beef+lamb new zealand

Farm Plan Environment Module

Integrating native biodiversity

Chapter Overview

This chapter is broken down into 6 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 – Biodiversity Goals

Identify goals for native biodiversity on your farm and any that may apply for your wider catchment.

Template – BT1 Biodiversity Goals

STEP 2 – Identify Areas with Native Biodiversity Values

Update and review your farm map ensuring you have identified major areas of native vegetation and any areas identified as being of ecological significance by Local/ Regional Councils.

STEP 3 – Assess your Biodiversity

Provide an overview of your whole farms native biodiversity assets. Asses each area of native vegetation identified on your map using the assessment framework. You may also complete initial photo points and identify native animals and invertebrates.

Template BT2 – Farm Biodiversity Assessment – Whole Farm

Template BT3 – Farm Biodiversity Assessment – Individual Sites

Template BT4 - Photo-point Record Data Sheet

Template BT5 – Recording Sheet for Birds

Template BT6 – Recording sheet for native invertebrates, lizards and bats

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STEP 4 – Identify Risks, Opportunities and Management Actions

Identify possible risks and opportunities to native biodiversity and the factors contributing to the risk or enabling the opportunity. Assess the level of risk using the risk assessment matrix. Identify management actions that have been or could be taken. Table 3.1 provides guidance.

Template BT7 – Biodiversity Risks, Opportunities and Management Actions

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STEP 5 – Action Plan

Based on your goals (step 1) and building on the management actions identified in step 4, prioritise and record the actions that still need to be implemented.

Template BT8 – Biodiversity Action Plan

STEP 6 – Monitoring and Review

Establish a programme for regular, long-term monitoring of your native biodiversity assets and review of your biodiversity management plan.

Template BT9 – Biodiversity Monitoring Plan

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

Why is native biodiversity on your farm important?

There are many reasons why integrating native biodiversity into your farm system is important, both for your farm and more widely.

At a fundamental level, we can only support New Zealand's native biodiversity in New Zealand. It occurs nowhere else, and the biodiversity on your farm is different to that on other farms – each farmer is custodian to a unique complement of New Zealand's native biodiversity, Furthermore, sheep and beef farms are particularly important because they are often located in areas where there is little public conservation land such as reserves and most of the remaining native biodiversity in rural New Zealand occurs on farms.

Objective of this section

By completing this section you should be able to:

- Assess and map the native vegetation resources on your farm
- Understand how to further integrate native biodiversity into your farm system
- Learn about the benefits biodiversity provides to you, the environment and the wider community
- Complete a risk assessment and identify goals and actions to manage your biodiversity resources
- Establish ongoing monitoring of your biodiversity resources.

What information do you need?

- Farm map
- Protected natural areas reports
- Any information that might be available on biodiversity of your farm such as reports prepared by Councils, DOC, QEII or others.

STEP 1 – Biodiversity Goals

Identify your goals for integrating native biodiversity into your farming system

In relation to your long-term vision, values and goals identified in the introduction chapter, identify specific goals for native biodiversity on your farm. You may also have objectives that your Regional Council or Catchment have outlined which you need to address in your Farm Plan.

Biodiversity can have both direct and indirect benefits for your farm.

Some examples of direct benefits might include:

- Native trees/shrubs provide shade & shelter which are beneficial for animal welfare and may earn carbon credits
- Well managed native vegetation can help regulate water yield from higher catchments (e.g. in wetlands and ungrazed forest), which together with riparian plantings can help protect lower stream banks from erosion
- Native biodiversity can provide opportunities for alternative income sources such as tourism, sustainable timber harvest, honey etc
- Access to specific supply programmes or customers
- Having a biodiversity plan in place can enhance access to banking facilities and improve farm resale value

Some examples of indirect benefits might include:

- Adds aesthetic value to the farm making it a nicer place to work
- Opportunities for recreation by farm team (e.g. hunting)
- Forms part of the inter-generational story of the farm, preserving legacies from the past and stewardship for the future
- Benefit to the broader social licence to farm
- Protection or enhancement of habitat and native species

Some examples of goals you might have for biodiversity on your farm might include:

- To protect and enhance biodiversity assets on farm
- To reduce the impacts of plant and animal pests on native biodiversity
- Native biodiversity adds value to our farm business and provides an income stream
- Our farm contributes to biodiversity broadly across the catchment/region
- To have thriving biodiversity and native habitat on farm, as well as a profitable farm business
- To be able to enjoy hearing native birds on farm and see native plantings flourishing

Record your biodiversity goals and any goals or objectives your catchment or council has in relation to biodiversity in **Template BT1** in "Our Plan" an example is provided below.

Biodiversity Goals

Biodiversity Goals
· To protect and enhance biodiversity assets on farm and within my community *· To reduce the impacts of plant and animal pests on native biodiversity* *· Native biodiversity adds value to our farm business and provides an income stream*
Catchment Biodiversity Goals
· The local catchment group aims to remove all possums from the catchment by 2035 and then focus on the removal of stoats and ferrets. *· The local catchment group has a goal to improve riparian corridors linking bush blocks between farms by 2030*

Example

BT1

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

STEP 2 – Identify Areas with Native Biodiversity Values

Update and review your farm map

A useful place to start in identifying areas with native biodiversity values on your farm is to review your farm map. You may have completed this as part of Step 3: Farm Mapping in the Introduction chapter. Map the major areas of native vegetation and other areas that you think or know have biodiversity values such as:

- ☐ Patches of native bush or shrubland
- ☐ Wetlands and riparian strips with native species
- ☐ Tussock grassland (short or snow tussocks)
- ☐ Known locations for native fish, crayfish, lizards, birds etc
- ☐ Areas of exotic habitat that native species use (e.g. fruiting trees for birds)
- ☐ Significant Natural Areas (SNA) identified by a district or regional council

You could also use an aerial photo to help complete this. Number the areas you have identified for the individual site assessment you will carry out in Step 3.

It is also helpful to map adjacent areas of biodiversity on neighbouring properties (including on public conservation land) on the map of your farm. These areas can be important to your farms biodiversity for example as seed sources, for bird habitat or because the biodiversity on your farm helps support adjacent areas such as through an interconnected wetland.

There are a range of publicly available information sources that could hold information on biodiversity on your farm or in the wider area that you might want to consult.
These include:

- reports prepared through the Protected Natural Areas Programme (your local council should have copies of these)
- a range of scientific publications (e.g. natural history reports, scientific journals like New Zealand Journal of Botany, Notornis and New Zealand Journal of Ecology)
- publicly available databases like the National Vegetation Survey (NVS) database
- citizen science databases such as iNaturalist (a public data base that has maps of plant and animal species recorded throughout NZ)
- Regional and district councils may have also done surveys and hold information on your property either as reports or as map layers in their GIS systems.

Some examples of people you can consult with to help develop an understanding of what you have include:

- QEII National Trust representatives
- locals with biodiversity knowledge such as people in your catchment group, council staff or local plant nursery staff
- Or it might be that you consider employing an ecologist to assist.

Significant Natural Areas (SNA)

Almost all district and regional councils include criteria for assessing ecological significance in their plans (such as how representative the site is of broader ecological patterns, the diversity within the site, the presence of rare and distinctive species, and the ecological context of the site). Councils typically include rules around what farm management can be done in areas that meet these criteria (e.g. restricting vegetation clearance). It is important that you as a farmer are aware of any areas on your farm that have already been identified as significant or could potentially be considered as significant. Having this knowledge puts you in a much stronger position when it comes to discussions with Councils and others on how you can farm your land.

STEP 3 – Assess your Biodiversity

Understanding your native biodiversity resource

Biodiversity is the variety of all living things and ecosystems. It includes plants, animals, fungi and micro-organisms as well as the ecosystems (on land or in water) where they live. Native biodiversity in Aotearoa New Zealand is rich and unique. Many of our plants, birds, bats, insects, fungi, reptiles and fish occur only in New Zealand.

Changes in the use of our lands and waterways, invasive species, pollution, harvesting/ extraction and the rapidly increasing threat from climate change are all current threats to native biodiversity.

Biodiversity resources or assets can be identified on your farm at different scales, including larger areas of habitat (such as native bush block or wetlands) to individual species that are present on your farm (e.g. a rare plant or unusual animal). You may have species present that are regarded as rare, special or iconic species that require specific management or protection.

This step will help you describe the terrestrial biodiversity habitat assets (such as forest and shrubland remnants, wetlands, scattered native trees, matagouri scrub and tussock grassland) and the native species that occur on your farm. It will also help you assess their condition.

Knowing what biodiversity you have on your farm is invaluable for you, both to inform how you manage what you have, but also to enable you to have a more balanced discussion with Councils and Department of Conservation (DOC) about the values that are present and how they should be managed.

Knowledge is power but knowledge can also be empowering.

There is no requirement for you to share any information you obtain from undertaking a biodiversity assessment on your farm with Councils or government agencies such as DOC – this is your information. If you engage an independent ecologist they will be working for you and their information also stays with you.

Whole Farm Biodiversity Assessment

Record a brief description of the biodiversity found on your farm including a general overview of vegetation and any general trends including in native birds or animal pests and weeds. You may also like to include notes on any adjacent areas of biodiversity.
Complete **Template BT2** in the "Our Plan" section. Example provided below.

Farm Biodiversity Assessment – Whole Farm

Brief description of the biodiversity on your farm and any general trends
Vegetation *There is a 10ha regenerating forest block that has been fenced to exclude stock and part of QE11 since 1993.* *There is scattered native scrub in several gullies and on hillsides. These areas are not stock excluded* *Many areas of native plantings have been done over the last 20 years with ongoing planting occurring most years.* ***Native birds and animals*** *Bellbirds, fantail, kereru are all seen regularly and numbers seem stable.* *Tuis used to come to the kowhai trees, none seen for last 2 years.* *Kereru seen over summer in flocks of 10-20, I think the flocks used to be bigger when I was younger.* *Seem to come back regularly. 1-2 birds seen regularly around the house block most of the year.* *No falcon seen- several Harrier Hawk though.* *Occasional Ruru (Morepork) heard at night.* *Other smaller birds present in bush in good numbers.* ***Animal pests and weeds*** *Possum numbers high until recently when possum control work was carried out by contractors.* *Stoats -see them around occasionally. Have been trapping for them around the house block. Catchment group project to do some stoat trapping on the properties in the area.* *Spraying near top bush block has reduced gorse. Will keep spray programme going next year.* *Spotlighting for rabbits and hares, still in reasonable numbers.* *Pigs and goats on decline, not as many as previous years, controlling though shooting, but still lots of deer moving through the wider landscape.*
Notes on adjacent areas of biodiversity
Neighbours on western boundary and other neighbour on southern boundary share native forest area that continues from our place. The total area of the native block is approximately 130ha over the 3 properties. *There is a scenic reserve managed by DOC that is 2km from our property boundary and has native bush.* *Neighbours 3km further down the road have a large native bush block.* *Rivers going through several properties have riparian areas that are being planted in natives as part of catchment group project.*

Example

BT2

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

Individual Site Biodiversity Assessment

An assessment framework has been developed that allows you to classify the native vegetation present even if you do not know the species present. It is based on:

- The vegetation type (growth form) of the dominant plants (forest, shrubland, grassland, wetland)
- Their origin (remnant of the original pre-human vegetation or regenerating after past farming or planted)
- How complete the canopy cover is (continuous or scattered).

More information on the framework and examples of its application are included in the further reading section and the end of this chapter.

For each area of native vegetation you named or numbered on your farm map or aerial photo in Step 2 complete an Individual Site Assessment. This will most likely require you to walk through the patch to fill the information in. You should also consider setting up your photo-point monitoring sites at the same time.

Template BT3 provides a template for the Individual Site Assessment. It can be found in "Our Plan" or downloaded from **beeflambnz.com/farmplan**. The detail provided will depend on the ecological information available, but the following should, where possible, be addressed:

- Area (ha)
- Topography (type of country- for example gully, slopes, aspects, altitude etc)
- Vegetation type
  - Forest (e.g. beech, tōtara, kahikatea, mixed podocarp-broadleaved, kauri)
  - Wetland (e.g. flax, raupo, sedges, saltmarsh)
  - Shrubland (e.g. kānuka, mānuka, matagouri, tauhinu)
  - Grassland (e.g. snow tussocks, short tussocks)
  - Other (e.g. rock bluff, scree slope)
- Origin of the vegetation:
  - Original (remnant of the original or pre-human vegetation, no matter how modified)
  - Regenerating (vegetation that has regenerated on previously farmed paddocks such as kānuka shrubland or young tōtara and kahikatea forest)
  - Deliberately planted (e.g. riparian plantings)
- Canopy cover
  - Continuous (>70% canopy cover – largely intact native vegetation)
  - Scattered (15-70% canopy cover – native vegetation is scattered through pasture)
- Dominant plants if known by layers (canopy, understorey, ground)
- Rare plant species if known
- Native birds
- Other native animals where you know this e.g. lizards (skinks and geckos), fish (eels, whitebait, bullies etc), invertebrates (butterflies, snails, weta etc) and other fauna (e.g. bats)
- Vegetation condition (Canopy and understory; any evidence of dieback, has it been browsed out, and possible causes (deer, possums, herbicide, rabbits/hares etc), any fire impact or evidence of harvesting)
- Hydrological changes – e.g. straightening up of streams, damming etc
- Presence and condition of fencing
- Exotic animals – seen or signs of (carnivores such as stoats, cats, rats, or herbivores and omnivores such as deer, possums, pigs, goats)
- Weeds – presence and abundance and severity of infestation (woody, vines, herbaceous)
- Human influence – conservation management, rubbish, trampling damage etc
- Distance to other native areas- important for seed source and allowing animals to move in or out
- Any formal protection (e.g. QEII covenants)

Photo-Point Monitoring

Photo-points provide a relatively simple and objective tool for tracking change in native vegetation on a farm through time. Although photo-points can't provide detailed information on all the plant species present, photo-points are ideal for assessing the broad effects of your management (e.g. stocking pattern or fencing) on native vegetation cover and hence on native biodiversity. As such, they are very useful for helping you review your biodiversity management and for showing others the changes that have resulted from your management.

Some key points to remember:

- **Permanently mark photo points** - This ensures photos are always taken form the same place – best done using a metal standard driven into the ground as fences, buildings and trees can be moved
- **Take original photos along with you when repeating photos** - Essential to ensure that the same view is photographed each time (eg angle, inclusion of key features etc) Having a camera with the ability to zoom is helpful to make sure that the area captured in the image is the same each year
- **Take photos at the same time of year** - Photos are usually best taken in early summer (Nov – Dec) after the spring growth flush but before the vegetation starts to brown off through the heat and dry of summer. This reduces seasonality differences
- **Develop a series of photos over several years** - A single unusual season can result in misleading results so building up a sequence of images over several years avoids this

You should consider establishing a photo-point for each area of biodiversity on your farm. You may also like to establish them in other areas to monitor landscape changes over time.
If you are fencing off forest remnants, photo-points taken inside the forest can be a really useful way to track how the forest understorey and ground vegetation responds to removal of grazing pressure. **Template BT4** in "Our Plan" provides a recording sheet for the information relating to your photo-points. You can find out more and see some examples in the further reading section at the end of this chapter.

Identify individual species on farm (Optional)

More detailed information on biodiversity can be collected by identifying individual plant and animal species on your property. Some species may be iconic such as the kiwi or native falcon/kārearea, or distinctive of your region (for example kauri and pōhutukawa in the northern North Island, and tree daisies in Otago). Others may hold cultural significance or be important indicator species. Often whether these species are present or not, and their abundance can give an indication of overall ecosystem health or biodiversity. Knowing what is present can also help you prioritise your actions to protect their habitat or control for specific pests and weeds.

Identification Resources

Identifying individual species requires a degree of knowledge, that not everyone has. There are a range of resources available that can help you identify the native species present on your farm including:

- iNaturalist (community based public data base that has maps of plant and animal species recorded throughout NZ, you can upload pictures and the community will help you identify them). However, be aware, that unless you specifically unselect the locational information, the location of the species will be publicly available.
- Plant, bird, reptile ID web sites and phone apps such as: NZ Plant Conservation Network, NZ Birds Online or Department of Conservation website.
- Resources may be available from local libraries, schools, QEII National Trust, Department of Conservation, local and regional councils, plant nurseries, NZ Landcare Trust or catchment groups.
- Ecologist or others with specialist knowledge.

More information can be found in the further reading section at the end of this chapter and links can be found at **beeflambnz.com/farmplan**

Environmental DNA

Environmental DNA, or eDNA, refers to all the tiny traces of genetic material that is left behind as living things pass through water or soil. By collecting this discarded DNA and sequencing it, you can get a picture of the plants and animals in an area. It is a tool increasing in popularity as a way to quickly scan environments to detect change, monitor biosecurity threats, and better understand and track fluctuations in ecosystem health. The analysis can identify thousands of species of fish, macroinvertebrates, birds, mammals, reptiles, amphibians, plants, fungi, protists, bacteria, and other organisms from a cup or two of water.

In terms of on-farm native biodiversity, eDNA is most informative about what is in streams and wetlands, and less so about terrestrial habitats. A link to find out more and order sampling kits can be found at **beeflambnz.com/farmplan**

Identifying Birds

You may already have an idea of what birdlife there is on your farm. Start building a list of species that are present. Birds are very mobile and may be present occasionally or seasonally in particular areas throughout the year. If you are unsure of species, try to take a picture if possible but this is often challenging with birds. Some companies are now also able to take an acoustic recording and use AI to identify the bird calls. **Template BT5** in "Our Plan" provides a recording sheet for birds.

Identifying other native animals

There may also be other animals present like lizards, bats and of course terrestrial invertebrates (weta, beetles, snails etc). These animals typically don't move as far as birds, however they can be easier to see at various times of the year, often during warmer months.

Most freshwater fish in New Zealand are nocturnal, so red-light spotlighting at night is a great way to see what you might have. You may also have identified a range of invertebrate species that are present in waterways on your farm when doing your Waterway Assessment in the Freshwater section or from results of eDNA. **Template BT6** in "Our Plan" provides a Recording Sheet for Native Invertebrates, Lizards and Bats

STEP 4 – Identify Risks, Opportunities and Management Actions

Risk and Opportunity Identification

A range of factors can threaten native biodiversity on farms or create opportunities. There may also be a number of constraints on your ability to manage biodiversity. The focus of this part of the plan is identifying the risks that might be affecting your biodiversity as well as what opportunities exist, now or in the future

Now that you have an understanding of what biodiversity assets you have on your property consider what risks, threats or opportunities might be present. **Table 3.1** identifies some of the common risks and opportunities, impacts, benefits and potential contributing factors related to native biodiversity. You can use this for ideas when completing **Template BT7** in "Our Plan" for your own farm business. An example is provided after Table 3.1. There is also space in the template to add other risks or opportunities that you identify.

Risk Assessment Matrix

Likelihood	Consequence		
	Slight	Serious	Major
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

Risk Assessment

For each factor contributing to risk identified, use the Risk Assessment Matrix to assess the likelihood and consequence and determine if the risk level is high, medium or low. The risk level can then be recorded in **Template BT7** in "Our Plan". This will help you to target and prioritise your management actions.

Management Actions

The final column in **Table 3.1** provides examples of some possible management actions that could be taken to manage the various risks, threats or opportunities identified. Identify management actions that have or could be taken to protect or enhance biodiversity assets on your farm. This will inform your action plan.

In addition to the examples provided in Table 3.1 some other general considerations for native biodiversity include:

- Active (planting and seeding) and passive (natural regeneration) restoration of native habitat.
- Plant and animal pest control
- Use native biodiversity for economic returns (e.g. honey)
- Increase native biodiversity by incorporating native plants in shelterbelts, erosion plantings, homestead gardens etc.
- Covenant key biodiversity areas (e.g. QEII National Trust).

Then for each management action categorise it as: completed, ongoing or new.

- Completed actions require no ongoing implementation, you may like to note the location if applicable.
- Ongoing actions are actions you are currently doing or have done and need to continue doing into the future.
- New actions are those you plan to start.

Record your management actions and if they are completed, ongoing or new in **Template BT7** in "Our Plan". An example is provided after Table 3.1.

Table 3.1 Risks, Opportunities and Management Options for Native Biodiversity

Risk or opportunity	Impact or benefit	Some potential factors contributing to risk or enabling opportunity	Examples of possible management actions
Risks			
Loss of remnant areas	Ongoing loss of areas of native vegetation reduces the amount of habitat available	• Grazing of native vegetation by livestock and/or pest animals • Smothering by weeds • Clearing of native vegetation • Fires or burning • Lack of fencing	• Fencing or stock exclusion to prevent gazing by livestock and/or rabbits and/or feral animals such as deer & goats (allows for regeneration and provides protection for restoration plantings) • Remove weeds that threaten the native vegetation (e.g. old man's beard or wandering willy) • Retain and don't clear native vegetation • Additional planting – enrichment and/or restoration – to increase area of native habitat and bring back locally absent species • Weed and pest control • Have appropriate fire control and suppression plans in place for your property
Isolation of remnant areas	Due to habitat loss, remnants are isolated which can be a major barrier for native species to move between remnants or recolonise if they go locally extinct	• Grazing of native vegetation by livestock and/or pest animals • Smothering by weeds • Clearing of native vegetation • Lack of fencing • Lack of connecting biodiversity corridors	• Planting (including enrichment planting) - to increase area of native habitat, help reconnect areas and bring back locally absent species • Providing key food resources for birds (can use exotic plantings) • Enhancing nesting opportunities (nest boxes) - allows some native birds to be able to nest free of predation pressure (e.g. ruru/morepork). • Weed and pest control • Fencing or stock exclusion to prevent grazing by livestock and/or rabbits and/or feral animals such as deer & goats (allows for regeneration and provides protection for restoration plantings) • Retain and don't clear native vegetation
Managing scattered trees or shrubs	Enhance native habitat across the farm while providing shade and shelter for livestock	• Protection of significant trees or shrubs from stock and pests	• Managing scattered trees or shrubs across paddocks for shade and shelter (tōtara, kānuka, matagouri, tussocks etc.) • Control plant and animal pest species • Manage grazing densities to not degrade scattered native vegetation • Allow for good establishment of new plantings • Where appropriate use a local source of seeds or seedlings (eco- sourcing) • Protect tree trunks and foliage from livestock damage e.g. sleeves or trunk protectors • Make sure that plants are non-toxic to stock
External effects from adjacent land	Activities in areas adjacent to remnants (e.g. land-use, herbicide, fire, pests) can adversely impact remnants	• Spray drift from neighbouring land • Land use change or lack of plant and animal pest control could cause an increase in weeds or animal pests that spread over the boundary • Regional plant and animal pest management plans or strategies	• Be aware of activity in surrounding areas both on your farm and on adjacent properties • Maintain communication with neighbours discuss any negative impacts or potential areas for collaboration
Introduced herbivores (deer, goats, pigs, possums, hares, rabbits)	Damage forest understorey and grasslands and prevent regeneration	• Number of herbivores present • Amount of pest control done • Activity on land or surrounding land • Regional control strategies or funding sources	• Feral animal control (shooting and/or traps), can consider additional hunter access or using contractors • Possum control (traps and/or baits) • Predator control (traps and/or baits) • Liaise with neighbours to coordinate management
Introduced carnivores (stoats, cats, rodents, possums etc)	Predators kill native animals especially birds and reptiles	• Number of predators present • Amount of pest control done • Activity on land or surrounding land • Regional control strategies or funding sources	• Feral animal control (shooting and/or traps) • Possum control (traps and/or baits) • Predator control (traps and/or baits) • Liaise with neighbours to coordinate management
Weeds (wilding conifers, willow, hawthorn, old man's beard, blackberry etc)	Weeds smother native vegetation and prevent native plants from regenerating	• Type and location of weeds • Access to site for control • Regional control strategies or funding sources	• Weed control – manual removal, spraying or biological control– approach will depend on the weed type and situation • Liaise with neighbours to coordinate management

Table 3.1 Risks, Opportunities and Management Options for Native Biodiversity *continued*

Risk or opportunity	Impact or benefit	Some potential factors contributing to risk or enabling opportunity	Examples of possible management actions
Climate change	As conditions become more extreme (droughts, flash floods etc) native plants and animals are impacted through habitat loss and impact on food supply. Changes in distribution or prevalence of pest and weed species and diseases	• Current climate conditions • Changes in seasonal and longer-term climate and weather patterns • Topographic features • Vegetation types present	• Pest and disease management • Understand the expected climate changes in your area and the associated risks on your farm • Putting in place a plan for adapting of being more resilient to climate variations and extreme events • Have suitable types of vegetation in the appropriate places on your farm that can tolerate the conditions
Poor plant survival	Poor survival of newly established plantings due to lack of suitable protection from animals, insufficient root structure, drought or dry conditions, competition from weeds	• Timing of planting • Types of species planted • Lack of moisture • Pests and weeds	• Make sure that plants are planted at a time of year that gives them the best chance of establishment and survival • Select appropriate plant species for the site that can tolerate the conditions • Keep plants protected from stock and pests • Where possible control weeds to allow for good growth • Make sure plants will not dry out too much especially until they are established
Opportunities			
Sustainable native timber production	Sustainable timber production can provide an income source along with habitat for native species. The income may be used to offset or fund the cost of management of the forest and plant and animal pest control.	• Existing areas of native forest that can be harvested sustainably such as tōtara • Suitable areas that could be planted such as non-productive areas • Suitable time and capital investment available • Access to suitable expertise on plant requirements and management • Long term vision and outlook	• Manage native species such as beech or tōtara for sustainable timber production under an MPI sustainable management plan or permit • Continue forest management and weed and pest control • Plant species suitable to your particular areas that will grow effectively • Understand the growing requirements for the species your plant
Mānuka honey	Mānuka acts as a long-term nursery crop for native forest regeneration and adding bees to make mānuka honey can provide an economic return for many years.	• Having less productive areas to plant or enable regeneration • Quality and density of mānuka impacts on honey quality and potential income • Having beekeepers available • Suitable climate	• Establish mānuka or allow to regenerate in appropriate areas • Work with a bee keeper on honey production • Understand the growing conditions required for good honey production • Weed management plan in place
Wetland planting	Wetland planting can absorb additional nutrients and act as a sediment trap and enhance freshwater ecosystem health while contributing to enhanced biodiversity. Wetlands can also slow the flow of water into lower parts of catchments, thus ameliorating the impacts of severe storm events like tropical cyclones.	• Suitable areas available for wetland planting • Appropriate plant species available in suitable quantities for planting • Catchment scale initiatives	• Use native species suitable for wetlands in your area • Consider establishment of new areas or enhance existing areas and link with your freshwater management plan • Try to use locally sourced seeds or plants where possible • Join a local community or catchment group
Native species in shelterbelts	Provides additional habitat for native species and aesthetic values as well as shade and shelter	• Local sources of suitable plants • Suitable fencing or stock exclusion or protection • Can have co benefits for providing habitat for native or beneficial insects • Provide good shelter and shade for livestock • Access to suitable source of plants or seeds	• Consider using suitable native species as part of new shelterbelts or in enhancing existing shelter belts • Check that the species you plant are not toxic to livestock • Plant appropriate species that grow to the right height, size and density • Make sure that there is suitable protection from livestock and pests.

Biodiversity Risks, Opportunities and Management Actions

Risks and Opportunities	Factors contributing to risk or enabling opportunity	Risk level	Management Actions	Action completed, ongoing or new
Loss and isolation of remnant area	*Top Bush block not fenced*	*Medium*	*Will fence top block to stop access from cattle to the native bush area.*	*New*
Loss and isolation of remnant area	*Scrub clearing on neighbouring areas to Top bush block*	*Low*	*Some scrub areas to be left and not cleared*	*Ongoing*
Introduced plant and animal species	*Pigs and possums*	*Medium*	*Start shooting more pigs and allow some pig hunters access.* *Control of possums by pest contractors*	*New* *Ongoing*
Mānuka Honey production	*Existing dense mānuka block*		*Talk to local beekeeper about suitable hive locations*	*New*
Climate Change	*Change in climate leading to more pests and diseases*	*Medium*	*Create a plan for pest and diseases management*	*New*
Establish a flax/ harakeke shelter belt	*Provide shelter and shade for livestock*		*Establish a flax/harakeke shelter belt to provide shelter for livestock*	*New*

Example

BT7

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

STEP 5 – Develop Action Plan

Based on your goals (step 1) and building on the management actions identified in step 4, Template BT7, Risk Assessment and Management Actions, document a Biodiversity Action Plan to protect and enhance your biodiversity assets. This should include details of those actions that still need to be implemented. You may also identify new areas to develop such as wetlands or new shelterbelts or want to complete the same action in multiple locations.

It is important to prioritise your action plan as not everything is able to be achieved at once due to both resource requirements (time and money) and the multi stage nature of some actions (eg reticulating water before stock can be excluded from a stream that is the only water source).

Some factors to consider when prioritising actions include:
- The biodiversity values habitats, and species present on your farm.
- The likelihood of achieving the biodiversity outcome.
- The cost of implementing the action and the resources you have available to do this. This should include people and time as well as money. Also, consider the initial and long-term costs.
- How the action might impact other aspects of your farming operation.
- Regulatory requirements that affect biodiversity.
- What you as the owners or managers feel passionate about.

There is additional guidance on each of these in the further reading section at the end of this chapter.

Include the action to be taken along with its location, priority, assigning a timeframe, cost and a person responsible. Record your Biodiversity Action Plan in **Template BT8** in "Our Plan". An example is provided below.

Biodiversity Action Plan

Action	**Location,** Land Management Unit or paddock	**Priority** (Low, Medium, High)	**Planned Timeframe**	**Costs**	**Person responsible** and others involved	Date completed and evidence of completion
Will fence top block to stop access from cattle to the native bush area.	*Top block*	*High*	*Start fencing Nov 2021*	*$25k plus future maintenance*	*Manager and fencing contractor*	
Start shooting more pigs and allow some pig hunters access.	*Whole farm*	*Medium*	*From May 2021*	*Minimal*	*Manager and hunters*	
Control of possums by pest contractors	*Whole farm*	*Medium*	*From June 2021*	*$10k per annum*	*Manager and contractors*	
Create a plan for pest and disease management	*Whole farm*	*Medium*	*October 2021*	*Time only for development*	*Manager*	
Talk to local beekeeper about suitable hive locations for mānuka honey production	*Hill block*	*Medium*	*Before spring 2022*	*NA initially*	*Manager and beekeeper*	
Establish and fence a flax/harakeke shelter belt to provide shelter for livestock	*Flats*	*Medium*	*July 2022*	*$12k plus ongoing maintenance*	*Manager*	

Example

BT8

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

STEP 6 – Monitoring and Review

Long-term monitoring of your biodiversity is important as many changes can take a long time to be visible. You may not see changes in your monitoring for some time but tools such as Photo-points are a useful to observe small changes.

Key principles that underpin biodiversity monitoring include:

- Address clear questions that relate to goals – being clear about the questions that monitoring is addressing is key to effective management. These need to relate to your goals so that you can develop the appropriate management and monitoring methods.
- Only monitor when necessary – monitoring can be time and resource intensive and needs to focus on the key issue(s) of interest.
- Use repeatable and simple (but appropriate) methods and be consistent with place, time and method – simple methods are usually easier to repeat than complex methods and are likely to be less sensitive to equipment changes than complex methods.
- Keep the time of year monitoring is undertaken the same – this is important to avoid seasonal variations.
- Choosing appropriate variables to monitor – the indicator chosen needs to be appropriate for answering the question being asked and should focus on biodiversity outcomes (e.g. canopy cover) rather than pressures on biodiversity (e.g. deer or possum numbers).
- Choosing the right scale to monitor – monitoring needs to be undertaken at a scale that is appropriate to the question. For example, one-off stream chemistry measurements will not provide an assessment of overall stream and catchment health.
- Monitoring should show change or lack thereof over time-frames that are relevant to management.
- Monitoring should inform your management which needs to be adaptive and provide assurance on the condition of native biodiversity to others (markets, regulators, stakeholders)
- Clearly and accurately document what you monitor. Find and utilise a simple and easy way to store all the information that you collect so it can be referred to, tracked and repeated.

It is recommended that you carry out annual photo point monitoring. You may have set up initial photo points as part of your individual site assessment in step 3. More information and examples are available in the further reading section at the end of this chapter but don't forget to:

- Permanently mark photo points
- Take original photos along with you when repeating photos
- Take photos at the same time of year
- Develop a series of photos over several years

You may also wish to carry out some form of monitoring of individual native animals such as birds (annually and throughout the year), fish, macroinvertebrates, lizards and bats (throughout the year as they are sited). Further detail on monitoring approaches for these can be found in further reading section at the end of this chapter.

Set out your Biodiversity Monitoring Plan in **Template BT9** in "Our Plan". An example is provided below.

Biodiversity Monitoring Plan

Site Name	Assessment type	Person Responsible	Monitoring Frequency	Assessment Due Date				
Upper flats	*Photo point monitoring*	*Manager*	*Annual*	*Nov 2022*	*Nov 2023*	*Nov 2024*	*Nov 2025*	*Nov 2026*

Example

BT9

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

Review

At least annually you should reflect on and review your Biodiversity Plan to ensure it remains a living document. After you have completed monitoring or assessments and/or when farm plans and budgets are being set for the next year can be good times to do this.

Some things you might want to consider:

- Has there been any changes to the surrounding areas?
- Are there any new rules, regulations or market requirements to be met?
- Review your monitoring and assessment results
- Review your goals and progress towards them
- How is your action plan progressing, is it still fit for purpose and achievable? Are any additional actions required?
- Adapt what you are doing based on what you have learnt

Further Reading - Integrating native biodiversity

B+LNZ would like to acknowledge the contribution of Professor David Norton to the material in this chapter and for the provision of the images in Figures 3.1-3.8.

Vegetation assessment framework and examples

The native biodiversity on your farm comprises the different native vegetation types and the native plants and animals that occur in them. This guidance will help you name or classify what native vegetation is present in different patches on your farm.

It is important to have some knowledge of the different vegetation types present on your farm to guide management in and around this. An ecologist would establish plots in native vegetation patches, recording information on the different species present and their abundance, as a basis for describing vegetation. As this is not usually possible for an individual farmer, the following framework has been designed as a simple tool to help you describe and map native vegetation types present on your farm without needing to know all of the species present, although knowing dominant plants can add value to your descriptions.

The framework is based on a three-level classification reflecting:

- The type of vegetation (growth form) present
- Origin of vegetation
- Canopy condition - if cover is continuous or scattered

The type of native vegetation present:

- Forest (e.g. beech, tōtara, kahikatea, mixed podocarp-broadleaved, kauri)
- Wetland (e.g. flax, raupo, sedges, saltmarsh)
- Shrubland (e.g. kānuka, mānuka, matagouri, tauhinu)
- Grassland (e.g. snow tussocks, short tussocks)
- Other (e.g. rock bluff, scree slope)

The pre-human vegetation that occurred in those parts of New Zealand that are used for pastoral farming today was predominantly forest or wetland. Natural shrublands would have been of limited extent (exposed coastal sites, recent river floodplains, rocky areas etc) while natural grasslands were largely restricted to above the alpine tree line. With human deforestation, shrubland expanded into areas that were previously forested, while grasslands also expanded especially in the South Island.

Overlap between vegetation types does of course occur, especially between shrubland and forest, where some shrubland communities (e.g. kānuka and mānuka) can be transitional to forest. In some situations, mixed communities can also be common (e.g. forest/shrubland or grassland/shrubland mixtures). In these cases, you can either refer to the predominant vegetation type or note that it is mixed.

The origin of the vegetation:

- Original (remnant of the original or pre-human vegetation, no matter how modified)
- Regenerating (vegetation that has regenerated on previously farmed paddocks such as kānuka shrubland or young tōtara and kahikatea forest)
- Deliberately planted (e.g. riparian plantings)

The origin of the current vegetation is important as remnants of the original native forest and wetland, no matter how modified (e.g. through past logging or grazing), are significant as they represent what used to be present across your farm. As well as being of immense value in themselves, such remnants and their soils contain propagules (seeds, or spores) of plants and animals that can disperse out and recolonise regenerating and planted sites (seeds, fungi, insects etc).

New Zealand farms also have large areas of regenerating native vegetation, mainly shrubland and forest, which has established on sites that were previously grazed. This vegetation is also important because if managed properly, it will develop into mature forest similar to what would have been there in the past. Regenerating vegetation is critical for enhancing connectivity across the landscape for mobile species like birds as well as increasing the total area of native habitat present.

Canopy condition:

- Continuous (>70% canopy cover – largely intact native vegetation)
- Scattered (15-70% canopy cover – native vegetation is scattered through pasture)

In many situations, native vegetation is not continuous and occurs scattered through the pasture matrix (e.g. tōtara trees scattered across farmland or short tussocks scattered through pasture). Scattered or diffuse native vegetation still has important biodiversity values (e.g. birds using paddock tōtara or kahikatea) and can also be very important for farming (as shade and shelter). Mapping scattered native vegetation is important for planning farm management.

There will be instances where exotic species occur in mixtures with natives (e.g. gorse shrubland with mahoe or five-finger regeneration coming up through it) and these can also be mapped using the system described here. It is also possible to map exotic woody vegetation like forest and shrubland where planted and regenerating examples can be readily distinguished (e.g. farm woodlot or gorse and broom shrubland).

When you come to map the different patches of native vegetation on your farm, you can supplement the descriptions derived from the framework outlined here with the names of dominant species that you know. This provides further information on what you have. Examples might be a continuous tawa-rimu original forest, scattered regenerating tōtara forest, continuous regenerating kānuka shrubland, or scattered regenerating short tussock grassland.

Examples of how classification works

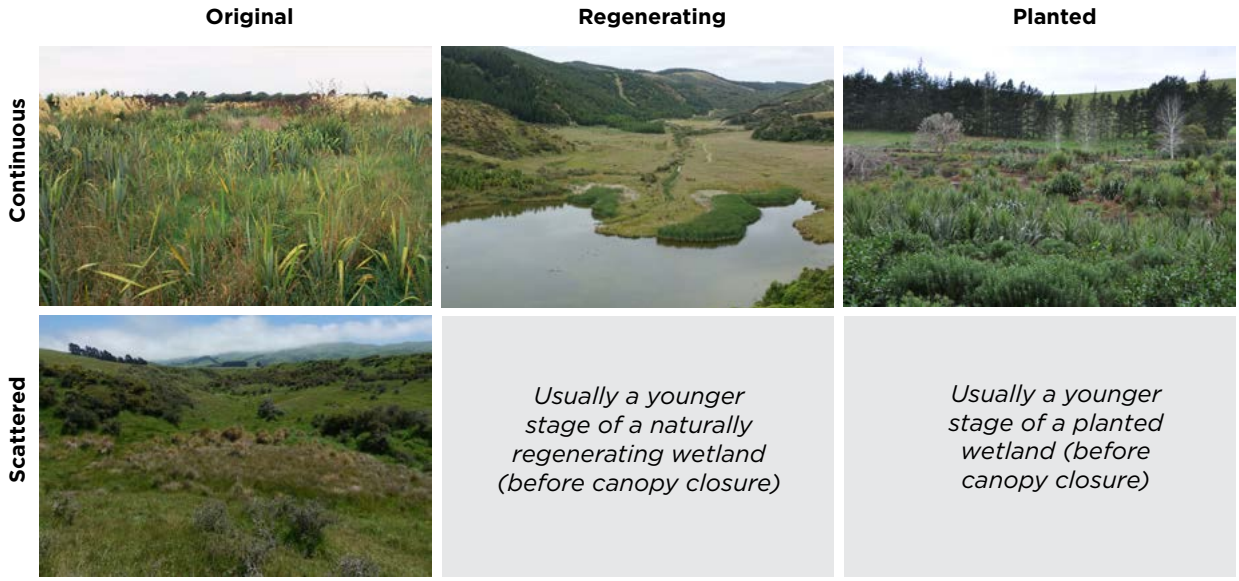
The following examples illustrate how the classification can be applied. The primary focus here is on forest and wetland as this would have been the predominant native vegetation across pastoral farms before human clearance. Furthermore, active management of regenerating native vegetation like kānuka and mānuka and restoration plantings also usually aim to restore forest and wetland.

Figure 3.1 Forest vegetation

The examples in the above photos are described as:

- Original continuous – a cutover stand of podocarp-broadleaved forest that would have been dominated by rimu, tōtara, kaihikatea etc over a canopy of broadleaved trees, but after historic logging is now dominated by tawa, rewarewa, hinau etc and is typical of much North Island remnant forest (King Country).
- Original scattered – black beech forest that has been partially cleared but still retains standing mature beech trees growing in a pasture mix (Canterbury).
- Regenerating continuous – a mixed stand of kānuka and tōtara on a site that was previously pasture (Northland).
- Regenerating scattered – scattered tōtara through paddocks (King Country).
- Planted continuous – mixed-species forest restoration planting (Canterbury).

Figure 3.2 Wetland vegetation



The examples in the above photos are described as:

- Original continuous – flax/harakeke wetland with a minor shrubland component (Canterbury).
- Original scattered – scattered plants of purei (Carex secta) in a narrow wetland now largely invaded by exotic grasses and sedges (Canterbury).
- Regenerating continuous – raupo establishing around the edge of an artificial pond (Canterbury).
- Planted continuous – wetland restoration with ti kouka, harakeke and purei (Northland).

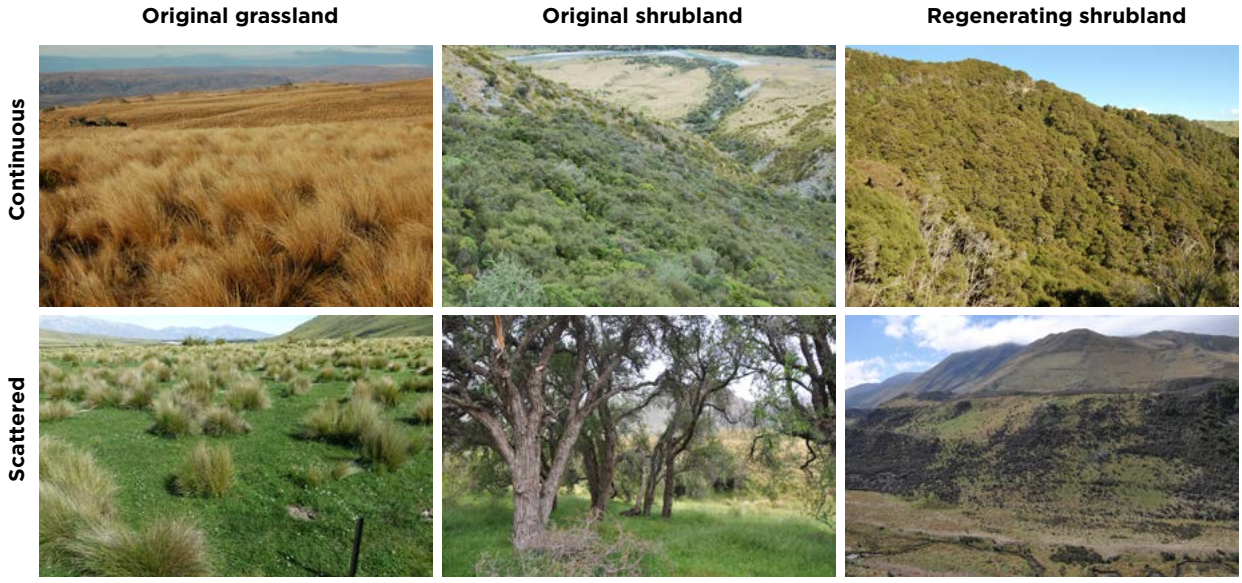
Wetlands although of minor extent in the modern landscape are really critical for both their native biodiversity and as filters for runoff from paddocks. Most wetlands occur in sites that would have always supported wetlands. Remnants of original wetlands are still widespread but can be isolated and usually lack their original marginal woody vegetation. However, many wetlands have been invaded by exotic grasses, sedges and rushes, often because of drainage, and only scattered native wetland plants remain. In some cases, native wetland plants are regenerating in sites where they previously didn't occur such as damp paddocks or artificial ponds.

Figure 3.3 Other Vegetation Types

For other vegetation types (grassland, shrubland, rock bluffs etc) the framework discussed here doesn't work as well as only a subset of the different combinations occurs.

Native grassland on pastoral farms is largely restricted to the South Island and is mainly dominated by either snow tussocks (including red tussock) or short tussocks (hard tussock and silver tussock). Although many of these grasslands have been induced by early Māori burning, they are best regarded as original in terms of the framework discussed here.

In some parts of New Zealand there are original shrublands on farms, examples include shrublands on recent alluvial surfaces, in frost flats or on sand dunes and exposed coastal cliffs. However, most shrublands are either regenerating back to forest (as discussed above) or because of lack of seed sources and management history (especially over-sowing and top-dressing) are less likely to revert to forest – examples include matagouri and tauhinu shrubland and can be mapped as shrubland.



The examples in the above photos are described as:

- Original continuous grassland – snow tussock grassland (Canterbury).
- Original scattered grassland – silver tussocks in a pasture matrix (Canterbury).
- Original continuous shrubland – bog pine shrubland with native woolly moss (Southland).
- Original scattered shrubland – dryland kānuka shrubland partially invaded by exotic grasses (Canterbury).
- Regenerating continuous shrubland – continuous matagouri shrubland (Canterbury).
- Regenerating scattered shrubland – matagouri shrubland with pasture grasses (Otago).

Photo-point monitoring

Photo-points provide a relatively simple and objective tool for tracking change in native vegetation on a farm through time. In essence, photo-point monitoring involves taking repeat photos of the same scene from the same place for several years. Although photo-points can't provide detailed information on all the plant species present, photo-points are ideal for assessing the broad effects of your management (e.g. stocking pattern or fencing) on native vegetation cover and hence on native biodiversity. As such, they are very useful for helping you review your biodiversity management and for showing others the changes that have resulted from your management. One of the key reasons for undertaking photo-monitoring is that it provides a simple but objective way of recording change. No matter how good we think we are at observing change, our own assessments are influenced by our perceptions of what we think should be happening, an inability to fully recall what conditions were like in the past, and a failure to compare exactly the same place or in the same season.

Photo-points can be used to follow changes in both overall vegetation cover (landscape photo-points; **Figure 3.4**) and vegetation composition (close-up photo-points; **Figure 3.5**). The latter can be used to track changes in shrub or tussock density, or forest understorey condition. The strength of photo-points is that they are cheap and easy to do, and can be established and managed by you the farmer. Depending on how they are set up and repeated, it is also possible to extract some quantitative information from them, at least for dominant species (e.g. by counting the number of tussocks or shrubs present).

There are some simple steps to obtaining a successful sequence of photos that can allow interpretation of vegetation cover through time (**Table 3.2**).

Table 3.2 Key steps for photo-monitoring

Key steps	Explanation
Permanently mark photo-points	This ensures photos are always taken from the same place – best done using a metal standard driven into the ground as fences, buildings and trees can be moved.
Take original photos along with you when repeating photos	Essential to ensure that the same view is photographed each time (e.g. angle, inclusion of key features etc) Having a camera with the ability to zoom is helpful to make sure that the area captured in the image is the same each year.
Take photos at the same time of year	Photos are usually best taken in early summer (November-December) after the spring growth flush but before vegetation starts to brown-off through the heat and dry of summer. This reduces seasonality differences.
Develop a series of photos over several years	A single unusual season can result in misleading results so building up a sequence of images over several years avoids this.

The approach to taking landscape and close-up photo-points are slightly different.

Landscape photo-points are best for illustrating changes in major landcover types like shrubland or forest and should include whole hillsides or similar large areas in the image. Accurate repeat photos and subsequent comparisons are best done when the image includes some distinctive features like ridges or rock bluffs. It is also important to ensure that the view being photographed will not be blocked out by changes in the foreground in the foreseeable future (e.g. tree growth or new buildings).

Close-up photo-points provide more detailed information on dominant species and their cover abundance at a particular site. For these, permanent reference points such as metal standards allow precise locations for accurate comparisons between years. Close-up photo-points are best located within areas of vegetation that are typical of the more general conditions in the paddock or block of interest, and should be relatively uniform with respect to vegetation, landform and management regime, and preferably on the mid-slope. They should also be at least 20 m away from structures (fences, water troughs, shelterbelts, tracks, buildings etc) as these can modify grazing animal behaviour and hence vegetation. Finally, the site should one that won't be disturbed in the foreseeable future (e.g. through cultivation).

Drones also provide a useful way to obtain aerial images of remnants and other biodiversity areas that are hard to photograph from the ground (**Figure 3.6**). With modern drones it is possible to program them so they take a photo from the same place and in the same direction each time, which greatly increases their value.

The number of photo-points established will vary depending on the size of the property and the amount of native biodiversity present. Too-few photopoints will not provide sufficient information on overall property condition while too-many will most likely result in their never being properly analysed. For landscape photo-points, several photos can be taken from the same place (a panorama – **Figure 3.7**). Depending on the size and nature of a property, the number of landscape photo-points is likely to range from 5–20 per property. The number of close-up photo-points will depend on the vegetation present and management issues that might apply on the farm. If the farm has some tussock grassland, then close-up photo-points are very good for tracking changes in tussock density. Close-up photo-points are also great in bush remnants or regenerating forest such as kānuka to track change in their understorey vegetation through time, especially with grazing removal or feral deer control (**Figure 3.8**).

Once established, photo-points should initially be re-photographed annually for two or three years to establish a good baseline, and then at least every other year to develop a long-term sequence. Where possible, photo-points should be established close to access routes (e.g. farm tracks) as this will substantially reduce the amount of time required to photograph them. The position of photo-points should be marked on your farm map, ideally having been recorded using a GPS, as well as marking them on the ground. Photos need to be properly annotated and stored once they have been taken.

It is important that you as the land manager have "ownership" of your biodiversity and the way your management interacts with it, and photo-monitoring is an ideal way for doing this. You should be actively involved in establishing, repeating and interpreting photo-point monitoring. However, in interpreting the results of any monitoring, including photo-points, it is important to recognise that farm management is not the only factor that influences native biodiversity, and the results of monitoring need to consider other potential influences (e.g. factors beyond your control such as pest species and drought). The greatest value of photo monitoring comes from long-term sequences of photos, so make it a priority to keep up with the monitoring.

Figure 3.4 Landscape photo-point showing change in vegetation cover on a retired sheep and beef farm over 13-years (2005 left, 2018 right). Note the increase in shrub cover on the hill side in the top right and restoration plantings below this, and the changes to the two ponds and especially expansion of raupo on the left-hand pond. Mahoe is also now dominant in the vegetation on the spur in the foreground where it was less important in 2005. The flats in the middle distance were cut for bailage not long before the 2018 photo was taken.

Figure 3.5 Close-up photo-point sequence showing little change in fescue tussock grassland over 13 years.

Figure 3.6 Drone image of Hawkes Bay forest remnant (Adam Forbes photo).

Figure 3.7 Panorama of three images of high country farmland taken from the same spot (Otago).

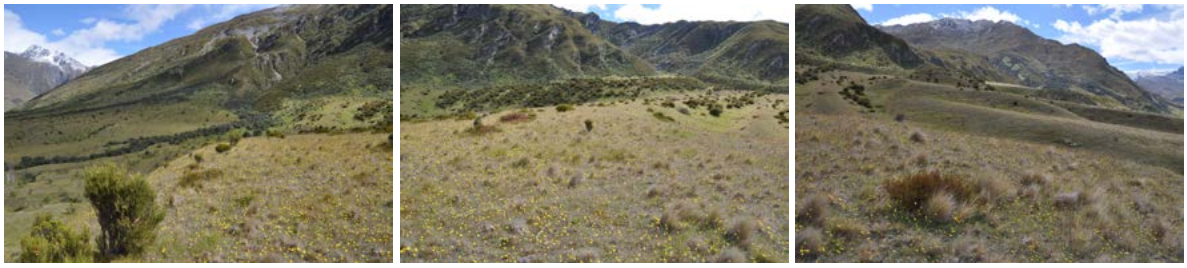


Figure 3.8 Close-up photo-point showing rapid re-growth of mahoe under a kānuka canopy over three years with grazing animal retirement. Note background trees for reference.

Identifying and recording individual native birds

Native birds are a distinctive feature of most sheep and beef farms with a wide range of birds present across a diversity of habitats including grassland, riverbeds, wetlands, shrubland and forest (**Table 3.3**). Many are iconic species and part of what makes New Zealand distinctive and their conservation is seen as a priority. In addition, there are also a range of introduced bird species that are common across rural landscapes.

Table 3.3 Common native birds found on sheep and beef farms

Habitat	Common native birds
Riverbeds, lakes, ponds & wetlands	Paradise shelducks, scaup, pukeko, grebe
Forest and shrubland	korimako/bellbird, tui, kereru, piwakawaka/fantail, riroriro/greywarbler, ruru/morepork
Grassland	Pipit, banded dotterel
Widespread species	karearea/falcon and kahu/harrier

The presence and abundance of native birds can be useful indicators of environmental condition and the effects of farm management. However, it is important to recognise that the abundance of native birds is driven by a range of factors including predation pressure (mustelids, cats, possums etc), competition (with exotic birds), resource availability (e.g. food and nesting sites) and habitat connectivity. Not all of these can be influenced by farm management and for more mobile species like kereru or tui, factors beyond the farm can be as important for determining on-farm bird presence and abundance as on-farm biodiversity management. Notwithstanding this, indices of native bird presence and abundance can be an important part of on-farm biodiversity monitoring and these notes provide guidance on how you can do this on your farm.

The most common approach to monitoring native birds in New Zealand involves either five-minute bird counts at a stationary point or walked transects of defined length or time, with the number of birds seen or heard, and their distance from the observer recorded. These observations are then used to develop indexes of bird conspicuousness that can be compared through time to assess trends in bird abundance. These methods require good bird identification skills, including identifying birds by their calls. They are not recommended for on-farm monitoring. However, if you are confident with your identification skills, you may like to do this.

See the Cacophony Project (**www.cacophony.org.nz**) if you are interested in identifying bird calls and using information technology to help protect our native birdlife. There are also other groups coming out with similar technology.

The method for on-farm bird monitoring that is recommended here is to develop a simple index for one or a few distinctive birds that can be used to track changing bird activity across your farm. As is the case with all monitoring, there are a few simple rules that will make the results of your bird monitoring useful:

- Undertake bird monitoring at the same place each time you do it. Ideally these sites should be clearly marked on the ground (e.g. with a tag in a tree) and recorded on the farm plan.
- Record birds for the same length of time at each monitoring period (e.g. 5-10 mins).
- Undertake your monitoring at the same time of day, at the same time of year and under similar weather conditions (best done in fine weather in spring/early summer and within 1-2 hours of first light).

A range of birds can be assessed (**Table 3.4**) but if you have bush remnants it is suggested you use simple korimako/bellbird and tui activity counts as an index of bird activity (unless you are really good at bird calls, don't try and separate korimako/bellbirds and tui based on calls). Have 2-4 sites around your farm in or adjacent to areas of bush or other woody vegetation (could even be your homestead garden), and spend 5-10 minutes listening and recording all birds heard or seen (best done in late spring/early summer). Try and be objective and count the actual number of birds if at all possible. If you have a acoustic recorder, make a recording at the same time as this can be analysed in the future. It is recommended that you repeat this bird monitoring on at least three consecutive mornings under similar weather conditions so you build up a picture of overall bird activity.

You could do similar monitoring for your wetlands (e.g. ponds) recording the species and number of birds seen at the same time of day for three days. For rare birds like kea, grebe or falcon/karearea, you could simply record them whenever you see a bird, noting where it was on the farm and the time and date using **Template BT5** in "Our Plan".

Table 3.4 Examples of birds that could be monitored on sheep and beef farms

Bird	Methods
Bellbirds and/or tui	Record number of individual birds seen and heard in forest remnants, or even around the homestead, at least once each year, making sure that the month and time of day, and weather conditions, are broadly similar, and that records are made from the same place each time (probably best done for 5-10 minutes, three or four times during one week).
Water birds	Same as above but counting number of individuals of each species present on a waterbody (e.g. scaup and pukeko) at a set time.
Karearea/falcon	Note all sightings including date and location on the property for this iconic bird.
Rare birds	Note all sightings including date and location on the property for rare birds like kea and grebe.

On most sheep and beef farms the best approach is likely to be a mix of formal counts (e.g. bellbird/tui and/or water birds) supplemented by incidental observation of rare or unusual species. There is also merit if you drive or walk a standard route regularly or at the same time of year (e.g. mustering), to keep a count of particular species along that route. A really good resource to help support you with identifying birds is the New Zealand birds online web site (**www.nzbirdsonline.org.nz**) which covers native and exotic birds with excellent photos and audio recordings of their calls, and a tool to help you identify birds.

It is important that you as the land manager have "ownership" of your biodiversity and the way your management interacts with it, and monitoring is an ideal way for doing this. The bird monitoring system proposed here has been designed so that you can be actively involved in establishing, repeating and interpreting the monitoring. However, in interpreting the results of any monitoring, including bird monitoring, it is important to recognise that farm management is not the only factor that influences native biodiversity, and the abundance of birds can be affected by factors beyond your control such as pest species and availability of habitat on adjacent properties. The greatest value of any monitoring comes from long-term sequences of observations, so make it a priority to keep up with the monitoring.

Identifying and recording individual native invertebrates, lizards, and bats.

There may also be other animals present like lizards, bats and of course terrestrial invertebrates (weta, beetles, snails etc). Lizards, snails and other terrestrial invertebrates don't move as far as birds, however they can be easier to see at various times of the year, often during warmer months. Keep an eye out for anything that catches your eye or looks unusual. Many of New Zealand's native animals are nocturnal, so having an explore of the farm (safely) after dark might be a good way to see what you have. Keep a list of these animals and take a picture of them if possible. Note down the location and date (**Template BT6**) in "Our Plan".

Prioritising biodiversity actions

The two hardest steps in developing a farm biodiversity plan are knowing what native biodiversity you have (see Step 3) and deciding how to prioritise biodiversity actions. There are a number of factors you can consider to help prioritise biodiversity actions including:

- The biodiversity values, habitats, and species present on your farm.
- The likelihood of achieving the desired biodiversity outcome.
- The cost of implementing the action and the resources you have available to do this (people and time, as well as financial, initially and for any ongoing maintenance).
- How the action might impact other aspects of your farming operation.
- Regulatory requirements that affect biodiversity.
- What you as the owners or managers feel passionate about.

The following notes provide some guidance on each of these factors, but the process will vary from farm to farm and will also be strongly influenced by what you as farm owners/ managers feel most passionate about.

Biodiversity values, habitats and species present

Two rules of thumb here:

1. Biodiversity actions that help protect/sustain existing areas of native biodiversity such as forest remnants or wetlands are more important than management actions that create new areas (e.g. through restoration plantings). This is because existing areas have a continuous connection with the past, even if modified through logging and other disturbances, and therefore have intact soils and much flora and fauna that serves as a propagule source for the future.
2. Management actions that hep to sustain and where appropriate enhance nationally threatened species (Critical, Endangered or Vulnerable) should be prioritised over other management actions as these species are at most risk of extinction.

Likelihood of achieving the desired biodiversity outcome

It can be a long journey to achieving biodiversity outcomes and some biodiversity actions are more likely to be successful than others. Given resources are usually scarce, it is often better to focus on those actions that are most likely to succeed.

It may also be worthwhile to focus on “low-hanging fruit” first – pick projects that are relatively easy to do and do not require a large amount of resources first and then use these to learn from as you subsequently embark on more ambitious projects.

Some projects particularly around pest control or habitat for mobile bird like kereru or tui may be more impactful when carried out in conjunction with surrounding properties.

Cost and resource constraints

A guiding principle is to make sure that any project you embark on can be sustained in terms of both financial costs and the human resources required. For example, restoration plantings require ongoing weed management for several years while predator traps require regular (often monthly) servicing. Make sure that it is realistic to do these things before you start. Sometimes it is possible to gain funding for the initial part of the project, but you need to be aware of ongoing costs and time.

Interactions with other parts of the farming operation

It is important to think carefully about how a proposed biodiversity management action might affect other parts of the farming operation. The best example of this is fencing, where fencing a remnant or gully for example might restrict stock access to drinking water. So before this action can be implemented, reticulated water will need to be installed. However, fencing might also be an opportunity to rethink how paddocks are laid out and it may be that through fencing a remnant or gully, there is the opportunity to better reconfigure fencing in the adjacent paddocks. Also when fencing a remnant or similar, always remember to include a gate or two so that stock that might get in can be easily removed.

Regulatory requirements

In some instances, such as stock exclusion rules, regulatory requirements will dictate biodiversity action priorities.

There is also merit in prioritising projects that can contribute to your "social licence" which may involve plantings around your driveway or fencing of remnants closer to roads and other public access points, before embarking on projects further back on the farm.

What you feel passionate about

At the end of the day it is important that you prioritise the things that you feel passionate about and enjoy. It might be that you like having kōwhai flowering around your farm so you fence off remnant patches and/or plant kōwhai into amenity plantings and along shelterbelts.

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:

- Introduction
- Managing soil health
- Freshwater ecosystem health
- Responding to a changing climate
- Waste and chemical management
- Forage cropping management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