

Protect our waters Protect our health

A guide for landholders on managing
land in drinking water catchments



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Who benefits when drinking water catchments are protected?

- the community
- the environment
- the landholder

Introduction

Water is essential to sustain life. Our health depends on having an adequate supply of safe water. Many of us take the quality of drinking water for granted. When you turn on the tap, you expect safe and pleasant-tasting water.

Many towns in Victoria rely on drinking water sourced from natural waterways. If the source becomes contaminated, the safety of community drinking water supplies can be affected. Contamination of water catchment areas has been recognised as a leading cause of illness around the world by numerous bodies, including the World Health Organization (WHO). Therefore, the condition of the source (water catchment) is a crucial factor in the quality of such community drinking water supplies.

In Victoria, protecting the environment, including our waterways, is a responsibility shared by government, industry, businesses, communities and individuals. Landholders, in particular, have a responsibility to manage their activities to avoid polluting waterways.

The importance of catchment management is an essential part of the multi-barrier approach that has been recognised by the WHO and, in Australia, by the National Health and Medical Research Council's 2004 'Australian Drinking Water Quality Guidelines' (ADWG). The ADWG state that 'prevention of contamination provides greater surety than removal of contaminants by treatment, so the most effective barrier is protection of source water to the maximum degree practical'.

This booklet:

- describes the various contaminants that can enter waterways as a result of agricultural activities and development, and can present a risk to the health of communities
- describes the sources of these contaminants and how they can be controlled by landholders
- considers planning issues and some generic principles that can be adopted by all Victorians to protect community drinking water supplies.

The actions of landholders can have a significant impact on the quality of drinking water supplied to surrounding communities. Poor quality drinking water can affect human health.

By controlling the various contaminants entering waterways, you will not only help protect the health of communities, but you can also:

- create sustainable farming practices
- save money on farm operations
- have a positive impact on the overall environment
- create healthier, better-looking and therefore more valuable land.

This booklet explains the important things to consider when managing land in a water catchment. Though not all of the described management practices may be applicable to your circumstances, you are encouraged to follow the guidance for those that are. This can help you manage your land more effectively and protect drinking water supplies for the community by:

- improving the condition of waterway frontages with vegetation
- preventing stock access to waterways
- maintaining onsite wastewater treatment systems (e.g. septic tanks)
- preventing soil erosion
- using and managing nutrients wisely
- improving agricultural chemical use.



Poor catchment conditions not only affect river health and the environment, but can also affect drinking water quality and, therefore, the health of communities.

Part 1. Protecting Victoria's drinking water catchments

A reliable supply of quality drinking water is essential to community health and wellbeing. Poor-quality drinking water supplies place communities at risk from water-borne disease. To minimise this risk, it is necessary to reduce the sources of contamination in our catchment areas, and avoid over-reliance on water treatment processes.

1.1 What is a drinking water catchment?

A catchment is typically land bounded by natural features such as hills or mountains, from which surface or runoff water flows to a low point. In a natural surface water catchment area, the low point could be a river, creek, inland lake or lagoon. Groundwater catchments are more complicated and don't just rely on the shape of the land surface.

Water catchments vary in size and composition. They can contain large areas of developed land or can be areas within national and state forest or parks. Catchments are often bordered by mountain ranges. They can include major drainage networks of rivers and creeks. They are often comprised of hundreds of smaller sub-catchment areas.

Community drinking water supplies are mainly drawn from two sources: **surface water** (rainfall and its runoff) and **groundwater** (water that has collected in underground stores or aquifers). Both sources are recharged from **catchments**.

Types of drinking water catchments

There are two types of water catchments:

- **Closed** water catchments are often forested and are not accessible to the general public. Often they are managed by a single entity.
- **Open** water catchments are accessible to the public – the land is privately and/or publicly managed over many land titles by the rural community or by government agencies. Outside the Melbourne metropolitan area, the majority of drinking water supplies come from open catchments.

Declared Water Supply Catchments

There are 134 Declared Water Supply Catchments in Victoria. Declared Water Supply Catchments (formerly known as Proclaimed Water Supply Catchments) are the basis for catchment planning and management under the provisions of the *Catchment and Land Protection Act 1994*.

Under this Act, Declared Special Areas (Water Supply Catchments) officially recognise designated catchments that are used for water supply purposes. This system highlights for the community, land managers and planners the importance of the catchment to water supplies.

The Department of Primary Industries provides information on Declared Water Supply Catchments and special area plans to protect water quality in these catchments (including maps). See the DPI website <www.dpi.vic.gov.au>.

What does this mean for landholders?

Many waterways in rural Victoria lead to a point where drinking water is sourced. If your property drains to a point where raw water is drawn for drinking water purposes, you live in a drinking water catchment.

You do not have to have a waterway such as a continuously flowing creek or river on your property to be designated as 'living in a water catchment'. Catchments sometimes contain waterways that are dry for extended periods. They may not always be visible, but these also need to be protected.

It is important to note that the management practices detailed in this booklet are relevant to water catchments in general, not just drinking water catchments.

If you are unsure if your property is in a drinking water catchment, contact the local water supplier, council or catchment management authority.



You live in a drinking water catchment if your property drains to a source that is used for drinking water.

1.2 Why do catchments need to be protected?

The quality of the drinking water that communities receive from catchments is dependent on the condition of the land and the management practices used on that land. What happens in one part of a catchment is likely to have an effect elsewhere.

Poor practices affect river water quality, which, in turn, can affect the health of the environment and put stress on the drinking water treatment process. Without proper consideration and planning, silt and many kinds of waste can end up in our waterways, which can have a negative impact on human health.

To avoid these potential risks to public health, development and use of land within drinking water catchment areas should be managed to optimise the quality of water collected from the catchment.

Increased contaminant loads in source waters can impair the effectiveness of water treatment processes. Some contaminants can not be removed from water by treatment, so preventing water contamination is best.

1.3 How is water made safe to drink?

Drinking water collected from catchments is made safe by a combination of protection and treatment. This includes:

- protecting the catchments and source water
- holding water in protected reservoirs or storage
- treating and disinfecting the water
- protecting and maintaining the distribution system.

The water treatment process is essential for reducing contaminants in the water supply. Better-quality water at the catchment source means:

- water treatment is likely to be more effective
- the risk of water-borne diseases affecting your family, neighbours and friends is reduced
- fewer chemicals need to be added to the water
- the water tastes better.



Photo courtesy of Julie Eichner.

A treatment process separating particulate matter from drinking water.

Preventive actions give the best outcomes

The condition of the catchment area is one of the most important factors influencing the quality of drinking water. Your help counts.

Remember that what you do on your property can affect the quality of drinking water in surrounding towns.

1.4 What are contaminants and how do they enter our waterways?

Human impacts

Many contaminants in water are found naturally. However, many result from a range of human activities. These activities include:

- inadequately treated sewage or poorly maintained sewage systems (that is, wastewater treatment systems, including septic tanks)
- animal waste from poorly managed agricultural practices
- improper use and/or management of chemicals
- inappropriate disposal of waste materials (wastes get caught up in stormwater runoff or groundwater flow and eventually enter the raw water supply)
- poor land management practices that lead to soil erosion
- soil disturbance from poorly managed road maintenance and building sites
- leaching from poorly sealed waste-holding dams.

Types of contaminants

Certain contaminants in water are deemed hazardous and can pose a significant risk to public health and the health of the natural environment. They include:

- pathogens (disease-causing microorganisms) from stock faeces and human waste
- sediment from erosion and the disturbance of stream banks
- chemicals from pesticides and herbicides and inappropriate waste disposal
- nutrients from fertilisers as well as from stock faeces and urine.

Hazards in water

- pathogens – bacteria, viruses and protozoa
- sediment
- chemicals
- nutrients



A river contaminated with excessive loads of sediment.

Pathogens

Pathogens in drinking water pose the greatest risk to human health. They include certain bacteria, viruses and protozoa. Many outbreaks of disease have been linked to the consumption of drinking water contaminated by human or animal waste (faeces).

Pathogens in drinking water pose the greatest risk to human health.

Sediment

Accumulation of sediment in the raw water supply reduces storage capacity and creates an extra burden on the water treatment process. Supplying water from sediment-heavy catchments negatively affects treatment plant performance and drinking water quality is reduced. The less sediment that enters the raw water supply, the better the quality of water exiting the treatment plant.

Chemicals

If agricultural chemicals are not used or managed appropriately, excess chemicals will end up in our drinking water supplies. Some chemicals:

- are transported by water or attach to soil particles
- take many years to break down in the environment
- are not always removed by the water treatment process.

Agricultural chemicals can end up in our water due to:


- wash-off from land into stormwater and agricultural drains or waterways after rainfall
- misuse or inappropriate disposal near waterways or within catchments.

Nutrients

Excessive nutrient loads in catchments – particularly phosphorous and nitrogen – affect water quality and can lead to an increase in algae growth. Increased nutrient loads from runoff containing sediment and fertilisers along with warm weather, sunlight and little water movement, may result in algal blooms. Many algal blooms are toxic. They can make the water unsuitable for consumption by humans and animals, and require extensive water treatment.



Waste that is disposed of inappropriately can enter raw water supplies via stormwater drains.



Benefits of protecting
drinking water sources:

- healthier communities
- sustainable farming
- financial advantages
- healthier environment
- more valuable land.

Part 2. How can landholders protect waterways?

The activities of landholders can have a direct effect on the community's drinking water supply. The sections in this part highlight areas where you can contribute to catchment water quality by controlling hazards, and discusses issues to consider and what actions you should take.

By controlling the hazards to drinking water quality, you can:

- create sustainable farming practices
- save money on farm operations
- have a positive impact on the overall environment
- create healthier, better-looking and therefore more valuable land.

Eventually the water that runs off a drinking water catchment area will be consumed by people. Every control measure counts and contributes to the quality of drinking water supplies in the long term.

You can do the following things on your land to improve the condition of drinking water catchments:

- improve the condition of waterway frontages with vegetation
- prevent stock access to waterways
- maintain onsite wastewater treatment systems
- prevent soil erosion
- use and manage nutrients appropriately
- use and manage agricultural chemicals wisely
- plan and develop thoughtfully.

More information

Find more information in Part 3, which includes relevant resources and contacts.

Funding may be available to control the hazards (see sections 2.1 and 2.2 below).

Eventually, the water from drinking water catchment areas is consumed by people, so everything we do to protect these catchments contributes to drinking water quality.

2.1 Improve the condition of waterway frontages with vegetation

The condition of land fronting natural waterways, including riverbanks – also known as riparian land – directly influences the body of water. Well-managed frontages reduce the amount of material that ends up in waterways and reservoirs.

Planned management of land adjacent to natural waterways is an essential part of sustainable property management. It can yield numerous benefits – including increased productivity (some of these are described in the box to the right).



10 good reasons to protect waterway frontages

- 1 healthier waterways
- 2 better water quality
- 3 improved biodiversity and healthier ecosystems
- 4 decreased erosion
- 5 decreased algal growth
- 6 less insect pests
- 7 reduced risk of stock injury and loss
- 8 soil retains more nutrients
- 9 provision of windbreaks and shelter
- 10 healthier, better looking and therefore more valuable land

How a waterway frontage buffer strip protects the waterway from contaminants

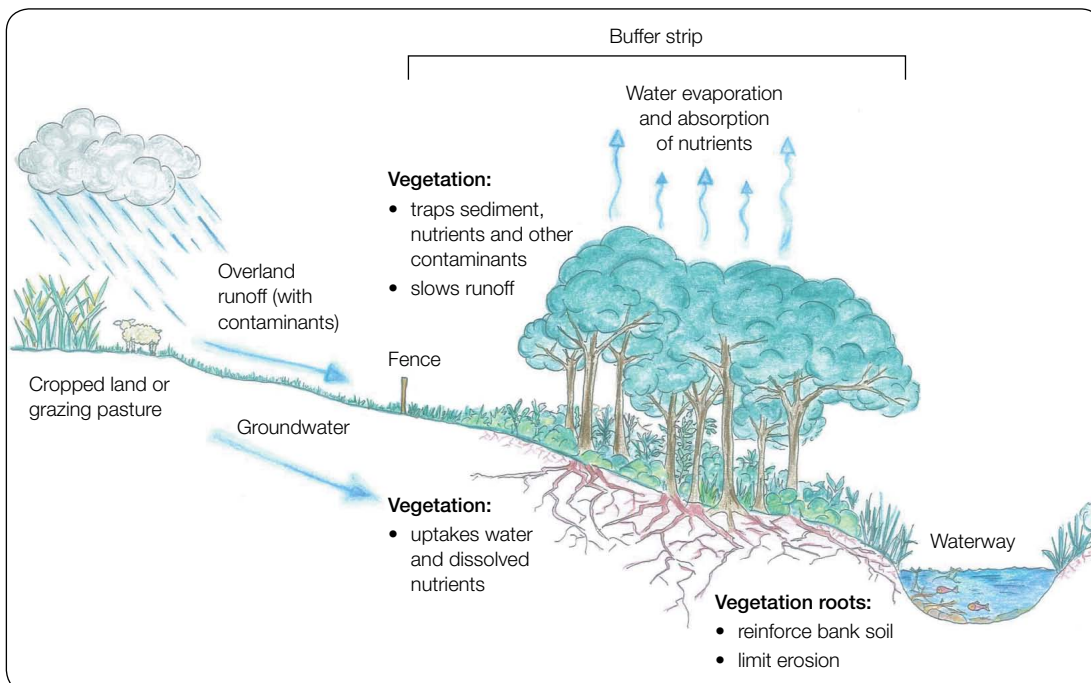


Illustration: Julie Eichner

Financial assistance may be available for fencing and the creation and maintenance of vegetated land alongside waterways. Contact your local catchment management authority, Landcare group or the local water supplier for information.

Slowing runoff

Vegetation on waterway frontages slows the overland movement of runoff water and acts as a filter or buffer to trap sediment, nutrients and other contaminants. This is desirable because reducing the movement of contaminants into the waterways will improve water quality.

Vegetation filters and traps contaminants.



Reducing erosion

Degraded vegetation alongside waterways makes the banks more prone to erosion. Flows from heavy rainfall result in increased volumes, which scour the riverbanks if they are not well reinforced. Heavy rainfall can also wash large amounts of soils, which potentially contain harmful contaminants, from the catchment into storage reservoirs. It can also mix water and sediment within reservoirs, stirring up settled microorganisms and other matter.



Stabilising riverbanks

Planting of appropriate deep-rooted species on waterway frontages can help to stabilise riverbanks and protect them in times of flood. The roots of vegetation reinforce soil (like steel rods reinforcing concrete). Root reinforcement by waterway frontage vegetation is usually the most important safeguard against bank collapse. Fine roots are more important in this process than thick roots.

Plants stabilise riverbanks and prevent erosion.

Riverbanks often collapse when they are saturated with water. Vegetation on the face of the riverbank helps to support the soil above it so it does not collapse. It also helps by taking up the water, improving the soil's drainage.

Choosing vegetation

Wherever possible, a range of native or indigenous plants should be planted – try to copy nature. When revegetating to reduce bank erosion, consider:

- the siting and the selection of appropriate plant species – avoid species that might obstruct the waterway during high-flow events
- establishing vegetation all over the bank surface – not just on the top
- selecting a range of plant species so the revegetation mimics the native or indigenous vegetation of the area
- choosing smaller plants for planting near the lowest part of the bank.

Choose indigenous plants where possible.

Native grasses, reeds and shrubs with flexible stems and branches often occupy the lowest parts of the bank. These plant types bind soil and resist flood flows well.

Further up the bank, shrubs and small trees may predominate, mixed with grass species.

Advice on which native or indigenous species to plant can be obtained by contacting your local Landcare group or catchment management authority.

Generally, the wider the vegetated land alongside waterways, the better.

Vegetated land alongside waterways should be wide enough to maintain the natural drainage function, minimise erosion of stream banks and reduce contaminants from surface runoff from the adjacent land. The width of vegetated land adjacent to waterways is subject to local conditions and the use of the land that it abuts.

Fencing

To protect waterways and the adjacent land, fencing should be erected between the vegetated water frontage (riparian zone) and the rest of the property. This prevents stock from entering the waterways and causing erosion and introducing contaminants. (For more information, see section 2.2 below.)



i More information

Section 3.1.4 provides a link to the Department of Sustainability and Environment website for incentive schemes that provide landholders with financial assistance for protecting and managing vegetation. It also has specific links to documents about the relationship between native vegetation and land and water health.

See also section 2.4 and sections 3.1.1, 3.1.8 and 3.1.9.

2.2 Manage stock to protect drinking water catchments

Manage stock numbers

When assessing stock numbers, remember to take into account the capability of the land to sustain grazing in each season and the potential risks that overstocking may have on the catchment.

Overstocking can cause a depletion of ground cover vegetation leading to soil erosion. This, in turn, causes sediment and potentially other contaminants to enter waterways.

Rotational grazing allows grasses on grazed areas to regenerate and allows them to continue to act as a buffer to trap sediments, nutrients and other contaminants moving over the land.

Prevent stock access to waterways

Preventing stock access to waterways is an integral part of good land management. It helps protect:

- the health of our waterways
- our drinking water supplies
- the land and vegetation adjacent to waterways.

Stock accessing natural waterways affects the adjacent environment by depleting vegetation and increasing the risk of erosion. This affects river health and water quality by introducing:

- **pathogens** from stock faeces or stock carcasses, causing an increased risk of disease
- **nutrients** from faeces and urine, causing an increase in the risk of blue-green algae blooms (some of which are toxic).
- **sediments** from erosion and disturbance of stream banks, which harms aquatic life, clogs streams and burdens the drinking water treatment process.

Stock should be prevented from accessing waterways and provided with alternative water supplies.



Drinking contaminated water affects the health of people and animals.

Keep calves out of waterways

As noted above, farm animal waste (faeces) contains pathogens (disease causing microorganisms). Faeces from calves, in particular, contains higher quantities of pathogens. Therefore, priority should be given to keeping calves out of waterways. If they contaminate our drinking water these pathogens can cause serious outbreaks of disease.

Provide stock watering troughs and shade

Water pumped from a waterway to stock watering troughs is of better quality than river water that stock have been walking or standing in. Better-quality water is better for stock.

Providing a shaded, clean watering trough or providing a watering trough closer to preferred pastures can significantly reduce the amount of time stock spend in unfenced riparian areas.

Adequate shade and drinking water troughs provided on the property also help prevent stock from forcing their way into fenced riparian land.

What can landholders do?

Landholders should protect water quality in catchments by:

- fencing off waterways
- providing stock with alternative drinking water supplies
- providing adequate shade in grazing paddocks.



Actions to manage stock and protect water quality

- Fence off waterways.
- Provide stock with alternative drinking water.
- Provide shade on pastures.

Financial assistance

may be available for fencing and the installation of off stream watering points. Contact your local catchment management authority, Landcare group or the local water supplier for information.



More information

See also sections 3.1.1, 3.1.8 and 3.1.9.

2.3 Maintain onsite wastewater treatment systems

All onsite wastewater systems need ongoing care and maintenance if they are to continue to function properly and not cause pollution that ends up in waterways. The maintenance of onsite systems (such as septic tanks) requires attention to not only the treatment unit, but also the land areas surrounding it.

Onsite wastewater treatment systems operate primarily through the biological digestion of organic matter. Detergents, disinfectants and other household materials affect or kill the bacterial action within these systems – making them ineffective – so the disposal of such substances into the onsite wastewater systems should be avoided. It is also critical that rubbish is not disposed of through such systems (including items such as sanitary napkins, disposable nappies, plastics and so on).

The Environment Protection Authority (EPA) approves the type of onsite wastewater treatment systems that may be installed in Victoria via a certificate of approval system. The approved systems can be viewed at www.epa.vic.gov.au/water/wastewater/.

You should obtain a copy of the certificate of approval for your system and ensure that the maintenance requirements outlined in that document are followed, in addition to any council permit conditions. If you fail to do this, your system is likely to fail.

Onsite wastewater treatment systems must be de-sludged as specified in the EPA certificate of approval for your system (usually every three years or whenever the tank becomes more than half full of sludge). Without de-sludging (and with system misuse), raw sewage (sludge) can flow to the effluent disposal area, pollute your land and waterways, and affect the health of surrounding communities.

Maintain your onsite wastewater system to keep it running well and avoid polluting waterways with pathogens and excessive nutrient loads.



Lush growth indicating a failing wastewater system.



Boggy soil indicating a failing wastewater system.

i More information

Get advice on the proper care and use of wastewater treatment systems from the environmental health officer at your local council or from the system manufacturer.

Section 3.1.6 provides links to further information, including EPA's 'Code of Practice – Onsite wastewater management'. The Code details requirements for the care and operation of septic tanks (including tank inspection and de-sludging, disposal area maintenance and surge flows) and lists indicators of failing systems.

If you suspect your system is not operating as it should, consult a licensed plumber with experience in onsite wastewater treatment systems.

2.4 Prevent soil erosion

Soil erosion affects the water quality and productivity of your land. When erosion occurs, valuable topsoil is lost, and nutrients from the soil are lost and enter waterways. There can be an increased risk of stock injury and the value of the property can be affected. It can commonly result from overgrazing, excessive tree removal and/or over-cultivation.

Effective control of soil erosion can be achieved by:

- developing a farm plan
- stabilising stream banks by planting riparian vegetation and controlling stock access
- establishing continuous ground cover through pasture improvement and the planting of native vegetation
- maintaining continuous ground cover by not overstocking and over-cultivating and, where necessary, restricting stock access
- establishing windbreaks using trees, tall dense shrubs or built materials
- placing vegetable and garden beds across rather than down sloping ground, to minimise the loss of topsoil and residue runoff that may contain sediment, fertilisers and pesticides
- restricting horse-riding and off-road vehicle (e.g. quad and trail bikes) use to flat areas on your property and sticking to existing tracks to avoid creating areas of bare land. Hoofed animals disturb the soil, as do off-road vehicles.



Trees and shrubs

Trees play an important role in protecting drinking water catchment areas. Waterways are seriously affected by clearing and the degradation of native vegetation.

Land alongside waterways should have an adequate tree and shrub buffer. Existing vegetation on the rest of your land should be preserved as much as possible. Trees and shrubs not only provide valuable habitat for wildlife, shade and shelter for stock, but they also prevent erosion – particularly on steeper slopes. Indigenous native vegetation should be chosen as a preference when improvements are being made and tree planting is being considered.

Actions to prevent soil erosion

- Prepare and implement a farm plan.
- Stabilise stream banks.
- Maintain continuous ground cover.
- Provide windbreaks.
- Establish well-situated vegetable and garden beds.
- Restrict damaging activity on slopes.



Plant indigenous vegetation.

Photo courtesy of Goulburn Broken Catchment Management Authority.

The impacts of the clearing of vegetation from the landscape are increases in:

- erosion
- runoff (which carries more sediment, nutrients and pollutants such as agricultural chemicals into waterways)
- groundwater and thus the risk of surface waterlogging and salinity impacts.

As mentioned earlier (section 2.1), vegetation slows overland movement of runoff water and acts as a filter to trap sediment. The roots also reinforce the soil, thereby preventing erosion.



Before removing any trees on your land, contact your local council. A permit may be required.

Over-clearing and intensive development of a catchment usually results in more water moving quickly off the land surface in times of heavy rain. Sometimes river channels cannot cope with the extra flow, the water level rises, riverbanks are broken and flood damage can result. If land is not well vegetated heavy rain can strip topsoil from pastures, erode riverbanks and, in extreme cases, force the creation of new river channels. Apart from the obvious impact on water quality, this leads to the loss of valuable agricultural land.

Before removing any trees from a waterway, contact your local catchment management authority. A planning permit or Works on Waterways permit may be required.

Trees and logs in waterways can play an important role in providing aquatic habitat and reducing flow velocities. These activities have the benefit of improving water quality or minimising the impacts of water quality degradation.

Check before you cut down trees or remove them from waterways – you might need a permit (council or catchment management authority).

Sand, soil and gravel extraction

You should not remove soil, gravel or similar materials from creek banks, flood plains, wet areas, steep slopes and existing unstable areas. Where possible, you should obtain your fill requirements from outside the drinking water supply catchment area.

When soil is disturbed by extraction activities, it becomes loose and is more easily eroded from the land by water or wind. The soil then often reaches waterways, which negatively affects water quality. Even extraction on a small scale can cause this problem. These areas can be difficult to regenerate.

i More information

Section 3.1.5 provides links to specific documents on soil erosion. Section 3.1.4 provides a link to the Department of Sustainability and Environment website for incentive schemes that provide landholders with financial assistance for protecting and managing vegetation.

See also sections 3.1.1, 3.1.2, and 3.1.9.

2.5 Use and manage nutrients wisely

Fertilisers

Inappropriate or excessive use of fertilisers can lead to nutrient runoff into waterways, increased costs to the landholder and reduction in the quality of produce. Wherever possible:

- time your fertiliser applications to avoid periods of intense runoff – do not apply fertiliser when the soil is saturated or rain is forecasted
- place fertiliser within the soil or under surface vegetation and avoid the use of broadcast applications
- apply fertilisers as the plants need them by giving several light applications rather than one heavy dose
- apply soluble fertiliser through an irrigation system with drippers or low-pressure micro-jets
- use stubble mulching, trash blanketing and other methods to protect soils from water and wind erosion to help keep the nutrients where they should be (on the paddock, waiting for the next crop or supporting increased pasture growth)
- consider land forming and the use of contour banks to help reduce the amount of soil and nutrients lost from paddocks
- test your soil regularly to assist in determining your soil's nutrient and trace element requirements.

Use nutrients appropriately to maximise their benefits.

Commercial fertilisers inappropriately applied to home gardens can run off and end up in local waterways. (Up to half of the nitrogen from fertiliser applied to lawns ends up as water pollution.) Alternatives include the use of natural fertilisers, such as compost and worm castings, and replacing lawns with native plants and shrubs.



Nutrient runoff into waterways increases the risk of blue-green algae blooms.



Photo courtesy of Leanne Wells.

Excessive nutrient loads causing an algal bloom in a waterway.

Actions to fertilise wisely

- Time fertiliser applications.
- Fertilise within soil and under surface vegetation.
- Avoid broadcast applications.
- Fertilise via low-pressure irrigation.
- Test soil regularly.
- Use lighter, more frequent applications.
- Protect soils from erosion.

Manure stockpiling and dairy effluent

Inappropriate stockpiling of animal manures can lead to the contamination of waterways following rain or irrigation. If stockpiling is necessary:

- ensure the pile is sited on flat ground away from drainage lines
- cover the manure during wet weather to prevent nutrients washing into waterways
- bund stockpiles, where appropriate.

Dairy effluent is a potential source of nutrient pollution (as well as pathogens) in waterways. With an estimated 1.2 million dairy cows in Victoria, the overall management of dairy effluent is an important factor in avoiding serious impacts on the environment. Reducing the amount of effluent waste requiring storage and treatment can also create operational benefits.

Other sources of nutrient runoff

In addition to fertiliser runoff, large amounts of nutrients can enter waterways from sediment via soil erosion (section 2.4) and wastewater treatment systems (section 2.3). Therefore, controlling these sources is also important.

i More information

Section 3.1.7 provides a link to the Department of Primary Industries range of useful Information Notes on managing dairy effluent. Section 3.1.2 has information on DairySAT, a useful self-assessment and action planning tool for farmers (for better management practice). For further information on the use of fertilisers, see section 3.1.3.

See also sections 3.1.1 and 3.1.9.

2.6 Use and manage agricultural chemicals wisely

Agricultural chemicals must not be used in a way that causes damage to waterways or damage to plants and stock beyond the targeted area (i.e. beyond your property boundary).

Choose chemicals that are less harmful and less persistent in the environment, but still give the desired control. Where possible, chemical use should be minimised.

Integrated pest management/Integrated weed management

Consider using an Integrated Pest or Weed Management (IPM or IWM) approach, utilising a range of alternatives to chemicals, such as biological or mechanical controls (or use in conjunction with chemicals to reduce chemical use).

Effective IPM (or IWM) can often lead to reductions in production costs in the long-term. It can also limit the build-up of chemical resistance in pests and weeds. This means improved productivity and more effective weed or pest control.

Spills and storage

- Spills of oil, petroleum, agricultural and industrial chemicals can seriously pollute catchment streams. Store chemicals wisely.
- Situate a dedicated and secure chemical storage facility away from drainage lines. The storage facility should be on flat land with bunding to contain any spills.
- Chemicals and fuel should be stored above flood levels to avoid water contamination in a flood or overland flow event.
- Chemicals should be stored in their original containers. Labels must not be removed. All containers must be sealed properly.
- In the event of a spill, contact the local water supplier or EPA so that they can respond to the situation, if needed.
- Consider obtaining a chemical or fuel spill kit.

Targeted application

Carefully identify the pests, weeds or diseases before applying chemicals. Apart from wasting money, unnecessary spraying can create other problems, such as chemical resistance and damage to beneficial species. Once identified, determine if the pest, weed or disease is present at a level likely to cause economic damage.

Do not spray in or near watercourses or on windy days.

Suitable spraying equipment and conditions are important to ensure off-target drift is avoided.

Follow instructions

Read all chemical labels and make sure you understand them before using any chemicals. Always use chemicals according to instructions. Environment-related information is usually in the 'Protection of Wildlife, Fish, Crustaceans and Environment' section of the label.

Follow official requirements and guidelines

- There is a range of Acts and Regulations controlling the use of chemicals. The use of some chemicals is restricted in several areas of Victoria. Contact the DPI Customer Service Centre (Ph: 136 186) for information.
- Follow DPI's 'Top 10 Spraying tips: To get the job done safely and effectively' (available from DPI).



Unacceptable spraying conditions: high winds causing spray drift.



Spot spraying.

Taking care with chemicals

- use Integrated Pest (or Weed) Management
- store wisely
- follow instructions
- manage spills appropriately
- targeted application
- dispose of safely
- follow the rules of use
- seek training, if required

Dispose of chemicals safely

Follow label instructions for disposal of all agricultural chemicals. Rinsing and wash-down water must not be allowed to drain into groundwater, stormwater drains or water supplies.

Dispose of empty chemical containers by returning them to the supplier (if recyclable) or disposing of the empty container through a disposal program (such as 'drumMUSTER' <www.drummuster.com.au>).

Dispose of excess or unwanted chemicals through 'Chemclear', a program to collect unwanted rural chemicals. Information is available from Chemclear (Ph: 1800 008 182 or check their website <www.chemclear.com.au>).

Chemical user training

Many farmers undertake farm chemical user courses on a voluntary basis or as a requirement for an Agricultural Chemical Users Permit (ACUP) to use certain chemicals. These courses inform about correct application rates, safe use and safe storage.

i More information

Section 3.1.3 provides links to further information on chemical use, including the Department of Primary Industries (DPI) range of useful information notes on dealing with agricultural chemicals (such as chemical user courses and ACUPs).

2.7 Plan and develop land thoughtfully

Whether you are purchasing land or already have a property, proper planning and development of your land will help protect the environment as well as maintaining the value of the land and your investment in the long term.

Proper planning and development of land helps protect the environment and maintain land value.

Before buying land

DPI's 'New, Small Rural Landholders' website

www.dpi.vic.gov.au/new-landholders summarises the issues you should consider when purchasing a rural property, provides services and information for new landholders, including managing a small property, and lists the main areas of law and legal compliance obligations associated with living in rural areas. (This site also has useful information for existing landholders.)

Planning scheme controls

All local planning schemes contain a requirement for certain kinds of permit applications within catchment areas to be referred to another authority or body (such as the relevant water supplier) for comment or review.

Do your homework and find out what controls apply to the land by speaking to the planning section of your local council. Find out if any planning scheme controls apply to the land, particularly Flood Overlays (FO) and Land Subject to Inundation Overlays (LSIO). The presence of these overlays signifies that flooding or inundation and development in these areas can have detrimental impacts on water quality. The presence of these overlays can also place restrictions on the future use and development of that land.

Planning permits

Local councils, in consultation with government agencies and their communities, have the responsibility for determining land use. Because of the risks to public health, all use and development on land within drinking water catchment areas should be managed and sited to protect the quality of water collected from the catchment area. These issues are considered during the assessment process of a planning permit application for a property that is in an open drinking water supply catchment area.

Residential development and agriculture have the potential to impact adversely on water quality through the discharge of contaminated runoff and wastes, nutrient contributions or sediment to waterways.



Sources of contaminants

- septic tanks
- poor agricultural practices
- buildings and works or techniques

Unacceptable septic tank installation located too close to a waterway.

Before commencing any development of your land, contact your local council planning section to ensure your proposed development is permitted. Some developments that require council approval are:

- wastewater treatment systems (e.g. septic tanks)
- certain buildings and works (including such things as land forming and levee bank construction)
- certain agricultural activities.

In assessing planning permit applications, councils refer to:

- any regional catchment strategy or special area plan under the *Catchment and Land Protection Act 1994*
- the *Environment Protection Act 1970*
- any relevant State Environment Protection Policy (SEPP) or waste management policy.

Always contact your local council planning section before building, developing your land or carrying out a new agricultural business.

The SEPP (Waters of Victoria) covers the need for protecting waterways used for drinking water and includes the requirement to protect such waterways from the effects of waste discharges and contaminants.

Agricultural activities

Council may consider including a condition on a granted permit that specifies a maximum stocking rate. Some agricultural activities may require an EPA Works Approval as well as a Local Council permit. Activities that may require an EPA Works Approval include piggeries and cattle feed lots.

Certain activities may be prohibited in declared water supply catchments and Land Use Conditions may be invoked where special area plans exist. In these catchments, approvals for activities are generally referred to the Catchment Management Authority for approval.

Wastewater treatment systems

EPA-approved wastewater treatment systems must be installed in accordance with the EPA's Code of Practice – Onsite Wastewater Management, which can be accessed from the Environment Protection Authority's website <www.epa.vic.gov.au/water/wastewater/onsite.asp>.

A land capability assessment (LCA) may be required with a planning permit application to install an onsite wastewater treatment system. An LCA needs to demonstrate the ability of the site to sustain a wastewater treatment system and addresses the property's environmental sensitivities. Refer to the Code of Practice specified above for more information.

Authorities may apply the 'precautionary principle' when considering the cumulative risk of adverse impacts of onsite wastewater or septic tank systems on water quality resulting from increased dwelling density in the catchment. This means that if several neighbours in a drinking water catchment have an approved wastewater treatment system installed, it does not necessarily mean that more will be approved in that area.

Construction sites

Council may require appropriate measures to be used to restrict sediment discharges from construction sites in accordance with relevant guidelines (e.g. *Construction Techniques for Sediment Pollution Control*, EPA 1991).

Land clearing: native vegetation

Land clearing is a risk to water quality, particularly when clearing occurs in close proximity of a waterway.

A planning permit from council is required before removing native vegetation from your land unless the removal is exempt under the local council planning scheme. Local laws and overlays may impose additional controls and requirements, which can override some of the exemptions. Contact your local council regarding permit and exemption enquiries.

Land clearing is a risk to water quality.

Section 3.1.2 provides a link to the DSE document 'Native vegetation: planning permit applicant's kit' which provides guidance on preparing a planning permit application to remove native vegetation.

Under the planning schemes, native vegetation includes all plants indigenous to Victoria, including trees, shrubs, herbs and grasses. Every planning scheme therefore requires rural landholders to obtain permits if they intend to clear land for pasture development or cropping. Similarly, a permit is required to crop or re-sow paddocks containing native grass more than ten years old.

Farm planning

Effective farm planning aims to simplify farm management, improve productivity and include biodiversity and ecological issues in farm decision making. The benefits of planning for the farm business, productivity and land stewardship are significant.

Some councils may request a Farm Plan to assist with permit applications – such as for a farm dwelling or a change in agricultural enterprise (e.g. a feedlot). DPI has guidelines to help landholders to respond to council planning processes that require a farm plan. Section 3.1.2 provides a link to these guidelines.

Land Channel

'Land Channel' is a useful interactive map that provides a fast-track approach for a pre-planning meeting with your council – knowing the zone and any overlay/s can guide what may or may not be permitted and what issues will need to be considered for any development proposals. See section 3.2 for details.

DairySAT

'DairySAT' is a useful self-assessment (e.g. for better management practice) and action-planning tool for farmers that can be used in developing a farm plan.

Planning for the farm business, productivity and land stewardship has significant benefits.

Farm Services Victoria

Farm Services Victoria (FSV), a division of DPI, provides a broad range of advisory and support services to help Victoria's land managers.



Tips for planning

- Avoid siting a house or other buildings on steep slopes, boggy land or on soils that easily erode or shift.
- For septic tank installation, check the soil type. Avoid boggy areas. Situate absorption trenches away from waterways and divert stormwater away from the area. Your local council will require you to meet these conditions before giving permission to proceed with an installation. Set back distances apply (see EPA's 'Code of Practice: Onsite Wastewater Management').
- To avoid water pollution, locate stockyards away from waterways and dams and ensure drainage around milking sheds and farm buildings doesn't run into waterways.
- Site dams away from streams. Situate them where soils and slopes are suitable. Contact your local council before building a dam.
- Locate roads in areas away from wet depressions. Sediment traps should be installed to catch sediments from any erosion.
- Maintain trees and shrubs along waterways to help prevent bank erosion.
- Prevent stock access, particularly calves, to waterways. Supply water for stock away from waterways.
- Cultivation can occur on slopes less than 9% (5 degree angle) if soil conditions are right. Contact your local council to check if your intended land use is allowed.
- Priority should be given to revegetating slopes that are steeper than 9% (5 degrees) and maintaining the vegetative cover.
- Slopes greater than 9% (5 degrees) should not be cultivated except to renew pasture.
- On slopes greater than 18% (10 degree angle), tree cover should be retained or established. Cultivating should be avoided and grazing restricted to maintain ground cover.
- Steep slopes above 30% (17 degree angle) are high erosion-risk zones and should be left undisturbed. These areas typically have shallow soils and increased risk of landslip. See Part 3 – Interactive maps to assist with determining the slope of your land by selecting land contours for a map overlay.

Bushfire protection and recovery

Intense bushfires can not only cause significant damage or destroy water catchments, they also leave the ground bare and vulnerable to erosion. When heavy rainfall occurs after a bushfire, many contaminants (such as ash, debris and unusually high sediment loads due to damaged vegetation alongside waterways) are washed into waterways, causing poor water quality.

Contact your local CFA for information on how to reduce fire risks on your property and for assistance in the development of fire preparedness plans.

DPI's Farm Services Victoria provides services that help in the recovery of farming businesses and communities and water catchment areas. Contact DPI for further information.

DSE has a range of information sheets on 'Making Victoria Fire Ready' (see section 3.1.4 for details).

More information

Section 3.1.2 provides further details on farm planning, including DairySAT and FSV.

See also sections 3.1.1 and 3.1.6.

Heavy rain after a bushfire washes many contaminants into waterways.

2.8 Treat catchments with respect

Everyone should treat catchments with respect, regardless of where they live. Remember that many waterways in Victoria drain to systems used for drinking water supplies. This means that wherever you are in Victoria, your actions can have a potential health impact on communities. In times of drought, when reservoir levels in water catchments are low, even more careful management of water quality and quantity is required.

Wherever you are in Victoria, your actions can have a potential health impact on communities' drinking water supplies.

Recreational use of water catchment areas

Many Australians enjoy the experience of getting outdoors and going bush. When pursuing recreational activities in drinking water catchment areas, you must always:

- follow signposted directions
- remain on marked tracks, trails or roads
- camp only in designated areas.

If in doubt, check with the responsible authority to find out what activities are permitted.

You should be considerate when camping and undertaking high-impact activities to reduce negative impacts on the water catchment.

Rubbish should either be taken home with you or placed in bins provided.

Do not bring domestic animals into drinking water catchment areas.



Disposing of wastes

Do not litter or pour chemicals down drains. Rubbish thrown onto the street or in the gutter usually ends up in the stormwater system and this runoff eventually ends up in rivers and streams (waterways). This so-called 'urban runoff' is a major source of contamination of waterways.

Dispose of wastes properly to avoid them or their by-products ending up in our waterways.

Good waste management on farms is essential to protect your land and waterways from contamination. It can also save you money, prevent stock injury or death, improve the value of your property and help avoid costly clean-up. The EPA has two publications available for reference on Farm Waste Management (see section 3.1.7).

Household rubbish

Kitchen scraps can be composted – approximately 25% of your household rubbish can be converted to fertiliser. Other household rubbish should be disposed of by a waste management contractor or at the local landfill or transfer station.

Rubbish must NOT be burnt.

Sustainability Victoria <www.sustainability.vic.gov.au> has a free 'Detox your home' household collection service. It accepts a range of domestic materials, including gas cylinders, batteries, fluorescent tubes and chemicals, such as acids and oil paints. See section 2.6 for more information on safe disposal of chemicals.

Oil and used filters

Oil and used oil filters must not be disposed of on farms. Oil and oil filters can be reused or recycled by waste oil contractors, which can be found in the Yellow Pages. Contact your local council for details of landfills and transfer stations that accept waste oil.

Treated timber and tyres

If it is not possible to reuse treated timber (which contains copper chrome arsenate (CCA) or creosote) it should be disposed of at a transfer station or landfill. It must **not** be burned as the ash can not only have adverse impacts on soil and water, but can also affect human and stock health. Ash from burnt CCA timber contains up to 10 per cent (by weight) arsenic, copper and chromium.

Waste tyres may be re-used for certain uses but they must **not** be burnt. If not being re-used, waste tyres should be taken to a licensed landfill for recycling or disposal.

Dead animals

Dead animals dumped in or near waterways decay and can pollute streams and contaminate watercourses with pathogenic microorganisms. Never bury dead stock in water supply catchment areas. Dead animals should be sent to a knackery, rendering plant or to an appropriate landfill. Stock should not be burnt unless specified for disease control. See the EPA publication 'Farm Waste Management' for further details.

More information

See also sections 3.1.1, 3.1.7, and 3.1.9.

A photograph of a waterfall in a lush, mossy forest. The water is cascading over dark, wet rocks. In the foreground, a clear glass of water is shown, partially filled with water, symbolizing the journey from source to glass. The background is filled with green ferns and moss-covered rocks.

From the source...

to the glass.

It's a shared responsibility.

Part 3. Further information, resources and contacts

For specific information or assistance about controlling hazards in drinking water catchments, contact the local water supplier, Landcare group or catchment management authority.

Financial assistance may be available for fencing and the creation and maintenance of vegetated land alongside waterways and the installation of off-stream watering points. Contact your local catchment management authority, Landcare group or the local water supplier for information. Assistance may also be available for training and education.

Section 3.1 contains a wide range of resources that can help you with many aspects of protecting water catchments on your land.

Section 3.2 provides details on useful online interactive maps.

Section 3.3 lists several organisations that may be able to assist with managing your land effectively.

Financial assistance may be available for:

- fencing
- creating/maintaining vegetation along waterways
- installing stock watering troughs.

3.1 Further information and resources

3.1.1 Key guidelines, codes of practice and legal responsibilities

<ul style="list-style-type: none">• Environmental Requirements for Victorian Farmers (DPI): Six booklets that cover legal responsibilities, codes of practice and guidelines for: Water Management, Soil Management, Biodiversity Management, Chemical Management, Weed and Pest Management, Waste Management.	<p>www.dpi.vic.gov.au (type 'Environmental Requirements for Victorian Farmers' in the search field) Ph: 136 186</p>
<ul style="list-style-type: none">• Rural Law Online: Contains information and links to relevant legislation and codes of practice, and publications. Relevant subject headings include: Native vegetation, Vermin control, Chemicals and fertilisers and Noxious weed control. Web links for various topics are found under the following headings: Land and its uses; Environment and Planning (includes a link to Catchment Management Authorities); Livestock, Pets and Wildlife (includes Codes of Practices for: Apiaries; Dairy Safe; Broiler Farms); and Crops and other produce.	<p>www.rurallaw.org.au</p>
<ul style="list-style-type: none">• DPI's <i>Information Notes</i>: Topics include Animals and livestock, Crops and pastures, General farming, Horticulture, Soil and water, Trees and vegetation, Weeds.	<p>www.dpi.vic.gov.au (follow the links: agriculture > information notes)</p>
<ul style="list-style-type: none">• Managing a Small Property (DPI website): Provides links to various topics such as: Caring for plants, Animals, Caring for your land, Legal obligations, Farm diversification and other useful information.	<p>www.dpi.vic.gov.au/new-landholders (follow the link: Managing a small property)</p>

(3.1.1 continued)

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- *Water Made Clear – a consumer guide to accompany the Australian Drinking Water Guidelines 2004:* Available from the National Health and Medical Research Council. www.nhmrc.gov.au
Ph: 1300 064 672
-

3.1.2 Farm planning

Whole Farm Planning is a process of planning, property design and management based on natural resources and economic factors. The Plan develops short- and long-term goals based on the aims of the farming family or operation. The Plan aims to simplify management, improve productivity and include biodiversity and ecological issues in farm decision making. It takes into account livelihood, lifestyle and landscape to ensure sustainability of all three. The plan should include a continuous process of 'plan, do, check and review'.

The Plan can address objectives at the property, industry, landscape, catchment/regional, state and national scales. It can include issues such as:

- identifying assets and threats
- risk management
- increasing the profitability of the business
- demonstrating sustainability and environmental stewardships (such as Environmental Management Systems (EMS))
- applying best management practice (BMP) programs.

For more information on:

- Whole Farm Planning courses – to complete a Farm Plan with a preferred provider – contact:
 - DPI
 - your local TAFE
 - Landcare
- completing a Farm Plan using self-assessment guidelines, enquire with DPI for programs such as Environmental Best Management Practice (EBMP)
- having a Farm Plan prepared by a farm planning service provider, contact the DPI Farm Planning Officer in your region, or check the telephone directory for registered farm consultants.

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- DPI's *Guidelines for Planning Applications in Rural Areas. Helping landholders respond to council planning processes that require a farm plan* www.dpi.vic.gov.au
(follow the links: agriculture > about agriculture > streamlining and property management systems > publications)
-

- DPI's *Whole Farm Planning* brochure www.dpi.vic.gov.au
(type 'whole farm planning' in the search field)
-

- 'DairySAT' (self-assessment tool) is a useful online self-assessment and action-planning tool that farmers can use to assess their natural resource management. It was developed by Dairy Australia in conjunction with farmers and industry consultants. It includes information and self-assessment on native vegetation and waterways, effluent management, soils, fertilisers, irrigation, pests and weeds and more. A fact sheet is also available from DPI. www.dairyaustralia.com.au
(type 'DairySAT' in the search field)
Ph: (03) 9694 3777
Memberline 1800 004 377
Consumerline 1800 655 441
www.dpi.vic.gov.au
-

<ul style="list-style-type: none"> • Farm Services Victoria (FSV), a division of DPI, helps farmers from a diverse range of agricultural communities apply new knowledge and practices to boost profitability, while preserving and protecting natural resources and environment. FSV provides a broad range of advisory and support services to help Victoria's land managers. These services include land and water advice and whole farm planning. Contact DPI for more information or refer to the DPI website. 	<p>www.dpi.vic.gov.au (type 'FSV' in the search field)</p>
<ul style="list-style-type: none"> • <i>Australia's National Framework for Environmental Management Systems in Agriculture</i>, Natural Resource Management Ministerial Council 	<p>www.daff.gov.au/natural-resources/land-salinity/ems/framework</p>
<ul style="list-style-type: none"> • DAFF's <i>Introduction to Environmental Management Systems in Agriculture – Biodiversity Resource Guide (Victoria)</i> Contains information on relevant legislation, policies and strategies; codes of practice and best practice guidelines; technical information and links; and contacts for training (e.g. whole farm planning, small farm management, Landcare, revegetation project planning, riparian ecology management). 	<p>www.daff.gov.au/natural-resources/land-salinity/ems Ph: (02) 6272 3933</p>
<ul style="list-style-type: none"> • DSE's <i>Native vegetation: planning permit applicant's kit</i> 	<p>www.dse.vic.gov.au (follow the links: land management > land > native vegetation > local government)</p>
<ul style="list-style-type: none"> • <i>Planning permit applications in open, potable water supply catchment areas</i>, Department of Planning and Community Development 	<p>www.dpcd.vic.gov.au/planning or www.dse.vic.gov.au (type 'potable water supply' in search field)</p>
<ul style="list-style-type: none"> • Information on planning processes in Victoria is available on the DPCD website 	<p>www.dpcd.vic.gov.au Ph: 1300 366 356</p>
<ul style="list-style-type: none"> • CSIRO's publications on farm planning, farm management and systems, Landcare, pest and weed control, crops and pastures 	<p>www.publish.csiro.au Ph: (03) 9662 7500</p>
<ul style="list-style-type: none"> • TAFE short courses – new landowners and lifestyle farmers can seek information on TAFE courses relevant to their land management activities 	<p>Look up your local TAFE in the telephone directory or visit the websites of specific TAFEs.</p>

3.1.3 Chemical use (including fertilisers)

<ul style="list-style-type: none"> • DPI's <i>Top 10 Spraying tips: To get the job done safely and effectively</i> 	<p>www.dpi.vic.gov.au/chemicalstandards (click on the 'publications' link)</p>
<ul style="list-style-type: none"> • DPI's <i>Information Notes</i> on agricultural chemicals, including chemical user courses and ACUPs 	<p>www.dpi.vic.gov.au/chemicalstandards or visit www.dpi.vic.gov.au (and follow the links: agriculture > information notes > general farming)</p>

(3.1.3 continued)

• DPI's <i>A Practical guide to applying agricultural chemicals in Victoria</i> (under review at time of print)	www.dpi.vic.gov.au
• DPI's <i>Information Note: Using fertiliser test strips on pasture</i>	www.dpi.vic.gov.au (follow the links: agriculture > information notes > crops and pasture)
• DPI provides information on the use of fertilisers on the DPI website	www.dpi.vic.gov.au (follow the links: agriculture > soil and water > fertilisers)
• <i>Herbicides: Guidelines for use in and around water</i> , Cooperative Research Centre (CRC) for Australian Weed Management	www.ehmpcg.org.au/documents/herbicidesandwater.pdf

3.1.4 Vegetation

• DSE provides information on incentive schemes that provide landholders with financial assistance for protecting and managing vegetation	www.dse.vic.gov.au (follow the links: land management > land > native vegetation > incentives and trading)
• DSE's <i>Victoria's Native Vegetation Management: A Framework for Action</i>	www.dse.vic.gov.au (follow the links: land management > land > native vegetation)
• DSE's <i>Native Vegetation – Sustaining a Living Landscape</i>	www.dse.vic.gov.au (follow the links: land management > land > native vegetation)
• DSE's <i>Making Victoria Fire Ready</i> information sheets <ul style="list-style-type: none">– Preparing for bushfire– Clearing of native vegetation to prepare for bushfires– Clearing of native vegetation affected by bushfires– Repair of fences damaged by bushfire– Frequently asked questions.	www.dse.vic.gov.au (follow the links: land management > land > native vegetation > local government)

3.1.5 Soil erosion

• DPI's <i>Information Notes</i> on native vegetation (including shelterbelts for wind erosion) and different types of erosion (e.g. gully and tunnel erosion), landslips and measures for control	www.dpi.vic.gov.au Ph: 136 186
• DSE's <i>Managing erosion and landslip risk</i>	www.dse.vic.gov.au (follow the links: land management > land > native vegetation > local government)
• DPI's <i>Managing erosion with temporary sediment traps and fences</i>	www.dpi.vic.gov.au

3.1.6 Onsite waste water management systems

• EPA's <i>Code of Practice – Onsite Wastewater Management</i> , Publication 891.2 (under review at time of print)	www.epa.vic.gov.au/water/wastewater/onsite.asp
• EPA's <i>Model Conditions for Septic Tank Permits</i> , includes system maintenance	www.epa.vic.gov.au/water/wastewater/onsite.asp
• EPA's <i>Land Capability Assessment for Onsite Wastewater Management</i> , Publication 746.1	www.epa.vic.gov.au/water/wastewater/onsite.asp

3.1.7 Farm wastes

• EPA's <i>What to do with farm wastes</i> , Publication 1049.1	www.epa.vic.gov.au
• EPA's <i>Farm Waste Management</i> , Publication IWRG641	www.epa.vic.gov.au
• DPI's <i>Information Notes</i> on managing dairy effluent	www.dpi.vic.gov.au (follow the links: agriculture > dairy > dairy information)

3.1.8 Waterways and adjacent land management

• <i>Stock and waterways: A Manager's Guide</i> , Land and Water Australia (LWA) (though now disbanded, LWA's information was still available online at time of print)	www.lwa.gov.au/programs/river-landscapes (type 'stock and waterways' in the search field)
• <i>Protect our Waters, Protect our Health: Highlighting the importance of preventing stock access to waterways</i> , Department of Health	www.health.vic.gov.au/environment/water
• DSE's <i>Managing riverbanks for better farms and rivers</i>	www.dse.vic.gov.au (follow the links: land management > land > crown water frontages)
• LWA's <i>River and Riparian Management Series: Fact Sheets 1–13</i> : <ol style="list-style-type: none">1 Managing riparian land2 Stream bank stability3 Improving water quality4 Maintaining in-stream life5 Riparian habitat for wildlife6 Managing stock7 Managing woody debris in rivers8 Inland rivers and floodplains9 Planning for river restoration10 River flows and blue-green algae11 Managing phosphorous in catchments12 Riparian ecosystem services13 Managing riparian widths	www.lwa.gov.au/programs/river-landscapes (type "river and riparian management" in the search field)

3.1.9 Other catchment guides

<ul style="list-style-type: none">• <i>Caring for Country: A guide for Sustainable Land Management in Central Victoria</i>, North Central Catchment Management Authority	<p>www.nccma.vic.gov.au Ph: 03 5448 7124</p>
<ul style="list-style-type: none">• <i>CRP Manual: Current Recommended Practices for Water Quality in the Goulburn Broken Catchment</i>, Goulburn Broken Catchment Management Authority	<p>www.gbcma.vic.gov.au Ph: 03 5820 1100</p>
<ul style="list-style-type: none">• <i>Recreational access to drinking water catchments and Storages in Australia</i>, Research report 24, Cooperative Research Centre (CRC) for Water Quality and Treatment	<p>http://www.wqra.com.au/Reports.htm</p>
<ul style="list-style-type: none">• <i>A guide to hazard identification and risk assessment for drinking water supplies</i>, Research report 11, CRC for Water Quality and Treatment	<p>http://www.wqra.com.au/Reports.htm</p>
<ul style="list-style-type: none">• <i>A consumer's guide to drinking water</i>, CRC for Water Quality and Treatment	<p>http://www.wqra.com.au/WQRA_publications.htm (under the heading 'other CRC publications')</p>
<ul style="list-style-type: none">• <i>Victorian Landcare and Catchment Management Magazine</i>	<p>www.landcarevic.net.au (follow the links: resources > magazines) or www.dse.vic.gov.au/victorianlandcaremagazine</p>
<ul style="list-style-type: none">• <i>Landcare in Focus Magazine</i>	<p>www.landcareonline.com (follow the links: resources > publications)</p>

3.2 Interactive maps

Land Channel

Land Channel <www.land.vic.gov.au> is a useful tool to find out about zones, possible overlays for your property, land contour lines and location of rivers. Select interactive maps on the right-hand side and click on 'I Agree' (terms and conditions). You can then type in your property address or use the map of Victoria to select your area and zoom down to a particular property. From the menu, select:

- 'Get Reports', click on 'Next' and then chose 'Basic Property Report'; this free report will show parcel details, utilities, planning zone summary – zones and overlays
- 'Build map'; map layers can be built by selecting various options, including rivers, lakes and land contours. Click refresh and the report can be printed.

DSE's interactive maps

DSE's Interactive Maps section provides a wide array of Victorian Information layers, including waterways, roads, properties, parcels, Landcare group boundaries, water resources and more. Similar to Landchannel, map layers can be built using the data from the drop-down boxes. Visit <www.dse.vic.gov.au> (follow the links: About us > interactive maps). Two relevant interactive maps are:

- Biodiversity Interactive Map – provides information on the biodiversity of Victoria and displays data including: waterways (select hydrology), topography (land contours), catchment information (e.g. Proclaimed water supply catchments, floodways, groundwater bores), land classification and planning overlays, Ecological vegetation classes (Native vegetation EVCs), flora and fauna and management areas
- Victorian Water Resources – integrates water-related data from various networks and systems, including the Victorian Water Quality Monitoring network, Index of Stream Condition and Groundwater Management System.

3.3 Key contacts

Water suppliers

For the local water supplier contact details, refer to your local telephone directory, visit the Victorian Government's Our Water, Our Future website <www.ourwater.vic.gov.au/governance> or call the Department of Sustainability and Environment's customer service centre (Ph: 136 186).

Catchment management authorities (CMAs)

For the contact details of your regional catchment management authority:

- refer to your local telephone directory
- visit the Victorian Government's Our Water, Our Future website <www.ourwater.vic.gov.au/governance>
- visit the Department of Sustainability and Environment website <www.dse.vic.gov.au> (follow the links: Land management > Catchments)
- call DSE customer service (Ph: 136 186).

Melbourne Water

Ph: 131 722

Web: www.melbournewater.com.au

For all River Health Incentives Program enquiries, phone 03 9235 2231 or visit <[www.melbournewater.com.au/content/rivers and creeks](http://www.melbournewater.com.au/content/rivers_and_creeks)> (follow the links: our programs and projects > community engagement programs > stream frontage management program).

Note: Natural Resource and Catchment Authorities (NRCAs) will be established by the end of June 2011. Four NRCAs will incorporate the existing Catchment Management Authorities and Regional Coastal Boards. Contact DSE for more information or check their website.

Local government

For your local council contact details refer to your local telephone directory or refer to the Department of Planning and Community Development (DPDC) website <www.dpdc.vic.gov.au>.

Department of Primary Industries (DPI)

Ph: 136 186

For regional office locations and contact details, refer to the DPI website <www.dpi.vic.gov.au>.

Department of Sustainability and Environment (DSE)

Ph: 136 186

For regional office locations and contact details, refer to the DSE website <www.dse.vic.gov.au>.

Environment Protection Authority (EPA)

Ph: 03 9695 2722

For regional office locations and contact details, refer to the EPA website <www.epa.vic.gov.au>.

Department of Health (DH)

Ph: 1300 761 874

For regional office locations and contact details, refer to the DH website <www.health.vic.gov.au>.

Department of Agriculture, Fisheries and Forestry (DAFF)

Ph: 02 6272 3933

For organisational information and contacts, refer to the DAFF website <www.daff.gov.au>.

Landcare

For your local Landcare group, visit the Landcare website <www.landcarevic.net.au> or call your regional catchment management authority.

The Victorian Landcare Gateway is an interactive and informative website providing news from Victorian Landcare groups and networks, including information about volunteer activities, events, project information and contacts.

The gateway also hosts an online discussion forum and allows you to find Landcare groups and networks in your region. It is full of resources, case studies, grant information and toolkits for community groups.

