Water and Rivers Commission | WN4 January 2000

Water notes

Government of Western Australia

Natural Heritage Trust

Advisory Notes for Land Managers on River and Wetland Restoration

Wetland buffers

A wetland buffer zone is an area of vegetation which usually begins from the boundary of wetland dependent vegetation and extends outward, ending at the interface with another landuse. The buffer zone will vary in size and nature depending upon the specific purpose for which it was created.

Why are buffers important?

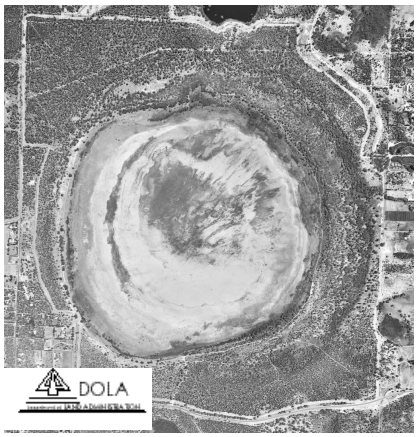
The retention and management of vegetated buffers is very important to ensure that healthy wetland ecosystems are maintained and protected. A wetland buffer zone may perform functions such as:

- reduce surface water runoff from surrounding land into the wetland;
- maintain good water quality in a wetland by reducing sediment, nutrient and pollutant loads in runoff;
- provide feeding and breeding habitat and shelter for wetland fauna;
- contribute to wildlife corridors between the wetland and adjacent wetlands or bushland;
- reduce disturbance of native fauna from surrounding development (for example noise, movement and light from residential development);
- provide a buffer area between residential areas and nuisance insects such as mosquitoes and midges;
- minimise invasion by weed species;
- obscure incompatible scenery from the wetland (for example, housing or industrial development); and
- provide an area for passive recreational activities such as bird watching, photography and bush walking.

Environmental and economic costs associated with the loss of wetland buffers

Significant economic costs to the community may be incurred where there are inadequate buffers. This includes cost associated with control of midges and mosquitoes, management of invasive weed species, rehabilitation and revegetation of native vegetation, flooding control measures and management of increased sedimentation and eutrophication (nutrient enrichment). Environmental costs include modification of wetland ecology, disturbance of fauna, loss of habitat, and a loss of biodiversity.

Lake Monger, an example of a lake which is not protected by a buffer.



Thomsons Lake has a large buffer of native vegetation.

Buffer zone width

The buffer width recommended for a particular wetland will be dependent upon the conservation significance of the wetland and the purpose of the buffer. Table 1 summarises currently recommended buffer widths for the protection of wetlands on the Swan Coastal Plain, for a range of threatening processes. As a general guideline to protect wetland's environmental values, the Water and Rivers Commission recommends that a minimum buffer of 50 m is

established from the boundary of wetland dependent vegetation. Where a wetland has significant conservation value a buffer of 200 m or greater may be recommended. However, it is recognised that in many situations, there are reasons why the buffer widths are not possible.

The size of the buffer required for ***visual and noise screening*** depends on the magnitude of disturbance and the density of the buffer. Narrow buffers can block visual intrusion, while either wide or dense buffers will attenuate noise. Buffers widths recommended to minimise ***disturbance to fauna*** depend on the ecological requirements of the species concerned and are usually measured from the outer edge of the wetland vegetation. For waterbirds species which nest in trees, such as the Grey Teal or the Pacific Black Duck, a buffer of 100 m may be required whereas ground nesting ducks like the Australasian Shoveller need a buffer of 40 - 50 metres of low vegetation to ensure breeding success. Afurther example of the specific buffer requirements of an animal species is that of the Long-necked turtle which lays its eggs in the soil among upland vegetation and requires the retention of a buffer of up to 200 m.

For ***nuisance insects*** the buffer zone required depends on wetland orientation, the ecology of the species concerned and the severity of the nuisance problem. Buffers between residential areas and mosquito producing wetlands may need to be 2 km or more, while buffers to prevent midge nuisance may be required to be several hundred metres wide to be effective.

Table 1. Examples of recommended widths for wetland buffers on the Swan Coastal Plain

Purpose	**Recommended buffer width**
To maintain ecological processes and major food-webs[1]	20-50 m
Nuisance insects[1] wetland	100-800 m (depending on orientation)
Reduce nutrient inputs[3]	200 m
Pollution protection (input of heavy metals)[3]	100-200 m
Protection from rising salinity[3]	250 m
Minimise sedimentation[2]	100 m
Protection of groundwater[3]	2 km in direction from groundwater flow

[1] Includes wetland vegetation and is measured from the outer edge of open water.

[2] Measured from the outer edge of the seasonally inundated zone.

[3] Measured from the boundary of wetland dependent vegetation.

(Note that the buffer widths are guidelines only and do not represent statutory requirements of the Commission.)

Looking after wetland buffers

Wetland buffers can be degraded or lost as a consequence of different activities which include:

- recreational activities such as horse riding, 4 -wheel driving and motorbike riding;
- grazing by livestock and pest species such as rabbits;
- trampling of vegetation by livestock and recreational users;
- weed invasion and introduction of feral animals;
- clearing native vegetation to allow rural or urban development;
- mining;
- road construction;
- frequent fires; and
- increased water levels due to discharge of stormwater.

Management is needed to prevent the loss of natural buffers, restore degraded buffer zones and preserve wetland integrity and species diversity. Sustainable management of wetland buffers will involve careful landuse planning and activities such as revegetation, control of weeds, fencing and creating paths to guide recreational activities.

Rehabilitation of vegetation:

It is necessary to first identify the purpose of the buffer and then to determine the vegetation structure and composition that is required. A range of methods can be used to re-establish native vegetation including direct seeding, planting of seedlings and introduction of the desired seed and rootstock by using topsoil from other local buffer areas. It is possible to allow regeneration to occur naturally within the proposed buffer, however this may be a slow process and have limited success due to competition from weeds. It is preferable that local native species are used in rehabilitation projects as they are most suited to the local climate and soils, provide habitat for native fauna, and maintain local varieties and hence biodiversity.

Buffer restoration and retention may utilise productive land and farmers may wish to compensate for this loss by using some of the buffer zone in other ways. Farmers may consider using buffers for tree crops and flowering trees for bees in cleared rural wetlands.

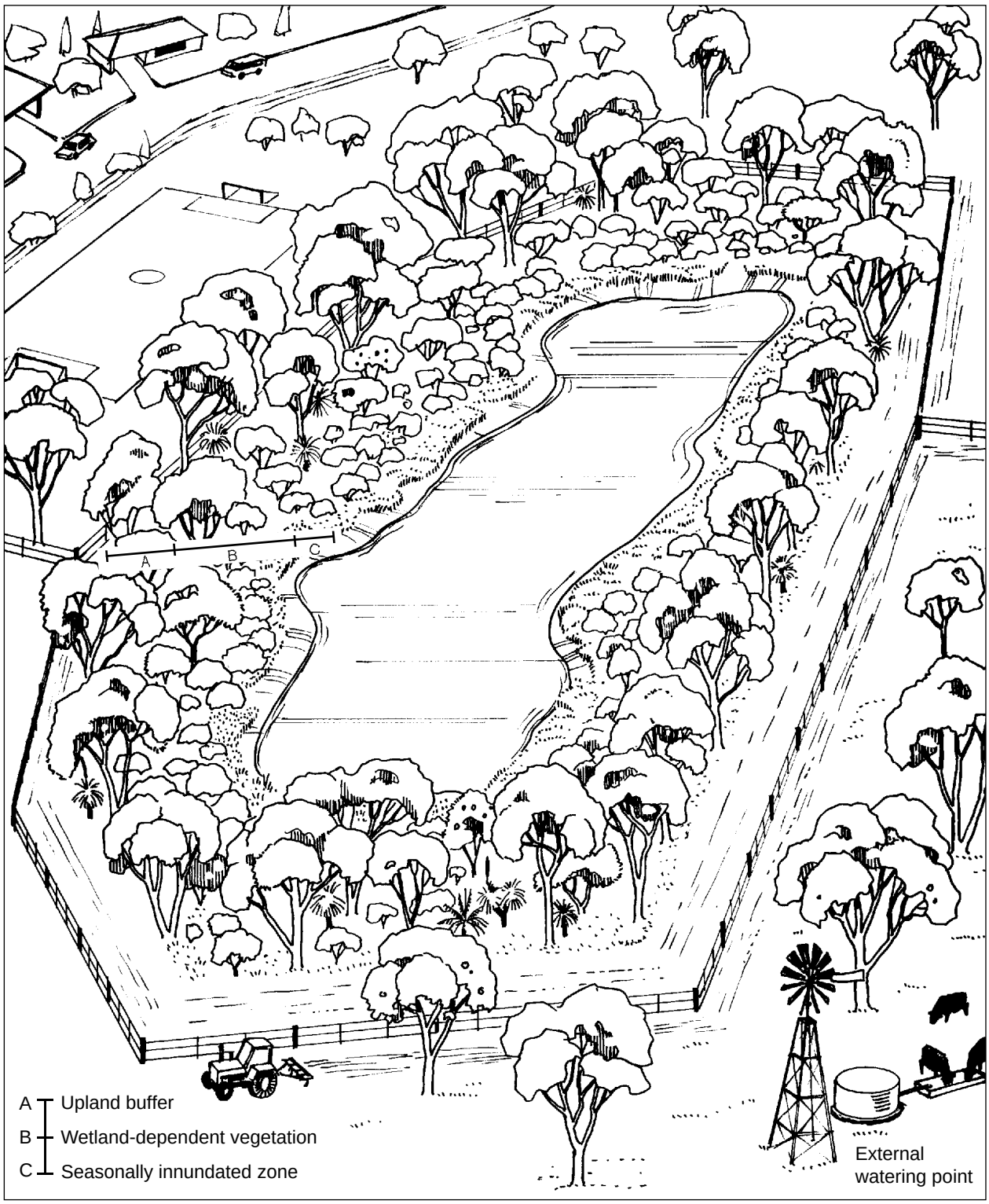
Fencing:

Fencing is an important management tool used to prevent livestock grazing, trampling of wetland vegetation and to limit human activities to appropriate areas. The type of fence will differ depending on its purpose and the compatibility of the material used with the aesthetic values of the area. Fences can be built from logs, wire and wood, or even from alternatives such as rocks, or dense or prickly vegetation which follows land contours. Access points to allow wildlife passage and fire-fighting operations should be included in fence design.

Weed control:

Seek to identify the weeds in the buffer wherever possible as this will enable the most effective method of weed control to be adopted. Advice on weed identification and control can be sought from Agriculture Western Australia, the Department of Conservation and Land Management or the Swan Catchment Centre. For information on identification and control of declared plants in Western Australia contact Agriculture Western Australia.

When removing weeds care should be taken to minimise soil disturbance and work from areas with native plants towards weed-infested areas. It is preferable to manually remove weeds rather than to use herbicides unnecessarily. When using herbicides carefully follow the manufacturer's instructions and selectively apply herbicides by stem-injecting or applying them with a wick applicator where possible. If spraying is used, it is important to take care to avoid spray drift into the wetland itself.



A simplified diagram depicting a wetland buffer.

To reduce weed invasion of your wetland buffer:

- do not plant invasive exotic plants in parkland next to wetlands and their buffers;
- do not use the buffer areas as disposal sites for garden waste;
- never tip aquarium or pond plants into waterways or wetlands; and
- always allow native plant regeneration to dictate the rate of weed removal.

Paths:
Paths can be useful to minimise disturbance of wetland buffer zones by leading people to specific areas of high aesthetic or natural value while simultaneously guiding people away from environmentally sensitive areas. Paths should not interfere with natural drainage lines and are best built with porous material to minimise runoff.

State Wetlands Coordinating Committee:
Note that the State Wetlands Coordinating Committee has identified buffers as a high priority issue. It is currently establishing a sub-committee to review recommended buffer widths and to find ways of ensuring that land planning adjacent to wetlands properly considers the need for buffers.

Further reading

Available from Water and Rivers Commission

Water note WN1 *Wetlands and weeds*
Water note WN2 *Wetlands and fire*
Water note WN3 *Wetland vegetation*
Water note WN5 *Wetlands as waterbird habitat*

Available from other sources

Australian Association for Environmental Education (WA) (1994) *Forum Proceedings*. Weeding Western Australia; A forum for Land Managers.

Balla, S. (1994) *Wetlands of the Swan Coastal Plain, Volume 1. Their nature and management.* Water Authority of Western Australia and the Department of Environmental Protection, Australia.

Brouwer, D. (1995) *Managing your wetlands on farms*. NSWAgriculture.

Buchanan, R.A. (1991) *Bush Regeneration: Recovering Australian landscapes*. TAFE, Sydney Australia.

Davies, P.M. and Lane, J.A.K. (1995) *Guidelines for design of effective buffers for wetlands on the Swan Coastal Plain.* Report to: Australian Nature Conservation Agency Canberra.

Davies, P.M. and Lane, J.A.K. (1996) *Nutrient content of surface water discharge into Lake Clifton; an internationally significant wetland*. Journal of the Royal Society of Western Australia 80: 121-136.

Hussey, B.M.J. Keighery, G.J. Cousens, R.D. Dodd, J. Lloyd, S.G. (1997) *Western Weeds: A guide to the weeds of Western Australia*. Plant Protection Society of Western Australia.

Schetlma, M. and Harris, J. (eds.) (1995) *Managing Perth's Bushlands: Perth's bushlands and how to manage them. Greening Western Australia.* Perth, Western Australia.

Storey, A.W. Vervest, R.M. Pearson, G.B. and Halse, S.A. (1993) *Wetlands of the Swan Coastal Plain, Volume 7. Waterbird usage of wetlands on the Swan Coastal Plain.* Water Authority of Western Australia and Environmental Protection Authority, Australia.

Wykes, B. (1990) *Birdlife of the South-West Estuaries.* Waterways Information No. 3, Waterways Commission.

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