NRM SOUTH
NATURAL RESOURCE MANAGEMENT
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HEALTHY FARMS

PROPERTY PLANNING GUIDE FOR LANDHOLDERS

Supporting smallholders to manage farms for productivity and environmental sustainability

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We acknowledge and respect the traditional custodians of lutruwita (Tasmania), and their continuing connection and stewardship of the land and sea Country on which we live and work.

This guide is a resource developed for NRM South's Property Management Planning workshops, part of the Climate Smart Farming project, funded by the Australian Government's Natural Heritage Trust and delivered by NRM South, a member of the Regional Delivery Panel.

Thanks to the Euroa Arboretum and to the Goulburn Broken Catchment Management Authority and the for the use of material contained in their 2018 'Healthy Hectares' guide.

DISCLAIMER

Information sources have been provided in this document as appropriate. While information is considered true and correct at the time of publication it should be acknowledged that changes post publication may affect the accuracy of content.

This guide is designed as an aid to property planning, users of this guide must consider their own personal circumstances and seek further advice as appropriate.

SOUTHERN TASMANIA NRM REGION

Tasmania's southern NRM region covers 2.5 million ha, spans 12 twelve municipal areas (Brighton, Central Highlands, Clarence, Derwent Valley, Glamorgan Spring Bay, Glenorchy, Hobart, Huon Valley, Kingborough, Sorell, Southern Midlands, and Tasman), and is bounded by the Southern Ocean.

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INTRODUCTION

The productive landscapes in the regions surrounding Hobart are home to a significant and growing number of smallholdings, hobby farms and lifestyle properties. Part of the appeal of this lifestyle is the opportunity to connect with the land and better understand how to work with it. To get the most out of your property, and understand how to support the health and function of the landscape, property management planning is essential.

Through our 'New Farm Solutions' Property Management Planning workshops, NRM South is supporting landholders on properties ranging in size from 5-100 ha to develop and document the visions and goals for your property, with a focus on natural resources, reducing impacts and connecting with like-minded people in your region.

This comprehensive guide has been designed to help you understand the requirements for managing a small rural property in a way that protects and enhances its natural values and supports sustainable production. Small farms bring with them a variety of opportunities and diversity of landholder needs, so this guide can't cover every possible scenario, but it will give you a starting point for managing your land and assist you in seeking further information and advice.

NRM South also provides online resources and delivers relevant land management programs for landowners in Southern Tasmania that will further assist you in sustainably managing your land.

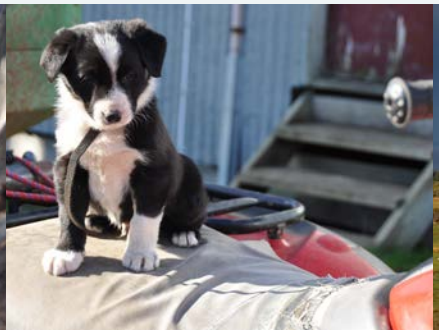
A VIBRANT REGION

Southern Tasmania is a region of exceptional diversity, both in its environment and in its variety of productive land uses. From viticulture to sheep grazing, smallholdings to market gardens, the range of microclimates across the region contributes to the popularity of productive ventures.

This wealth of natural resources contributes significantly to southern Tasmania's identity and economic, social, and environmental wellbeing. Managing these valuable assets underpins the success of the lifestyle and the key industries on which we rely.

Southern Tasmania has a diverse agricultural sector and contains 24% of all farm businesses in Tasmania. Land used for production spans approximately 6,450 km2 (27%) of the region's land area and 35% of the total farmland within Tasmania.

The economy is driven by sectors reliant on natural resources, including agriculture, fisheries, aquaculture, forestry, tourism, and energy production.


WHAT OTHERS HAVE SAID

"The PMP course has been fundamental in the successes we've had on the property."

- Dave Rolph, Deep End Farm

"The greatest improvement has been a framework that we've been able to apply to all the decisions that we're making, we've got access to resouces that allow us to make improvements across the board. "

- Matt Tack, Our Mates Farm

THE ROLE OF NRM SOUTH

NRM South is one of 54 natural resource management organisations in Australia and one of three in Tasmania. We work to protect, sustainably manage and improve our natural resources for the shared environmental, social and economic benefit of southern Tasmania's community.

PLANNING

Planning is a process for identifying the visions, goals and actions for your property, recording natural and property resources, and putting into action efficient and sustainable management practices to support a healthy and productive property.

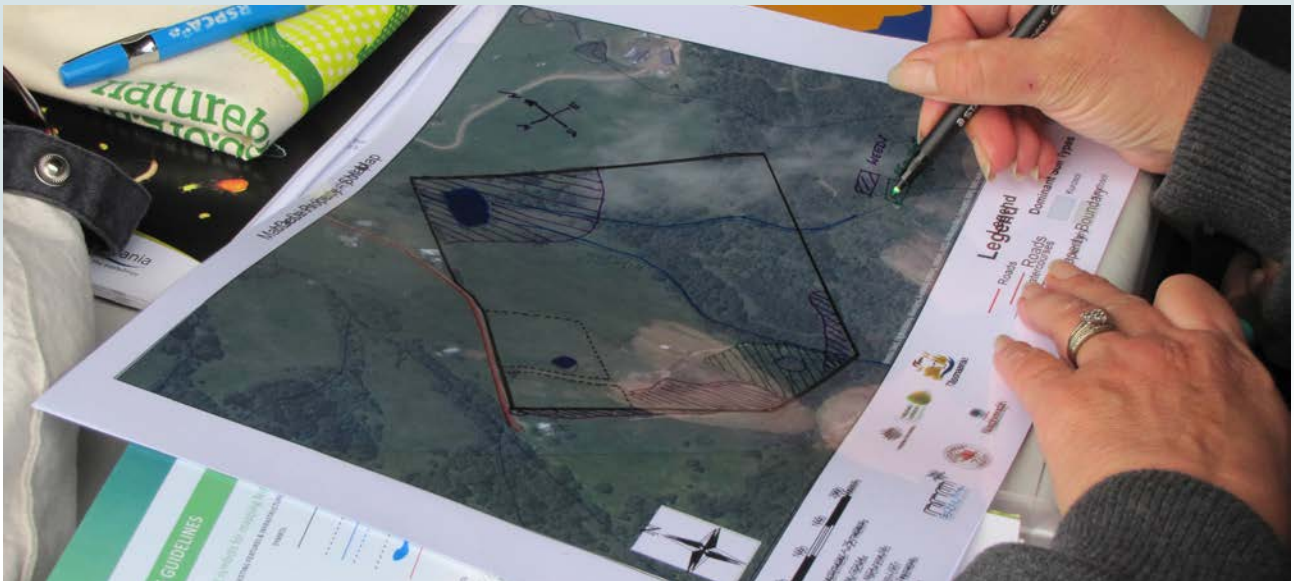
KEY LEARNINGS:

- Property management planning is the key to managing a successful property.
- An aerial map of your property is a great way to start planning.
- A key consideration for planning is land capability.
- Ensure you have a well-developed and up-to-date bushfire plan for your property.
- Climate change may present direct challenges to the way you manage your land.
- As a landowner you have management responsibilities for your property.

PROPERTY MANAGEMENT PLANNING

Property management planning is the key to managing a successful property. It requires you to do a stock take of your assets, risks and opportunities to assist in developing and managing your property sustainably.

It can guide on-ground changes but may also prompt you to undertake research or skill development to aid in managing your property and itsnatural resources.



Mapping out areas according to their capability will help you understand the risks and opportunities on your land.

You may for instance decide to change the current stock fencing layout to fence between two different land capability areas allowing stock in one area, but not in a vulnerable area at certain times of the year or to exclude them entirely.

An aerial map of your property is a great way to start planning, as it highlights physical features, your land capability and soils, and allows you to visualise and mark out future improvements. The plan doesn't have to be complicated and can change as needed, the most important thing is that you have one and you use it.

LAND CAPABILITY

A key consideration for planning, particularly when grazing livestock, is land capability. This is determined by factors including the region, local rainfall, soil type, geology, aspect and slope.

Specific areas of your farm may have different management risks based on particular characteristics and need to be managed differently.

For example, steep north-facing slopes are more prone to erosion and dry out more quickly than moderate south-facing slopes. Low lying paddocks near creeks may be much more prone to waterlogging (particularly in winter) than sloping ground away from creeks.

LAND CAPABILITY CLASSIFICATION SYSTEM FOR TASMANIA

LAND CLASS	DESCRIPTION
1	High quality arable farming land with no or only minor limitations to cultivated uses – flat, well structured, free draining, non-stony and fertile soil. The land also has no or very minor climatic limitations (frosts, drought, high winds etc).
2	Very good quality arable land with minor limitations to cultivated uses – gently undulating lands with well structured soils, good drainage and moderately fertile soils and few climatic limitations.
3	Good arable land but on rolling slopes or with other limitations which lead to soil erosion or other limitations to use e.g., frost, low rainfall, erosion due to slope or weaker soil structure etc.
4	Marginal arable land with slopes which are moderate, weaker soil structure, more drainage issues or climate issues. This is the lowest class of arable land but is excellent pasture land or forestry land.
5	Non arable land, but good pasture land. Cover is critical to keeping the soils from eroding. The limitations for use of the land might include climate, topography, erosion, stones, or weakly structured soils.
6	Lower class pastoral land, non-arable and prone to erosion if ever cultivated. The land might be stony, steep, with shallow soils and any number of climatic limitations.
7	Non arable lands - areas of very steep land, rock outcrop or swamps and salt flats. Not suitable for agriculture.

CLIMATE CHANGE AND DROUGHT

Climate change will affect everyone, but as a property owner it may present direct challenges to the way you manage your land and put constraints on your resources, such as water and soil.

Climate change predictions for southeastern Australia will likely see more extreme weather events at increased frequency, such as floods and bushfire, a decrease in winter rainfall and an increase in summer rainfall.

Droughts will continue to occur as part of natural weather cycles in Australia but are also predicted to increase in frequency and severity. There are a number of strategies (below) that you should consider employing on your property that are designed to reduce the impacts of drought but will also assist you in preparing your property for climate change impacts.

PREPARING FOR CLIMATE CHANGE AND DROUGHT

Water budgeting

- ✓ Develop a water budget for your property and monitor closely (also see Water on Farms section)
- ✓ Install as many rainwater tanks to buildings as possible
- ✓ Understand your daily water requirements for each type and age class of stock you keep or intend to keep

Weather forecasting

- ✓ Regularly check your regional weather and climate forecasts
- ✓ Monitor rainfall on your property using a rain gauge

Bushfire planning (also see Native Vegetation section)

The risk of bushfire is very real and as a rural landowner you need to ensure you have a well-developed and up-to-date bushfire plan for your property. For more information on how to develop a plan and better understand the risks in Tasmania, refer to Further Reading at the end of this section.

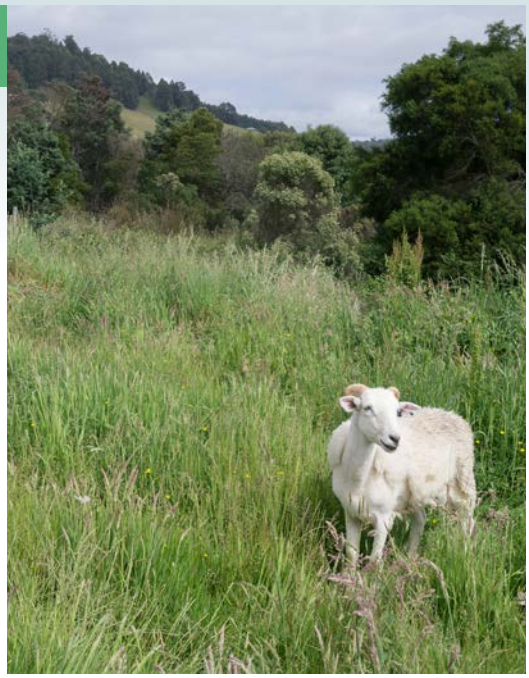
Animal, soil, water and pasture management requirements

- ✓ Identify sacrifice paddocks that have the best potential to recover
- ✓ Create a feed budget if you intend to keep stock
- ✓ Check troughs daily
- ✓ Monitor your groundcover carefully, remove stock as soon as it goes below 70% cover
- ✓ Investigate the availability and cost of trucking in water and feed
- ✓ Identify clear trigger points and actions e.g. 'If X happens I will do Y.'
- ✓ Ensure your stock are fenced off from dams and there are sufficient water troughs to maintain water quality
- ✓ Ensure native animals have access to water during drought
- ✓ Plan for the humane culling of suffering animals

LANDOWNER RESPONSIBILITIES

As a landowner you have management responsibilities for your property including:

- ✓ Maintaining boundary fencing
- ✓ Keeping livestock on your property, registering and tagging animals, maintaining animal welfare standards (see Managing your Animals section)
- ✓ Managing weeds, pests and disease incursions (see Biosecurity on Farms section)
- ✓ Avoiding contamination of water sources
- ✓ Managing fuel build up (see Native Vegetation section)
- ✓ Manage native vegetation in accordance with Tasmanian Government legislation (see Native Vegetation section)



FURTHER READING

The List Map:
https://www.thelist.tas.gov.au/app/content/home

The List Map user guide:
https://www.thelist.tas.gov.au/app/content/the-list/news_and_information/resources/listmaphelp.pdf

Small and New Landholders and Hobby Farmers - Managing Your Property
https://nre.tas.gov.au/agriculture/multifaceted-agriculture/small-and-new-landholders

Living Next Door to a Farmer
https://tasfarmers.com.au/projects/living-next-door-to-a-farmer

My Climate View
https://myclimateview.com.au/

Farming Forecaster
https://farmingforecaster.com.au/

HEALTHY SOILS

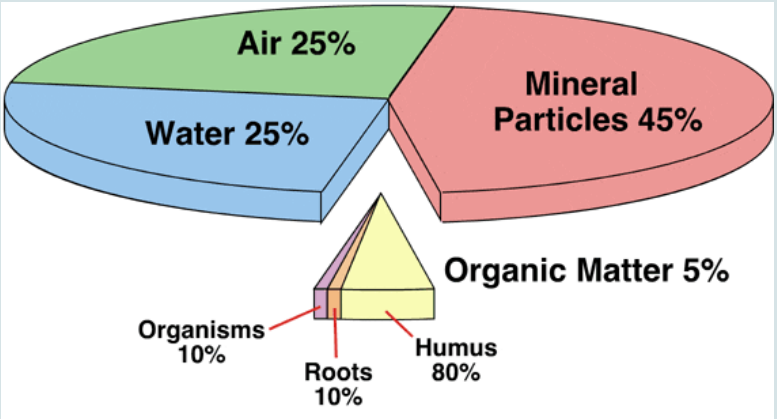
Soil health refers to the condition of the soil and its potential to sustain biological function, maintain environmental quality, and promote plant and animal health.

KEY LEARNINGS:

- Healthy soil systems support strong root growth, resulting in healthy plants.
- To gain a comprehensive understanding of your soils, start with a physical inspection, followed by chemical and biological soil testing.
- Practice minimum or low tillage to maintain soil structure, organic matter, and support beneficial soil life.
- Identify and address soil issues promptly to ensure long-term soil health and productivity

A healthy soil is one that is productive and easy to manage under the intended land use. It has physical, chemical and biological properties that promote the health of plants, animals and humans while also maintaining environmental quality.

- Land and Water Australia



SOURCE: Growing Spaces, Soil Composition 101

Soils are described according to the following attributes;

PHYSICAL: Soil type, texture, structure, compaction, erosion, water holding capacity and permeability.

CHEMICAL: Salinity, pH, fertility and nutrient availability.

BIOLOGICAL: Soil organic matter, beneficial organisms such as microbes and living organisms, and pathogens.

CHARACTERISTICS OF A HEALTHY SOIL

CHARACTERISTIC	DESCRIPTION
Physical	
Good soil tilth	Refers to the overall physical character of the soil in the context of its suitability for production.
Good soil aeration	Essential for soil and root health. Well-aerated soil has sufficient oxygen to support gas exchange by microorganisms and roots, vital for nutrient cycling. Good soil aeration encourages microbial growth, and increases the water holding capacity and nutrient uptake, crucial for plant growth and resilience to stressors.
Sufficient rooting depth	Refers to the extent of the soil profile to which roots are able to grow and function. A soil with a shallow depth as a result of a compaction layer or past erosion is more susceptible to extreme fluctuations in the weather, predisposing the crop to drought or flooding stress.
Good soil drainage	Even after a heavy rain, a healthy soil will drain more rapidly as a result of good soil structure and an adequate distribution of different size pore spaces, but also retain adequate water for plant uptake.
Resistant to degradation	A healthy soil is more resistant to adverse events including erosion by wind and rain, excess rainfall, extreme drought or vehicle compaction.
Resilience when unfavourable conditions occur	A healthy soil will rebound more quickly after a negative event such as harvesting under wet soil conditions, or if land constraints restrict or modify planned rotations.
Chemical	
Sufficient but not excess supply of nutrients	An adequate and accessible supply of nutrients is necessary for optimal plant growth and for maintaining balanced nutrient cycling within the system. Excess nutrients can lead to leaching and potential ground water pollution, high nutrient runoff and greenhouse gas losses, as well as toxicity to plants and microbial communities.
Free of chemicals and toxins that may harm the crop	Healthy soils are either devoid of harmful chemicals and toxins or can detoxify and/or bind such chemicals making them unavailable for plant uptake.

Biological	
Small population of plant pathogens and insect pests	Plant pathogens and pests can cause diseases and crop damage. In a healthy soil, the population of these organisms is low and/or inactive. This could result from direct competition from other soil organisms for nutrients or niche habitats, hyper parasitism, etc. Also, healthy plants are better able to defend themselves against a variety of pests.
Large population of beneficial organisms	Microbes are important to the functioning of the soil. They help nutrient cycling, decomposition of organic matter, maintenance of soil structure, biological suppression of plant pests etc. A healthy soil will have a high and diverse population of beneficial organisms to carry out these functions and thus help maintain a healthy soil status.
Low weed pressure	Weed pressure is a major constraint in crop production. Weeds compete with crops for water and nutrients that are essential for plant growth. Weeds can interfere with plant establishment, block sunlight, interfere with harvest and cultivation operations, and harbour disease-causing pathogens and pests.

MEASURING SOIL HEALTH

1. Physical Inspection

Digging with a spade is a simple way to assess the physical aspects of your soil.
Record your thoughts on the following;

- What does it feel and smell like?
- What is the soil texture (sand, loam or clay)?
- How easily does it break up and how hard is it to dig?
- What plants are growing in it and how deep are the roots?

WHAT TO LOOK FOR

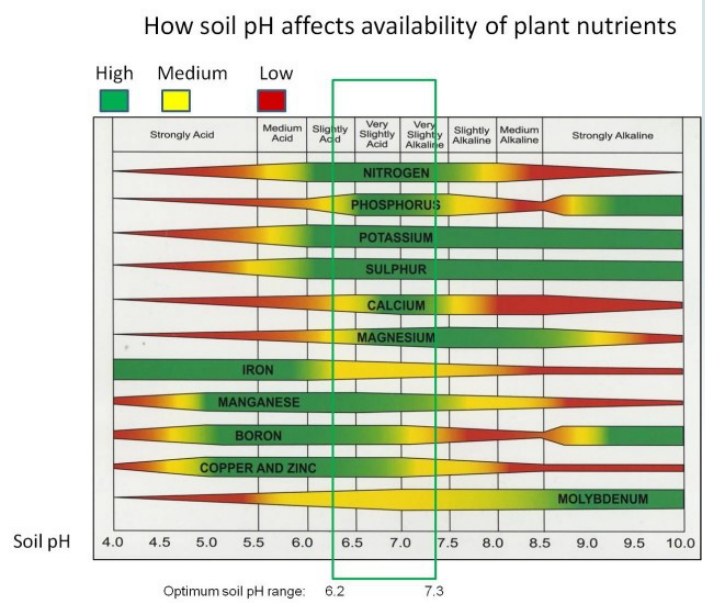
	Good	Poor
Soil surface	✓ Textured, rough ✓ Good water drainage ✓ Good plant cover & growth	× Crusted, surface sealing × Water sheets/ runs off/ ponds × Moss/algal growth
Soil aggregates (structure)	✓ Rough faces on surface of aggregates ✓ Assorted-sized aggregates (ideal is 1-5mm) ✓ Friable ✓ Crumbly ✓ Lots of pores	× Sharp angles, “clean” faces × Larger aggregates × Falls to powder (no crumbs) × Clods × Few or no pores × Compacted, layers parallel to surface (at any depth) × Settles to blocks/bricks
Rusty colours/ mineral deposits in topsoil (water logging)	✓ Few/ small/ not noticeable	× Many/ noticeable
Plants	✓ Lots of roots in the soil and deep roots	× Few or no roots in the soil

SOURCE: Cornell Soil Health Assessment Training Manual, Edition 1.2.2

2. Chemical Soil Testing

A soil test will give you an indication of the chemical properties of your soil.

There are many laboratories that can carry out soil tests for you, local agronomists and fertiliser reps will be able to advise you on these. It is preferable to use a laboratory that is Australian Soil and Plant Analysis Council Inc (ASPAC) and National Association of Testing Authorities (NATA) accredited. It is advisable to take samples at the same time of the year and to use the same lab over time so that you can compare your results. Not all laboratories use the same testing methods and procedures.



Nutrient availability is optimised in soils with topsoil pH levels in the optimum range pH 5.5 – 7.5 ($CaCl_2$).

WHAT CAN BE FOUND IN A SOIL TEST?

Test	Description
Organic Matter (OM) & Organic Carbon (OC)	OM/ OC are essential for soil structure and nutrient retention. They are measured as percentages and the amount of OM is roughly twice the amount of OC. Ideal OC levels will depend on soil type and generally range from 2.5 – 4 %.
pH	pH refers to a soil's acidity or alkalinity. It is measured on a scale of 1 -14, with 7 being neutral, <7 is acidic and >7 is alkaline. pH affects nutrient availability and most plants prefer a soil with a pH range of 6 – 7.
Electrical Conductivity (EC)	EC is the soil's electrical conductivity. The more ions present, the greater the conductivity. EC is often used to indicate salinity. EC <0.15dS/m is safe for most crops on most soil types.
Chloride	Chloride (Cl) levels are related to salinity, and may become elevated when using fertilisers that contain Chloride.
Macronutrients	Macronutrients (Nitrogen (N), Phosphorous (P), Potassium (K), Sulphur (S), Calcium (Ca), Magnesium (Mg)) are required by plants in large amounts. P and K may become "locked up" in some soil types.
Cation Exchange Capacity (CEC)	CEC is related to soil texture (sand, clay, loam etc). The higher the CEC, the higher the nutrient holding capacity (sand < loam < clay)
Sodium	Sodium (Na) interferes with plant nutrient and water uptake and soil structure. Sodic soils have Na levels >6% CEC. Maximum recommended levels depends on soil type.
Ca / Mg, Ca / K & P / Mg ratios	Calcium / Magnesium, Calcium / Potassium and Potassium / Magnesium ratios indicate whether the soil's cations are balanced. Major cations are Ca, Mg, K, H, Na and Al. They have a positive charge.
Trace Elements	Micronutrients such as zinc, iron, manganese, copper, boron are important for plant health, but required in small amounts.

SOURCE: Cornell Soil Health Assessment Training Manual, Edition 1.2.2

3. Biological Soil Testing

A soil test will give you an indication of the biological activity of your soil.

Soils with good physical and chemical condition usually have good soil biology. Some laboratories offer soil biological testing. Ask your local agronomist for details of labs that offer this service.

Soil organic matter is an essential food source for soil microbes and organisms and therefore soils with high organic matter will have higher soil microbial populations.

Healthy Root System
D. Blaesing

SOIL ISSUES TO LOOK OUT FOR

Erosion

Erosion is the loss of soil due to water or wind, which can result in the loss of valuable topsoil, increase sediment and nutrient loads in waterways and destabilise the banks of rivers, streams and gullies. Erosion can be managed by;

- ✓ Keeping good ground cover especially during winter, and
- ✓ Maintaining riparian vegetation.

Erosion on a dam bank

Buck's horn plantain is a common indicator of salinity

Salinity

Soil salinity is the accumulation of salts in a soil profile such that it limits plant growth. Salinity can be identified by;

- Plant and soil symptoms such as salt scalds, surface crusting of salt, poor areas within crops (often in lower lying areas), yield losses, stunted plants or burnt leaves.
- The presence of plant species that like salty conditions (e.g. sea barley grass, buck's horn plantain, water button).
- Measuring electrical conductivity in soil and/or water samples.

Saline areas can be managed by;

- ✓ Maintaining deep rooted vegetation in the landscape,
- ✓ Ensuring effective drainage,
- ✓ Planting salt tolerant plants, and
- ✓ Building soil organic matter.

Sodicity

Soil sodicity refers to an excess of sodium in the soil. It is measured by the proportion of sodium in the cation exchange capacity (CEC) and expressed as % sodium (Na) or exchangeable sodium percentage (ESP).

Sodicity affects the uptake of potassium (K), calcium (Ca), and magnesium (Mg). Sodic soils are usually poorly structured, hard setting when dry and sticky when wet and can be susceptible to water erosion due to their dispersive nature.

Sodicity can be managed by;

- ✓ Building soil organic matter,
- ✓ Applying soil treatments (e.g. gypsum).

Erosion in a sodic clay soil

Compaction due to traffic

Compaction

Compaction occurs from frequent traffic over soils especially when wet. Compaction restricts rooting depth of plants, impedes drainage and leads to soil structure decline.
Compaction can be managed by;

- ✓ Using designated roadways (controlled traffic),
- ✓ Avoiding working soils when wet,
- ✓ Avoiding overgrazing livestock (particularly in winter).

Acidification

Acidification is a decrease in soil pH that usually results in a reduction in plant vigour.

Acidification of topsoils, and more seriously, subsoils will lead to lower yields, reduced pasture and crop options and contribute to wider catchment problems such as weed infestations, salinity and erosion.

In acidic soils, aluminium, iron and manganese can reach concentrations toxic to the roots and there may be deficiencies in molybdenum, calcium, magnesium and potassium. (DPI, Victoria)

Acidity can be managed by;

- ✓ The application of lime,
- ✓ Avoiding the use of acidifying fertilisers,
- ✓ Using acid-tolerant crop and pasture varieties.

Measuring soil pH


Waterlogged field
S Folder

Waterlogging

Waterlogging occurs when soil pores are saturated with water for significant periods of time because of impeded drainage due to poor soil structure or in low lying areas.
To manage waterlogging;

- ✓ Minimise vehicle traffic,
- ✓ Do not work on paddocks when they are wet
- ✓ Consider improving the soil structure and drainage work.

For more information, refer to the *Land Drainage for Farming in Tasmania* tool (see 'Decision Support Tools link in Further Reading). It is important to keep in mind the impact of drainage to the broader landscape and waterway health.

Soil Structure Decline

Soil structure describes how individual soil granules bind together and aggregate, and therefore, the arrangement of soil pores between them.

Compaction and loss of organic matter, surface crusting, increase of surface run-off, poor infiltration, poor water holding, loss of drainage, hard setting, cloudiness, poor workability and low resistance to erosion are signs of poor or degraded soil structure.

Soil structure can be maintained through good soil management practices including;

- ✓ Minimal tillage,
- ✓ Not working when wet,
- ✓ Using designated roadways,
- ✓ Building soil organic matter,
- ✓ Good crop rotations with pasture phases.


Poor Soil Structure
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FURTHER READING

Tasmanian Decision Support Tools
https://nrmnorth.org.au/sustainableagriculture/tasmanian-soil-extension-program

Soil Management. A guide for Tasmanian Farmers
https://nre.tas.gov.au/Documents/Soil-Guide.pdf

Soils for Life
https://soilsforlife.org.au/

WATER ON FARMS

Water is an essential resource and will influence what you can do on your land.

Water quality and availability will be influenced by your management, the local environment and a changing climate.

KEY LEARNINGS:

- Water management is a shared responsibility.
- Water resources support important habitat for native flora and fauna and should be managed sensitively.
- Developing a water budget for your property will assist you in knowing what you can and can't do on your land.
- Your farm management should include strategies to reduce farm runoff.

Water is an essential resource, and its management should be a core consideration for your property. Future climate change predictions for south-east Australia indicate lower winter rainfall and more severe conditions which will impact water use and availability.

You need to know how much water you need to manage your property, including livestock requirements, the environment, firefighting and any activities that may affect the quality and quantity of water leaving your property. Your farm is part of a catchment and how you manage your land and its water resources will impact land and users beyond your property boundary.

Assessing the amount of water you have access to throughout the year can determine what activities you undertake on your land. In dry years water availability may decrease, and this should be factored into your planning.

As with any finite resource, it is helpful to develop a water budget for your property across the seasons. You will need to calculate your water input, output and storage capacity, and understand the different sources of water you can access (e.g. mains water, dams, stream water, groundwater, irrigation) and any legal requirements for accessing and managing these water sources.

RUNOFF

Runoff refers to the water that flows over farms and paddocks during irrigation or when it rains. As it moves across the land, this water picks up soil sediment and associated pollutants such as fertilisers and herbicides, eventually flowing into nearby water catchments such as rivers, lakes, and oceans. Agricultural runoff is a major environmental concern because it introduces a wide range of harmful substances into natural water systems, impacting both aquatic ecosystems and human health.

Activities that expose soil (construction, overgrazing, cultivation) to the elements for extended periods not only negatively affect soil health, but they also increase the likelihood of some of that soil in the form of sediment ending up in waterways, particularly in high rainfall events.

Sedimentation is a major hazard for native fish, frogs, invertebrates, plants and algae. It reduces light and covers holes and crevices that provide shelter and breeding sites. Maintaining good groundcover and controlling erosion on your property will help reduce sedimentation.

ON-FARM INPUTS

Fertilisers and manure contained in run-off create an excess of nutrients in waterways. This leads to ‘eutrophication’ (excessive nutrient richness in a body of water) and associated algal blooms. Both are highly toxic to plants and animals, as well as humans.

Pesticide and herbicide sprays can seriously damage water quality and are highly toxic to aquatic life. They can enter waterways through run-off and by direct contact from spray drift. If you are going to apply pesticides and herbicides, avoid spraying on windy days or when rain is forecast. Always read the label to check for suitability of use near a waterway.

Creating management buffer zones on your property that reduce risk of farm inputs (e.g. fertilisers, herbicides) entering waterways and dams and using organic fertiliser that combines readily with the soil will assist in protecting water resources from contamination.

FARM DAMS

Dams are essential infrastructure for farming operations, including for livestock and irrigation.

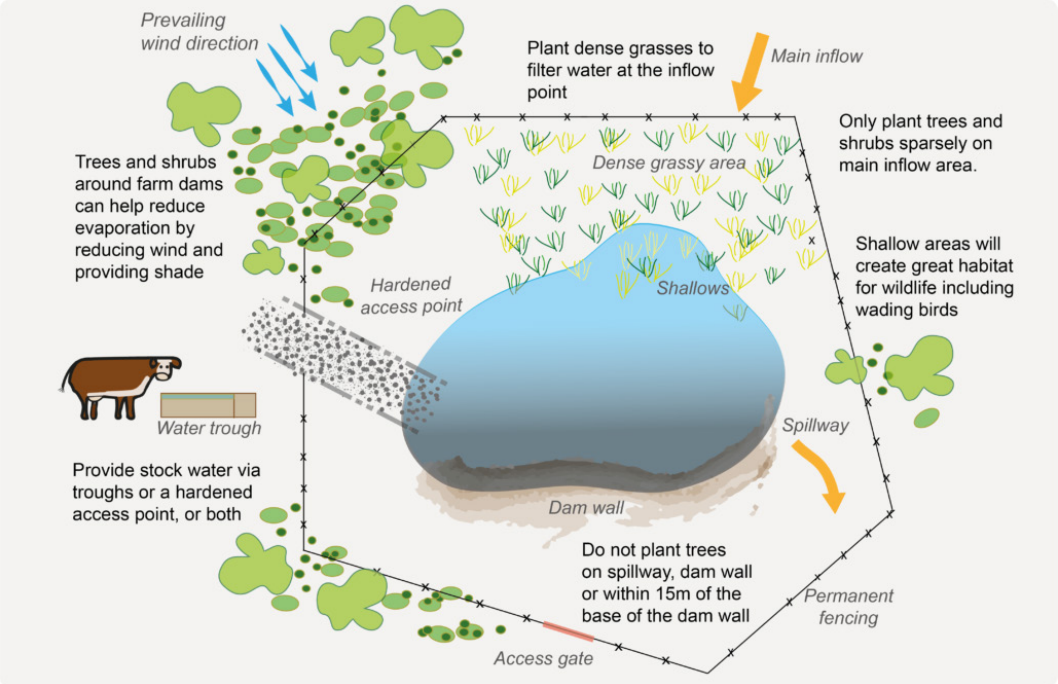
Enhancing a farm dam can lead to improvements in water resources and provide habitat for a wide variety of native wildlife. Enhancing dams for wildlife can reduce water loss from evaporation, improve water quality, provide shade and assist with natural pest control in nearby pastures and crops.

Dams should be fenced off to exclude stock and allow for natural regeneration of marginal and aquatic plants. This can be supplemented by planting suitable native species. If planting on a dam wall or rim, use low-growing plants, as large shrubs and trees drive their roots into the wall creating a potential seepage point. Ideally you want your dam to be a combination of shallow water and deep water to allow a range of aquatic and semi-aquatic vegetation to grow.

Aim to construct your dam fence a minimum of 10m from the high waterline. If you require dam water for stock, ensure you have the appropriate infrastructure in place to either gravity feed water to troughs directly below the dam or pump water from the dam to stock water troughs.

If this is impractical and you need stock to access the dam water, provide one small access point to the water and exclude the remainder of the dam. Make sure you stabilise the walkway to the water's edge with gravel / rocks to prevent erosion.

Dams can also be an important water source for fire-fighting purposes, so allow for vehicle access via a gate in your fence design. Fencing off a dam can also allow native plants to colonise the dam. This can be supplemented by planting suitable native species.



SOURCE: Watershed Landcare

FURTHER READING

Tasmanian State Government freshwater resources
https://nre.tas.gov.au/water

Sustainable Farms (includes dam management and water planning)
https://www.sustainablefarms.org.au/

PASTURE AND GRAZING

Pastures are an essential component of agricultural properties throughout Southern Tasmania. They provide feed for livestock, incorporate atmospheric nitrogen into the soil (legume species), are an important break in cropping rotations and provide ground cover to protect soils from erosion.

KEY LEARNINGS:

- Maintain good pasture quality to meet livestock nutritional needs.
- Ensure adequate ground cover to prevent soil erosion (avoid overgrazing).
- Graze pastures at the three-leaf stage for optimal regrowth.
- Use rotational grazing to manage pastures effectively and control weeds.
- Understand the management requirements of different pasture species.
- Monitor and address pasture pests and weeds to sustain productivity.

Several methods can be used to improve pasture management, but important outcomes should include;

- ✓ Having adequate feed to meet livestock requirements.
- ✓ Having good pasture quality to meet livestock requirements for energy, protein and fibre.
- ✓ Controlling weed growth and establishment.
- ✓ Controlling pasture pest populations.
- ✓ Ensuring adequate ground cover to avoid soil loss through wind or water erosion.
- ✓ Encouraging pasture species diversity to build more resilient pastures and to provide livestock with a wider range of nutrients.
- ✓ Increasing water infiltration.
- ✓ Decreasing nutrient loss by reducing water runoff from bare ground.
- ✓ Providing a fibrous root system which adds organic matter into your soil.

MOST PASTURES ARE A MIX OF GRASS AND LEGUME SPECIES. IN TASMANIA THIS MAY INCLUDE THE FOLLOWING COMMON PASTURE SPECIES;

Grasses
Annual ryegrass
Perennial ryegrass
Cocksfoot
Tall fescue
Phalaris
Prairie grass (brome)

Perennial legumes
White clover
Red clover
Strawberry clover
Caucasian clover
Lucerne
Birdsfoot trefoil
Greater lotus

Perennial herbs
Plantain
Chicory

Annual legumes
Sub clover
Arrowleaf clover
Persian clover
Balansa clover
Biserrula

ANNUAL VS PERENNIAL PASTURES

Annual pasture species need to set seed in order to re-emerge the following season.

Perennial pasture species regrow using tillers which grow from the base of the plant. Managing pastures in spring and autumn to avoid them growing too long is important as it allows sunlight to reach the base of the plant for setting up tiller establishment for the following season.

Mixed pasture grasses

IMPORTANT POINTS TO CONSIDER IN MANAGING DIFFERENT PASTURE SPECIES

- Grasses provide good year-round production and will provide more feed than legumes in late autumn, winter and early spring. They are also more tolerant to grazing.
- Legumes are important as they have higher levels of digestible protein, greater concentrations of calcium compared to grasses and significantly increase the nutritional value of pasture.
- Legume species have the ability to fix nitrogen from the atmosphere into the soil. They can provide at least 100kg /ha/year of nitrogen, which is essential for the growth of all pasture plants.

ANIMAL HEALTH CONSIDERATIONS FOR DIFFERENT PASTURE SPECIES

- In spring, legumes (e.g. clovers and lucerne) can cause bloat in ruminant animals. It is important to regularly monitor livestock when grazing legume-rich pastures. Bloat oil can be used to treat animals and pastures when conditions are bad.
- Some grass species can have animal health effects such as ryegrass staggers or phalaris toxicity.
- Ryegrass staggers is caused by an endophyte in the ryegrass. It can be more of a problem when pastures are short as new growth appears in late summer and autumn. Avoid stock management practices that encourage animals to graze close to the ground. Maintain a close watch on stock whenever feed is in short supply. Choose low endophyte species when renovating pastures.
- Phalaris toxity can occur in young green shoots of phalaris based pastures. It is due to the presence of an alkaloid. It is more of a problem with sheep than cattle and can be managed by avoiding hungry stock grazing regenerating phalaris pasture after rain. It can be exacerbated by stress caused by frost or moisture stress.

PASTURE ASSESSMENT

Why assess pastures?

- To better match animal requirements and pasture production.
- To know how much feed you have - how different classes of animals will perform and to allocate stock accordingly.
- To reduce supplementary feeding.
- To enable accurate feed budgeting.
- To meet livestock production targets.

Visual Pasture Assessment

Pasture species selection is region and site specific. Local agronomists can provide you advice on what pasture type is best suited to your property and enterprise.

PASTURE QUANTITY

Pasture quantity is described in kilograms of dry matter per hectare (kg DM /ha). The dry matter component of a pasture is the part from which animals derive their protein, energy and fibre needs.

Pasture 'rulers' or sticks are an easy way to measure pasture height which can then be converted into an estimate of the kg of green dry matter/ha using height density tables. The table demonstrates the difference in kilograms of dry matter per hectare (Kg DM/ ha) according to pasture height between a dense (typically sheep grazed) pasture and an open pasture. Green refers to new vegetative growth of the pasture as opposed to dry standing feed. For typical sheep pastures use the 'dense pasture column' for typical beef pastures use the 'moderately dense column'.

Height (cm)	Kg DM/ ha		
	Lightly Grazed 50% green	Moderately dense pasture 100% green	Dense pasture 100% green
1	250	400	500
2	500	700	800
3	600	1000	1100
4	800	1200	1400
5	1000	1400	1700
6	1150	1600	2000
7	1300	1750	2300
8	1450	1900	2600
9	1600	2000	2800
10	1700	2100	3000

SOURCE: Prograze manual

A pasture ruler, used to measure pasture quantity

Matching the pasture quantity available (kg DM/ha) with livestock requirements will enable you to determine grazing rotations for your pastures and to determine if supplementary feed is required. It is also a critical tool to ensure that the soil is protected from overgrazing and livestock targets are achieved.

PASTURE QUALITY

Pasture quality refers to the feed quality of the pasture, or the amount of energy and protein it contains.

Pasture quality is affected by the species composition of the pasture, pasture growth stage (fibre content) and the percentage of green verses dead matter in the pasture.

Pastures are generally at their highest feed quality in spring when they are actively growing, in their vegetative growth stage (when fibre content is low) and when the legume content is high.

Once a pasture moves into the reproductive phase, begins to flower and send up its seed head (mid to late spring) the amount of fibre in the pasture increases and the feed quality declines.

A FEEDTEST can be used to measure pasture feed quality in a laboratory and will give you measures of energy, protein, fibre and digestibility of your pasture.

Feed testing can also be useful in determining the feed quality of hay and other supplementary feed products. The quality of different pastures and supplementary feeds can vary considerable, which in turn will influence the health and wellbeing of your livestock and overall farm productivity.

For more information on feed testing seek advice from an agricultural consultant or an accredited laboratory.

PASTURE GROWTH

The following elements are essential for pasture growth

SUNLIGHT

Plants produce carbohydrates from sunlight through the process of photosynthesis.

WATER

Irrigating pastures at dry times of the year will increase the amount of pasture growth and provide more feed for livestock.

NUTRIENTS

Pasture plants derive most of their nutrients from the soil. Soil testing establishes what nutrients are potentially available to the plants. Plant sap tests are needed to determine what nutrients are actually taken up and are present in the plants. Data from both soil and sap tests can show whether there are deficiencies or over-supply of particular nutrients.

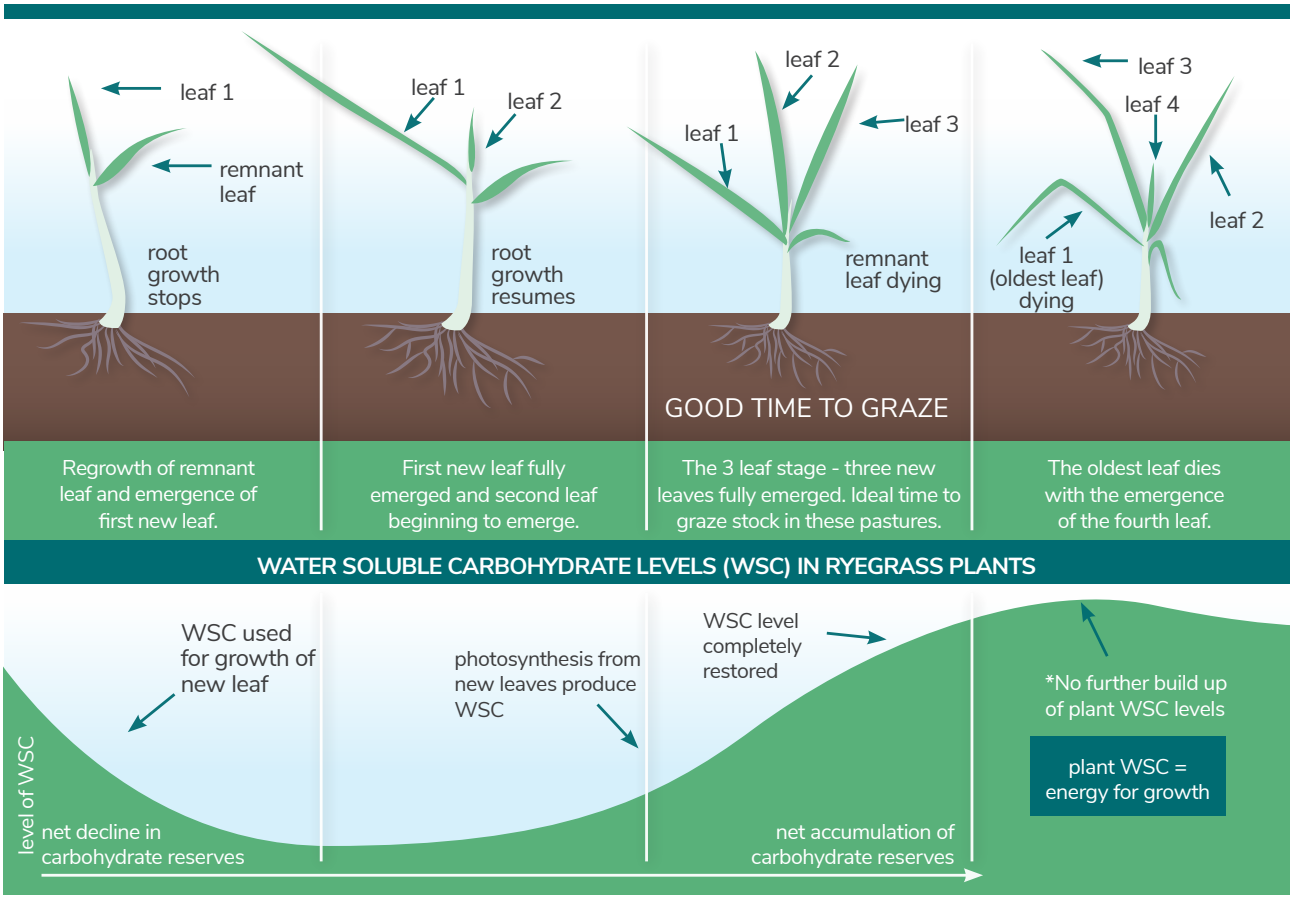
TEMPERATURE

Pastures will have faster growth in warmer temperatures and slower growth in cooler temperatures.

MANAGEMENT

Grazing, weed pressure and pest control in pastures will affect pasture growth potential.

STAGES OF GROWTH AND GRAZING



How a perennial rye grass plant grows.

MODIFIED FROM: MLA More Beef From Pastures Manual

While plants at the 4 leaf stage are no longer building WSC, the older leaves provide a good source of fibre for animals and when pushed into the soil surface by livestock will add beneficial organic matter to the soil, helping build soil carbon and in turn improving soil and pasture health.

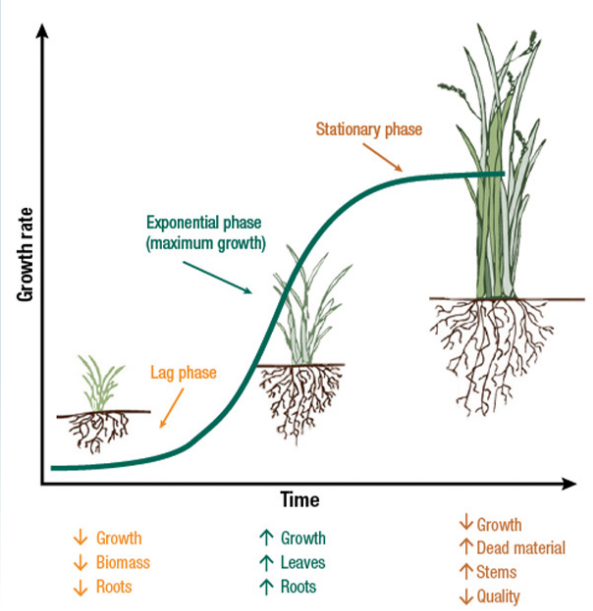
GRAZING MANAGEMENT

Grazing management gives property managers the ability to manage when a pasture is grazed according to the best time for the plant and the animal.

The best time for grazing depends on the condition of the pasture, common practice is to graze when pasture grasses are at the 3 leaf stage when full photosynthetic potential of the plant is reached and when there is the most feed available for the livestock.

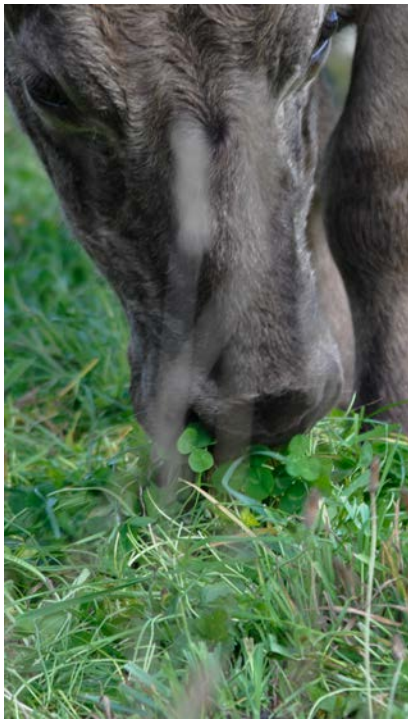
Pasture plants that are continually grazed at the one leaf stage do not have the opportunity to replenish root carbohydrate reserves required for re-growth. They will have smaller root systems and therefore a reduced ability to access water and nutrients from the soil than plants grazed at the 2 or 3 leaf stage.

Plant growth curve



Growth rate of plants over time (or biomass-equivalent) showing three phases of pasture production and the relative effects on components.

SOURCE: AgProud, Marcelo Wallau and Jean Savian, 2020



Examples of different grazing systems:

SET STOCKING

Livestock are usually grazed in the same area on the farm and there is minimal stock movement between paddocks through autumn and winter.

INTENSIVE ROTATIONAL GRAZING

Stock are moved frequently (every 1 to 3 days) through a large number (e.g. 15 – 30) of paddocks.

SIMPLE ROTATIONAL GRAZING

Stock moved according to a set grazing schedule (5-14 days) through a small number (e.g. 4-8) of paddocks.

HOLISTIC MANAGEMENT® PLANNED GRAZING

Stock are moved regularly through a large number of small paddocks based on regular assessment of pasture health and livestock performance, recently grazed paddocks are typically rested for long periods (6-9 months).

Paddock ready for grazing (front) S Folder.

SELECTIVE GRAZING

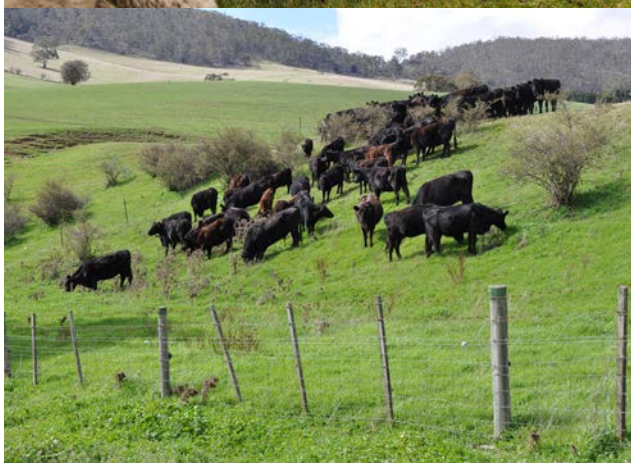
Livestock will selectively graze the pasture species that they prefer within a pasture.

Sheep have a greater ability to selectively graze than cattle. In a set stocking situation livestock can continually graze the new growth as it emerges (first leaf stage), in which case the pasture does not have the opportunity to replenish root carbohydrate reserves and may lead to weaker plants and less persistent pastures. Weed species that are less desirable to livestock will be given more opportunity to flourish under situations where selective grazing can occur.

AVOID OVERGRAZING AND SOIL COMPACTION

To help increase grazing productivity and reduce the impact of grazing on the landscape:

- ✓ Ensure your paddocks always have ground cover. If you are seeing bare areas, consider reducing stocking rates, offering supplementary feeding or resting the area. Bare soils lose their ability to absorb moisture and contain fewer nutrients and beneficial soil microorganisms.
- ✓ Establish multiple paddocks to provide options for reducing grazing pressure. Too much grazing pressure in one paddock results in animals selectively feeding on the more palatable pasture species and leaving the unpalatable grasses and weeds.
- ✓ Regularly allow plants to rest from grazing so they can set seed. This can be achieved through light stocking rates or rotational grazing.
- ✓ Keep stock out of wet areas while they are saturated, to reduce soil compaction, pugging and erosion.
- ✓ Continually assess your paddocks and adjust stocking rates accordingly. Move stock before pasture is grazed to below 5cm high and consider the impact of other grazers such as rabbits and wallabies.
- ✓ Contain use of supplementary feed to a specific area to reduce the risk of introducing weeds.



Source: Healthy Landscapes: A practical guide to caring for land in the Mount Alexander region.

CONSIDERATIONS FOR ROTATIONAL GRAZING

A simple rotational grazing system is a good way of managing pastures and controlling weeds. Setting your property up into several small paddocks is generally a good idea for all types of livestock.

Rotational grazing allows time for pastures to re-grow and replenish root reserves before the next grazing.

Rotationally grazed pastures have greater root mass and are therefore better able to access water and nutrients stored in the soils and lead to more healthy soils.

Many perennial pasture species favour rotational grazing and therefore these desirable species will flourish under rotational grazing systems.

Rotational grazing systems require a greater labour input than set stocking systems as stock need to be moved according to your rotation length.

It is essential that there is adequate stock water in all paddocks in your rotation to meet livestock requirements at all times of the year. Stock water requirements will be greater in the warmer months when it is hot and pastures are free from dew.

Whilst the proven benefits of good rotational grazing are widely known, there are different schools of thought as to what types of rotational grazing techniques work best.

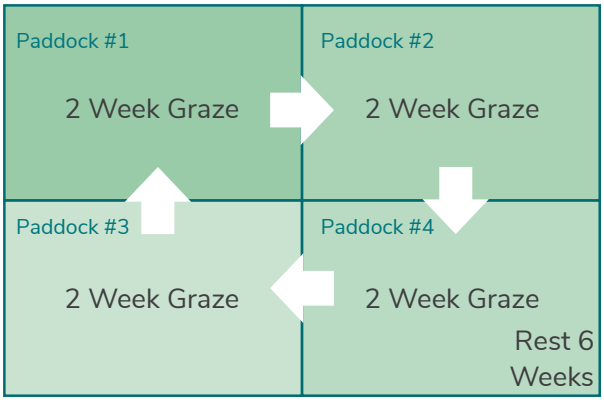
As a land owner it is important that you look at what your goals are for your property and to match these with your lifestyle to see what type of grazing technique works best for you. Regardless of the technique you decide to employ, it is essential that you have a grazing plan for your property.

Time Based Rotational Grazing

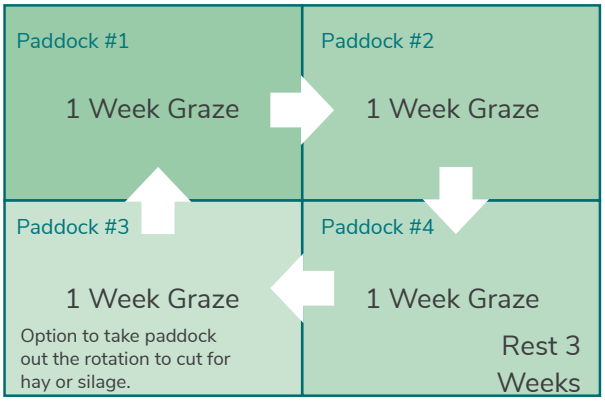
Meat and livestock Australia recommend a rotation length that is managed so that pastures are grazed at the three leaf stage and when there is adequate pasture quantity to meet livestock requirements for a set period of time.

Time Based Rotations (4 Paddocks)

DURING MODERATE GROWTH



DURING FAST GROWTH (SPRING)



SOURCE: Meat & Livestock Australia
Tips & Tools, Getting started on a simple time based rotation

CARRYING CAPACITY AND DRY SHEEP EQUIVALENT (DSE)

Dry Sheep Equivalent (DSE) describes the amount of feed or dry matter needed to maintain a 45-50 kg wether or non-lactating ewe per day. In agriculture, carrying capacity is the maximum number of animals that a piece of land can sustain without degrading the land or damaging the animals' health.

Dry Sheep Equivalent (DSE) is a standard to compare between different classes of livestock and to determine stocking rates and carrying capacity of a property.

ADAPT THESE EXAMPLES TO YOUR HOLDING

EXAMPLE 1

Holding size: 25 hectares

Amount of useable pasture is (exclude infrastructure and bush areas): 21 hectares

STOCK ON HAND			
Sheep	**Number**	**Value of DSE**	**Total**
Sheep			
Ewes with Lambs at foot	8	3.3	26.4
Dry Sheep	8	1	8
Cattle			
Rising 2 year old beef steers	14	10	140
Weaned 9 month old beef steers	4	8	32
Horse			
	1	10	10
		Grand Total DSE	216.4

Divide the total DSE by the useable area of the holding: 216.4/21 = 10.3 DSE/ha.

EXAMPLE 2

Another way of calculating the current stocking rate of a property is to divide the average liveweight per hectare by 50.

At certain times of the year when pasture quality or quantity might be limiting supplementary feed maybe required to help you meet livestock feed requirements.

The soil type, fertiliser history and pasture quality all affect the carrying capacity of a property.

10 dry sheep @ 60 kg each in a 2 ha paddock. The paddock is carrying 10 x 60 = 600kg/(2 ha) which equates to 300 kg per ha and divide by 50 (DSE value) giving you 6 DSE per ha.

DSE RATING FOR DIFFERENT LIVESTOCK

A table comparing the different DSE values attributed to different livestock classes is included below.
One DSE requires 1kg of DM per day to maintain body weight.

When expressed in metabolisable energy or megajoules/day one DSE is equivalent to 7.6 MJ/day.

Local agronomists can advise you on the DSE rating per hectare for your region to help you determine your property's stocking rate.

At certain times of the year when pasture quality or quantity might be limiting, supplementary feed maybe required to help you meet livestock feed requirements.

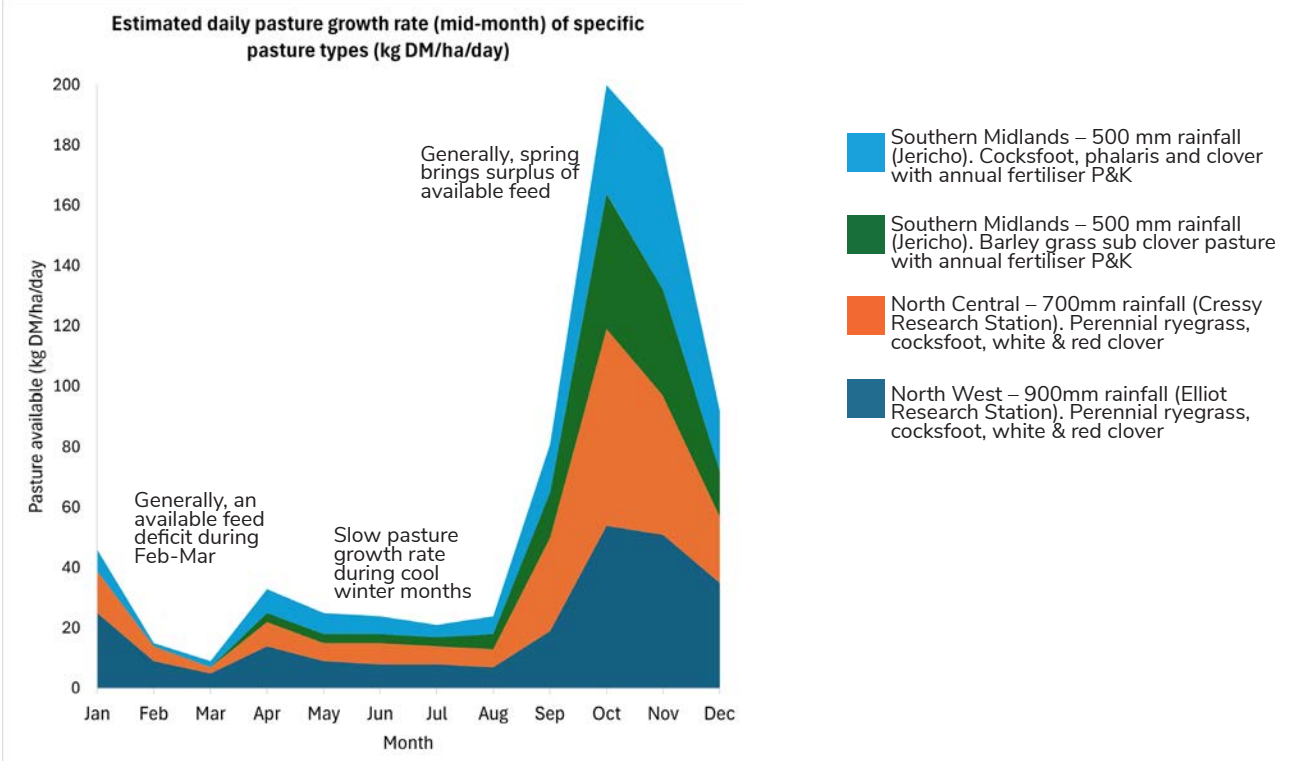
CLASSES OF LIVESTOCK	VALUE OF DSE
SHEEP	
Dry sheep: wethers, ewes, hoggets (45kg)	1.0
Merino ewe: Spring lambing	1.5
Merino ewe: autumn lambing	1.8
Ram	2.0
Dairy Cattle	
Cows: milking or double suckling (350kg to 500kg)	14.0 – 16.0
Yearling steer or heifer	6.0 – 7.0
Weaner (3-6 months)	3.0 – 4.0
Beef Cattle	
Dry cow or steer (350kg – 450kg)	8.0 – 10.0
Yearling steer: fattening (250kg – 400kg)	8.0 – 10.0
Yearling steer: store (250kg – 350kg)	5.0 – 7.0
Fattening cattle: 20 to 32 months (350kg – 550kg)	9.0 – 12.0
Cow with calf at foot (up to 8 months)	12.0 – 14.0
Bull (800kg)	14.0
Alpacas (65kg)	
Dry adult	0.9
Deer	
Fallow dry female or castrate	1.5
Fallow breeding female with fawn	2.2
Goats	
Dry Angora	1.0
Breeding Angora	1.5
Dry milk or meat goat	1.5
Milk or meat goat lactating	3.0
Horses	
Pony	8
Large horse	10

Working out potential sustainable carrying capacity is complex and neighbours who may have been in the district for a long period may be able to assist with locally relevant advice. Local agronomists can also provide further advice on the DSE rating per hectare for your region to also help you determine your property's most sustainable stocking rate.

ESTIMATING PASTURE GROWTH RATES

The following growth rates are for a typical pasture mix of perennial ryegrass and cocksfoot with white and red clover in the high rainfall areas, grading to sub clover in the lower rainfall areas. The measurements were taken over 4 years (1992–1995) at trial sites.

These figures are the kg DM/ha/day of feed produced at the trial sites. This information can be a guide for the landholder to start from, and the figures highlight seasonal variation in pasture growth. However once again be aware that the figures can only be used as a guide, each property and management regime is different.



SOURCE: DPIW data, as cited by Making more from Sheep (AWI & MLA)

KEY REMINDER: In southern Tasmania, pasture growth trends show a **deficit in winter** due to slow growth from cooler conditions, while **spring often brings a surplus** with rapid growth exceeding herd requirements. Managing this seasonal variability is essential for balancing feed supply year-round

PASTURE PESTS

Watch out for pasture pests such as red legged earth mite and lucerne flea which will feed on pasture leaves in the spring and autumn.

Pasture grubs such as black headed cockchafer, red headed cockchafer and corbie grubs will feed on pasture roots and are often detected by bare patches in your pasture in the autumn and winter months. Grubs can be found in the soil of affected pastures.

Pasture pests can be controlled using an integrated pest management approach by applying a range of methods including application of selective sprays (chemical control), cultural control and biological control. Cultural methods can include selecting pest resistant cultivars when re-sowing, not letting pastures grow long in summer as it will be less attractive to corbie moths laying eggs and use of soil cultivation to expose grubs and disrupt their life cycle. Biological control involves the use of natural enemies that prey on pasture pests. Most are naturally occurring so it is important to monitor for beneficial pest insects as well as pest ones. If using chemical controls make sure that you get advice on sprays that will target pests and not affect beneficial insect populations (selective insecticides).

Red legged earth mite damage on clover leaves.
CSIRO (Wikimedia)

PASTURE WEEDS

Weeds will compete with pasture plants for space, light, water and nutrients. It is important to manage weeds as they can significantly reduce the production and persistence of your pastures.

Some weeds can also be toxic to grazing livestock and should be controlled immediately (e.g. Ragwort, Foxglove and Patterson's Curse).

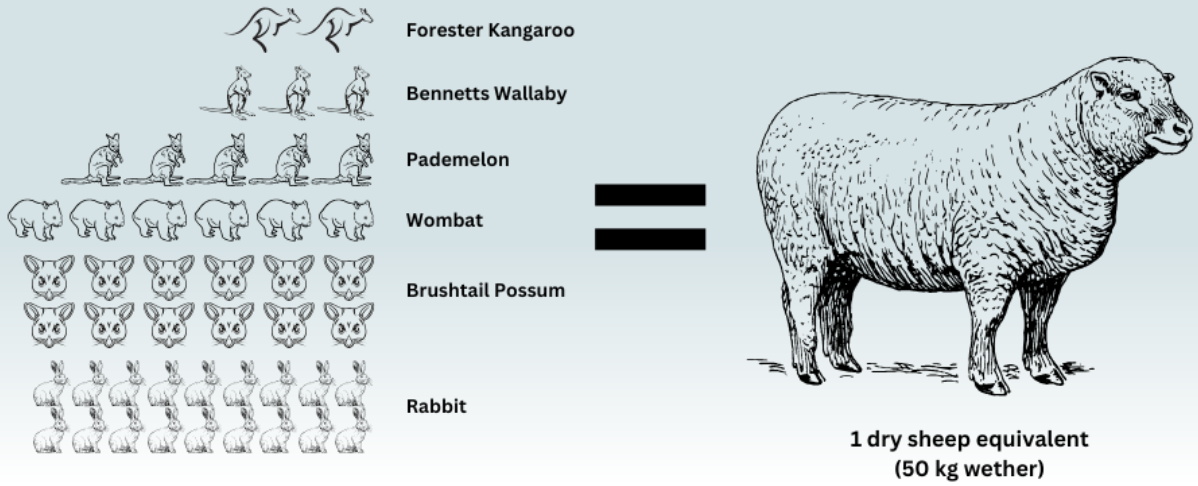
Good grazing management (use of rotational grazing) can be very effective in controlling pasture weeds. Spray grazing is a technique that can be effective for controlling weeds such as cape weed. It involves the application of a low dose of herbicide to bring the sugars into the leaves and make the plant very palatable to stock. This is then followed by heaving stocking to graze out the weeds.

Seek the advice of a local agronomist when deciding on herbicide programs for your pastures.

IMPACTS OF WILDLIFE BROWSING

In your pastures, consider the impacts of other grazing species in your system. Further information is available in the Living with Native Wildlife chapter.

Grazing equivalents - wild animals to domestic stock



BENEFITS OF CARING FOR PADDOCKS

- ✓ Stabilise soils and increase ground-cover year-round.
- ✓ Reduce soil erosion from wind and water, improve water infiltration rates, and improve soil moisture retention.
- ✓ Help pastures hold more moisture and remain greener during summer, reducing fire risk.
- ✓ Increase pasture resilience during drought, providing more reliable feed for stock when feed is scarce.

Source: Healthy Landscapes: A practical guide to caring for land in the Mount Alexander region.

FURTHER READING

Farming Forecaster: latest forecast on pasture production in Tasmania
https://farmingforecaster.com.au/

Improving pasture use with the MLA Pasture Ruler
https://www.mla.com.au/globalassets/mla-corporate/extensions-training-and-tools/creative-commons/pasture-ruler-tips-and-tools---cc.pdf

Common grasses of Tasmania
https://nrmsouth.org.au/wp-content/uploads/2014/11/CommonGrassesofTasmaniaLaneetal2015.pdf

Tasmanian Pasture and Forage Pests. Identification, biology and control
https://nre.tas.gov.au/Documents/Pasture-Pests-Book-final.pdf

Derwent Pasture Network - About Dryland Grazing
https://www.pasturenetwork.org/about-dryand-grazing.html

Best practice land management guidelines for small grazing properties
https://cdn.environment.sa.gov.au/landscape/docs/hf/best-practice-land-management-guidelines-small-grazing-properties-gen.pdf

MANAGING YOUR ANIMALS

Providing feed, shelter, water and exercise are all part of caring for livestock. When adding animals to your property plan, consider the type and number of livestock you are able to manage.

KEY LEARNINGS:

- Provide balanced nutrition, access to clean water daily, and ensure animals have appropriate shelter.
- Ensure parasite control is a fundamental part of your livestock herd management.
- Handle animals safely, monitor for injuries, and address health issues promptly.
- Meet species-specific care requirements, manage breeding responsibly, and provide necessary care for pregnant and young animals.
- Make sure livestock leaving your property have your Property Identification Code (PIC) recorded on the ear tag and/or eID microchip.
- Biosecurity Tasmania provides some information on basic animal husbandry and biosecurity requirements.

Keeping livestock requires care and planning, especially for smallholders wanting to keep large livestock.

NUTRITION

Nutritional management is a key concern when managing livestock. Numerous nutritional diseases are linked to deficiencies, excesses, or imbalances. Animals need a well-balanced and consistent diet

Poor nutrition is often associated with overstocking. It can be easy to overestimate the carrying capacity of a holding, especially where a lot of grass is present during the height of spring or when the property has perhaps been de-stocked for a period of time. Carrying capacity – often talked about in dry sheep equivalent (DSE), is a tool to help work out the correct number of animals for a given area. Supplementary feeding may be required when inadequate feed is available.

It is strongly advised that you seek professional guidance on nutrition and evaluating any suspected deficiencies, as this is a highly specialised field. For further information, please contact your local livestock veterinarian, animal nutritionist, or experienced agronomist.

FOOD AND WATER

Some pastures are more nutritious than others; factors such as annual rainfall, seasonal conditions, soil type and soil fertility as well as pasture composition affect the amount of pasture produced, which directly equates to the number of animals a property can carry.


A. Renkin

Farming methods, weed density, and fertiliser history also impact on productivity and the number of stock that can be carried. Rotational grazing results in a property carrying more stock because the pasture is rested between grazing rotations, as opposed to properties that are set stocked.

Adequate feed means fewer health problems. The best (and cheapest) feed is good pasture. Most cattle need some supplementary feeding during late winter and, in some areas and seasons, late summer as well. Buy only good quality hay as many people bale poor pasture that stock will not eat.

Clean water needs to be readily available at all times for domestic animals, especially in summer. Daily water requirements vary between animals, sheep may need around 2 litres per head, horses can drink 40-50 litres, while a lactating cow can need up to 100 litres.

SHELTER

Animals need access to shade and shelter. For larger livestock this is usually provided by trees, hedges or shelterbelts.

It is a requirement under the Animal Welfare Act 1993 to provide shelter for livestock. An animal which does not have shelter, particularly during bad weather, will require a much greater food intake to keep warm. Providing shelter therefore also lessens the demand on pasture or hay.

HEALTH AND WELLBEING

No matter the size of your herd, parasite control is a fundamental part of livestock herd management. Most livestock need periodic drenches or vaccines. Common problems are intestinal worms and lice which are treated with drenches, and clostridial diseases which need a prophylactic vaccination.

There are many different products available. Whenever you use a drench, vaccine or other chemicals, always read the label.

It is very important to follow the instructions about dosage rates and withholding periods. These will vary between different products.

If using herbicides or insecticides in a paddock, check the label for guidance on destocking requirements to ensure safety. Similarly, when spreading poultry manure or compost, remember to destock the paddock for at least three weeks.

It is possible for soils to be deficient in minerals necessary for optimal livestock health. An example is copper – coastal soils are generally considered to be low in copper. Selenium is another trace element necessary for animals to thrive, and is locally deficient in parts of Tasmania. A local agronomist or vet can provide advice.

Livestock diseases impact on animal welfare, reduce productivity, and can infect humans. Animal diseases may be reduced through good animal husbandry and good nutrition because healthy animals are more resistant to disease.

Worms are a common problem on many small farms and are commonly found in cattle, sheep and goats. Sheep and goats are more susceptible to worms than cattle. Young animals are at higher risk of infection and you should avoid grazing young stock on higher risk pastures e.g. short pastures, set stocked pastures.

Rotating pasture grazing to allow for rest periods and rotating grazing between different stock types (e.g. sheep and cattle) can help to reduce worm burdens. A strategic drenching program is also an effective way of managing worms. Worm faecal egg counts can be undertaken by NRE Tasmania to help you understand what type of worms you might have and the level of infection on your property.

All livestock owners are required by law to report any signs of an emergency animal disease. In these cases, contact your local vet.

HANDLING AND INJURY

Using low-stress stock handling practices will reduce stress on the animal, reduce the risk of injury to you or others and will impact on livestock temperament and performance.

Low stress stock handling training courses are offered by some training providers. Techniques such as yard weaning, feeding stock in the yard and having well designed handling facilities / yards will have an impact on your livestock's temperament and ease of handling. Poor temperament is a hereditary trait and therefore it may not be best to breed from poor tempered animals.

Specialised facilities are required for a number of domestic livestock. Most sheep, alpacas and some goats require a shed or at least yards for shearing, crutching and drenching. A cattle crush or headbail in cattle yards is essential for most handling of cattle (e.g. drenching).

Paddocks need to have good fencing to protect both the animals and the general public. If livestock stray onto a road and are hit by a car, the owner of the livestock is legally responsible. Public liability insurance is essential.

For the safety of livestock the fences must not have loose wire where the animals can get caught or cut themselves. All but minor injuries need to be attended to by a vet, as soon as possible.

Be aware that the male animals can become territorial, dominant or aggressive. This is partly due to inherited genes which encourage the male to protect "his herd" but aggression can also come about through familiarity and lack of respect for people. It is best to handle males which you intend to keep for a long time with respect, demand respect in return, and don't become too familiar with them. You are actually helping the male animal establish a "correct code of conduct".

Times of bad weather, will require a much greater food intake to keep warm. Therefore providing shelter also lessens the demand on pasture or hay.

COMPANIONSHIP

Most domestic animals are also herd animals, and are much happier with others of their own kind for companionship. Avoid keeping herd animals by themselves.

REPRODUCTION

Breeding animals whether they are sheep, cattle, horses, pigs or goats have special needs, so consider carefully before planning a breeding program. A pregnant female requires a rising plane of nutrition as her pregnancy progresses.

In the case of sheep, if the female doesn't have enough nutrition in the last 4-6 weeks before lambing she is at risk of pregnancy toxaemia (also called twin lamb disease).

The name twin lamb disease is explicit because if the ewe is going to have twins or triplets, her nutritional requirements are greater than a ewe carrying a single lamb. Ewes will die from pregnancy toxaemia.

There are also particular risks for cows associated with the quality of feed available; grass tetany and milk fever can cause death, and these conditions relate to a lack of calcium (milk fever) or magnesium (grass tetany) in the pasture. Difficult births do occur, and may need vet assistance. A basic rule of thumb to help decide if a sheep or cow is having difficulty giving birth, is not to let more than 4 hours elapse from the time the water bag or feet of the foetus are showing until the lamb/calf is born. If it takes longer the unborn lamb/calf will be in distress and it is time for immediate vet assistance. For cattle, a cattle crush will be needed to restrain the cow to prevent disease.

SPECIFIC ANIMAL TREATMENTS

POULTRY

External and internal parasites can be a problem for free range birds, and poultry needs to be protected from predation from dogs, feral cats and quolls.

NRE Tasmania has a design for a "quoll proof hen-house" on their website. Poultry need access to clean water at all times and be aware when feeding chickens that they can eat products which are illegal to supply to cattle, sheep and goats. Processed poultry feed usually contains Restricted Animal Material (RAM) which is illegal to feed to ruminants (cattle, sheep and goats). The feed bag should state if it contains RAM. Also, if you feed your poultry kitchen scraps containing even small amounts of meat or bone, make sure that ruminant animals cannot share these scraps.

SHEEP AND GOATS

Sheep and goats have similar husbandry needs. Although their smaller size means they can be easier than cattle to handle, they require specific handling facilities.

Except for shedding breeds, (e.g. Dorper,Wiltshire) sheep need annual shearing, and Angora goats need shearing twice yearly. Animals also need to be crutched (removing wool from around the face and rear end). They need to be drenched for internal parasites, so yards and a holding race are essential, and a working dog may be needed to get the sheep into the yards.

If carrying lice, sheep and goats will need treatment, usually after shearing, and in the summer the owner needs to keep a close watch for fly strike, particularly in unshorn sheep. Fly strike will kill animals, slowly and painfully. Flies generally strike in humid weather, often around a dirty tail or pizzle, so if an animal is seen kicking or biting at a part of its body, closer inspection is urgent. It is possible to use preventative measures against fly strike, again facilities for handling are necessary.

Sheep and goats need hoof paring (trimming) for good foot health. The bacteria that causes scald and footrot is spread by infected sheep or goats. Some breeds are more resistant but purchasing clean stock will avoid the problem.

Johne's Disease is a chronic, incurable bacterial disease that can affect stock. Purchasing vaccinated stock from reputable breeders is advisable. Both sheep and goats are herd animals, and are much happier in company. Fences need to be especially good to keep goats enclosed.

ALPACAS

These social animals like to be kept in flocks, and require shearing once a year.

They do not produce lanolin in the fleece like sheep, and require protection from cold, wet conditions when their fleece is waterlogged. They drink around five litres of water a day, and need routine toenail trimming and periodic teeth checks. Alpacas are susceptible to clostridial diseases such as tetanus and pulpy kidney, and are vulnerable to Rye grass staggers, Vitamin D and Selenium deficiencies, and Johne's Disease.

PIGS

Pigs can live up to 25 years, and need a clean shelter, particularly from the sun, as pigs are prone to sunburn. They also need clean water at all times.

Pigs over 10 weeks of age must have a tattoo which is registered to the property (obtained from NRE Tasmania). They need vaccinations for diseases including parvo, leptospirosis and erysipelas. It is illegal to feed pigs swill (food waste containing meat, bone or meat products or dairy products such as soft cheeses) as it can lead to Foot and Mouth Disease or Swine Fever. Most pig feeds contain Restricted Animal Material (RAM). If you are planning to purchase pigs, contact your local council first to check if you need any approvals.

It is important that ruminants such as cattle, sheep, alpacas, deer or goats cannot access pig feed.

HORSES

Horses are an expensive undertaking because they require specific gear and regular care, often supplementary feeding, and possibly farrier and vet fees.

Although temperament varies between animals, horses can be more excitable and accident prone than other domestic livestock. Horses require dental checks as they age, because their teeth continually grow and over time chewing will wear sharp edges on molars. They also need periodic drenches for intestinal worms, and their hooves need trimming, or shoeing if the horse is in regular work.

Their condition needs to be monitored as serious animal health problems will arise if they get too fat, or too thin. They need permanent access to fresh, clean water as they drink a lot in summer, particularly after strenuous exercise. Shade and shelter from the elements needs to be accessible, and as horses are very selective grazers, pasture in paddocks stocked with only horses will degrade over time. Resting paddocks and putting sheep in the paddock with the horses will keep pasture in a better condition.

NATIONAL LIVESTOCK IDENTIFICATION SCHEME

Sheep and goats born from January 1, 2025 need to be tagged with a NLIS approved electronic identification device (eID) before they leave their properties.

The National Livestock Identification System (NLIS) applies to anyone with cattle, sheep, pigs or goats. Even if you are a hobby farmer or smallholder, you MUST comply. As animals are bought, sold and moved along the supply chain, each movement is recorded centrally on the NLIS database. Using this information, the NLIS is able to provide a life history of an animal's movements.

To comply with the NLIS tagging requirements, you will need to have a Property Identification Code, more commonly known as a PIC. Your PIC is very important to biosecurity and food safety, as it enables the NLIS to identify and quickly trace animals when needed. A PIC is assigned and remains permanently associated with that property. If you do not have a PIC, you must make an application for the registration of your property through NRE Tasmania.

FURTHER READING

National Livestock Identification System
https://www.nlis.com.au/
https://www.integritysystems.com.au/identification--traceability/national-livestock-identification-system/

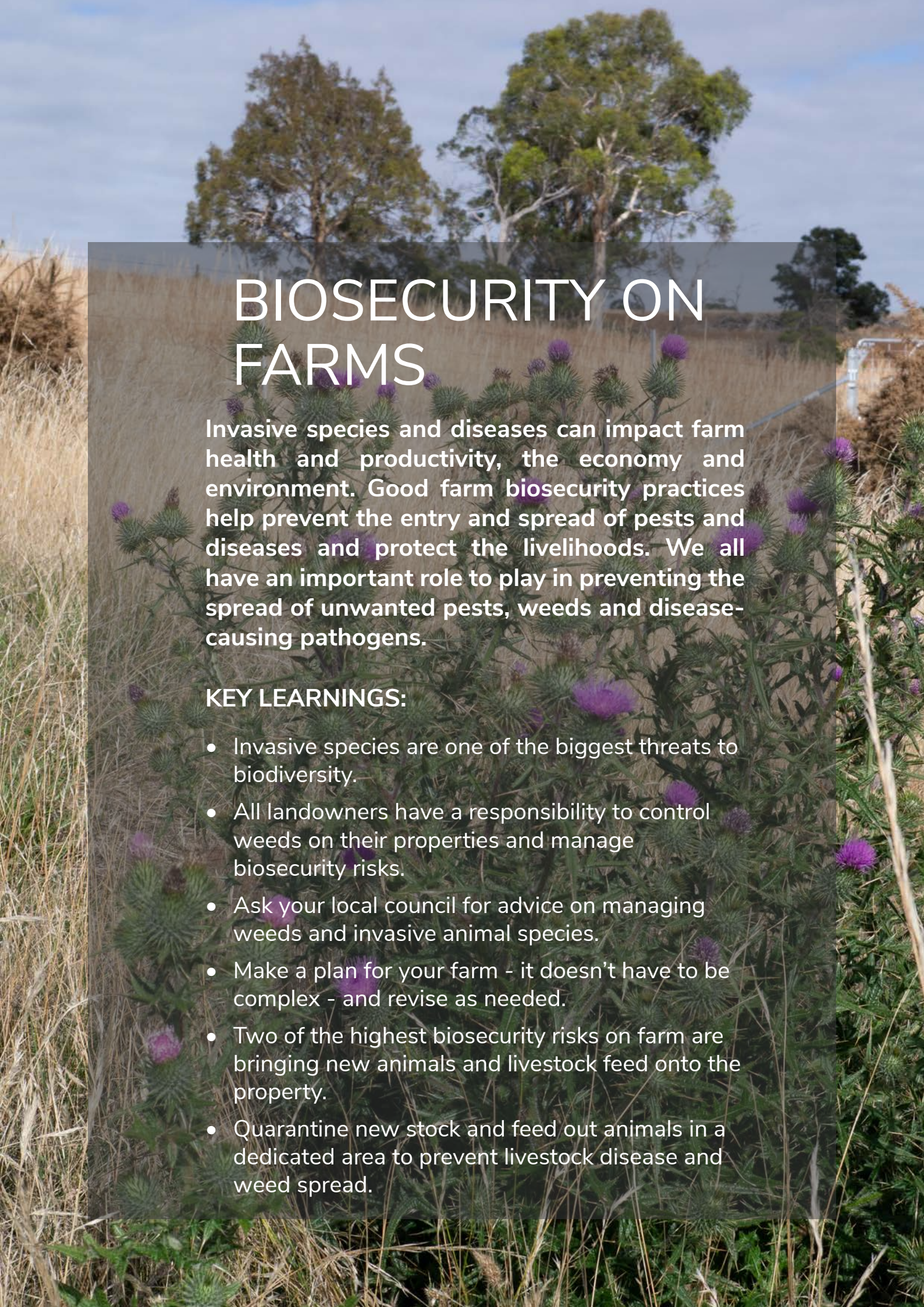
PIC and NLIS - NRE Tasmania
https://nre.tas.gov.au/Documents/NLIS_forHobbyFarmers.pdf

AWI Extension Tas
https://www.awiextensiontas.com/

Meat & Livestock Australia
https://www.mla.com.au/

Animal Health Australia (includes Tasmanian Livestock Health Monitoring Network reports)
https://animalhealthaustralia.com.au/

A national guide for smallholder livestock producers
https://www.mla.com.au/globalassets/mla-corporate/research-and-development/program-areas/livestock-production/a-national-guide-for-smallholders.pdf



BIOSECURITY ON FARMS

Invasive species and diseases can impact farm health and productivity, the economy and environment. Good farm biosecurity practices help prevent the entry and spread of pests and diseases and protect the livelihoods. We all have an important role to play in preventing the spread of unwanted pests, weeds and disease-causing pathogens.

KEY LEARNINGS:

- Invasive species are one of the biggest threats to biodiversity.
- All landowners have a responsibility to control weeds on their properties and manage biosecurity risks.
- Ask your local council for advice on managing weeds and invasive animal species.
- Make a plan for your farm - it doesn't have to be complex - and revise as needed.
- Two of the highest biosecurity risks on farm are bringing new animals and livestock feed onto the property.
- Quarantine new stock and feed out animals in a dedicated area to prevent livestock disease and weed spread.

Farm biosecurity responsibility is shared between farm owners, managers and handlers, the people working on the farm and farm visitors.

Report unusual diseases, pests or weeds to an agronomist, vet, NRE Tasmania, the Emergency Animal Disease Watch Hotline (**1800 675 888**) or the Exotic Plant Pest Hotline (**1800 084 881**).

Groups that play a role in protecting Tasmania's agricultural industry from the introduction and spread of weeds, pests and diseases include Government (state and federal), the scientific community, veterinarians and the local community.

GENERAL BIOSECURITY DUTY (GBD)

The 'General Biosecurity Duty' (GBD) is a legal obligation under the 2019 Biosecurity Act that came into effect on the 31 March 2021 The GBD operates as a statutory "duty of care" in respect to biosecurity. This means that a person has to take all reasonable and practical measures to prevent, eliminate, or minimise biosecurity risks. The GBD applies if that person knows, or it is reasonable to expect a person to know, that a risk may be presented by any dealing with biosecurity matter, or a carrier. Visit the Biosecurity Tasmania website for more information https://nre.tas.gov.au/biosecurity-tasmania

THE IMPACT OF FERAL ANIMALS, VOLUNTEER PLANTS AND WEEDS

Feral animals can carry disease causing organisms. Australia invests billions of dollars every year in the controlling these issues and preventing their ongoing spread. Volunteer plants can escape from production areas and create a 'green bridge' that harbours pests or diseases between growing seasons. Weed species are significant biosecurity problems in their own right, as well as being hosts to agricultural and horticultural pests.

Weeds can cause other issues for farm profitability - some can make livestock sick and many export markets have low to no tolerance for weed seed contamination, causing shipments to be rejected (e.g. grain markets). It is important to undertake active control measures for feral animals, volunteer plants and weeds.

A GROWING ISSUE

According to the State of the Environment Report for Tasmania (2024), pressures that are contributing to, and that will exacerbate the future spread of pests in Tasmania include:

CLIMATE CHANGE

Changing climatic conditions influence pest establishment and spread to areas that are not currently suitable for the species to survive or, in the case of pathogens, for disease symptoms to occur. Analyses suggest that some parts of Tasmania will become more suitable to some species with climate change therefore ongoing vigilance will be needed to control outbreaks or spread. Climate change also has the potential to limit the spread and even eliminate some pest species currently present in Tasmania.

FIRE AND FLOOD

These extreme events create disturbance and bare ground, which allows the establishment of many weed species. Floods also transport weed seed which exacerbates spread.

CHANGING LAND USE

Increased fragmentation through urbanisation and other development result in garden escapes, increased pressure from domestic cats, as well as spread of weeds and diseases through poor hygiene.

INCREASED MOVEMENT OF PEOPLE AND GOODS

Both from mainland Australia and overseas – this increases the risk of pest incursions being carried in on people, equipment and goods, including through the online garden trade.

Flooding in a post-bushfire landscape

WEEDS

A weed is a plant growing in the wrong place. Tasmania contains some of the most productive agricultural land in Australia; the climate, soils and rainfall are good for growth, however weed species also benefit from these conditions.

We want to protect our agricultural industries and the environment by keeping weeds to a minimum.

"Weeds reduce farm and forest productivity, displace native species and contribute to land degradation. The cost of weeds to agricultural industries is estimated at about $4 billion a year. The cost of weeds to the environment is difficult to calculate but could be greater than the estimated cost to agricultural industries"

- Department of Agriculture, Fisheries and Forestry

Australia's National Weed Strategy defines weeds as a plant that requires some form of action to reduce its harmful effects on;

1. The economy
2. The environment
3. Human health and amenity

Different weeds have different habitat preferences. For example amongst the declared weeds you will mainly find Boneseed, African boxthorn and Asparagus species near the coast while Crack Willow will be found along watercourses.

A weed management plan (WMP) has been written for all Tasmanian declared weeds. The WMP will state according to each municipality whether a particular declared weed is widespread or isolated in occurrence, and therefore if the goal is eradication or control.

HOW WEEDS SPREAD

Weeds spread in the environment as plant material or through seed dispersal. Plant material might be dumped garden waste or stem fragments (such as willows), whereas seeds can be dispersed by:

- animal movement (via droppings, fur and feathers)
- wind and water
- soil movement
- seed pod actions
- topsoil on vehicles or machinery moved between areas
- gravel and quarried materials
- soil on boots or clothing
- along roadsides (via vehicle movement)
- hay making machinery or hay bales moved between areas
- farm animals moved between sites
- fodder, grain or birdseed.

WONS AND DECLARED WEEDS

NRE Tasmania has a full list of all weeds declared under the *Weed Management Act 1999* in Tasmania. Plants become listed as declared weeds because of the level of threat they present.

Declared weeds that pose the biggest threat to the southern region include gorse (WONS), ragwort, bridal creeper (WONS), Chilean needle grass (WONS), pampas grass, blackberry (WONS), brooms (WONS), Spanish heath, California thistle, African boxthorn (WONS), boneseed, St. Johns wort, serrated tussock (WONS), and willows (WONS).

Control measures for these weeds should be implemented to ensure that further spread in the state / region is prevented and their impacts on the environment and Tasmania's agriculture are reduced.

Different categories of weeds

DECLARED listed under the Tasmanian Weed Management Act 1999, these weeds MUST be controlled under the law. Environmental and agricultural weeds can be declared weeds/ WONS.

WEEDS OF NATIONAL SIGNIFICANCE Across Australia, there are currently 32 Weeds of National Significance (WONS). These have been identified based on their invasiveness, potential for spread and environmental, social and economic impacts.

AGRICULTURAL weeds invade crops and pasture and cost money and time. Control measures can impact on the natural environment.

ENVIRONMENTAL weeds are often garden plants, often spread by birds or dumped garden waste. Coastal properties and bush areas can be particularly vulnerable to environmental weeds.

REFER TO OUR WEEDS OF SOUTHERN TASMANIA GUIDE FOR A FULL LIST OF PRIORITY WEEDS.


Serrated tussock
Nassella trichotoma

HIGHLY INVASIVE GRASSES

Highly invasive perennial grasses pose a serious threat to Tasmanian agriculture and horticulture by competing with desirable pastures and crops, reducing stock carrying capacity, tainting wool and fur and, in the case of one invasive grass, even causing stock injuries.

These invasive grasses also have a devasting impact on natural ecosystems, particularly in grasslands and grassy woodlands and forests, where they rapidly diminish the quality and diversity of the native ground-flora and impact on shrub and overstorey regeneration. This in turn can impact on native fauna, including a range of invertebrates dependent on native ground-flora for habitat.

These include:

- Chilean needle grass
- Texan needle grass
- Serrated tussock
- Mexican feather grass
- African love grass
- African feather grass
- Feathertop
- Espartillo
- Parramatta Grass
- Perennial Veldt Grass

weed control

When controlling weeds a big decision is what method to employ, and the options include mechanical, chemical, biological or manual removal. By far the best outcome though is covered by the saying “prevention is better than cure” so good hygiene is very important. Ensure contractors only bring clean machinery onto your property because “one year’s seeds makes seven years of weeds”.

PLAN YOUR WEED CONTROL

- Which method or combination of methods; mechanical, chemical, biological or manual?
- Placement and control of weed heaps (e.g. will a fire permit will be necessary if weed heaps are burned?)
- Special precautions if using chemicals near waterways
- Define a patch size that you can manage to control, and only take on an area where you know you can carry out follow up work. A lot of time, effort and money is wasted in weed control by not being able to follow up
- Start with smaller, outlier patches and work into the largest patch
- The mantra for effective weed control is follow up follow up follow up
- Make a site-specific plan
- New weed incursions which may result from drought, fire, flood, contaminated vehicles and farm equipment, imported feed and other materials
- Practicing strict bio-security measures and designating specific vehicle and equipment wash-down areas, monitor for new weed incursions, for example in new feed out areas for livestock
- Time of year is critical for successful weed management, herbicide treatment should only be employed on actively growing plants before they flower and set seed
- Don’t leave bare ground for more weeds to re-colonise. The timing for re-planting with beneficial plants is critical, not too soon in case soil stored seed germinates, but before other weeds take over the bare ground.

HEAVY MACHINERY

Heavy machinery such as excavators or dozers can be used for raking up dense woody weed infestations (e.g. gorse or broom) or removing willows from rivers and streams in conjunction with the cut stump and paint method.

A mulching machine or meri-crusher attached to a tractor is another control method which mulches plant material.

Heavy machinery can be a good initial option if weed infestations are large and dense. However, mechanical control creates soil disturbance. After the initial control, a mass germination will occur from soil-stored seed, so follow up control is imperative.

Excavators can also be used to remove riparian and aquatic weeds. The benefits of mechanical control mean that less chemical is being applied, particularly if the target weeds occur in a waterway. However the machine operator needs to be very careful not to alter the structure of the waterway. Also consider that the excavated material still needs to be disposed of, which may require burning the heap.

Mulching machine at work on a dense gorse infestation
N. Crane

Mass germination of soil stored seed after gorse removal
A. Fergusson

MANUAL REMOVAL

Hand-pulling

This method can be very successful as long as it is followed up. Start with the outliers and small isolated patches and work into the thickest patch of weeds. Don't clear large patches of weeds at once as it results in bare ground and weeds recolonising. Give natives a chance to germinate and establish ground cover before removing the next patch of weeds.

Cut and paint

Involves cutting the stem or trunk of the weed and applying Glyphosate directly to the cut stump within 30 seconds of cutting. This method results in much less chemical in the environment, the chemical is not applied with a sprayer so is safer for the operator and results in targeted application. The cut material will still need to be disposed of appropriately.

Working near waterways

Controlling weeds in or near waterways can be challenging. By law a person must not apply chemicals within 0.5 km up-stream of potable water intake in flowing water (a river or stream), or within 0.5 km of a potable water intake in a standing body of water such as a lake, pond or reservoir. Roundup Bioactive® or Weedmaster 360® without added surfactants are the only safe option for infestations near waterways (these are the only herbicides registered for use near waterways).

BIOLOGICAL

A number of different biological control agents are used in Tasmania. For example, the gorse spider mite lives in colonies on the host, covered by a web and feeds on the gorse plant. Often biological control weakens the host, or interferes with the fertility of the plant, but may not kill the host.

CHEMICAL

We would all like to use fewer chemicals in the environment, but sometimes the careful use of chemicals can result in less physical disturbance to a site.

Spraying in a sensitive area an operator is using correct personal protective equipment as well as a dye in the spray
J. Cooper

In a particular situation it may be possible to use the cut and paint method, or drill and fill which are very target specific applications, rather than spraying which has the potential to harm non-target plants. The most important message for chemical use is to READ THE LABEL, and mix only at the rates as directed. Use the correct chemical for the task and please consider your own safety and biodiversity. It is possible to look at chemical labels and Material Safety Data Sheets (MSDS) on line before purchasing chemicals, and guidelines are also given on the NRE Tasmania website under the chemical control link for specific weeds.

ChemCert courses are run periodically in all states; these courses are accredited and cover safe chemical handling and use. For more information visit their website: www.chemcert.com.au. Wearing the correct protective equipment is essential, and can include gloves, face mask, long sleeved shirt and trousers as a minimum.

Make sure to correctly identify your target weed as they can be similar to some native plants:

WEED		LOOKALIKE NATIVE SPECIES
Gorse *Ulex europaeus*	VS	Native gorse *Daviesia ulicifolia*
Spanish heath *Erica lusitanica*		Common heath *Epacris impressa*
Cumbungi *Typha spp*		Narrow-leaf & broad-leaf cumbungi

With its spiny branches, native currant bush (*Coprosma quadrifida*) may look like a problem species, but is a native that produces berries for native birds.

Native currant bush

INVASIVE ANIMALS

Invasive species are one of the biggest threats to biodiversity and agriculture in Tasmania.

Invasive species have the potential to harm not only our environment but also our economy, lifestyle and even human health. Invasive species currently cost the state millions of dollars each year in lost production and management costs and have far reaching impacts across all sectors of the community.

Feral Cat eating roadkill
Els Wakefield

The Australian Pest Animal Strategy 2017- 2027 conservatively estimates the national economic impact of pest animals, particularly in agricultural systems, at between $720 million and $1 billion annually, in production losses and public and private management costs.

Currently Tasmania is free from many of the invasive species that damage crops, spread disease, threaten native species survival and disturb ecosystems on mainland Australia.

Without community action, the situation in Tasmania could change rapidly. We need to be vigilant and prepared to rapidly respond to the threat posed by new and emerging invasive species. We also need to work together to manage the impacts of invasive species already established in Tasmania.

Feral Cat
Lindsay Cooke

CATS

Cats prey on many native species and compete with native carnivores. They can spread diseases such as Toxoplasmosis, which can be transmitted to humans and other mammals. Toxoplasmosis can kill native animals and cause abortions in sheep and goats.

The *Cat Management Act 2009* helps landowners manage the impacts of feral cats. The Act provides statutory powers for primary producers, land owners and land managers to trap, seize or humanely destroy stray and feral cats in certain circumstances. Councils can also declare cat management or prohibited areas in their municipality after a public notification process.

It is important that domestic cats do not provide a source of recruitment for the feral cat population. Responsible pet ownership such as microchipping and desexing domestic cats helps prevent unwanted kittens from becoming feral cats and has important animal welfare benefits. Desexed cats are less likely to wander and be injured in traffic or fights and microchipping allows for cats to be returned home. Cat owners can further assist in reducing the environmental impact of their cats by confining them to their properties, particularly if they live near bushland.

Factsheets available on the NRE Tasmania website

FALLOW DEER

The *Tasmanian Wild Fallow Deer Management Plan 2022-27* sets contemporary objectives for managing wild fallow deer in Tasmania. Tasmania's population of fallow deer has more than tripled since the 1970s and it is estimated that by mid-century the population could exceed one million (*Invasive Species Council*). Fallow deer impact on native wildlife and vegetation, cause soil erosion, spread weeds and increase the potential for disease transmission.

RATS

Rats can carry and spread diseases that are harmful to humans, livestock and native species. In large numbers they can destroy crops, will consume animal feed (e.g. poultry grain) and can contaminate feed and water supplies. The presence of rats may also attract snakes or feral cats. While rodent control is an important part of farm planning, it is also important to consider the potential impacts of control methods - such as the impact of rodenticide on wild raptor populations such as Masked Owl or scavengers such as quolls or Tasmanian devils (see the 'Living with Native Wildlife' chapter).

RABBITS

A pair of rabbits can produce 30-40 offspring in a year, and populations can increase rapidly when conditions are right.

On farms they compete with livestock for pasture (9-18 rabbits can eat the equivalent pasture of one sheep), impact on native vegetation and can change the composition of the vegetation communities. At high levels they can eat the grass down to bare soil, leaving it open to erosion and weed infestation.

High rabbit populations can cause a rise in predator numbers, such as feral cats, which has a flow on effect for wildlife and spread of disease.

Control measures for rabbits should aim to reduce the resident population by more than 90%, otherwise the population can return to pre-control levels within one breeding season. Several methods are usually required to make an impact on the population. Where rabbit numbers are excessive and causing significant impacts, NRE Tasmania can advise landowners on management options.

For landholders who own pet or meat rabbits, feral rabbits can also spread diseases such as calicivirus and myxamatosis - used as biological control agents. NRE Tasmania has advice on how to protect domestic rabbits

RESPONSIBLE PRODUCTION PRACTICES

EQUIPMENT USE AND STORAGE AREAS

Poorly maintained farm equipment and storage areas can harbour weeds, pests and diseases. Simple measures to reduce the risk of spread include:

Equipment: have dedicated tools, clothing and footwear for use in production areas or on livestock and plants affected by pests or disease. Always work with sick plants or livestock last (work from clean to dirty).

Storage areas: clean and disinfect equipment storage areas regularly. Keep feed in a clean, dry store and regularly inspect feed supplies for insects, pests, mould, and damage. Ensure they remain secured and fit for purpose. Feed storage areas can be a point of contact for livestock and pest animals with issues like toxoplasmosis (cats) and salmonella (rodents) transferred to livestock through feed contaminated with excrement from infected pests.

WASTE MANAGEMENT

Leaf material, fallen fruit, abandoned orchards or vineyards can attract or harbour pests and diseases. It is important to break the life cycle of insect pests. Collect all plant waste that show signs of pests or disease and dispose of it by deep burial or burning, well away from water sources, nursery and production areas. For cuttings or healthy waste plant material, use a dedicated waste management facility or compost it thoroughly.

Effluent, waste and dead livestock can harbour disease-causing organisms. Disease agents in effluent can contaminate pastures, stockfeed and water sources. Dispose of animal carcasses and waste as soon as practical in a segregated area that cannot be accessed by livestock, or wild and feral animals to avoid the potential spread of contaminants by water, wind or animals.

PLANT AND LIVESTOCK HEALTH MANAGEMENT

Actively monitor the health of your crops and livestock. Isolating and treating stock as soon as an issue is detected can limit impacts on farm productivity, profitability and the environment. The consequences for introduction and spread of pests and pathogens can be severe, both in stock replacement costs and, when livestock are involved, animal welfare.

BRINGING NEW ANIMALS ONTO YOUR FARM

Keep new livestock in a designated quarantine area separated from current livestock for at least four weeks. This will give you time to observe the new animals and ensure they don't show signs of disease or parasites and get them up to date with their vaccinations and internal and external parasite treatments. A vet examination can be done if required.

Ensure the quarantine area is kept clean and rodent-free if possible. Have designated equipment for use only in the quarantine area including boots and overalls and minimise the number of people who enter the quarantine area, maintaining a high level of hygiene.

FENCING

Ensure fences are maintained to prevent livestock from straying onto and off your farm. Double boundary fences prevent livestock from making direct (and nose-to-nose) contact with neighbours' livestock. Alternatives with additional benefits are fenced-off revegetation planted as wind breaks or corridors between properties.

CONSEQUENCES OF THE INTRODUCTION AND SPREAD OF PESTS AND DISEASES FOR LIVESTOCK AND CROPS

There are significant consequences in failing to manage biosecurity risks for farms with livestock, cropping and/or perennial horticulture. The table on the following page highlights some of these;

	PEST/ DISEASE	HOST	SPREAD	SIGNS	CONSEQUENCE
LIVESTOCK	Lice	Sheep, cattle, goats, pigs	Physical contact, clothing	Itching, biting at wool and/ or pulled wool, bare patches	Low wool quality Discomfort
	Johnes disease	Cattle (bovine) Sheep (ovine), alpaca, goat	Movement of infected livestock, and faeces	Persistent scouring and weight loss	Death of infected sheep and cattle
	Tapeworms	Dogs spread sheep measles to sheep, and hydatids to cattle and sheep	Dogs eating contaminated offal and meat, then defecating in pastures grazed by livestock.	No obvious signs when animal is alive. Cysts in muscle (sheep measles) and organs (hydatids)	Sheep measles – carcass trimmed or condemned at abattoir; hydatids – zoonotic (humans can contract it) and offal condemned at abattoir
	Footrot	Sheep and goats	Movement of infected animals	Lameness, foot lesions	Discomfort, lower feed intake, lots of time and effort to eradicate
	Toxoplasmosis	Cats, sheep, birds, marsupials	Infected cat faeces, cats ingesting infected meat (sheep carcasses, rodents, birds or marsupials)	Low lambing percentage	Abortion or stillbirth in lambs. Abortion in pregnant women or foetal abnormalities
CROPPING	Wheat Streak Mosaic Virus	Wheat	Seed and wheat curl mite	Leaf streaking, plants losing leaves or failing to grow	Loss in yield
PERENNIAL HORTICULTURE	Blueberry Rust	Blueberries	Movement of infected plants, spores on clothing	Lesions on leaves	Extensive defoliation
	Phytophthora	Wide host range of both cultivated and native woody shrubs and trees	Movement of infected soil and water	Drought like symptoms, yellowing of leaves	Plant death
VINEYARDS	Phylloxera	Grape vines	Infected plants, people and clothing, equipment and vehicles	Yellowing of vines and stunted growth	Yield decline

PLANNING, TRAINING, RECORD KEEPING AND MONITORING

Early detection of pests and diseases gives you the best chance of preventing them from establishing on your farm and ongoing additional expenses for their control. Early detection also increases the chances of eradicating a new pest or disease. Recording the absence of pests or diseases is just as important as recording what you do see.

Regularly monitor your crops and livestock. Become familiar with pests and diseases commonly found in your region so you will know if you spot something different. Sentinel plants or livestock can provide early warning of emerging pest problems. Display posters showing common pests and diseases to help staff and visitors with identification.

Developing and implementing a Farm Biosecurity Plan can help in the identification of risks and in designing appropriate biosecurity measures for your farm. These plans can also help in identifying training needs and record keeping to allow trace back of any problems on your farm.

The Livestock Biosecurity Network (LBN) run planning workshops where you can develop a biosecurity plan for your farm. LBN also facilitates groups of producers in developing regional biosecurity plans to prevent or manage livestock related weeds, pests and diseases.

FARM BIOSECURITY

LEGEND

1. Gate signage.
2. Home & farm offices.
3. Car washdown, visitor boot and hand wash stations. (run-off away from resources).
4. Livestock quarantine area (new livestock kept separate from existing livestock until sure they pose a low risk).
5. Plant quarantine area.
6. Waste water (fenced from animal access).
7. Designated feeding out areas (monitored regularly for weeds).
8. Farm tracks (limit access and monitor regularly for weeds).
9. Restrict stock access to waterways using fencing and off-stream water points.
10. Vermin proof storage of stock feed
11. Re-vegetated buffer from neighbour's stock.
12. Coordinate stock movements with neighbour to prevent nose to nose contact.

A spatial representation of good biosecurity practices on a livestock farm.

FURTHER READING

Tasmanian Weed Index
https://nre.tas.gov.au/invasive-species/weeds/weeds-index

Weeds of Southern Tasmania
https://nrmsouth.org.au/wp-content/uploads/2023/04/NRM_South_Weeds_Booklet_2017_revision.pdf

Weeds Management Wall Chart
https://nrmsouth.org.au/wp-content/uploads/2023/04/weeds_time-it-right.pdf

Guidelines for Safe and Effective Herbicide Use Near Waterways
https://nre.tas.gov.au/Documents/herbicide_guidelinesFINAL2012.pdf

Managing weeds, pests and diseases
https://nre.tas.gov.au/agriculture/multifaceted-agriculture/small-and-new-landholders/biosecurity-for-new-or-small-landholders

Invasive species resources in Tasmania
https://nre.tas.gov.au/invasive-species

Responsible Cat Ownership in Tasmania
https://nre.tas.gov.au/invasive-species/responsible-cat-ownership

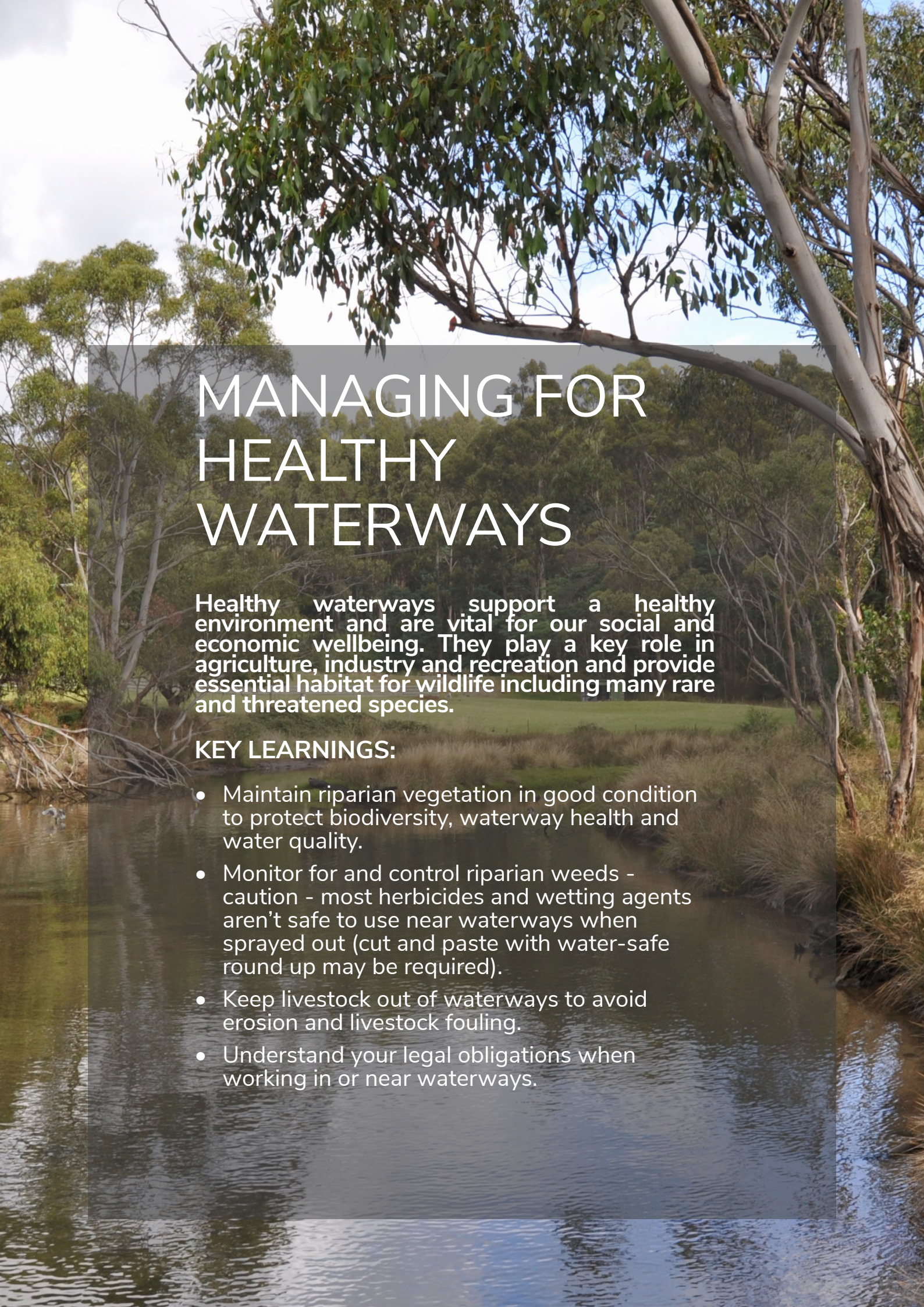
Responsible rodent control
https://www.landcaretas.org.au/rodenticides

Farm Biosecurity
https://www.farmbiosecurity.com.au/

Tas Farmers Biosecurity information
https://tasfarmers.com.au/biosecurity-general

Biosecurity resources (includes How to videos on washdown)
https://nrmsouth.org.au/project/biosecurity/

Tasmanian Washdown Guidelines for Weed and Disease Control
https://nre.tas.gov.au/documents/washdown-guidelines-edition-1.pdf



MANAGING FOR HEALTHY WATERWAYS

Healthy waterways support a healthy environment and are vital for our social and economic wellbeing. They play a key role in agriculture, industry and recreation and provide essential habitat for wildlife including many rare and threatened species.

KEY LEARNINGS:

- Maintain riparian vegetation in good condition to protect biodiversity, waterway health and water quality.
- Monitor for and control riparian weeds - caution - most herbicides and wetting agents aren't safe to use near waterways when sprayed out (cut and paste with water-safe round up may be required).
- Keep livestock out of waterways to avoid erosion and livestock fouling.
- Understand your legal obligations when working in or near waterways.

BENEFITS OF HEALTHY WATERWAYS ON YOUR PROPERTY

The land immediately surrounding waterways is highly productive and fertile. This 'riparian land' is the part of the landscape adjoining rivers and streams that has a direct influence on the water and aquatic ecosystems within them. It is important to manage this land sensitively, as downstream effects impact on both production and biodiversity. Riparian land includes the stream banks and a strip of land of variable width along the banks.

Keeping riparian vegetation in good condition benefits:

BIODIVERSITY

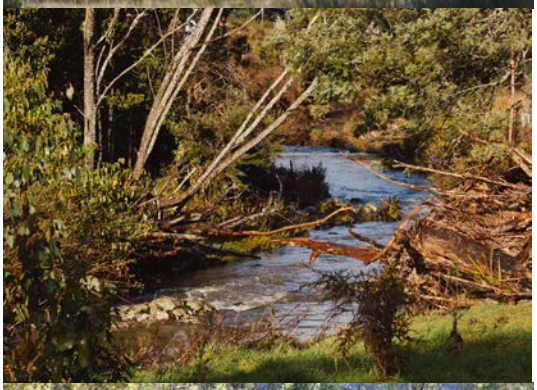
- Landscape refuge for native flora and fauna
- Corridors for wildlife
- Habitat for rare and threatened species
- Contributes to water availability and nutrients cycling on a property and landscape scale
- Shade from riparian vegetation, regulates water temperature, and also drops fragments into waterways that are used by fish for shelter, feeding and spawning

PRODUCTIVITY

- Water resources used in agriculture and industry
- Stock management and shelter: riparian vegetation creates shade and acts as a wind break
- Supports beneficial species that help control crop and pasture pests

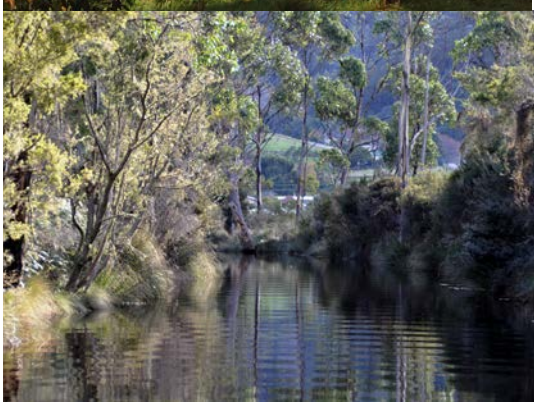
SOIL AND WATER CONSERVATION

- Reduces erosion and retains sediment by physically slowing water and wind movement
- Maintains river courses, stabilises soil surfaces through the action of roots, organic matter and increased infiltration
- Lowers the water table through root action reducing water logging and salinity
- Filters pollutants from surface water flows: ground cover plants and the litter layer help filter out pollutants before they reach the waterways



AESTHETICS AND WELLBEING

- Provide a connection to place
- Support recreation (bird-watching, bush walking, fishing)
- Provide landscape values
- Preserving original landscape
- 'Spiritual, therapeutic effect'



MANAGING WATERWAYS ON YOUR PROPERTY

Waterways and the riparian land surrounding them have undergone significant modification as a result of human activity. In many areas waterways are in poor condition. The modification of waterways has many unintended consequences that can severely impact productivity, social wellbeing and the broader environment; examples include the loss of productive farmland through erosion, and the loss of biodiversity and clean drinking through contamination of waterways by agri-chemicals, nutrients and chemical fertilisers.

Clearing riparian vegetation to make way for farmland and development, stream channel straightening, gravel extraction and de-snagging of waterways are some example of activities that can lead to widespread bank erosion, lowering of stream beds, localised flooding and the spread of willow and other invasive weeds. It is important to consider the long-term consequences of undertaking activities in and around waterways, which may be well-intended, but can adversely affect the health of waterways further along the catchment, either upstream or downstream.

SIGNS OF AN UNHEALTHY WATERWAY

Bed Lowering

Bed lowering, or bed incision, is erosion of a riverbed resulting in a deeper channel. This can be a natural process, but where it occurs at a faster than normal rate for any given river, it is viewed as an undesirable erosion problem. Bed lowering is often a precursor to bank erosion as a lowered bed leaves banks unstable.

The most common bed lowering process is the formation and upstream progression of a head cut (a small waterfall that moves upslope as its face is undercut from the action of falling water). Head cuts are a common feature of gully erosion but can also occur in the bed of a river. Successive waves of head cut progression can significantly lower the bed of a river quickly resulting in bank collapse and channel expansion.

Head cut in top of gully, rock used to slow erosion. Rick James

Two head cuts degrading creek. Rick James

Bank Erosion

Bank erosion can be a natural process. Accelerated bank erosion exceeds what would be normally expected for any given river. There are a number ways that bank erosion can occur and correctly identifying the cause is essential to effectively address the issue:

- Bed lowering: As the bed drops the “foundation” of the bank is lost. This is usually followed by bank slumping.
- Fluvial scour: The direct scouring of an exposed bank, typically on an outside bend.
- Hydraulic pressure: Groundwater seeping through the face of the bank causing destabilisation followed by slumping.
- Surcharge: The weight on top of the bank that causes collapse e.g. a large tree or building.

Depending on the site, some or all of the above may be operating.

An example of bank erosion. Rick James

RIVER CONDITION CHARACTERISTICS

CHARACTERISTIC	GOOD CONDITION	POOR CONDITION
Weeds	Few, if any, weeds present. If weeds are present, then they are low impact species only that will not affect native plant regeneration	River bank largely covered with weeds including many high threat weeds that will prevent the natural regeneration of native plants. Willow trees can gradually encroach into the centre of a waterway creating a shallower wider water course, which in turn leads to flooding and bank erosion.
Livestock	Livestock should have restricted or controlled access to riparian areas through adequate fencing. If limited access is given, this should only be to areas that are not erosion prone e.g. the inside of a bend. Stock should be prevented from entering the water course.	Livestock have free access including into erosion prone sections of the channel e.g. outside bends, for water and grazing. This leads to soil compaction and erosion. Livestock will also foul waterways leading to water quality and public health issues.
Landscape health	The surrounding landscape contains little to no bare ground; soils are healthy with good physical structure. These conditions allow rain to easily penetrate the soil profile, vegetation traps sediment and the lack of bare ground means soil is retained in the landscape and is prevented from entering a water course.	The presence of bare ground and compacted soil resulting from activities such as retaining fallow ground for extended periods, overgrazing and land clearance can lead to significant soil erosion, this can result in soil, nutrients and harmful chemical entering waterways.
Riparian vegetation and connectivity	Intact and diverse riparian vegetation provides connectivity for wildlife, enabling species to access essential resources and new habitat in the landscape. Native riparian vegetation helps trap soil and nutrient run off from the surrounding land, preventing them from entering adjoining waterways. It also provides shade, which regulates water temperature, and provides essential habitat and food resources for native species. The presence of large woody debris in the river helps trap sediment and helps to “lock” the bed of the river together, important for erosion control. It also provides habitat and food for aquatic life.	Fragmented riparian vegetation (containing large areas of exotic vegetation and/or cleared land) can prevent native wildlife from accessing essential resources and colonising new habitat in the landscape. A bank with poor vegetation cover can be subject to four times the erosive force during floods compared to a bank with a good cover of native riparian vegetation Bank destabilisation often results in massive increases in channel width, channel incision and gully erosion. Significant quantities of nutrients and sediment can enter waterways and adversely affect water quality. Increased nutrient levels (e.g. nitrogen and phosphorus), combined with increased temperatures from a lack of shade, stimulates weed and algal growth. This may cause major changes in aquatic habitat, reduce oxygen levels in the water column and reduce aquatic fauna, including fish. Significant in-stream vegetation can also lead to slowing of the stream flow and the watercourse becomes broader and shallower, leading to bank erosion.

ADDRESSING RIPARIAN RESTORATION

There are a number of approaches that can be applied to address riparian restoration, depending on the underlying issue. It is recommended that you consult with an expert before undertaking any significant works.

Common management options include:

- Rock ramp bed controls
- Rock lined scour pools (typically used to arrest a head cut in a gully system)
- Timber V-weir bed control
- Timber or rock girdles (structures installed at bed level)
- Re-snagging
- Realignment and log front wall construction
- Direct protection of the bank e.g. rock revetment (sloping rock structure), log walls, pinning large woody debris against the toe of the bank
- Groyne deflection structures e.g. rock groynes, pin groynes (low wall or sturdy timber barrier), log groynes
- Gabion baskets
- Revegetation

Assessing the causes will assist in developing a plan to address the problems

NATIVE VEGETATION AND WATERWAYS

Native vegetation plays a vital role in maintaining waterway health. Existing native species should be maintained and where appropriate actively encouraged to recolonise areas along waterways. This can be achieved by using livestock fencing to reduce grazing pressure and allowing early colonising plants such as Silver Wattle to establish - particularly in erosion prone areas.

In some cases, natural re-colonisation by native species may be hindered by ongoing disturbance and invasive weeds. Revegetation work may need to be carried out in such circumstances and often plays an integral role in restoring waterway health.

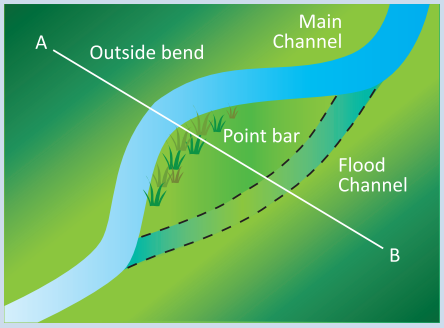
Establishing suitable native vegetation is particularly important in erosion-prone areas where bare ground requires immediate stabilisation. Revegetation should be carried out in conjunction with weed control and to support newly established erosion control structures. However, it is essential that factors such as species selection and planting sites are taken into consideration when revegetating waterways.

REVEGETATION CONSIDERATIONS

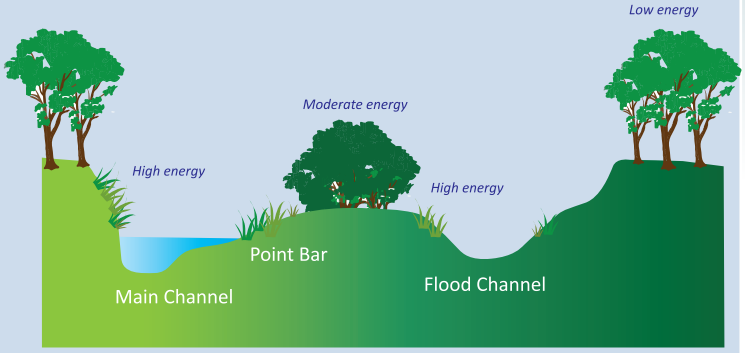
Some key considerations before carrying out revegetation work within the stream channel zone:

- Find a section of river similar to the one you will be working on that has good native vegetation cover. Observe which species are growing where. Which species can tolerate high tractive stress? What plants only seem to grow in areas of low tractive stress?
- Plan your revegetation works around your observations. Some plant species can hold on in the highest energy areas e.g. on the outside of a bend, while others can only grow where the energy level is low.
- It is important to maintain sufficient channel width without the restrictions caused by larger shrubs or trees. This is required for the channel to retain its hydraulic efficiency (e.g. its ability to convey flood flows). Planting large shrubs and trees on point bars, or within the flood channel zone is not a good idea as this will restrict the channel width over time.

The following diagrams show the typical variation in water energy flow across the channel of a partially confined watercourse.



River Bend on a Partially Confined River



A. Outside bend Cross Section B

EXAMPLES OF TASMANIAN NATIVE PLANTS THAT ARE SUITABLE FOR RIPARIAN REVEGETATION AND IDEAL PLANTING LOCATION

ENERGY LEVEL	TYPICAL CHANNEL ZONE LOCATIONS	TYPICAL RIPARIAN PLANTS
High	• The outside of bends • Flood channels • Some bank attached bars • Some mid-channel islands	Woolly tea tree (*Leptospernum lanigerum*) River tea tree (*Leptospernum riparium*) Bottlebrush (*Callistemon spp.*) Mat rush (*Lomandra spp.*) Rushes (*Juncus spp.*) Sedges (e.g. *Carex spp.*)
Medium	• Banks along straight river reaches • The back of point bars	Blackwood (*Acacia melanoxylon*) Silver wattle (*Acacia dealbata*)
Low	• Upper bank locations • Floodplains	Black gum (*Eucalyptus ovata*) White gum (*Eucalyptus viminalis*)

*Plant Tasmanian native plants that grow in your local area. Some native plant nurseries may be able to grow native plants with longer root systems on request; these plants are grown in deep tube pots, specifically for the purpose of revegetating riparian areas.

Many species of mat rush (Lomandra) are ideal for revegetation work in high energy flow areas of the channel. The leafy crown offers little resistance to flood flows while the extensive, fibrous root network is highly effective at binding soil together. *Lomandra longifolia* can often hold fast as the bank it was growing on has eroded. It can sit in the channel in a supporting column of soil in which its roots still hold firm.

Stock fencing protecting new riparian plantings

LIVESTOCK AND LANDSCAPE

Livestock should be managed sensitively around waterways. Maintaining good ground cover in surrounding pasture and riparian land is key to improving the health of waterways.

- Over-use of land within a catchment can contribute to a decline in waterway health, particularly where over-grazing results in poor ground cover (areas of bare ground) and compacted soil, leading to increased run off and soil erosion.
- Set a grazing regime around waterways that improves perennial vegetation cover and soil health using targeted grazing.
- Where possible use a flexible fence design, such as temporary electric fencing, near waterways. This helps to influence when and where you can graze and how long you rest the site for and can also assist planning for possible flood events.
- Knowing where your stock need to be in the next six months can influence how your riparian zone is managed as part of a planned grazing system.
- Provide off-stream watering points for livestock. Stock should be prevented from accessing waterways, particularly in erosion-prone areas.
- Retain native riparian vegetation to provide a minimum 10 metre width (buffer) upslope (away from) the top of the bank. Where no native vegetation is present, replant suitable native species, especially ground cover plants. For maximum trapping of sediment, nutrient and other contaminants, combine a 10 metre riparian vegetation buffer with a grass filter strip.
- Livestock can be used to manage vegetation near waterways, for example to control woody weeds in a revegetation site, but this requires sensitive forward planning.

Top Left: Eroding banks from stock access
Bottom Left: Cattle excluded by fencing,
Right: grazing paddocks, non grazed top paddock with weed growth.

WORKING AROUND WATERCOURSES

A watercourse is defined as a 'river, creek or other natural stream of water (whether modified or not) flowing in a defined channel, or between banks, notwithstanding that the flow may be intermittent or seasonal or the banks not clearly or sharply defined'.

- Water Management Act 1999

STEP BY STEP PROCESS FOR WORKS

For low impact works such as tree planting and fencing, steps 1 and 2 would normally suffice. For more complex activities such as the removal of willow using machinery or the construction of erosion control structures it is advisable to follow all five steps listed below. In-stream works may require a permit from your local council or from NRE Tasmania.

The Water Management Act 1999 does provide powers to require landowners to remove works from a watercourse if it is found to be done without a permit when a permit would have been required. The Water Management Branch at NRE Tasmania can review proposed works and provide guidance to landowners.

STEP 1: Establish Land Tenure boundary prior to works

STEP 2: Seek advice from NRM agencies and local councils

STEP 3: Seek advice from a river specialist required prior to in-stream works

STEP 4: Consultation with the NRE Tasmania Water Management Branch. Permits may be required for the following types of works: *Construction of battens, rock walls on banks or any structures placed in waterways, particularly those that may impede/alter current water flow, use of machinery in watercourses

STEP 5: Consultation with your local Council planners and Environmental Health Officers to establish if planning permit required

*Any activities that are likely to have a negative impact on native wildlife, in particular Platypus and their burrows, need careful planning and advice should be sought from NRE Tasmania's Policy and Conservation Assessment Branch.

In the unlikely event that disturbance or destruction (taking) of a Platypus burrow is unavoidable, a permit is required. Permits are unlikely to be issued for the taking (destruction) of a Platypus and any works must be undertaken in such a manner that taking of a Platypus does not occur. Avoid major earthworks near or within waterways between December and April (breeding season for Platypus). If this is not practical, further advice should be sought from the Policy and Conservation Assessment Branch.

USEFUL RESOURCES

EDO Tasmania have developed a guide for landowners to help them understand their legal obligations when working near waterways. This guide be found online, including in NRM South's resource library: nrmsouth.org.au/resource-library/

NRE Tasmania also have an online Wetlands and Waterways Works Manual that provides further details on working in watercourses and relevant legislation.

RIVER MANAGEMENT MYTHS

TREES CAUSE EROSION

The inter-relationship between riparian vegetation and channel form is complex. A river with a healthy native riparian plant community will be less erosion-prone than a similar system where the plant community has been disturbed. Large fallen trees can create an area of exposed bank and/or lodge in the channel and deflect flows into the bank, causing erosion. However, these situations are more than offset by the work trees do to prevent erosion.

BANK EROSION CAN BE FIXED BY BATTERING THE BANK

Battering a steep eroding bank will do nothing to stop the erosion. The only case where this may work is when the battered bank is immediately revegetated with suitable riparian plants and these plants have sufficient time to establish before the next large flood.

PUSH GRAVEL AGAINST AN ERODING BANK FROM THE OPPOSITE BAR TO PREVENT FURTHER EROSION

Moving gravel from the low energy side of the channel e.g. a point bar, to the high energy side – an eroding outside bend – will offer temporary protection at best. If the river had sufficient energy to move the material to the point bar, then it certainly has sufficient energy to move it away from the higher energy environment on the opposite bank. The gravel will simply be washed away.

USING CONCRETE FOR BED CONTROLS OR BANK PROTECTION IS THE BEST METHOD

Concrete is hard, but also inflexible. Water will always find a way of working around the edges of concrete structures, i.e. out-flanking them. Rock structures are more flexible as the overall structure can move to fill any localised scouring while maintaining overall integrity.

USING BUILDERS RUBBLE, OLD TYRES AND CAR BODIES ARE CHEAP WAYS OF PROVIDING BANK PROTECTION

Apart from being illegal in many cases, simply dumping rubbish over the bank is unlikely to be effective. However, clean builders rubble can be used in the core of revetment work and is then “faced-off” with quarry rock.

WILLOWS AND OTHER EXOTICS ARE BETTER THAN NATIVE PLANTS AT PROVIDING BANK PROTECTION

Willows were used extensively for riverbank protection in the past. Species such as Crack Willow (*Salix fragilis*) strike easily from green canes and can establish quickly and easily along a riverbank. In the absence of suitable native riparian plants, willows can temporarily protect against erosion and stream bed lowering, but in the long-term are likely to accelerate bank erosion and cause localised flooding. Carefully selected native plants will protect banks from erosion without any of the unintended consequences associated with the use of exotics. Develop a strategic plan for managing willows and consider factors such as where they are positioned along a water course.

Willow on inside bend, impacting on erosion on opposite bank

STRAIGHTENING OUT THE CHANNEL WILL SOLVE THE BANK EROSION PROBLEMS

Rivers rarely flow in straight lines. Straightening a river increases its bed gradient as it now has to travel over less distance per unit drop in elevation. Increased gradient means faster flowing water in a created channel with disturbed bed material. The result is almost always bed incision which leads to further bank erosion.

BUILDING LEVEE BANKS WILL STOP FLOODING

Levee banks trap more water in the channel during floods. This increases the energy within the channel itself and can trigger bed and bank erosion. As water leaves the channel and spreads out over a floodplain it loses energy and deposits sediment (this is how floodplain form).

VEGETATION AND LARGE WOODY DEBRIS BLOCK UP CHANNELS AND CAUSE FLOODING

More than 10% of the channel cross-sectional area needs to be blocked before any discernible backwater effect is evident. Many "messy" or "overgrown" sections of channel are well below this figure and as a consequence has very little impact on the hydraulic efficiency of the channel.

REMOVING LARGE WOODY DEBRIS(DE-SNAGGING) WILL REDUCE FLOODING

Large woody debris in the bed of a river often acts like the reinforcing bars in concrete, providing extra strength to the overall bed matrix of timber, sand, gravel etc. Removing this reinforcing can lead to bed lowering problems.

CLEARING TREES AND SHRUBS OFF THE BANK WILL HELP REDUCE FLOODING

Water will flow along the face of a well vegetated riverbank at approximately half the speed of a cleared one. Because of the mathematical relationship between water velocity and the energy it contains, doubling the speed (velocity) will result in the moving water having four times as much energy.

PLANTING TREES ON TOP OF THE BANK WILL STOP IT ERODING

This is partly true, but if the bank is higher than about 2 metres, then trees on the top of the bank are unlikely to do much to stop the toe (bottom) of the bank undercutting. Vegetation on the bank face, and at the toe of the bank are required. The one exception to this is where bank erosion is being caused by water seeping through the bank from under the floodplain. In this case trees planted back from the top of the bank can help reduce bank moisture and thus improve stability.

ALLOWING STOCK TO GRAZE RIVERBANKS DOESN'T DO ANY HARM.

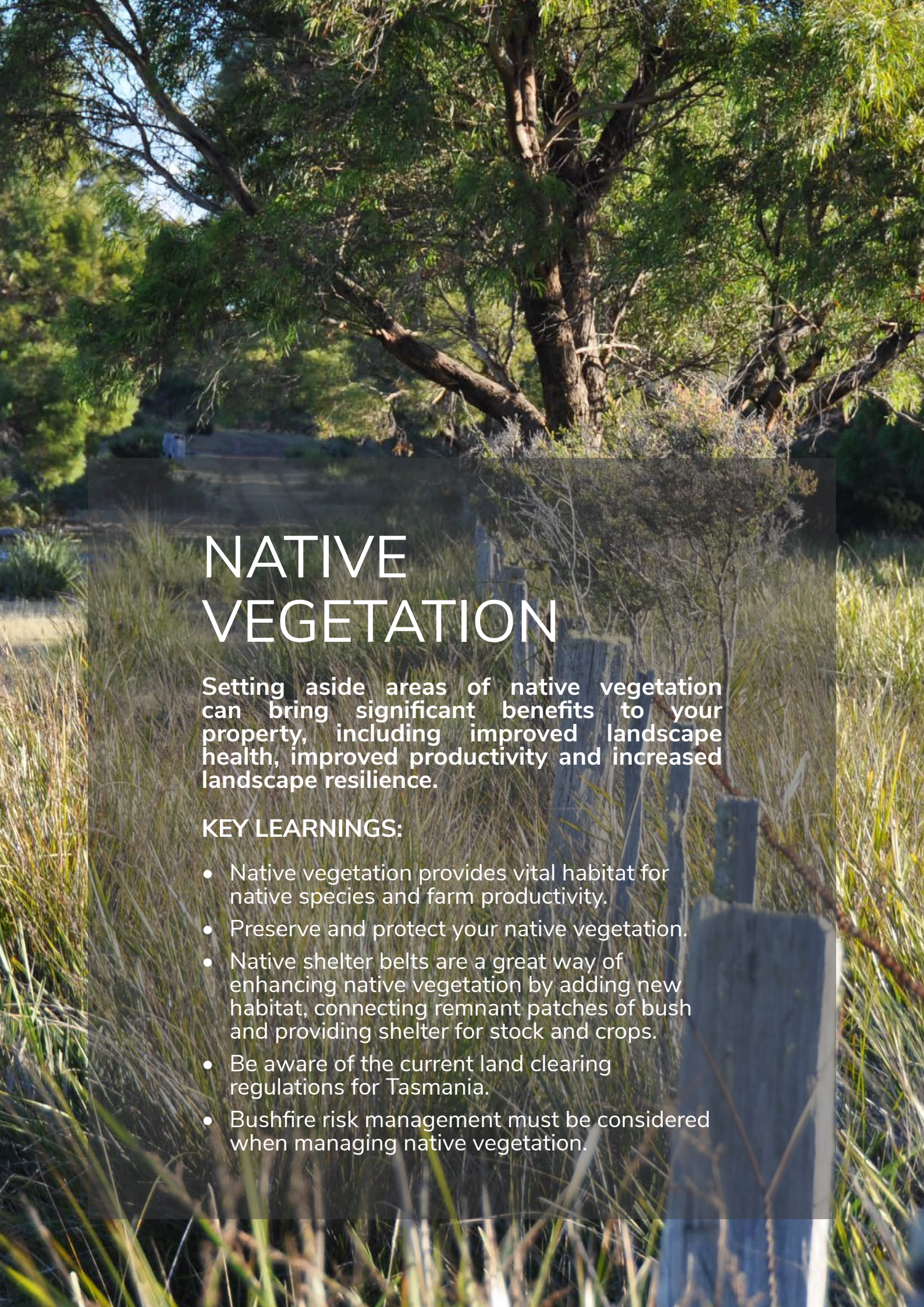
Banks kept "clean" by stock are prone to attack by fluvial scour. This process works on all the bare areas that stock cause e.g. stock tracks down the bank face, resulting in erosion problems on relatively straight reaches of a riverbank.

FURTHER READING

Guidelines for Safe and Effective Herbicide Use Near Waterways
https://nre.tas.gov.au/Documents/herbicide_guidelinesFINAL2012.pdf

Working near waterways. Understanding your legal obligations
https://nrmsouth.org.au/wp-content/uploads/2016/09/EDO_Waterways_Guide_for_Web-2016.pdf

A Revegetation Guide for Temperate Riparian Lands
https://www.greeningaustralia.org.au/wp-content/uploads/2017/11/GUIDE_A-revegetation-guide-for-temperate-riparian-lands.pdf



NATIVE VEGETATION

Setting aside areas of native vegetation can bring significant benefits to your property, including improved landscape health, improved productivity and increased landscape resilience.

KEY LEARNINGS:

- Native vegetation provides vital habitat for native species and farm productivity.
- Preserve and protect your native vegetation.
- Native shelter belts are a great way of enhancing native vegetation by adding new habitat, connecting remnant patches of bush and providing shelter for stock and crops.
- Be aware of the current land clearing regulations for Tasmania.
- Bushfire risk management must be considered when managing native vegetation.

HOW HEALTHY FOREST COMMUNITIES CAN BENEFIT FARMS

ADDITIONAL BENEFITS

- ✓ Provides habitat for birds, mammals and insects, including threatened species, and refuge for browsing mammals.
- ✓ Improves landscape connectivity and values and helps maintain biodiversity.
- ✓ Creates a legacy for future generations.
- ✓ Creates more favourable conditions (sheltered microclimates) for livestock and crops leading to improved livestock birth survival, increased stock growth rates, increased crop yields*, less blossom damage and warmer soils.
- ✓ Increased gross value of pasture output (at its highest when proportion of remnants is 34%).
- ✓ Increases organic matter and infiltration.
- ✓ Lowers water table through root action reducing waterlogging and salinity.
- ✓ Filters pollutants from surface water flows: ground cover plants and litter layer help filter out pollutants before they reach the waterways.
- ✓ Supports connection to place, overall mental well-being and recreational activities such as bird-watching and bush walking.

Increased yields of 20%-100% were observed in sheltered horticultural crops compared with unsheltered crops

Did you know?

Native fauna can consume large numbers of crop and pasture pests.

Magpies will consume 40 scarab (grass-grub) larvae a day.

Insectivorous bats can consume up to half their body weight in invertebrates in a night and some species feed extensively on agricultural pests.

TYPES OF NATIVE VEGETATION

Vegetation type is largely dependent on a multitude of factors, including soil type, geology, altitude and rainfall.

- RIPARIAN (AROUND WATERCOURSES)
- WETLAND
- SALTMARSH
- TREELESS (NATIVE GRASSLANDS, SCRUBLAND, HEATHLAND AND MOORLAND)
- EUCALYPT FOREST AND WOODLAND
- NON-EUCALYPT FOREST AND WOODLAND
- RAINFOREST
- REGROWTH VEGETATION

A dry forest in SE Tasmania

THREATS

Some of the main threats impacting on our vegetation communities include:

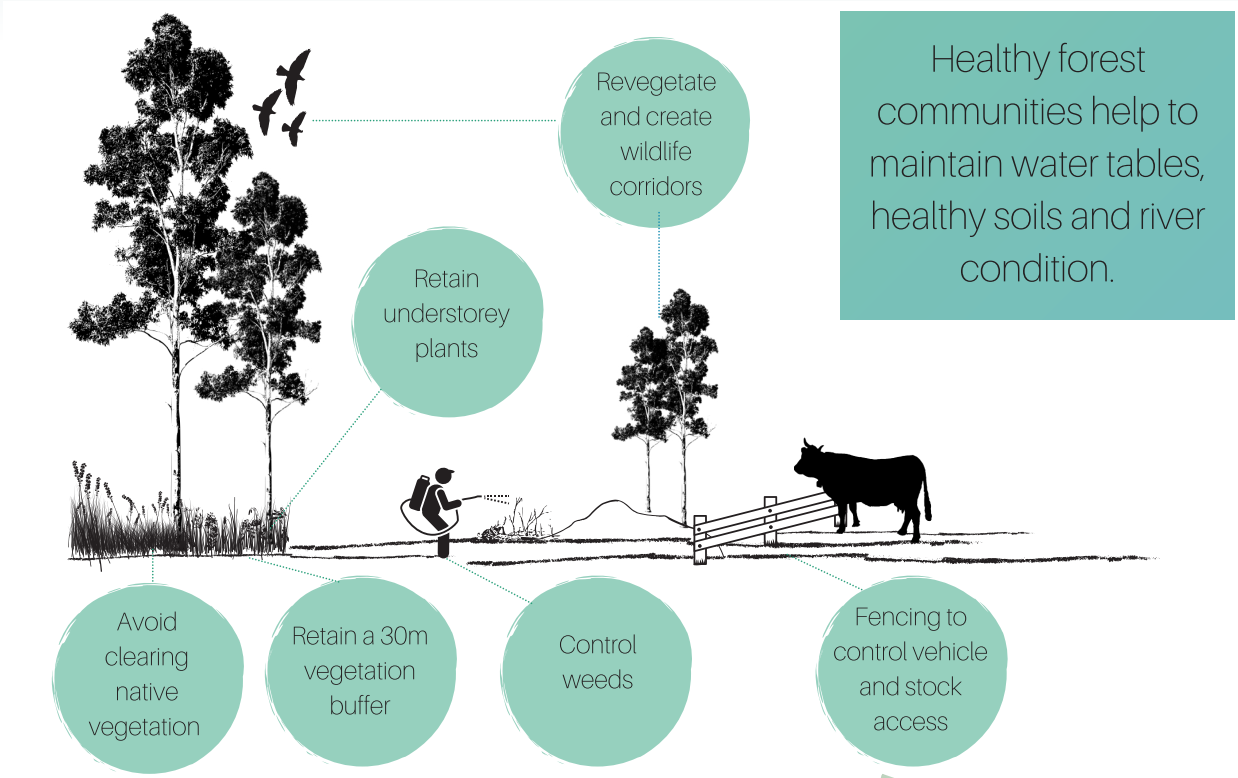
- Land clearing
- Introduced pest animals and weeds
- Changes to water flow and quality
- Stock grazing
- Changing fire regimes
- Disease and dieback
- Climate change

MANAGEMENT AND RESTORATION

Land managers can play a key role in the management and restoration of native vegetation communities on their properties.

There are several threatened vegetation communities in southern Tasmania. Important communities which may occur in areas of farmland include;

- *Eucalyptus amygdalina* forest and woodland
- *Eucalyptus brookeriana* wet forest
- *Eucalyptus globulus* dry forest and woodland
- *Eucalyptus morrisbyi* forest and woodland
- *Eucalyptus ovata* forest and woodland
- *Eucalyptus tenuiramis* forest and woodland
- *Eucalyptus viminalis* - *Eucalyptus globulus* coastal forest and woodland
- Wetlands



Healthy forest communities help to maintain water tables, healthy soils and river condition.

tree hollows

Numerous Tasmanian species depend on tree hollows, including possums, birds, bats and insects. You can help retain hollows by keeping old and dead trees (also see the Firewood section), protecting the root zone under the tree canopy and protecting trees with potential for forming hollows in the future.

Tree Hollows brochure from Kingborough Council.

LAND MANAGERS CAN IMPROVE NATIVE VEGETATION

You can manage and help to improve species and structural diversity of existing bush remnants by:

- Encouraging the presence of all structural layers within native bushland (ground cover, shrub layer, canopy including regenerating young trees, standing dead/dying trees and fallen logs)
- Reducing grazing/browsing impacts through partial or full exclusion of livestock, depending on vegetation type. Dry forest and woodlands can be grazed for short periods during winter, while wet forests, wetlands and riparian habitat need complete stock exclusion.
- Appropriate burning or soil disturbance (e.g. by encouraging native mammal foraging) to help seed germination and survival
- Infill planting of native grasses, shrubs or trees and developing linkages between remnants and large bush areas where possible. Planting means direct seeding, planting or transplanting native species in cleared (non-native) areas or home gardens. Planting is mainly used to protect and connect existing patches but can also provide new habitat in gardens.
- Weed control. Larger remnants are more resilient (likely to resist weed infestation and dieback).

Priority for restoration depends on the health of each patch. If all the layers (structural elements) are already there, restoration isn't needed. See which elements are missing and work out the best way to restore them. Some bush is naturally deficient in some structural layers, so if in doubt, have an experienced botanist look at your bush before commencing work.

shelterbelts

Where there is a lack of natural native vegetation, shelterbelts can be grown to provide some of the benefits, including connecting to larger native vegetation stands.

Use local native species, replicating the structural layers found in natural vegetation (planting trees first then underplanting with appropriate shrubs, sedges, grasses and ground cover species).

LAND CLEARING

Harvesting forests and clearing trees or non-forest threatened native vegetation is regulated on Tasmanian private and public land.

You may need a forest practices plan, depending on what you are planning to do.

'Check Before You Chop' is an interactive decision tool to help you find out if you will require an FPP for private land (https://www.fpa.tas.gov.au/TPA/CB4UC/main.html)

WILDLIFE CONSIDERATIONS

Refuge for native browsers

Invest in wallaby-proof fencing around your production areas – leave bush areas fence-free to allow natural animal movement. Plan wallaby-proof fencing with neighbouring landowners.

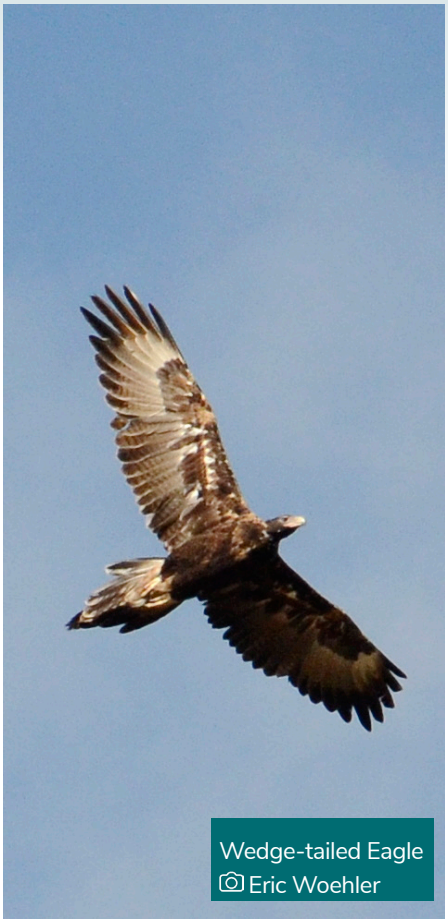
If there are large populations, seek advice from the Wildlife Management Branch for Game Management Plans. Reducing populations of browsers is preferable to allowing them to starve if cut off from a food source. Large populations fenced off from a food source will also impact heavily on the understorey within native vegetation.

Living with native predators

Tasmanian Devils and Eastern/Spotted-tail Quolls will predate on domestic poultry if they have the opportunity. It is your responsibility as a landholder to ensure your poultry are housed safely. See the Tasmanian Parks and Wildlife Service design for a safe free-range quoll-proof chook house.

Wedge-tailed Eagles, White-bellied Sea-Eagles and Grey Goshawks are subject to misconceptions that put these birds at risk. Landholders should provide shelter such as bushes or other places for free-range poultry to take refuge if raptors are around. Young chicks/bantams should be fully protected.

Healthy lambs and kids are rarely taken by eagles and moving livestock closer to habitation when due to lamb/kid reduces the risks even further. Occasionally young inexperienced eagles can become a short term problem. Seek advice and assistance from Biodiversity Conservation Branch of NRE Tasmania for more information.



Wedge-tailed Eagle
Eric Woehler

local landcare networks

Learn more about native plantings, seed collection and connect with like-minded people in your community. Visit the Landcare Tasmania website to find out more about the groups active in your area https://www.landcaretas.org.au/

FIREWOOD

Firewood is an important fuel for domestic use. In Tasmania the majority of firewood is collected on private property, where logs are taken from the ground or trees (dead or living) are chopped down. People often don't realise the importance of this dead wood to local wildlife and biodiversity.

Standing and fallen dead trees provide homes for many native animals and play an essential role in keeping our bushland areas healthy. Some native species are directly threatened by the removal of dead standing trees as they rely on hollows in trees for shelter and breeding (see our chapter on Living with Native Wildlife).

Hollows are produced by environmental processes that occur over long periods and trees with wildlife-suitable hollows are generally over 150 years old. Fallen timber on the forest floor is also vital habitat for mammals, reptiles, amphibians and invertebrates and is extremely important for mosses, lichen, fungi, liverworts and micro-organisms (such as bacteria, small fungi, algae) which play an important role in returning nutrients to the soil.

RESPONSIBLE FIREWOOD HARVESTING

There are a number of things you can do to help reduce the impact of firewood harvesting on native wildlife

- ✓ Collect smaller trees and branches instead of fat trees and logs that have hollows or may form hollows if left to decay.
- ✓ If you have the necessary skills, fell living trees and leave them to season for harvesting in the following year.
- ✓ Ring bark smaller trees for harvesting the following year.
- ✓ Leave hollow logs alone, whether they are standing or lying on the ground.

Pygmy possum
Dave Watts

FIRE

To minimise the risks associated with fire, there are four main areas that Guidelines for *Development in Bushfire Prone Areas of Tasmania* recommends should be considered:

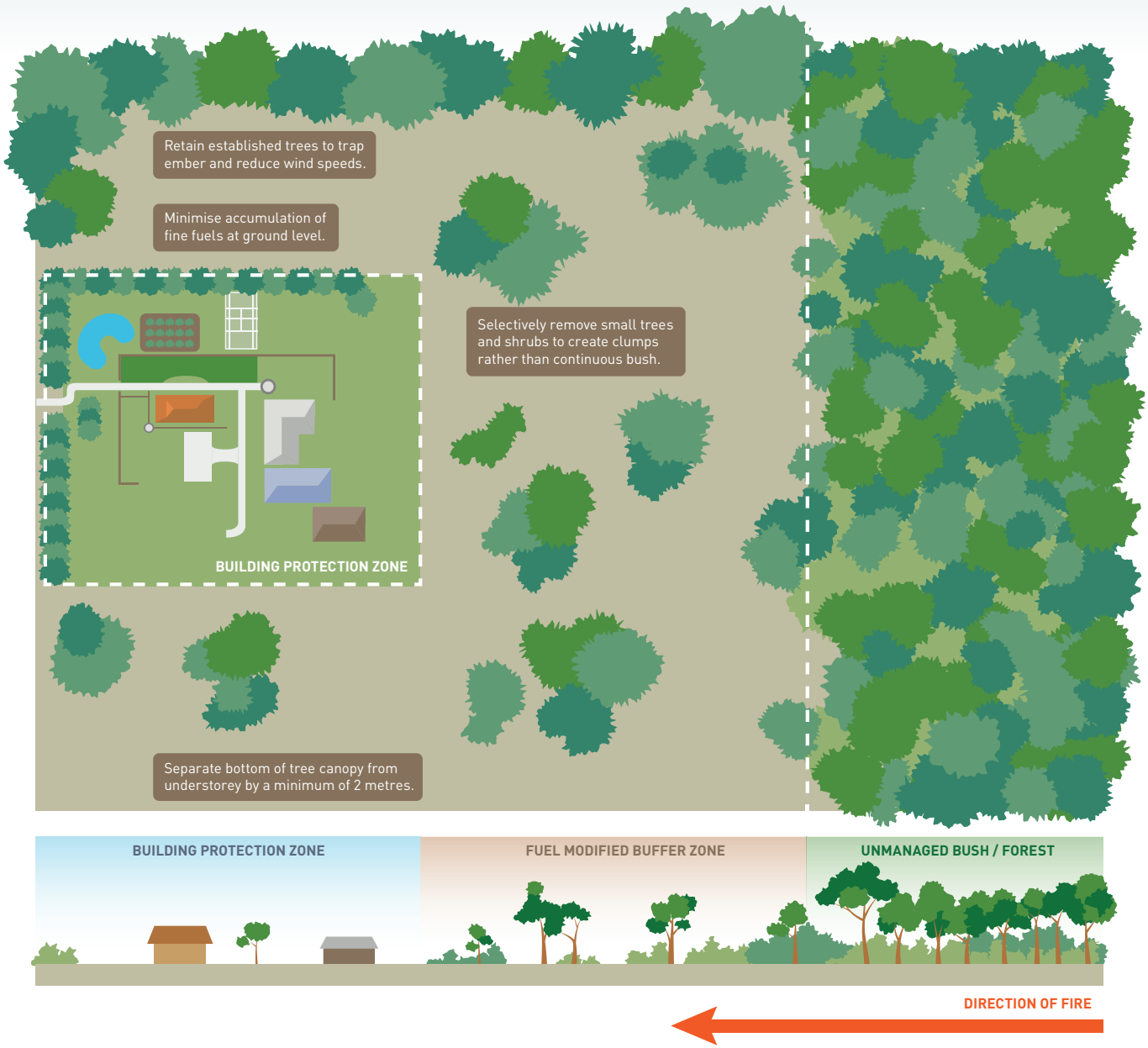
A. DEFENDABLE SPACE FROM BUSHFIRES:
Produced by separation of the building from the bushfire hazard and minimisation of nearby hazards;

B. ROADS:
Planning for network connectivity and designing and constructing roads and fire trails for emergency use;

C. WATER SUPPLIES:
Provision of adequate and accessible water supplies for effective fire fighting; and

D. BUILDING:
Siting, design and construction to maximise fire safety.

Lot layout showing the Building Protection Zone surrounded by the Fuel Modified Buffer Zone from "Guidelines for development in bushfire prone areas of Tasmania" Courtesy of the Tasmanian Fire Service



FURTHER READING

Tasmanian Bushcare Toolkit:
https://nre.tas.gov.au/conservation/conservation-on-private-land/bush-information-management/tasmanian-bushcare-toolkit

'Check Before You Chop:
https://www.fpa.tas.gov.au/TPA/CB4UC/main.html

Private Forests Tasmanian resources
https://pft.tas.gov.au/resources

Revegetation: Best Practice
https://www.landcaretas.org.au/revegetation

Bushfire planning
https://bushfire.tas.gov.au/

Aboriginal Heritage:
https://www.aboriginalheritage.tas.gov.au/learn/awareness/index.html@export=1.html
https://www.aboriginalheritage.tas.gov.au/propertysearch/

Hollows Brochure:
https://www.kingborough.tas.gov.au/wp-content/uploads/2019/09/Tree-Hollows-brochure.pdf

LOOKING AFTER NATIVE WILDLIFE

Southern Tasmania is home to 437 species listed under the *Tasmanian Threatened Species Act 1995*. We have a duty of care to protect our native wildlife and at-risk species, focusing not only on the species themselves but also their habitat, including threatened vegetation communities.

KEY LEARNINGS

- The Threatened Species Link website provides management and conservation advice
- Bushland that contains old trees with hollows, dead wood and understorey vegetation can provide ideal habitat for wildlife
- Commonly available poisons that are used to control rodents (rodenticides) can be deadly to our native wildlife, particularly birds of prey
- Follow the guidelines in this chapter to reduce the risk of poisoning native species with rodenticides

Grey Goshawk
N. Laurence

Southern Tasmania is home to many species found nowhere else in the world. Populations under threat are vulnerable to changes that alter their habitat or wipe out whole populations.

Even more common species may become threatened due to current processes or actions that, if left unmanaged, threaten their long-term future.

The main threats to our native wildlife are from habitat clearance and fragmentation, a changing climate, invasive species, disease, and road kill. Farmers can play a role in wildlife protection through actions to protect and improve existing habitat, improving habitat diversity, investing in natural management asset projects (such as fencing off dams and rivers) and employing approaches that improve groundcover as well as soil and waterway health.

THREATENED SPECIES MANAGEMENT

Changes to the landscape impact on our fauna and flora. Landholders can assist in providing some refuge for threatened species in our region by considering how habitat could be protected or enhanced to benefit any species that may potentially inhabit their land.

KEY THREATENING PROCESSES	EXAMPLES OF BIOTA MOST AFFECTED
Native vegetation clearance	Grassland and grass woodland species, hollow-nesting birds, raptors
Impacts of pests, weeds and diseases	Species of riparian, lowland open forest and heathland communities, freshwater fish
Degradation of water systems	Aquatic invertebrates, cave fauna, burrowing crayfish, wetland and riparian species
Inappropriate use of fire	Log dwelling fauna, litter and bark invertebrates, some heathland species
Inappropriate and illegal harvesting	Seabirds and marine species, freshwater crayfish, stag beetles
Impacts of stock	Orchids, palatable herbs, riparian flora

THREATENED SPECIES LINK

The Threatened Species Link website provides management and conservation advice on Tasmania's threatened species. You can find out which species might be on your land, and how to plan around their management and conservation needs:

www.threatenedspecieslink.tas.gov.au

Unless in accordance with a certified Forest Practices Plan, it is an offence to 'take' a threatened species without a permit. 'Take' includes kill, injure, catch, damage, destroy or collect and can include the destruction of critical habitat for threatened species.

- Threatened Species Protection Act 1995
- Nature Conservation Act 2002

SUPPORTING BIRD HABITAT

Encouraging more bird diversity on your property.

Southern Tasmania's drier settled areas still retain much of their original bushland. In many instances clearing for agriculture and urban development has produced a habitat mosaic, from treeless paddocks to established native bushland, in which many species of birds thrive. But they will begin to decline or disappear where intact patches of bush are lost or if this mosaic becomes too highly modified. Loss of the understory or tree layer can also make a site unsuitable for some species: shrubs are a rich food source of insects and nectar, and trees provide lerp, manna and a host of invertebrates on their trunks, branches and foliage.

About 60 species of birds live in bushland areas of southern Tasmania. Common groups include honeyeaters, parrots, robins, pardalotes and whistlers. Bush habitat also supports birds of prey, water birds in creeks and wetlands, and species using heaths or grasslands on the forest fringe.

Some species are more generalist, while some prefer very specific habitats, some remain in the same area while others increase their foraging range in late autumn, descend in altitude or spend winter on mainland Australia.

Either separately or in combination, loss of understorey, small patch size and increasing isolation account for much of the decline in bird species compared to those in structurally intact bush.

The Yellow-throated Honeyeater needs bush with good structure, as it forages high in trees but nests in shrubs close to the ground.

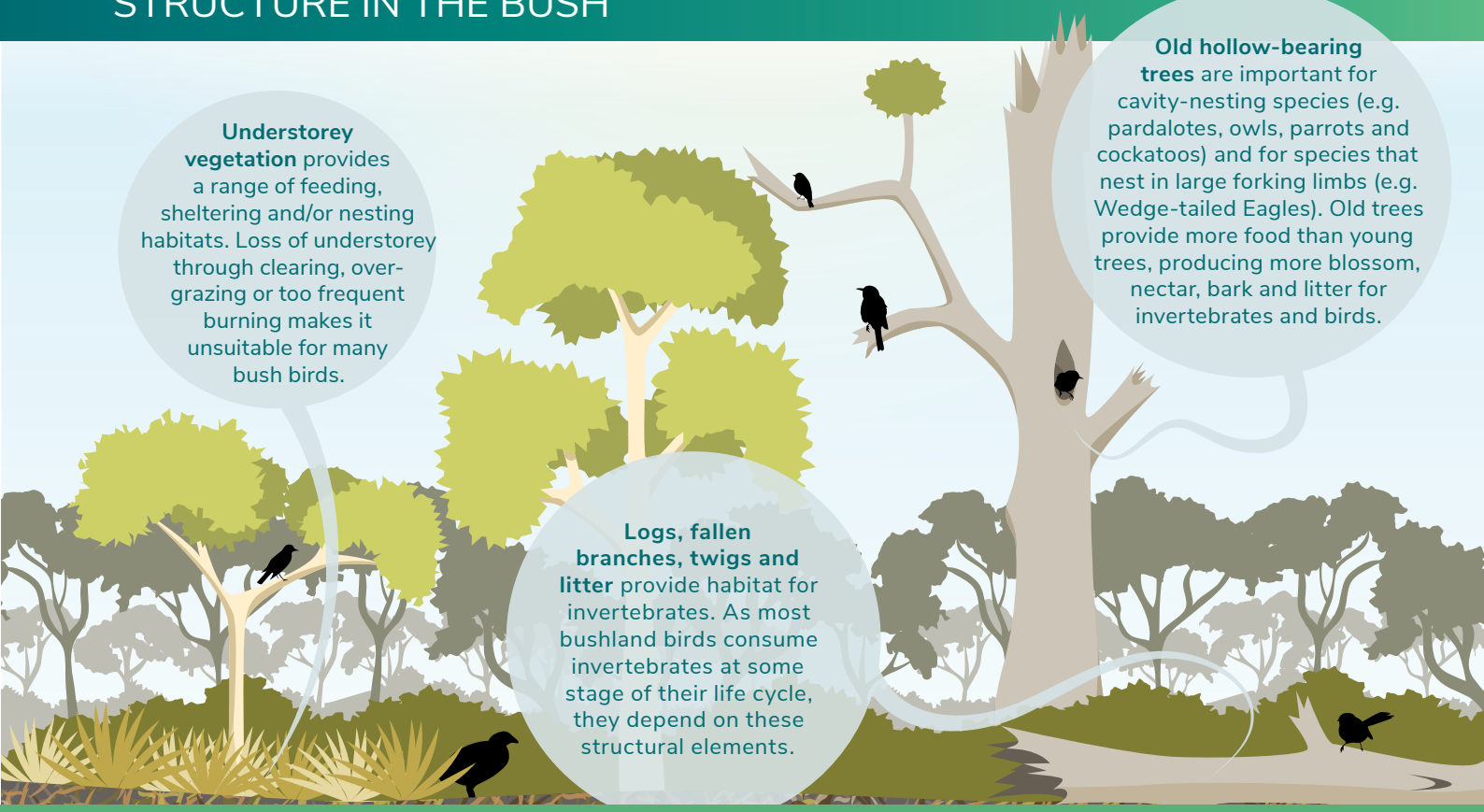
HOMES FOR THE BIRDS

Just like us, birds have three basic needs:

1. Their preferred food.
2. Places to rest and hide from danger and inclement weather.
3. A safe place to raise young.

Different bird species have their preferences in where they find these basic needs.

STRUCTURE IN THE BUSH



Messy is good!

Intact bush usually has a full range of structures – a varied understorey of grasses and herbaceous plants, small and tall shrubs and different aged trees especially large old eucalypts with hollows.

PATTERNS OF BIRDS IN THE LANDSCAPE

Large bushland areas with little disturbance have the most bird species as they contain structures that birds need: older trees with cavities, mature trees with full leaf canopies, younger trees, tall and short shrubs, tall grasses and saggs interspersed with herbs. In wetter areas the ground layers are often richer in ferns, cutting grass, and mosses.

Areas **close to waterways** are excellent sites for revegetation. Often some of the structural layers already exist because they are less suited to agriculture and primary productivity is naturally high. Planting a mix of trees and shrubs around marshes can be very effective.

Protecting existing remnants with new plantings should account for how birds use habitat patches and stepping stones. Patch sizes >20 – 30 ha, may provide persistent breeding habitat.

Photo: Chris Tzaros

Even **single paddock trees** or small copses are important to retain as stepping stones where their context is good. They provide shelter and nesting for cockatoos, owls and other animals.

Rehabilitating understorey and encouraging regeneration in large (>20-30ha) patches should increase bird diversity. Techniques can be as simple as removing or reducing grazing and browsing pressure, or using fire or disturbance to encourage seedlings.

Open paddocks remote from intact bush are often not worth replanting to increase bird diversity. This is because all the structural layers that birds need can take at least a whole human generation to grow.

IMPROVING HABITAT FOR BUSH BIRDS

Retain and restore existing bush, then buffer and reconnect - this is the priority order of work to help bush birds survive, thrive and recolonise.

1. As the highest priority, retain extensive areas of bush with structurally diverse vegetation, good understorey and especially bush that is close to waterways.
2. Where extensive areas are structurally degraded, restore missing structural elements by excluding or reducing grazing and browsing, active regeneration or even selective replanting.
3. Retain habitat patches larger than 20-30ha and restore missing structural elements.
4. Retain smaller patches, copses and even single paddock trees, where they can act as 'stepping stones' between habitat patches and restore missing structural elements.
5. Increasing the size of bush remnants by buffering them with new plantings may also help to increase bird diversity, but only if the remnants are structurally diverse.
6. Weeds (e.g. gorse and blackberry) may be extremely important in retaining bird diversity in areas where native understorey has been lost. A cautious and staged approach to their control is necessary if it is the only remaining habitat.

Photo: Chris Tzaros

Woodlands and forests with **intact layers of vegetation** support the richest array of bush bird species including pardalotes, robins, whistlers, honeyeaters, thornbills and cuckoos. The mix of species will vary depending on the vegetation (e.g. Golden Whistler and Dusky Robin prefer drier areas whereas Olive Whistler and Pink Robin prefer wet areas).

Bush edges are favoured by Scarlet Robins, Brown Thornbill and Superb Fairy-wren: species that may feed in the open but like bush nearby where they can roost and escape from danger.

Paddocks with some trees may provide feeding and nesting sites for species such as Forest Raven, Magpie, Eastern Rosella, Noisy Miner and Kookaburra. Raptors like Brown Falcon survey the landscape for prey atop paddock trees while other species use trees and small copses as 'stepping stones' between favoured habitats.

Home gardens in any area can be rich in birds, especially if it is close to native vegetation, but are typically dominated by the introduced species. Flowering plants provide food for New Holland Honeyeater and wattlebirds that may defend rich nectar sources and exclude smaller species. Plant dense bushy vegetation to support more bird species like Superb Fairy-wren and Eastern Spinebill.

Open paddocks typically favour introduced species like Skylark, Goldfinch and Starling but native birds like Sulphur-crested Cockatoo, Magpie, Masked Lapwing, Pipit and Flame Robin use them on a frequent basis. Swamp Harrier nest in open paddocks if long grass provides shelter.

STRUCTURE IN THE LANDSCAPE

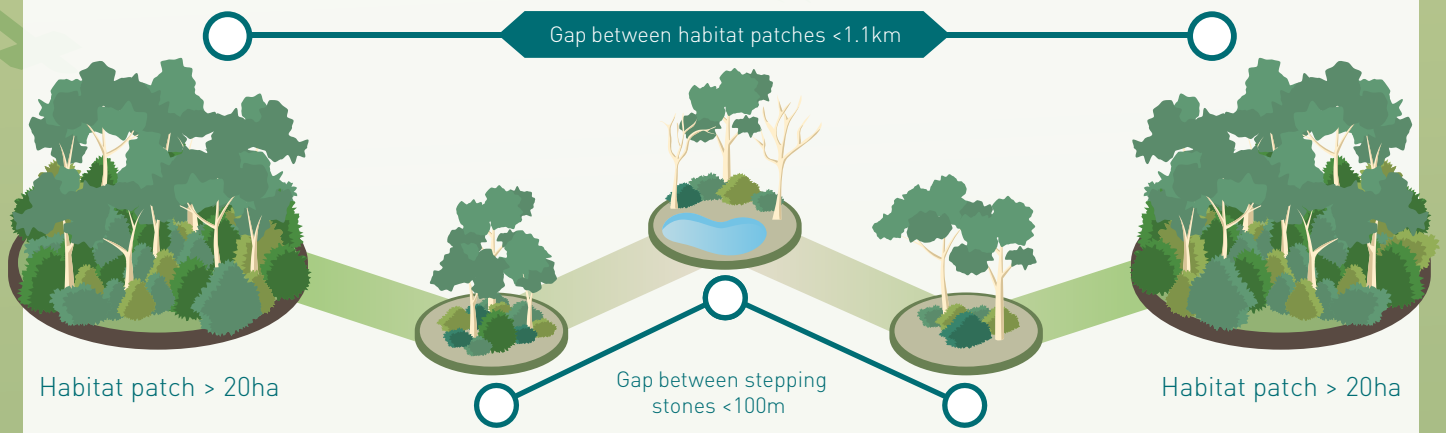
Most bushland bird speces are reluctant to fly over open areas greater than 100m and prefer to use 'stepping stones' to move between habitat patches.

Habitat patches

In Tasmania, good habitat patches are considered larger than 20-30ha, with a range of structures, enabling many bird species to breed successfully.

Stepping stones

Stepping stones are patches smaller than this: even as small as single paddock trees. Many birds may use these stepping stones to travel between habitats.



PRIORITY BIRD SPECIES ON FARMS

White-bellied Sea Eagle
Eric Woehler

GREY GOSHAWK, WEDGE-TAILED EAGLE AND WHITE-BELLIED SEA-EAGLE

These birds of prey are all under threat.

The Grey Goshawk breeds in wet forest and is under threat from habitat loss. Grey Goshawks prey on rats, small possums, rabbits and medium sized birds such as thrushes and currawongs.

Free range domestic fowl should have access to shelter in the form of low bushes or structures to retreat under if goshawks are around.

White-bellied Sea-eagles and Wedge-tailed Eagles feed on rabbits, hares, Brushtail Possums and wallabies in sheep grazing areas, but will also eat carrion. It is possible a sick or dead lamb or goat kid may be taken during breeding season and farmers can reduce any risks by lambing close to habitation. Wedge-tailed Eagles need >10ha of intact bush around their nest and no disturbance during the nesting period.

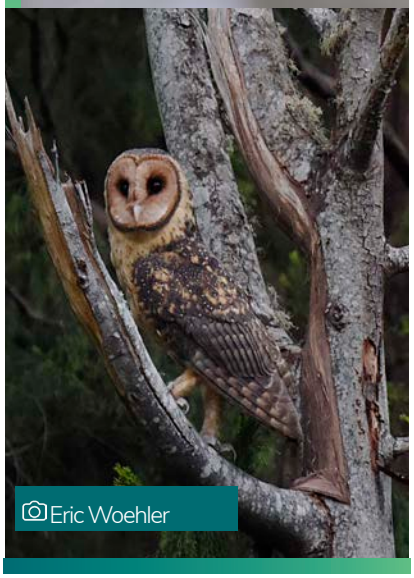
Chris Tzaros

SWIFT PARROT

Swift Parrots migrate from mainland Australia every spring to breed in Tasmania.

Swift Parrots arrive during August and nest in hollows in old eucalypts, mainly on the east coast. They have been impacted by loss of breeding habitat, as they rely on very old and dead standing trees in blue gum forests to provide the hollows for breeding. While we can protect their breeding habitat here in Tasmania, loss of feeding habitat in mainland Australia is also impacting on their populations.

Farmers can help Swift Parrots by retaining stands of Blue Gum and Black Gum (see the chapter on Native Vegetation), revegetating areas for future generations of Swift Parrots, retaining tree hollows and controlling weeds.



Eric Woehler

MASKED OWL

Masked Owls require large hollows for breeding an are at risk from the ongoing loss of old trees.

Masked Owls prefer woodlands and tree-lined waterways. In agricultural areas, they mainly feed on small introduced species such as rodents and rabbits. They are at significant risk from 'Second Generation Anticoagulant Rodenticides'. If they eat sick or dead rodents that have been eating this type of single dose rat poison, they can die from secondary poisoning. People living adjacent to forest and woodlands should try to use trapping for rodent control and restrict the use of poisons.

PRIORITY MAMMAL SPECIES ON FARMS

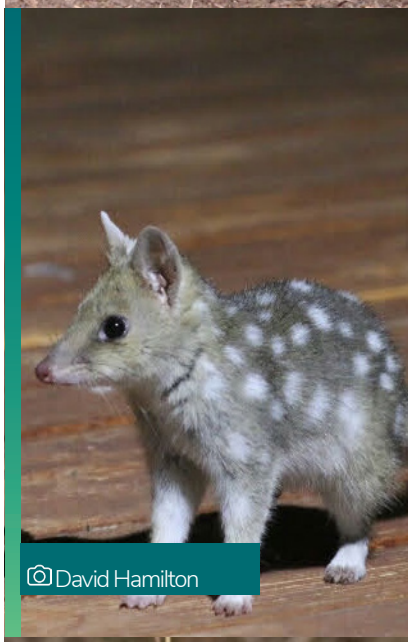

Eric Woehler

TASMANIAN DEVIL

Tasmanian Devils are under significant threat from the Devil facial tumour disease.

Predominantly a scavenger feeding mainly on animal carcasses, including dead farm animals. A decreasing number of devils may be allowing introduced carnivores such as cats to flourish. Landholders can play their part in protecting the Tasmanian Devil by slowing down on the roads at night, removing dead wildlife from roads if safe to do so and ensuring domestic fowl are in devil and quoll-proof chook pens. Devils will use fallen logs and occasionally wombat burrows as den sites, so it is recommended any potential sites be retained on your property.

Report sightings of diseased devils or road killed devils to the Save the Tasmanian Devil Program.


David Hamilton

EASTERN QUOLL

Extinct in the wild on mainland Australia since 1963, Tasmania is the last stronghold for this species.

As well as Tasmanian Devils, Eastern Quolls help to maintain farm hygiene by cleaning up carcasses (reducing the risk of blowfly strike to sheep), and removing weak animals to help control disease. Eastern Quolls prey on insects, small terrestrial mammals, reptiles and birds (including chickens).

This species is under threat from loss of habitat, persecution, roadkill and competition from other predators such as cats and dogs.


JJ Harrison

EASTERN BARRED BANDICOOT

Virtually extinct in the wild on mainland Australia, there is still a functioning population in Tasmania.

The Tasmanian population has suffered a downturn in numbers through threats such as loss of habitat, predation by cats and dogs and the disease Toxoplasmosis (carried by cats).

Farmers value bandicoots for their ability to reduce numbers of pasture pests such as corbies and grass grubs, and many are now planting undergrowth species to provide shelter, nest sites and habitat for the Eastern-barred bandicoot.

HARRIERS IN THE HARVEST

Swamp Harriers are a ground-nesting raptor that frequently nest in crop fields including hay and cereal.

Their nesting and fledging season coincides with harvest-time so farmers are encouraged to be on alert for the presence of nests in their paddocks and take measures to avoid nests during harvest season. Swamp Harriers prey on introduced feral herbivores such as rabbits, rats and other vermin, and bring significant benefits to farmers, If you spot a nest, flag off an exclusion zone or stack haybales around the nesting area. For more information and resources, visit the 'Harriers in the Harvest' website.

Flagged area around a Swamp Harrier nest
Harriers in the Harvest

MINIMISING IMPACTS OF NATIVE BROWSERS ON PRODUCTION

Numbers and distribution of Pademelons, Bennetts Wallaby and Brushtail Possums have expanded in Tasmania over the past 40 years.

Land clearance, in conjunction with improved pastures improved water supply and reduced hunting pressure, supports ideal conditions for these species.

Land clearance has resulted in a mosaic of pastures and remnant bushland which allows wallabies to feed at night on improved pasture and retreat to adjacent bushland to shelter by day. An average of 65% of pasture production is lost from rested paddocks near bushland, (and up to 90% of pasture production within 20 metres of bushland) to wildlife browsing. If the landholder believes that there is a problem with wildlife browsing, this can be quantified by measuring pasture loss using exclusion cages as outlined in the Measuring Pasture Loss to Browsing Animals sheet (See Further Reading section). If the losses are confirmed there are a few options to reduce the problem.

Wallaby-proof fencing is a successful method to control browsing, however it is expensive and should be planned in conjunction with neighbouring properties so that the problem isn't merely shifted or populations isolated. Reducing the population before fencing remnant bush can avoid high-density wallaby populations impacting on the understory

Pademelon
N Laurence

A permit is required to "take" (which covers to kill, injure, catch, damage, destroy or collect) wallabies and Brushtail Possums, which are classified as "Partly Protected Wildlife" under the Wildlife Regulations 1999 of the Nature Conservation Act 2002. Game Services Tasmania can assist in developing a Property-based wildlife Management Plan with control options which include using wallaby proof fencing as a control measure.

FURTHER READING

Living with Wildlife
https://nre.tas.gov.au/wildlife-management/living-with-wildlife

Kangaroos and wallabies
https://nre.tas.gov.au/wildlife-management/living-with-wildlife/living-with-kangaroos-and-wallabies

Brush-tailed Possums
https://nre.tas.gov.au/wildlife-management/living-with-wildlife/living-with-brush-tailed-possums

Threatened Species Link:
https://www.threatenedspecieslink.tas.gov.au/Pages/default.aspx

Land for Wildlife membership
https://tasland.org.au/programs/land-for-wildlife/

Measuring pasture loss to browsing animals
https://nre.tas.gov.au/Documents/Pasture-Monitoring-Brochure-final.pdf

Measuring Wildlife Browsing and Grazing losses
https://nre.tas.gov.au/wildlife-management/management-of-wildlife/managing-wildlife-browsing-grazing-losses

Property-Based Wildlife Management Plans
https://nre.tas.gov.au/wildlife-management/management-of-wildlife/managing-wildlife-browsing-grazing-losses/property-based-wildlife-management-plans

Save the Tasmanian Devil Program
https://nre.tas.gov.au/conservation/threatened-species-and-communities/lists-of-threatened-species/threatened-species-vertebrates/save-the-tasmanian-devil-program

Harriers in the Harvest
https://harriersintheharvest.com.au/

CONNECT WITH YOUR COMMUNITY

Being connected to your local community and networks can have many benefits, including supporting your property management aspirations. There are several initiatives, groups and organisations that can provide advice and support on land management and farming and connect you to your local region. Some organisations can provide valuable services to help you prepare for critical times such as natural disasters, unforeseen stress or an emergency. NRM South and other organisations also provide resources and deliver programs to support landowners in improving the management of natural resources. We encourage all new landowners to familiarise themselves with these networks.

https://www.huonvalley.tas.gov.au/services/natural-resource-management/

https://www.kingborough.tas.gov.au/natural-resource-management/

https://tasmanlandcare.org.au/

https://www.ccc.tas.gov.au/explore/community/volunteering/

https://derwentcatchment.org/

https://www.southernmidlands.tas.gov.au/natural-resource-management-services/

https://www.sorell.tas.gov.au/services/natural-resource-management-land-improvements/

https://gsbc.tas.gov.au/services-facilities/natural-resource-management/

https://www.coalriverproducts.com.au/

https://www.landcaretas.org.au/

https://www.rawtas.com.au/

https://tasfarmers.com.au/projects/living-next-door-to-a-farmer

https://www.sprout.org.au/

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WEB: www.nrmsouth.org.au