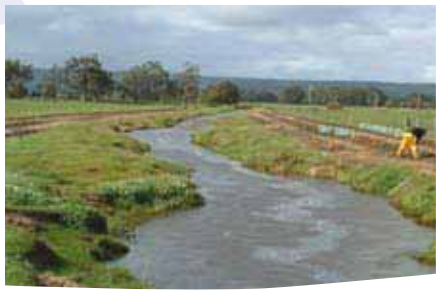
DairyingForTomorrow

DairyCatch

A Partnership for Sustainable and Profitable Dairy Farming in Western Australia

ENVIRONMENTAL BEST PRACTICE GUIDELINES
7.0 MANAGEMENT OF NATIVE VEGETATION



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7.0 MANAGEMENT OF NATIVE VEGETATION

Agricultural land has been extensively cleared for cropping and grazing on improved pastures, intensive animal production and horticulture. Only the Jarrah, Marri and Karri forests of the extreme south-west remain largely intact. The Swan Coastal Plain, wheat belt and mallee regions have been largely cleared and only patches of the original vegetation remain.

Protection of native vegetation on private property in Western Australia is essential in stopping and reversing land degradation and loss of biodiversity. Vegetation management encompasses the management of riparian areas that involves stock exclusion by fencing river and stream banks, channels and drains, creating wind and shelter breaks and manipulating wetland vegetation.

The management of vegetation is dependent on many factors, such as the size and shape of the vegetation, the nature of the adjoining land use, the type of vegetation in the area and the quality of the vegetation. Well-planned planting of trees can assist in controlling water and wind erosion and salinity. A shelterbelt of trees can act as an effective windbreak. A native bush strip along a fence line can offer good erosion control for your paddocks and provide valuable shade and shelter to stock.

In Western Australia, there is a need to protect native flora and fauna from the impacts of agriculture. In our southwest there is an exceptionally high level of species diversity, with many species restricted to small areas located on private property.

The State Government has recently made a number of changes to the Environmental Protection Act of 1986. Some of the amendments introduce provisions that protect native vegetation while allowing for approved clearing activities. Both public and private lands in rural and urban areas are subject to assessment upon application for a permit, making the process more equitable.

Under the new law, clearing native vegetation is prohibited, unless a clearing permit is granted by the Department of Environment (DoE), or the clearing is for an exempt purpose. These exemptions ensure that low impact day to day activities involving clearing can go ahead. People who wish to clear are required to submit an application if an exemption does not apply. This will be assessed against principles which consider biodiversity, land degradation and water quality. A guide to the exemptions and how they operate is available through the Department of Environment website or by contacting your local DoE office.

The DoE assesses applications for Clearing Permits and decisions are made to approve or reject the proposal in line with the Act. If you clear native vegetation without obtaining a permit and the clearing is not for an exempt wpurpose, you may be penalised. The maximum penalty for clearing without authorisation is $250,000 for individuals and $500,000 for corporations. In addition, the DoE can require an offender to restore the unlawfully cleared vegetation at their own expense.

Implementing Good Practice

The persistence of many native plants and animals relies on remnant vegetation on private property. The future of these remnants depends on the possibility they will be cleared or the probability they will degrade and be lost forever without some kind of management.

Riparian Land Management provides protection of waterway and floodplain riparian zones. Riparian land is the zone where land and water meet. It includes land surrounding lakes and wetlands and floodplain areas that interact with rivers during times of flood. Replanting riparian vegetation in combination with maintaining and managing existing riparian land has many economic, environmental, social and recreational benefits.

Fencing Channels and Drains is the simplest way of regulating animal access and grazing pressure on land surrounding channels and drains. Fencing will allow you to manage stock access according to need and available feed and opens up opportunities for additional or alternative productive use of riparian margins such as agro-forestry. The type and location of fencing depends on your stock type, the size and shape of the stream channel or drain and flood frequency and height.

Windbreaks and Shelterbelts created by planting trees and shrubs, usually along fence lines, can benefit you and the environment. Windbreaks reduce wind erosion, protect pasture and provide stock with shelter and forage. Trees use significant amounts of water and may reduce waterlogging. The effectiveness of shelterbelts and windbreaks is enhanced by planting shrubs on the outside rows of the windbreaks. Shrubs reduce the chance of wind tunnelling underneath tall tree trunks and serve as wildlife habitats. Rare or commercially valuable species can be chosen for seed production or floriculture. Further, healthy vegetation increases the aesthetic appeal of the landscape and overall value of a property

Preventing stock access to fragile areas will ensure the long-term survival of remnant vegetation. Stock exclusion enables plants to regenerate and reduce the need to plant seedlings. Stock exclusion reduces soil compaction and limits weed invasion caused by soil disturbance and nutrient/seed spread through dung.

Wetland Management deals with areas that are permanently, seasonally or intermittently waterlogged or inundated with water that may be fresh, saline, flowing or static. Seasonal wetlands often have a higher plant and animal species richness than permanent wetlands. Seasonally waterlogged wetlands, however, are being lost at a faster rate than other wetland types due to their less obvious boundaries and the traditional land development approach. At least 80% of all of the wetlands once present on the Swan Coastal Plain prior to European settlement have either been cleared, filled or developed. An estimated 15% have retained high ecological values (ie Conservation Category Wetlands).

The vegetation surrounding wetlands is crucial for the wetland to function and to filter nutrients entering from surrounding agricultural activities.

Additional management practices that can keep native vegetation healthy and protect native fauna include controlled burns to maintain or increase the diversity of native plant species, preventing the invasion of introduced weed species and feral animals into native vegetation areas and planting native under-storey species along streams as buffer zones.

Isolated patches of valuable remnant vegetation may be small and degraded, requiring vegetation enhancement to ensure their long-term survival. Enhancement may include establishing a buffer of commercial vegetation around the area to protect it, establishing a corridor of vegetation to link it to another area or the replanting of vegetation in disturbed areas within the site. Once isolated, remnant native vegetation rarely persists without some form of management intervention, such as fencing to prevent stock access.

Cows with access to the river will camp there on hot days

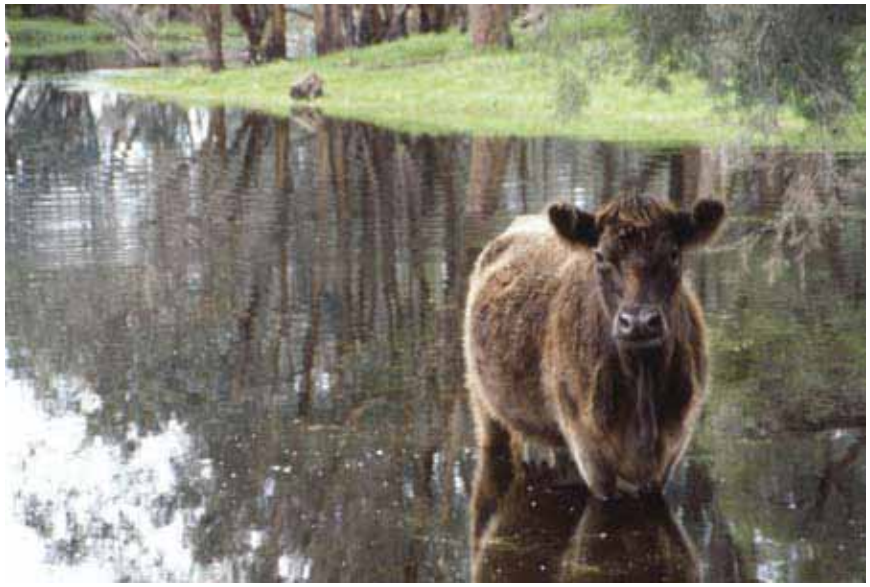
MANAGEMENT OF NATURAL VEGETATION

Benefits

- provides shade and shelter for stock while reducing stream and drain bank erosion and slumping
- shelter belts created by trees can reduce wind erosion and protect pastures
- visually attractive and adds value to property

Liabilities

- Expensive
- May take land out of production
- When fencing off waterways, the cost of constructing off stream watering points needs to be factored in
- May harbour weeds and pests.



Costings

Revegetation work can be expensive if fully implemented and costed within a farm context. Grants maybe available from Landcare groups to offset the cost of seedlings and fencing materials. Investigate these before starting your works.

Further Information

If you are have any queries or plan to clear vegetation on your property, contact your local DoE office or call the Native Vegetation Protection Section on 9278 0300 or the Free call number 1800 061 025. You can also visit the DoE web site at: www.environment.wa.gov.au

7.1 RIPARIAN LAND MANAGEMENT

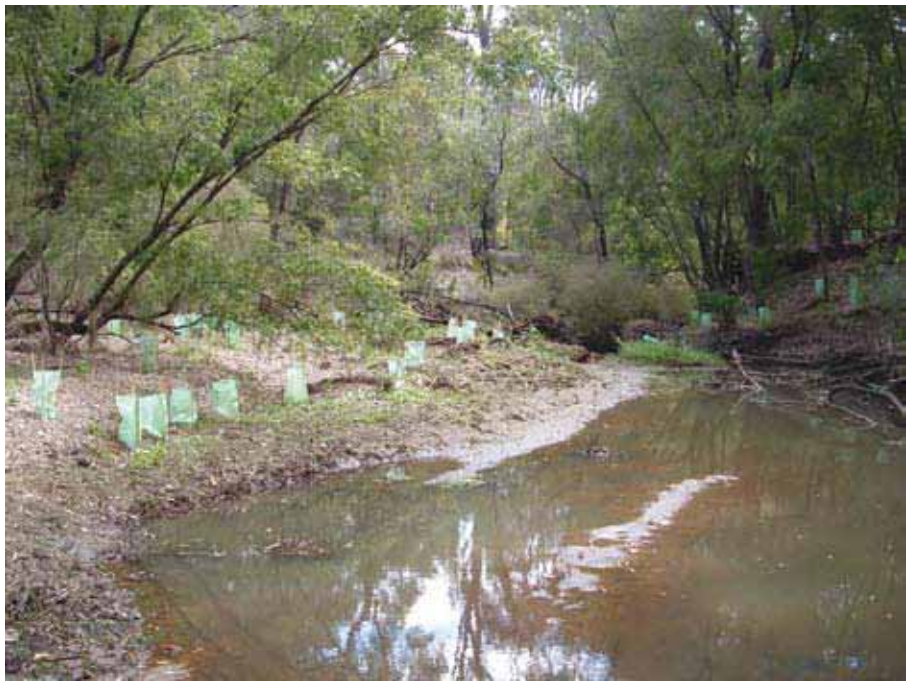
Over clearing and intensive agricultural development in many areas of the south west have resulted in large amounts of water moving quickly off the land and into streams, rivers and wetlands. This runoff water may transport nutrient-rich sediment from paddocks to drains, reducing water quality and silting up waterways down stream.

Riparian zones are the strips of land next to waterways and include land surrounding lakes, wetlands and floodplain areas that interact with rivers during times of flood.

Riparian land management is about protecting and maintaining waterways and floodplains.

Management and enhancement of riparian land is important as this zone performs a number of functions and improves water quality by:

- displacing sediment-producing activities, such as stock trampling stream banks, away from flowing water
- trapping sediments in surface runoff
- reducing the velocity of sediment-bearing storm flows, allowing sediments to settle out of water and be deposited on land
- stabilizing stream banks, preventing channel erosion
- moderating stream flow during floods and high flow, reducing bed scour, and
- contributing large woody debris to streams; these can trap considerable sediment, at least temporarily, and provide valuable habitat and breeding spots for wildlife



Managing riparian land involves a range of activities including fencing off drains and watercourses to control stock access, replanting native vegetation and providing off stream watering points to stock.

Replanting riparian vegetation in combination with maintaining and managing existing riparian land has many economic, environmental, social and recreational benefits.

Implementing Good Practice

Before you start work on riparian areas, give the matter careful thought and draw a map. Aerial photographs can be helpful here as they clearly identify areas of existing riparian land and features upstream and downstream. This will allow you to prioritise work to areas where the need is greatest and ensures planned work is designed to suit differences in slope, soil type, water balance and waterlogging.

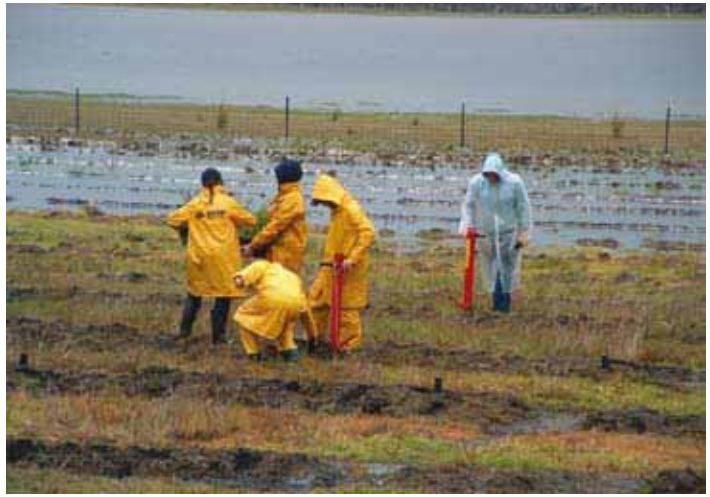
Consultation and collaboration between neighbours on shared watercourses can maximise the use of available funds. Riparian vegetation can be rehabilitated together and smaller areas of existing riparian land can be fenced together to create linked riparian corridors between properties.

A combination of grassed and forested buffers are most effective at trapping sediment and reducing nutrients from entering watercourses. Using strips of perennial pasture grasses between intensively used agricultural land and riparian vegetation provides an initial slowing of overland flow and trapping of sediment and attached nutrients, and this process is continued in the natural vegetation along the stream bank. Riparian vegetation has the additional benefits of increasing bank stability, providing wildlife habitat and improving the aesthetic appeal of the landscape. Snags and other large woody debris should generally be retained to provide habitat and food for aquatic fauna and create irregular and more natural stream channels.

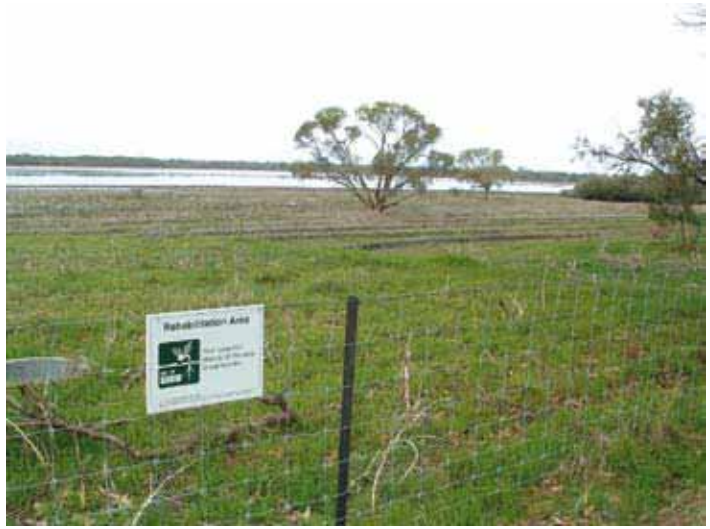
Riparian buffers are most effective at trapping sediment and reducing nutrients entering drains and waterways when implemented on smaller streams and drains. Low order streams and drains have the highest chance of accepting and quickly transporting nutrient rich sediment to larger streams and rivers, therefore a system of riparian buffers should be implemented on all streams and drains regardless of size.

Depending on the nature of the landscape and the adjacent land use, the width of the riparian buffer should be between 10-30 metres, generally the level of effectiveness increases as the width increases. Research has shown that approximately 90% of suspended solids can be trapped by 30 metre vegetation and grass buffers resulting in a reduction of phosphorus concentrations entering waterways by 79%.

When riparian land is fenced to control stock access and revegetated, adequate off-stream watering points and hardened stream access points for watering of stock should be constructed.



Riparian restoration in the lower Harvey River area



Direct watering of stock from streams is frequently associated with bank degradation and poor water quality. The provision of off-stream watering points should greatly reduce uncontrolled stock access and, if accompanied by fencing, will eliminate the damage stock can cause to riparian land.

It is not necessary to take riparian land out of production, but it is important to maintain it so that there is a complete ground cover at all times. Grass and understorey vegetation should be kept at least 10-15 cm high.

Don't let stock have uncontrolled access to waterways. This prevents pugging of stream banks and avoids pollution of the waterway with dung and urine. Allow for controlled grazing of riparian land, where stock can be put into the riparian zone for short periods of time to control weeds and reduce fire hazards. For further information on controlling stock access see section 4.2 Preventing Stock Access.

Some landholders are experimenting with the establishment of riparian agro-forestry plantations, comprising widely spaced trees and a good grass understorey. The grass provides feed for stock and offers the potential for farm diversification and income, while at the same time making a positive contribution to improve water quality.

Benefits

- Increases capital growth of property by improving aesthetics of stream corridors
- Provides shade and shelter for stock
- Improves water quality by stabilising stream banks and reducing erosion
- Trapping/removing sediment from runoff which reduces the amount of nitrogen and phosphorus entering waterways
- Prevents fouling of waterways by livestock
- Decreases algal growth. Riparian vegetation reduces the light and temperature levels of waterways which prevent the growth of nuisance plants and algae
- Erosion of topsoil and stream banks and beds is reduced
- Maintains healthy and diverse riparian ecosystems
- Maintains a suitable habitat for aquatic animals, including insects, fish and crustaceans
- Offers recreational and educational opportunities

Liabilities

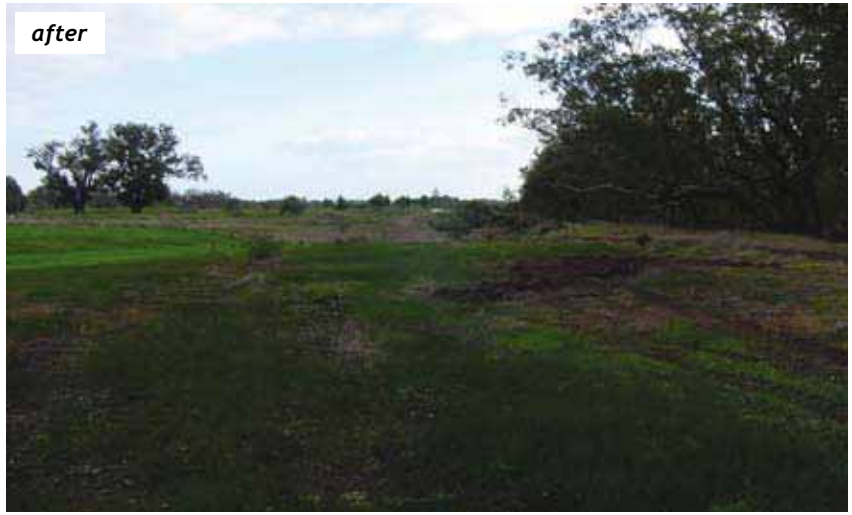
Fencing and enhancing riparian zones by planting trees and shrubs is an expensive task that requires a lot of time and labour. A staged plan, incorporated into a whole farm plan over many years is the best option to gradually work towards fencing and revegetating main drains and waterways.

Riparian buffers are very effective at controlling and reducing sediment-bound phosphorus over the short-term but can become less effective over the long term as soils become saturated with phosphorus and lose the ability to store and filter phosphorus. However, even when saturated, riparian buffers may still perform a valuable service by regulating the flow of phosphorus from the land to the stream. The phosphorus will still slowly leak into the water, but the stream is protected from extreme nutrient pulses.

Harvesting of riparian vegetation does provide a method of permanently removing some phosphorus from the system. To maintain stream bank stability and reduce erosion, it is recommended that harvesting be restricted to areas away from the waters edge. It is recommended that a minimum buffer distance of 4 metres be maintained at all times.

Riparian zones wide enough to provide sediment control (10-30 metres, increasing with slope) should provide short-term control of sediment bound phosphorus. Wider setbacks should be considered for application of animal waste, fertilisation, and other activities that yield large amounts of nutrients.

Due to their limitations, riparian buffers should not be viewed as a primary tool for reducing phosphorus loading of streams. Riparian buffers alone are not enough to mitigate the effects of otherwise uncontrolled upland activities and are not a substitute for good land management elsewhere in the catchment. Every effort should be made to reduce phosphorus inputs at their sources.



Good planning and site preparation will increase the survival rate of seedlings.

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7.2 PREVENTING STOCK ACCESS TO FRAGILE AREAS

Fragile areas include areas of native vegetation, wetlands, watercourses and floodplain areas and areas of degraded or fragile vegetation. These areas require appropriate stock management to ensure their preservation.

A number of measures can be used to prevent stock from accessing fragile areas. These include:

Fencing off areas

Fences are the most effective method of managing livestock distribution on your property. In order to maximize the benefits that fencing can obtain however, you must ensure that it is properly located, well-constructed and maintained.

When constructing corridor fencing you should consider if the exclusion area is going to be grazed in the future. If it is, it should be wide enough to allow effective grazing to take place.

Various types of barriers may also be used to control livestock distribution. For example, fallen trees and large boulders can be used to block off water access points and trails thus discouraging use in those areas. Plants that form a physical barrier due to dense growth or have low palatability can also deter livestock from using an area. Natural barriers combined with fencing can also achieve the above results by regulating trailing and loitering in some areas.

Innovative fencing, known as Virtual Fencing is currently being developed by the CSIRO in collaboration with scientists from the US Department of Agriculture's Research Service and the Massachusetts Institute of Technology. Although still largely conceptual, the technology once fully developed, will present the ultimate in remotely controlled grazing. Cows will be fitted with minute receivers that direct their movement along GPS coordinates transmitted by a network of satellites and orchestrated using mobile phones. Virtual Fencing could be commercially available within the next ten years.

Correct location and design of watering points

The largest component of milk is water and dairy cows require copious amounts to support their productivity. Creating water points away from fragile areas and areas of high traffic significantly reduces livestock foraging and loitering in these areas.

Numerous techniques can be used to develop an alternative water sources. These include reticulating water using pumps or gravity and developing springs, seeps or wells.

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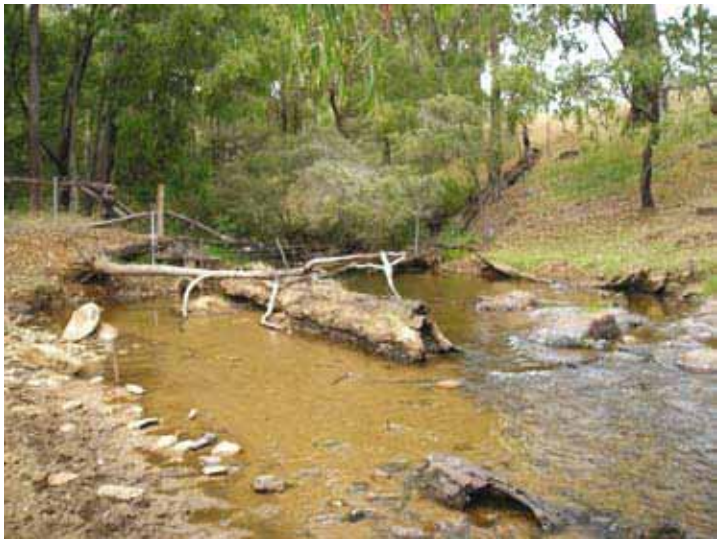
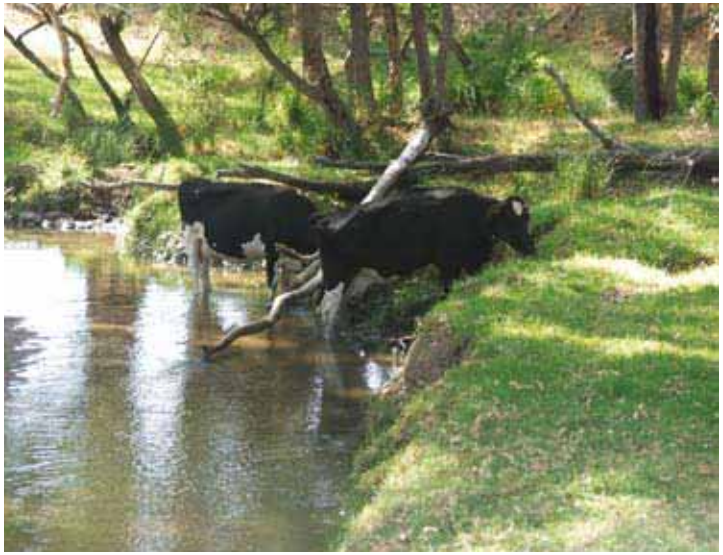




7.3 FENCING CHANNELS AND DRAINS

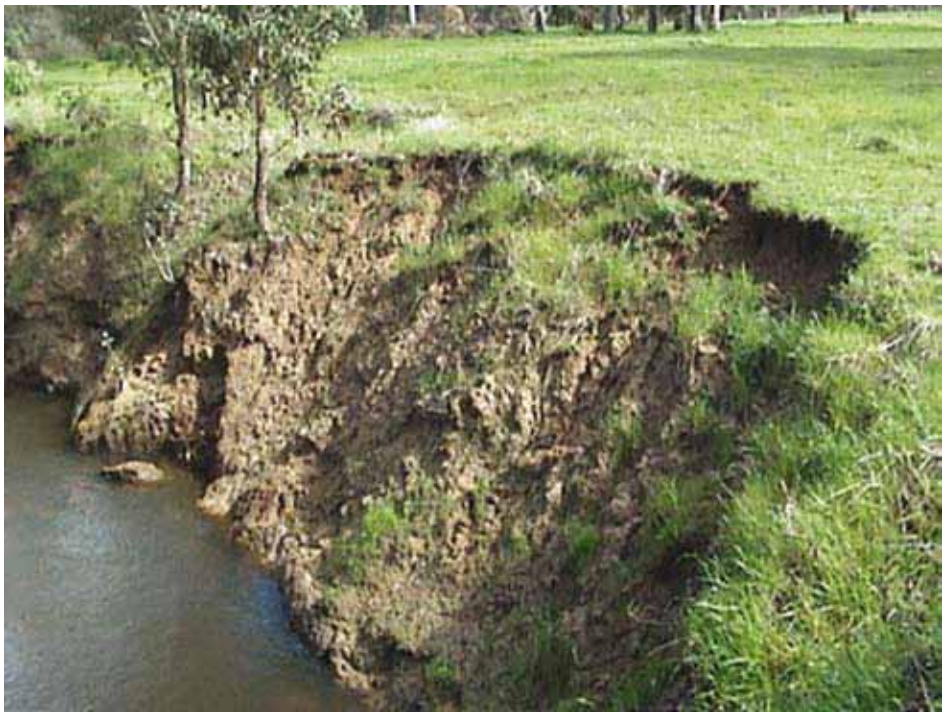
Currently the simplest way of regulating animal access and grazing pressure along channels and drains is to fence them off. Fencing allows you to manage stock access according to need and available feed and opens up opportunities for additional or alternative productive use these areas such as agro-forestry.

Once land alongside channels and drains has been fenced and fringing vegetation established, wether it be native vegetation or pasture, it can be classed as a riparian zone and should be managed accordingly.

The type and location of fencing that best suits your needs will depend on your stock, when and how much you want to use the land within the fenced area, the size and shape of the stream channel and flood frequency and height.

Implementing Good Practice

Conventional wire fencing was once considered a robust, low maintenance means of denying stock access but electric fencing is now generally favoured as being more cost effective and allowing greater flexibility in design. In addition, electric fencing can be used to exclude other animals such as kangaroos. Maintenance of the fences requires regular inspection and upkeep.



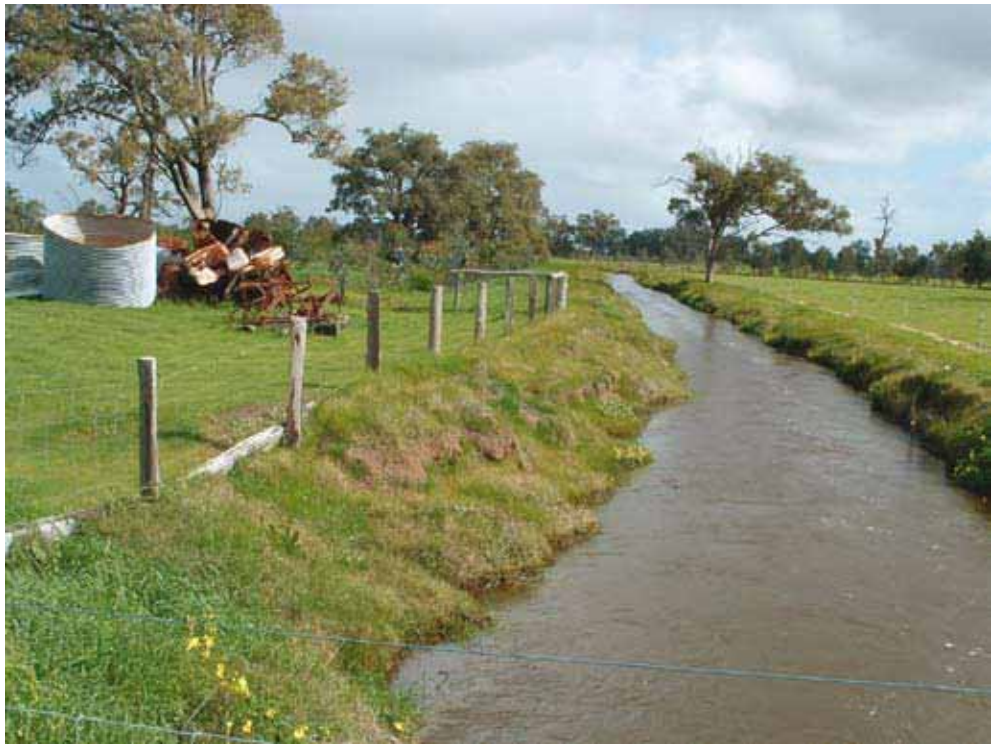
This severe erosion occurred during a flood because cows had free access to the stream bank in Marrinup Brook

Table 7.1 provides a comparison of difference types of fences currently on the market. More detailed information can be obtained from government agencies, retailers, fencing contractors, catchment groups and farm consultants.

The benefits of fencing off channels and drains relate to:

- Reduced maintenance costs for drains, channels and irrigation structures
- Maintenance of adequate flows within channels and drains through better weed control
- Reduced capacity for turbidity and nutrient (effluent) problems within drainage systems
- Potential to incorporate tree planting and habitat enhancement into the farming enterprise

The cost of fencing out cattle from irrigation channels and drains is related to both the fencing cost and the cost of supplying an adequate stock watering system.



A section of the Mayfield Drain fenced to restrict cattle access.

Table 7.1 Advantages and disadvantages of different current fence types.

Fencing Option	Advantages	Disadvantages
Plain Wire Suspension Fence	• Relatively flood Proof • Cheaper than fabricated mesh fences	• Can be less effective in controlling stock • Droppers are needed depending on post spacing • Restricted potential to follow steam curviture
Prefabricated Mesh Suspension Fence	• Very effective in controlling most stock • Strong • Droppers usually not needed • Erected comparatively quickly	• Expensive • Susceptible to flood damage • Restricted potential to follow stream curvature
Electric fence **Including portable electric fences.**	• Comparatively cheap to initially construct • Quick to erect • Relatively flood proof • Effective against cattle • Curved fence line possible	• Not so effective against sheep • Relies on electricity supply • Droppers may be needed, depending on post spacing
Drop fences	• Flood proof	• Expensive

Drains are constructed to move water rapidly from agricultural land. They should be maintained to ensure this primary purpose. Any fencing or revegetation must take into account the need for machinery access and must be done in co-operation with the authority managing the drain.

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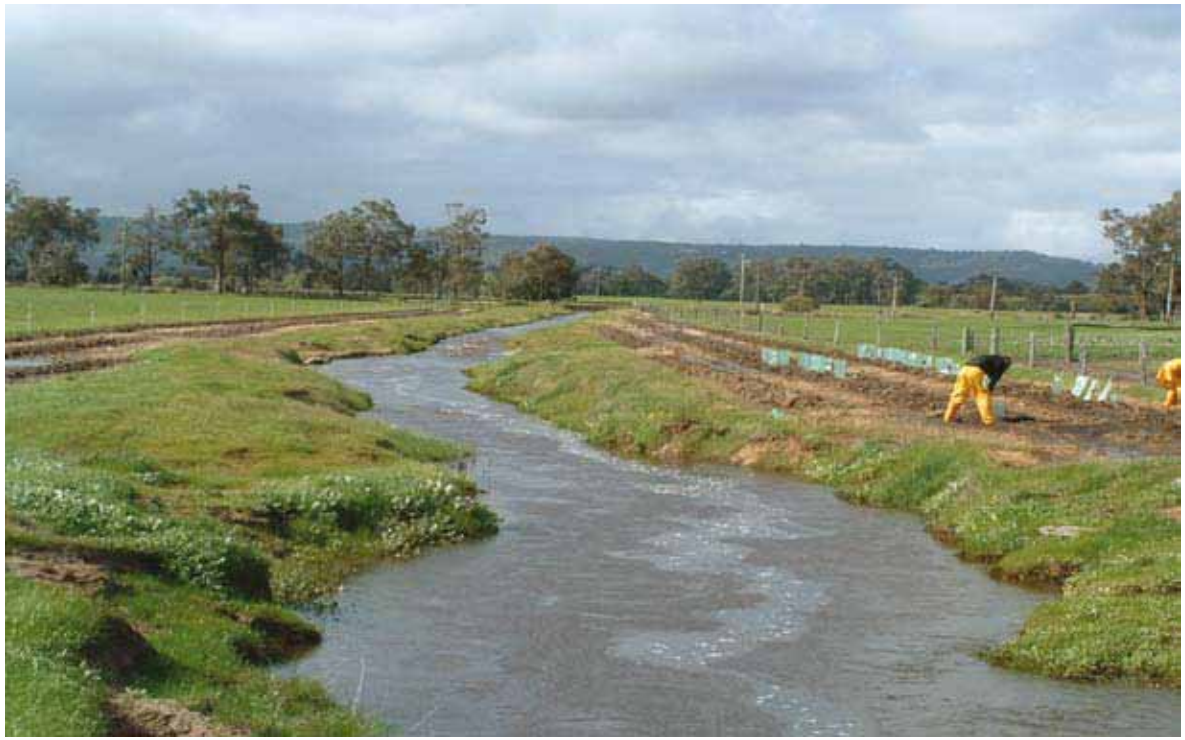


Drain streamlined and fenced to turn the drain into a functioning stream and prevent stock from having access to the watercourse.

7.4 WINDBREAKS AND SHELTERBELTS

Suitably located vegetation designed to create windbreaks and shelterbelts can increase agricultural productivity in adjacent paddocks by providing shade and shelter to stock and protection from climatic conditions to pastures, crops and soils. These benefits can increase production in livestock, crops and pastures.

Heat stress reduces live-weight gains and significantly reduces milk production. But the effects of heat stress can be lowered by provision of suitable shade and shelter. Increases of up to 17% in milk production can be obtained from dairy cattle where appropriate shade is provided.

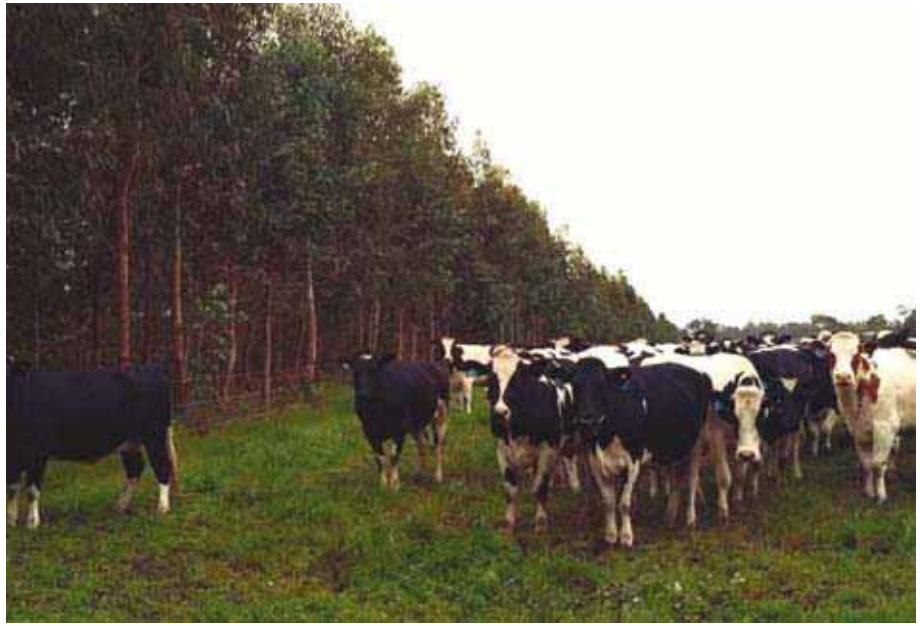
Implementing Good Practice

A windbreak's effectiveness at providing shelter depends on factors such as height, orientation to the wind, position in the landscape, permeability to wind and continuity.

When designing windbreaks, the first step is to decide what benefits you want from them - shelter, timber, aesthetic enhancement, or a combination of benefits. Next, consider your farm business and any limitations imposed by farm boundaries, roads, fences and soil types.

Because the cost of establishing windbreaks throughout a large farm can be high, give priority to:

- areas prone to wind erosion
- crops which are particularly susceptible to wind or spray drift
- paddocks for calving
- stock holding yards
- infrastructure such as dams, roads, sheds, milking yards.



Stock that are kept stress free are likely to spend more energy producing milk.

Spacing between windbreaks

Tree height is the main factor governing a windbreak's effectiveness, so the taller the trees, the further windbreaks can be spaced apart. Windbreaks give protection to the area around them by reducing wind speed at ground level by at least 20 per cent. Using this yardstick, windbreaks can protect land for at least 20 tree heights in their lee, and up to four tree heights upwind. The area of greatest protection is between two and 10 tree heights downwind. Windbreaks have little or no effect beyond 30 tree heights.

In most areas, windbreaks spaced at 25 to 30 tree heights give adequate protection. However, on soils prone to wind erosion, or in hilly areas with complicated wind patterns, spacings of 20 times tree height or less are recommended. Use even closer spacings around feed pads and dairy sheds where high levels of shelter are needed.

Orientation

New windbreaks and shelterbelts should be designed so that they are at right angles to the direction of the prevailing wind and that they have no gaps. Fill gaps in existing shelter with local native shrubs and trees. Windbreaks become progressively less effective as the wind angle decreases.

You know from experience which winds are most damaging on your farm so align your windbreaks accordingly. Where wind directions are highly variable, a grid pattern of windbreaks will give the best protection.

In winter in the south of Western Australia, strong winds blow from the north-west, west and south-west. North-westerlies can be destructive but south-westerlies are colder and more dangerous for stock. In summer, hot dry winds blow from the east.

A common orientation for windbreaks to protect crops is north to south, or north-east to south-west. A north-south orientation also minimises shading of crops or pastures and provides shade for both adjoining paddocks (at different times of day), whereas those that run east-west provide shade only for the southern paddock.

Windbreaks and shelter belts can provide Agro-forestry opportunities, reduce erosion and protect cows from harsh weather.

Planted shelterbelts provide welcomed shade for cows during the summer

To protect livestock from cold winter winds, windbreaks are often aligned north-west to south-east. If stock shelter is the main aim, wide shelterbelts, or dense blocks of trees are more effective than narrow windbreaks.

Permeability

Many existing windbreaks are inefficient because they are planted with tall trees. As the trees mature they lose their lower branches and allow the wind to pass under the foliage, creating a wind tunnel. The inclusion of lower shrubs on the outside rows of the windbreaks improves it's efficiency and it's value as a wildlife habitat. Rare or commercially valuable species can be chosen for seed production or floriculture. A range of proteas, banksias and foliage eucalypts can provide an additional source of income.

A windbreak's permeability determines the amount of air that flows through it and therefore the degree of wind speed reduction in its lee. Permeability varies with tree species, number of rows, spacing between trees and tree management.

To protect soil and crops, the ideal windbreak is about 30 to 40 per cent permeable to wind and has uniform foliage to ground level on at least one side. In practice, effective shelter is provided by windbreaks over a wide range of permeability. However, very dense or solid windbreaks can cause turbulence and eddies at ground level in their wake.

Length of windbreaks

Short windbreaks are less effective than long windbreaks because wind eddying around the ends reduces the area protected and can cause erosion problems. A rule of thumb for the minimum length of a windbreak is 20 times tree height.

If possible, establish a network of windbreaks, with the ends of each windbreak joining or butting into other windbreaks. You can also increase the effective length of windbreaks by abutting them to other tall objects such as buildings, bush and hills.

Number of rows

Most windbreaks with shelter as their main purpose have at least three rows of trees. Plant adjoining rows of trees in an offset pattern to avoid making gaps at right angles through the windbreak.

A single row of trees can make a reasonable windbreak if the trees grow uniformly and retain their lower branches and foliage. However, if some of the trees die or lose their lower foliage, wind can 'jet' (or 'funnel') through the gaps at increased speed.

Tree Spacing

Tree spacing depends on the species used, the size they will grow on the selected site and the density of shelter required.

Large trees are often grown in rows three to four metres apart, with a similar distance between trees in the rows. Smaller trees and shrubs may need to be planted closer together. Choose a plant spacing that will give a continuous screen of foliage without gaps when the trees and shrubs mature.

Aerial photo of planted windbreaks

Foliage gaps

Design windbreaks to minimise the number of gaps through which wind can 'jet'. For example, foliage gaps at the base of windbreaks are undesirable because they allow wind to jet through at ground level, increasing the potential for soil erosion under or near the trees. The risk is greatest on bare sandy soils, especially where stock camp, or where the trees have suppressed pasture growth.

Access tracks

If access tracks are needed through wide windbreaks, place them diagonally through the trees, or in areas where wind speed is lowest, or erosion is least likely. For access tracks passing through a series of parallel windbreaks, stagger the gaps to avoid making continuous passages for wind. Place gateways and gaps in areas of greatest shelter or where erosion risk is least.

Fencing and maintenance

During establishment of a windbreak, it is desirable to exclude stock so that the trees can reach their maximum height rapidly. Stock should only be allowed access to the understorey once trees are well established and are unlikely to be affected by cattle. You are better-off permanently excluding cattle if you have low-growing or shallow-rooted trees.

Once established, windbreaks require little maintenance other than weed control and fence maintenance. However, trees grown for timber may need special management, depending on the tree species and the products being grown.

Benefits

Windbreaks and shelterbelts improve agricultural productivity by:

- preventing soil erosion
- improving crop growth
- protecting crops and pasture from wind damage
- providing shade and shelter for livestock
- reducing groundwater recharge
- increasing biodiversity, and
- reducing evaporation from soils and dams

Further Information

Department of Agriculture and Food WA. Windbreak design and management in the greater than 450 mm rainfall zone of Western Australia. Tree Note No. 22. Available online at www.agric.wa.gov.au

Hipsey, M. 2001. Using windbreaks to reduce evaporation from farm dams. Farm Note 72/2002.Department of Agriculture, Western Australia. Available online at www.agric.wa.gov.au

Murray Catchment Management Committee. 1998. Economics of native vegetation. Veg Note Series 4. Department of Land & Water Conservation. New South Wales.

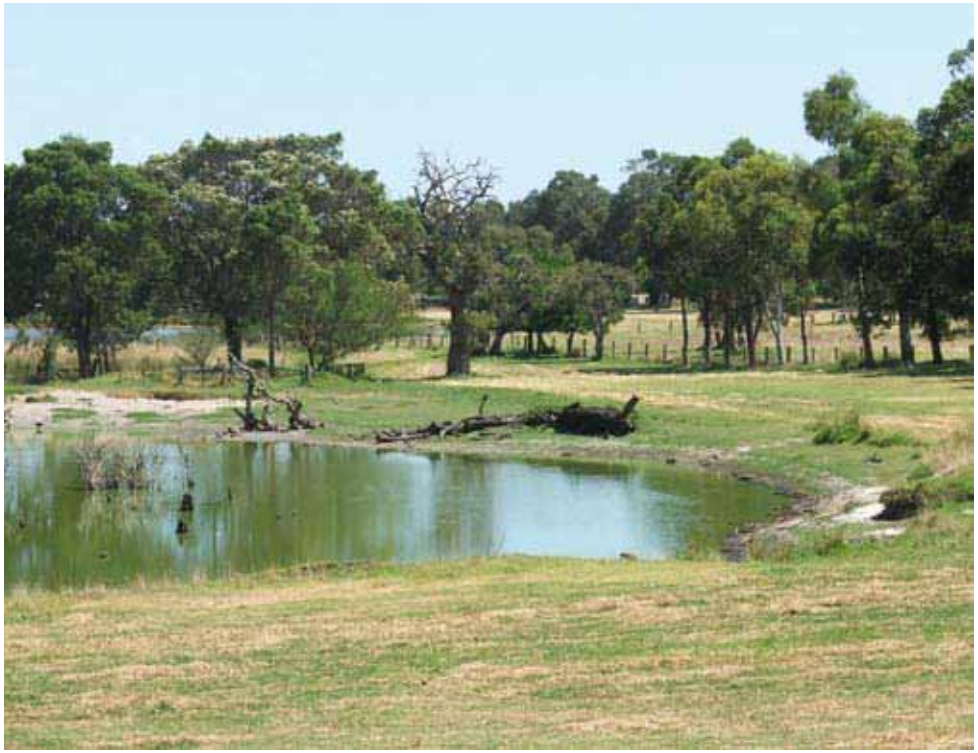
7.5 WETLAND MANAGEMENT

Wetlands are areas permanently, seasonally or intermittently waterlogged or inundated with fresh, saline, flowing or static water. They are vibrant habitats for a diverse range of fauna and flora. Wetlands also filter nutrients entering from surrounding agricultural and urban activities. At least 80% of all wetlands once present on the Swan Coastal Plain prior to European settlement have been cleared, filled or developed. Only an estimated 15% are classed as Conservation Category Wetlands with high ecological values that require specialised management. Seasonally waterlogged wetlands often have a higher plant and animal species richness than permanent wetlands and are being lost at a fast rate due to their less obvious boundaries and the traditional land development approach.

Wetlands perform a range of important ecosystem functions. They operate like sponges in the waterways, absorbing and storing floodwaters. Wetlands are normally the last to dry out during drought or low rainfall periods, making them a prized oasis for wildlife and domestic stock. However, wetlands are also where sediments, nutrients and some industrial and urban pollutants may be deposited and trapped. This is a serious environmental concern when wetlands are connected to the groundwater system.

In some situations, maintaining a healthy wetland may require landholders to modify (but not necessarily discontinue) their current practices. Future development options may need to be modified or sacrificed in the interest of retaining a functioning wetland ecosystem. As with any decision there are pros and cons to be considered. It is important that when making that decision you have the best information available on these benefits and costs.

Community attitudes towards wetlands are changing as more and more is being learnt about them. One of the implications for landholders is that areas of pasture considered by farmers to be of little or no environmental value can be included in the list of wetlands, or appear on wetland mapping for their area, simply because it is waterlogged or inundated at some time during the year. The values assigned to this sort of wetland are usually low, however, most biologists recognise that waterlogged and flooded pasture areas do present certain values for wildlife (grazing, feeding on invertebrates and possibly nesting by some waterbirds).



Here fertilisers have been washed into the wetland and along with stock having access an algae bloom has occurred in the wetland.

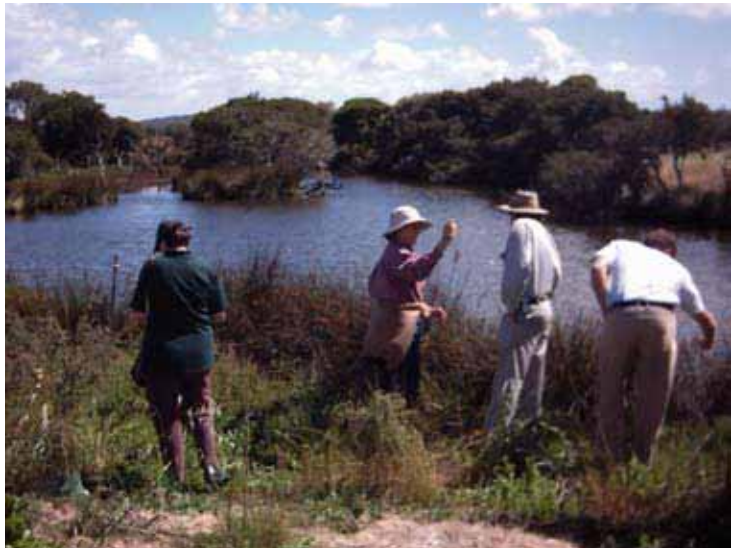
As a farmer, you need to determine to what extent you are willing and able to take the steps necessary to manage your wetlands. Over the years, balance sheets have shown that conserving wetlands can provide as much benefit to the private landholder as it does to the broader community.

As a starting point, list the current use and benefits you derive from your wetlands at the moment and then consider ways that you could perhaps take more advantage of what your wetlands have to offer. For example, if it is an area that attracts large numbers of waterbirds, is there an opportunity to diversify your farm income by developing small-scale eco-tourism - a bed and breakfast for birdwatchers? Or, if you changed the way you manage water on your property, perhaps reinstating closer to natural wetting and drying cycles, will this give you stronger plant growth for grazing? If you fence your stock out of some areas, will this improve the quality of the water you draw from the wetland? There are often ways to use your wetland for better returns; the trick is to understand the limits of the system and operate within them.

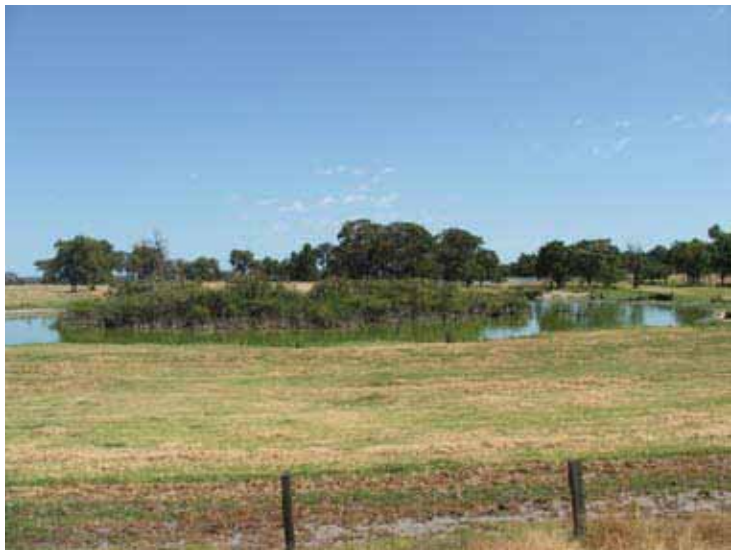
Another important issue to consider is that of the legacy you want to leave for your children and their children. Keeping wetlands healthy and using them wisely is a decision most people take with the long-term in mind. These are natural assets which if cared for, will continue to deliver services and benefits for generations to come. Wetland management is part of today's realisation that farming practices must strive for sustainability and not erode the natural ecosystems. Expanding areas of dryland salinity and declining water quality in rivers and streams are clear signs of past failings in this regard. The new ethos is sustainable farming, and maintaining healthy wetlands is a part of that approach

A summary of selected formal controls and protection mechanisms such as Legislation, Regulations and Policies covering wetlands is shown in Table 7.2.

In 1998, the Government of Western Australia proclaimed its Environmental Protection (South-West Agricultural Zone Wetlands) Policy (EPP). This EPP creates a register of protected wetlands, sets up a program for protection of wetlands and prescribes a number of controls on activities that might have a detrimental environmental impact on protected wetlands.

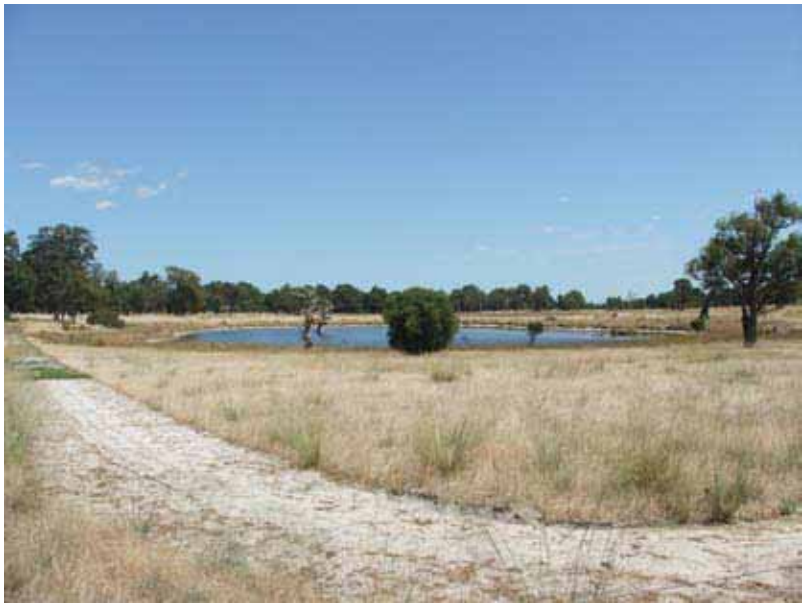


Controlling weeds



A wetland becomes protected when it is nominated to and entered on the Register of Wetlands, which requires the agreement of the landowner. The policy provides for offences that result from damage or degradation of registered wetlands and the development of an agreement between government and landowners to encourage voluntary adoption of environmentally sensitive practices.

Managing wetlands could include a range of practices, depending on past management and condition of wetland. Management could include fencing the wetland to exclude stock and rehabilitation such as planting sedges and native seedlings to create finging vegetation and a buffer zone around the wetland. There are many sources of information and programs that can offer on-ground assistance.



Examples of poor wetland management which is very common where vegetation has been cleared and stock have access.

Legislation - Policy	Provisions for Wetlands
Rights in Water and Irrigation Act	Controls surface water diversions in gazetted catchments; licensing and control of groundwater abstraction in gazetted groundwater areas.
Country Areas Water Supply Act	Controls clearing in gazetted catchments.
Soil and Land Conservation Act	Controls clearing state-wide, applies to the clearing of vegetation for areas greater than 1 ha, including wetland vegetation. Controls drainage state-wide. Formal controls on drainage exist where land degradation can occur.
The Environmental Protection Act 1986	Part 3 Environmental Protection Policies Part 4 Environmental Impact Assessment Part 5 has the objective of the prevention, control and abatement of environmental pollution, for the conservation, preservation, protection, enhancement and management of the environment.
Water and Rivers Commission Act	The Commission has water resources conservation, protection and management functions vested in it by various written laws. This Act also gives the WRC functions which relate to the conservation, management and assessment of water resources and planning for their use (water resources is broadly defined to include wetlands).
Waterways Conservation Act	Within certain gazetted management areas, a management authority will protect waterway systems.
Wildlife Conservation Act	Protection of Declared Rare Flora
South West Agricultural Zone Wetlands Policy (EPP)	Protection for nominated and registered wetlands in South-West Agricultural Zone only. See detailed note below.
Swan Coastal Plain Lakes Policy 1992 (EPP)	Protection for wetlands on the Swan Coastal Plain.
State Wetlands Conservation Policy	Principles for identification and protection of wetlands in Western Australia.
International Treaty to which Australian and State Governments are responsible	Western Australian Ramsar wetlands.
Department of Environmental Protection - Guidelines for environment and planning	Non statutory guidelines, provides advice on wetlands generally as well as those that are important such as Ramsar, current legislation and policies, classification of wetlands, and guidelines on protection mechanisms including buffers. EPA position statement on wetland protection.

7.6 RETENTION AND MANAGEMENT OF REMNANT VEGETATION

Good quality bushland on a farm is a rare and precious thing that should be preserved and protected. It provides a habitat for animal and plant biodiversity. Retention and management of native vegetation is aimed at preventing habitat modification and improving the environmental value and function of that habitat. Central to this is limited clearing as prescribed by relevant legislation or local vegetation and environmental management strategies. Farm bushland can be a source of direct and indirect income.

Implementing Good Practice

- Consider native vegetation retention and rehabilitation in development of a whole farm plan, particularly the enhancement and connection of remnant paths to develop corridors and facilitate the movement of fauna
- Monitor the condition of remnant vegetation areas, including recruitment, weed populations and species composition
- Apply appropriate controls for management of pest plants and animals
- Work towards retaining or revegetating between 15% and 30% of your farm land under native vegetation
- Maintain different age classes of trees and standing (dead) timber. If and when necessary, re- establish the composition and structure of ground and mid storey vegetation to preserve and provide a wild life habitat
- If you plan to revegetate, try a use local native plant species, and
- Good site preparation, including soil disturbance and weed control is essential for successful establishment.

Benefits of Implementation

- May improve the productivity of the agricultural system by
  - Providing shade and shelter for stock to reduce heat stress and wind chill
  - Increased pasture growth through protection from cold winds during the growing season
  - Increases in crop yields with bushland providing protection from erosive, chilling and drying winds
- Provides corridors to link fragmented vegetation remnants, provide habitat and wildlife corridors for animals
- Provides ecosystem goods and services, for example, pollination, biodiversity, water quality, soil health, nutrient cycling and habitat.
- Maintains aesthetic, heritage, cultural and land values

Further Information

Clifton,C, C Mc Gregor, R Standen and S Fritsch. 2004. Landscapes and Industries Program, Current Recommended Practices for Broadacre Dryland Agriculture. Murray Darling Basin Commission, Canberra. Available online at www.mdbc.gov.au

Holt, C and K Bradby. 2000. The value and benefits of healthy farm bush. Farmnote No. 141/2000, Department of Agriculture, Western Australia. Available online at www.agric.wa.gov.au