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# EDGES – THEIR EFFECT ON VEGETATION AND WILDLIFE

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The “edge effect” is a term used to describe the various consequences, on vegetation and wildlife, which occur as a result of one type of vegetation sharing a border with another. These edges may be natural, such as forest grading into woodland, streamside vegetation passing through an arid zone, burnt and unburnt areas; or induced, such as pasture abutting forest or a road through a forest.

Edges may have a variety of effects on wildlife. For example ‘Island Biogeography’ this refers to the small, isolated islands of remnant vegetation surrounded by urban or agricultural development. Toohey Forest in Brisbane, described as ‘An Island in Suburbia’ by Carla Catterall (1987), is a perfect example of how edge effects, due to human induced disturbances, have altered the vegetation, fauna and microclimatic regime of this community. It has been found that species diversity and numbers of individuals in Toohey Forest has steadily declined due to urban encroachment.

## What kinds of changes occur at edges?

Depending on the aims of management, edges may have positive or negative effects on wildlife and property management. Managing edge effects can improve the quality and long-term viability of wildlife habitats. Edges may affect wildlife through:

### 1. Micro-climatic changes

Solar radiation, humidity, air temperature, wind speed and soil temperature may all be altered along edges. This can have a dramatic impact on the vegetation and, ultimately, the wildlife. For example, new road works through bushland will increase sunlight and air temperature, which raises soil temperature and decreases soil moisture. This may prevent seeds of shade-tolerant species from germinating and favour other plant species (eg. species that thrive on increased light). The increased exposure can stress existing vegetation leading to dieback through insect attack, parasites, wind damage or fungal attack. Rainforest species, which normally exist in a ‘closed’ environment, are particularly vulnerable.

### 2. Different inhabitants, edge species

Along with the altered pattern of vegetation, a change in wildlife can occur. Firstly, species that have particular habitat requirements (eg. in the interior or ‘core’, further away from the edge) may be lost from the area. Secondly, ‘vacancies’ may be filled by species that have a wider tolerance range. Aggressive edge-dwelling species such as the Noisy Miner, may invade the habitat and displace prior inhabitants.

Edges provide habitat for species of wildlife that prefer edge habitat, and which are not all harmful. Many birds, such as parrots and cockatoos, will use edges for perching and nesting. Kangaroos and wallabies feed and move out along edges. Because edges are a meeting place between adjacent habitats, they are often rich in species (eg mixing of forest species, edge species and farmland species). Also, edges, especially where there is a scattered open ‘buffer’ type area, are often good places to see and experience wildlife.

### 3. An increase in pest animals

Pest animals such as foxes, cats and dogs tend to move and harbour along roads, tracks and cleared areas adjacent to or in bush areas. Edges, by providing improved access, can cause a decline in wildlife populations through predation and competition. Experimental and observational studies have shown that bird nests are more often preyed upon in edge habitats compared with core habitats (Andren &

Anglestam, 1988; Wilcove, 1985). Platypus and quolls have suffered from predation by foxes moving along bush tracks, particularly beside rivers (Rowley *et al*, 1993).

### 4. Weed invasion

Edges can provide opportunities for the invasion of natural vegetation by weeds. Disturbance creates opportunities for weeds to establish. Weed seeds are spread by wind, water, animals, people, vehicles, soil, livestock and in agricultural products. These dispersal mechanisms may be facilitated by edges.

### 5. Impacts from adjacent land-use

Edges are prone to many disturbances such as chemical and fertiliser drift from adjacent farmland, trampling and grazing by stock, fire escaping into habitat areas, recreational disturbance and littering. New tracks or clearing of vegetation may also change the hydrology of the area and cause erosion as water runs off compacted soil.

### 6. Noise and movement

An increase in traffic or human activities is not often considered. Many wildlife species rely on the seclusion of undisturbed habitat in order to breed successfully. For example, the Wedge-tailed Eagle has been known to abandon its nest due to disturbance (J. Robinson pers. comm.). Edge effects are likely to be most influential on narrow strips or small areas of habitat. Consequently, these are important issues in the management of corridors and small bush blocks. Larger areas are also vulnerable where disturbance, track construction and other activities create edges.

Larger bush blocks may benefit from retaining or managing edge habitats to meet other goals. For example manipulating the shape, length and composition of edges is probably an effective way of managing for Eastern Grey Kangaroos – the more edge, the more kangaroos.

## How do edge effects vary with shape and size?

Generally speaking, the longer the edge, the larger the area disturbed. The more angular the edges, the greater the edge effect. Corners increase the disturbance. Rounded edges and regular shapes minimise edge effects.

The smaller the area, the greater the risks of impact occurring throughout the vegetation, with the core habitat being destroyed.

## How far do edge effects extend?

The ‘depth’ of the effect in habitat varies greatly with the length of the edge, the contrast in edge, the width of the habitat, the type of vegetation, the species of wildlife and the stability of the vegetation. One study showed that in terms of vegetation structure, the width of a forest edge was less than 13 metres, but based upon the distribution of birds’ nests, the functional width of the edge ranged from 9 to 64 metres (Gates and Mosher, 1980).

It would be difficult to determine the exact extent of the “edge effect” in an area of private wildlife habitat. However, there are many actions landholders can take to prevent or diminish these effects in areas where edges are likely to have negative impacts.

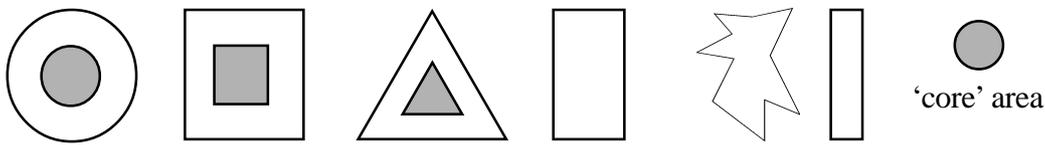


Figure 1. Edge effects and 'core' area impacts of different habitat shapes and sizes.

## Reducing the negative impact of edges.

### 1. Shortening edge lengths

The best way to reduce negative edge effects is to reduce the length (perimeter) of the edge. Rounded edges achieve this and also increase the 'core' size (refer Fig 1.).

### 2. Modifying edge shapes

Edges can be modified by revegetation or allowing regeneration of areas, such as vehicle tracks, that penetrate habitat areas.

### 3. Revegetation

Revegetation of degraded areas with local native species and planting a buffer zone around edges to increase the size of the habitat and its core can reduce edge effects. Buffer zones also have the effect on 'softening' the edges by reducing the contrast between land uses. The chances of success will be greatly increased if these areas are fenced. Buffer plantings may be enhanced by selection of plant species that are tolerant of the stressful edge conditions – useful local species filling this role may be recognised along natural edges. Buffer plantings can reduce the influx of weed seeds from adjacent land use. Buffer plantings of non-invasive native species between remnant vegetation and pasture can moderate the effect of pasture species invading native vegetation remnants.

### 4. Fencing wildlife habitats

Uncontrolled grazing by stock is not compatible with native vegetation management. Fencing habitat areas, so that grazing stock cannot enter, may assist natural regeneration to occur and will reduce the impact of grazing on native species.

### 5. Controlling weeds

Prevent weed invasion by limiting disturbance along edges and avoid introducing potential weed seed carriers such as stock feed and vehicles, to edges. Monitor edges for potential weed species and effect control of any weeds promptly.

### 6. Controlling pest animals

Department of Natural Resources (DNR), *Land for Wildlife* extension officers can offer advice on the control of pest animals. Advice on how to reduce the impact of domestic animals on wildlife is also available from Queensland Parks and Wildlife Service.

### 7. Re-routing tracks

Minimise the number and length of edges. Wherever possible, close off and revegetate tracks that dissect habitat areas. Construct new tracks and firebreaks outside the habitat area.

### 8. Using caution with chemicals

Care should be taken when using chemical sprays and fertilisers. Preferably use them well away from wildlife habitats. If this is unavoidable take note of wind speed and direction to prevent drift and be aware of potential chemical run-off and leaching through the soil into neighbouring habitat areas and waterways. Notes on chemical use for declared and some environmental weeds are available from DNR.

### 9. Removing rubbish

Garden clippings and other litter can introduce weeds and change the nutrient level of the soils. Rubbish can also attract pest animals or cause injury to native wildlife. Refuse should be placed well away from habitat areas where it can be recycled, composted or placed in sealed storage prior to transport to an official refuse depot.

### 10. Locating a house away from habitat areas

The noise, movement, soil disturbance, and other effects associated with human occupation can be avoided by building houses away from habitat areas. This will protect the habitat so that it can be enjoyed in its best condition.

### 11. Clumping revegetation areas

Several landholders, each contributing a small amount of habitat, can increase the 'core' area of the habitat by grouping their revegetation effort along common boundaries.

## Monitoring Edges

Habitat edges require regular monitoring. Look for:

- plants that have not been seen before;
- known weeds;
- diseased or unhealthy-looking plants;
- evidence of pest animals (cat faeces, tracks, wildlife remains);
- signs of erosion;
- litter.

Try recording your observations over time using a diary, fixed photographic points or other recommended techniques.

If action is required, seek advice on the most appropriate solutions, then proceed cautiously. For further advice contact:

- Your local *Land for Wildlife* extension officer,
- Local authority;
- Dept. Natural Resources;
- Queensland Parks and Wildlife Service;
- Dept. Primary Industries;
- Local Landcare and catchment groups.

### Acknowledgment:

Text and selected illustrations relating to this technical note was sourced from the Department of Natural Resources and Environment, Victoria: Land for Wildlife Program.

### References & further readings:

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See Land for Wildlife South-east Queensland Note No. 1 'Reference List' for further reading and references

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