

# Forestry Facts

## ***Wetland and riparian zone management***

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South Africa is a dry country which means that water is one of the most valuable resources. Commercial plantations are grown in the wetter regions of the country and there can be a conflict of interest between timber growers and other water users.

It has been estimated that forestry uses 8% of rainfall which would otherwise have flowed into rivers.

It is therefore important that forestry operations are managed in such a way as to minimise impact on the quantity and quality of water impacts. Wetlands and riparian areas play a critical role in this respect.

Timber farmers can ensure that the impact of their operations on water resources are minimised and thus help counteract the criticism against forestry.



*A well-managed riparian area with adequate buffer zones*

### **What is a wetland?**

It is land that is wet to enable for long periods of anaerobic conditions (no or very little oxygen present) to develop in the soil. Wetlands are characterised by wetland vegetation (e.g. sedges and reeds), water close to the soils surface and hydromorphic soils (soils formed under anaerobic conditions). In steep terrain, wetlands can take the form of seeps, sponges and springs. On flatter terrain they are found around rivers, lakes, pans and flood plains.

### **What is a riparian zone?**

It is the area adjacent to and associated with a watercourse. These areas are usually found in valley bottoms where water accumulates before entering streams.

### **Why are these so important?**

Functioning wetlands and riparian zones have many benefits for society:

1. Flood reduction and stream flow regulation. Vegetation in these areas provides resistance to water moving through catchments and allows more infiltration to occur. The net result is that floods are reduced and stream flow is prolonged during dry times.
2. Water purification. Vegetation in riparian zones acts as a buffer strip which filters sediment from surrounding areas. Streams and rivers with well vegetated riparian zones usually have clean water flowing in them. Wetlands are effective natural filters, helping to purify the water by trapping pollutants.
3. Erosion control. The vegetation found in these areas controls erosion by reducing current energy, binding and stabilising the soil and also by recovering rapidly from flood damage.
4. Biodiversity. A rich diversity of plant and animal life is found in these zones. These zones also act as effective corridors connecting unplanted areas. This allows for wildlife to move along these corridors between conservation areas.

### **Which land use activities affect these areas?**

The use of these zones for farming operations may provide good short term returns, but these operations are not necessarily sustainable. To reclaim these areas once they have been disturbed can be a lengthy and costly exercise.

Land use activities that may have a negative impact on these zones are:

**Timber production.** Timber planted too close to wetlands and streams has an impact on the ability of the planted area to store and shed water. Under increased shading beneath trees the vigour of indigenous plants is reduced and they are often out competed by alien invasive plants.

**Drainage and the production of crops** and pastures. When wetlands are converted to crop land most of the benefits of the wetland are lost. They become less effective at regulating stream flow, purifying water and controlling erosion.

**Grazing of domestic stock.** Over-grazing results in valuable grazing species being replaced by less productive species.

**Infrastructure.** Inappropriately design and positioned infrastructure such as roads can have significant impacts on water quality. A large proportion of erosion in plantations is as a result of water from road networks. The impact of roads can be reduced by ensuring that roads are well drained and that water from roads is shed into surrounding vegetation. Water should never run along a road for more than 30m. River crossings must be constructed and right angles to the stream and kept to a minimum.

### **How wide should the unplanted zone be?**

General guidelines can be given as to how far to keep plantations away from these areas, but common sense must be used in the implementation of these guidelines.

Plantations should not be planted closer than 20m to the edge of a wetland. The edge of a wetland can be defined as that point where hydromorphic soils are found at a depth of 50cm from the soil surface. In other words, the only way to accurately delineate a wetland is to use a soil auger to determine where the wetland soil are close to the soil surface.

### **How should these unplanted areas be managed?**

When formulating a management strategy the principle of conservation rather than preservation should be implemented and resources from these areas should be utilised to help sustain their management.

Wetlands and riparian zones should be clearly demarcated and forestry operations kept out of the demarcated area. This is usually achieved by means of boundary roads which must be planned before clear-felling, or in the case of new plantations, before establishment. Felling of trees



*A delineated riparian area showing **A**, the permanently wet zone; **B**, the temporary wet zone; and the 20m buffer from the edge of the temporary zone*

and dumping of plantation debris in these areas should be avoided at all costs. The severity of invasion by alien plants is directly proportional to the degree of disturbance in that zone.

Burning is a useful management tool in grasslands and wetlands. It can be used to improve livestock grazing, control weeds, improve the habitat for wetland dependent species and to reduce the risk of wild fires.

In the high rainfall areas of South Africa a fire every second year is unlikely to have a negative effect on wetland species. However, when a wetland is burnt it is important that unburnt areas are present in the vicinity to provide cover for animals.

Grasslands in riparian zones should be burnt annually, or biennially, during the winter. If possible patch burning should be practised. Large woody weeds must be eradicated before implementing a burn.

Grazing livestock in wetlands and riparian zones can be used as a management tool and at the same time generate income. Wetlands can provide valuable grazing lands in the early growing season and during droughts when the veld is dry. However, vegetation must be monitored to avoid overgrazing.

These areas are also important places where game can thrive. Recreational hunting can be used to control game populations and the

income generated can be ploughed back into the management of these areas. Natural forest in riparian zones should be disturbed as little as possible.

### **How does one rehabilitate wetlands and riparian areas?**

When compartments adjacent to wetlands and streams are felled the buffer zone needs to be delineated and the new plantations should be kept the required distance from these zones. The resulting unplanted areas would require intensive management for about five years to ensure that indigenous vegetation re-establish. Thereafter less intensive maintenance work can be carried out.

The biggest challenge is the control of alien vegetation. These areas are particularly susceptible to invasion because they are good dispersal routes resulting in a lot of seed being deposited.

The rehabilitation programme plan should include:

- Map riparian areas and wetlands and divide them into management units with compartment numbers.
- Prioritise riparian compartments in terms of their ecological importance.
- Identify the dominant weed populations in each compartment.
- Identify type of climax vegetation cover that is to be achieved (e.g. grasses vs trees).



*Mosaic burning in a riparian area implemented to provide a protected habitat*

- Assign initial clearing and follow-up operations to each block.
- Assign specific treatments to each block to ensure the most cost effective treatments are used (based on weed population composition and climax vegetation of the area).

It is important that rehabilitation of an area is well in hand before moving to a new zone because without annual management, half-rehabilitated areas will soon regress. Abandoned riparian areas serve as seed banks for alien infestation on a farm.

This means that one must not try to rehabilitate areas larger than are manageable. Some management 'tools' that can be used to speed up rehabilitation of areas are:

**Fire.** In grassland regions the riparian zone should be burnt on an annual basis for at least 5 years after removal of plantations. This will encourage grasses to dominate the vegetation. Areas devoid of grass seed may require artificial seeding using a grass seed mix.

**Grazing of livestock.** This can be used as a means of controlling certain alien species (e.g. wattle).

Goats can be used very effectively if they are 'fenced' into camps which can be moved around. They will feed on most weed species.

**Herbicides.** The selective use of herbicides is essential for the control of certain weeds (e.g. bramble and bugweed).

Although clearing timber out of wetlands and riparian zones is an expensive and management intensive operation the long term advantages far outweigh the costs involved.

Once rehabilitated the recreational, grazing and water-shedding value of these areas will more than justify the effort involved. The benefits derived from intact wetlands and riparian zones are numerous and a price cannot be attached to their value.