorly drained
- Shallow topsoil
- Poor soil moisture-holding ability
- Low natural fertility
- Poor soil structure
- Too much clay or sandy
- Susceptible to pugging or compaction
- High water table
- High nutrient leaching
- High runoff risk
- Excessive stoniness
- Hot dry aspect
- Wet cold aspect
- Drought prone
- Erosion prone
- Flooding risk
- Low quality pasture
- Excessively steep
- Exposed
- Weeds or pests are a problem
- Lack of stock drinking water
- Small or fragmented
- Poor machinery access

Examples of possible management practices or conditions of use:

- Critical Source Areas not grazed
- Low or no till only, no cultivation
- Manage fertiliser applications to minimise leaching
- Conditions of use might include only use land unit:
  - when soil moisture not excessively high
  - for grazing sheep or lighter stock classes
  - during autumn and winter when not too wet
  - for low or no tillage or direct drilling
  - when conditions are dry
  - for restricted (short) duration grazing periods
  - for emergency feed or shelter only
  - for multiple-bearing ewes during lambing
  - with slow release fertiliser
  - for pasture, no cropping
  - for low intensity grazing

Example of possible opportunities

- Feed high priority livestock
- Finishing lambs
- Space plantings
- Grow higher ME forage mixes
- Alternative crops or land uses eg
  - Annual horticultural or arable crops
  - Perennial Horticultural crops
  - Crops for seed production
  - Native vegetation
  - Production forestry

Complete the Resource Chart for your LMUs

Complete the resource chart you started in Step 4 using **Template OT3** in "Our Plan". For each Land Management Unit outline its strengths, weaknesses and any opportunities, management practices or conditions of use. An example is provided below.

Resource Chart

Land Management Unit	Description	Strengths	Weaknesses (or inherent vulnerabilities)	Opportunities, Management practices or conditions of use
1) River flats	*Flat, loam soils with alluvial deposits, waterway running through and critical source areas present, exposed to NW wind, no artificial drainage*	· *Cultivatable* · *Good soil fertility* · *Good soil structure* · *Holds soil moisture*	· *Susceptible to pugging when wet* · *Minor flood risk* · *Limited shelter*	· *Cropping,* · *Feeding high priority livestock,* · *Finishing lambs and bulls (excluding heavy bulls when soil is prone to pugging)* · *Manage fertiliser applications to minimise leaching* · *Critical source areas not cropped*
2) Hills	*Pallic soils – shallow top soil, Moderate slope hill country, erosion prone, contains critical source areas*	· *Moderate fertility* · *Some shelter*	· *Erosion prone* · *Poor soil structure* · *First areas to dry out* · *High risk of runoff*	· *Space planting* · *No cropping* · *Suitable for breeding stock*
3) Easy Hills	*Pallic soils – moderate top soil depth, pan at 40cm, gentle rolling hills, erosion prone, adjacent to waterway, critical source areas present*	· *Easy contour* · *Holds summer soil moisture* · *Good summer growth* · *High natural fertility*	· *Some erosion present* · *Can be wet in winter* · *Risk of runoff*	· *Year round grazing* · *Can grow some higher ME forage mixes – low or no till options only*
4) South-facing hill country	*Developed mudstone with clay plan present, moderate slope hill country, susceptible to erosion, soil holds moisture in summer and winter, contains 3 identified critical source areas*	· *Good summer pasture growth* · *High natural fertility* · *Sheltered from prevailing North West wind*	· *Can pug in winter* · *Erosion prone* · *High runoff risk* · *Exposed to Southerly weather*	· *Year round grazing – except no cattle in winter or when soil moisture is high* · *Add space planted tress* · *Potentially lambing risk from Southerlies*
5) Woody Vegetation	*Pallic soils – shallow top soil, Moderate slope, erosion prone, critical source areas present, Fenced blocks of pine trees for production forest and regenerating native bush*	· *Aesthetics and biodiversity in native areas* · *Erosion control* · *Carbon sequestration* · *Alternative income source in future*	· *Habitat for pests* · *No longer part of farms grazable area* · *Pines are a monoculture*	· *Stock excluded* · *Pest Control required* · *Risks during harvest will be managed with a harvest management plan*
6) Waterways and Wetlands	*Areas of waterways and wetlands that have been fenced and planted*	· *Swimming hole for the family* · *Aesthetics* · *Biodiversity* · *Mahinga kai*	· *Habitat for pests* · *Weeds outcompeting native plantings*	· *Stock excluded* · *Weed and pest control required*

Blank templates can be found in **Our Plan** section and at **beeflambnz.com/farmplan**

Over time, as you acquire further information (such as by completing soil assessments) you will develop a better understanding each Land Management Unit. At any time, you may decide to define new Land Management Units or refine existing ones.

When you are defining or refining your land management units, and understanding their strengths, weaknesses and conditions of use, this is also a good time to look for opportunities that may be possible. The opportunities may increase your productivity, profitability, reduce workloads, increase efficiency or result in better environmental outcomes. These could be things such as utilising the area for a different purpose, or installing or moving infrastructure, such as fence lines, tracks or culverts, which may improve access, make stock management easier or improve stream health.

If you make any changes, make sure that they are documented and maps are updated to reflect this.

For further information please see:

beeflambnz.com/farmplan and the B+LNZ Knowledge Hub.

The other chapters in the B+LNZ Farm Plan: Environment Module are:

- Managing soil health
- Freshwater ecosystem health
- Integrating native biodiversity
- Responding to a changing climate
- Waste and Chemical management
- Forage cropping management

Glossary

Alluvial fan: A triangle-shaped deposit of gravel, sand, and even smaller pieces of sediment, such as silt.

Alluvial plain/River flat: An alluvial plain also known as river flat is a largely flat landform created by the deposition of sediment over a long period of time by one or more rivers coming from highland regions, from which alluvial soil forms.

Basin: A geological depression in the surrounding area.

Indigenous Biodiversity: Indigenous or native biodiversity means the living organisms that occur naturally in New Zealand, including indigenous flora, fauna, and fungi, and their habitats.

Carbon sink: Reservoirs that absorb and store more carbon than they release.

Creek: A creek is a stream that is usually smaller than a river.

Critical Source Area (CSA): Critical source areas are areas in a paddock or on a farm that can contribute to relatively large amounts of nutrient and sediment losses to waterways. They are a landscape feature such as a gully, swale, or a depression that accumulates runoff from adjacent land and delivers, or has the potential to deliver, one or more contaminants to one or more rivers, lakes, wetlands or drains, or their beds (regardless of whether there is any water in them at the time).

Critical source area management: To identify and manage the critical source areas from which nitrogen, phosphorus, sediment and pathogens are lost to waterways.

Dam: A dam is a barrier that stops or restricts the flow of water or underground streams.

Drain: The natural or artificial removal of a surface's water and sub-surface water from an area with excess of water.

Ecosystem health: Ecosystem health describes the physical, chemical and biological components of an ecosystem. Freshwater ecosystem health includes water quality, water quantity, habitat, aquatic life, and ecological processes.

Ecosystem services: Ecosystem services are the many and varied benefits to humans gifted by the natural environment and from healthy ecosystems.

Emissions Intensity: Reflects the emissions relative to a unit of activity or output. It is calculated by dividing total emissions by the amount of output (e.g. CO_2-e per kilogram of meat).

Ephemeral waterway: An overland waterway that flows intermittently.

Erosion: The process of removal or breakdown of surface material (e.g. soil or rock) by wind, water, frost or another natural agent.

Floodplain: A floodplain or flood plain or flood-plain is an area of land adjacent to a stream or river which stretches from the banks of its channel to the base of the enclosing valley walls, and which experiences flooding during periods of high discharge.

Forage crops: Annual or biennial crops, which are grown specifically to be grazed by livestock or conserved as hay or silage.

Glacial moraine: A glacially formed accumulation of unconsolidated glacial debris that occurs in both currently and formerly glaciated regions.

Global Warming Potential (GWP): GWP is a measure of how much energy a ton of a gas absorbs over time, compared to a ton of carbon dioxide (CO_2). This allows the various GHGs to be compared to each other as different gases differ in their ability to absorb energy (radiative forcing) and how long they stay in the atmosphere (lifetime).

Gorge: A deep cleft between escarpments or cliffs resulting from weathering and the erosive activity of a river over geologic time scales.

Greenhouse gases (GHG): A number of the gases in the atmosphere (such as carbon dioxide, methane and nitrous oxide) act like a blanket around the earth, trapping warmth from the sun.

Hill country: Land with slopes above 15° and located below an altitude of 1000m.

Inherent vulnerabilities: Means risks to freshwater and freshwater ecosystems from the biophysical features of land, including from irrigation and drainage.

Lake: A body of fresh water which is entirely or nearly surrounded by land.

Land use and grazing management: To manage and assess the appropriate land use and grazing management for specific areas on farm in order to maintain and improve the physical and biological condition of soils and minimise the diffuse discharges of contaminants.

Land Management Unit (LMU): Areas of land that can be farmed or managed in a similar way usually because of underlying physical similarities, your farm infrastructure, or your intended use.

Land Unit: Means an area of contiguous or non-contiguous land with similar biophysical features (as used in certified freshwater farm planning).

Land resource inventory (LRI): Inventory of five physical factors (rock, soil, slope, erosion type and severity, and vegetation) which is the basis of assessing land resources.

Land Use Capability (LUC): Systematic arrangement of different kinds of land, according to those properties that determine its capacity for long-term sustained production. “Capability” is used in the sense of suitability for productive use or uses after taking into account the physical limitations of the land.

Māhinga kai (food gathering): Species, natural habitats, materials and practices used for harvesting food, and places where food or resources are, or were, gathered.

Mountain land: A large landform that rises above the surrounding land in a limited area, usually in the form of a peak.

Natural capital: The world’s stock of natural resources, which includes geology, soils, air, water and all living organisms. Some natural capital assets provide people with free goods and services, often called ecosystem services.

Natural resources: Materials and components (something that can be used) that can be found within the environment. Includes land, water, air, soil, minerals, and energy, all forms of plants and animals (whether native to New Zealand or introduced).

Nationally Threatened Species: Means any species listed as “threatened” under the New Zealand Threat Classification System administered by the Department of Conservation (DOC). NZTCS

Overland flow: Where water is more likely to flow over the soil rather than into it, due to saturation of the soil or a physical barrier that restricts water penetration such as a compacted soil surface. May also be referred to as runoff.

Pond: A pond is an area filled with fresh water, either natural or artificial, that is smaller than a lake.

Pugging: The penetration of soil by hooves of grazing livestock, usually on wet soil that causes compaction of the soil and damages soil structure leading to less water infiltration.

Ridge tops: A geographical feature consisting of a chain of mountains or hills that form a continuous elevated crest for some distance.

Riparian management: To manage waterway margins to avoid damage to the bed and margins of a water body, avoid direct input of nutrients, and to maximise riparian margin nutrient filtering. Usually through excluding livestock and/or planting trees and shrubs.

River: A continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation or farm drainage canal). (source: RMA)

River bed: the space of land which the waters of the river cover at its fullest flow without overtopping its banks.

Rolling hills: Rolling hills are a series of low hills; rolling refers to the up-and-down motion of riding over them.

Scarp slope: A steep slope or long cliff that forms as a result of faulting or erosion and separates two relatively level areas having different elevations.

Significant Natural Area (SNA): A regulatory designation of natural areas that provide habitats for native plant and animal species, and provide ecosystem services to the region.

Soil management: To maintain or improve the physical and biological condition of soils in order to minimise the movement of sediment, phosphorus and other contaminants to waterways, and maximise the growing capacity of the soil resources.

Spring: A point at which water flows from an aquifer to the Earth's surface.

Spur: A lateral ridge or tongue of land descending from a hill, mountain or main crest of a ridge.

Steep land: Hill and mountain land greater than 20 degrees in slope.

Stream: A body of water with surface water flowing within the bed and banks of a channel.

Swale: A shady spot, or a sunken or marshy place.

Swamp: A forested wetland.

Terrace: A natural, flat surface that borders and lies above the floodplain of a stream or river.

Thriving Biodiversity and Healthy Ecosystems: Waterways support region appropriate diversity of flora and fauna, nutrient concentrations and habitat and life supporting qualities.

Valley floor: A low area between hills or mountains typically with a river running through it.

Visual Soil Assessment (VSA): A tool designed to assess soil state and quality quickly, reliably and cheaply on a paddock scale.

Water bodies: Any water body that continually contains water such as lakes, wetlands, estuaries, harbours, dams, or aquifers.

Waterway: Any waterway that continually contains flowing water such as rivers, streams, or open drains.

Wetland: Permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions. (source: RMA)

Wetland management: To manage wetlands to avoid damage to the margins, maximise filtering and flood control and support a healthy wetland or catchment ecosystem.

Please note that the definitions provided are intended to offer general guidance only. Other definitions may apply in certain circumstances particularly in different regulatory contexts.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