

Rehabilitating righteously

By Michelle Nel

One of the most important aspects of managing a wetland is to repair damage from poor land use. Wetland rehabilitation is a very viable process that can be highly successful and rewarding, says David Lindley of the Mondi Wetlands Programme.

If only people understood the tremendous financial and ecological benefits of owning an intact wetland. Sadly many a landowner, looking out over his wetlands will think only of planting crops or grazing cattle to try and get some returns from the land. In our previous installment of this series on wetlands we discussed how you can use a wetland without destroying it. However, if you have a damaged wetland, all is not lost.

The worst damage anyone can inflict on a wetland is to drain it for the production of pastures and crops. Other insults to wetlands include overgrazing, excess cattle trampling and the wrong burning regime. Mismanagement of a wetland usually results in erosion, especially in the form of head-cuts (this is a type of erosion that eats uphill towards the flow of water, leaving a huge gully behind it). Channels and head-cuts essentially drain the wetland, dry it out and ultimately destroy it. They also increase the amount of sediment in the water thereby decreasing water quality.

Another major wetland problem in South Africa is erosion along riverbanks. The cause of this erosion is most often a result of poor land management – removal of streambank vegetation, invasion of alien plant species, excess cattle trampling, overgrazing, and flooding because of land disturbances in the upper catchment.

Fixing what's broken

There are two methods of rehabilitation – either stabilising the problem area and maintaining the present condition of the wetland, or trying to reclaim the wetland area that has been lost. It is vital to make informed decisions when undertaking wetland rehabilitation and if you are ever in doubt, get specialist advice, for example, from the Mondi Wetlands Project or Working for Wetlands.

Some simple methods of rehabilitating wetlands include closing drains, fencing off sensitive areas to keep grazers out, and placing plugs in gullies. All these methods will help wetland plants re-establish themselves and it is the plants that hold the magic key to the functioning of wetlands. Wetland and riverbank plants are vital for preventing erosion, They play a crucial role in the purification of water, reduce the severity of floods and regulate water especially during droughts. When the plants go, these valuable functions disappear.

Principles of successful wetland rehabilitation

- Remove the cause of the damage (for example the drain or the cattle) and manage the resource correctly.
- Re-establish the natural water flow patterns within the wetland.
- Do not concentrate water, for example, by having only one culvert under a road. Always try to spread it out. This will reduce the possibility of erosion occurring.
- Do not underestimate the force of the water during high flow periods.
- Many wetland soils are highly erodible; be aware of this when designing structures such as roads or dam walls.

And so to work

The following are a set of general rehabilitation ideas that can be used in stabilising the soil and restoring the water flow of the wetland.

Reclaim the drains

Drains and gullies lower the water table and effectively dry out the wetland. They produce excess sediment ultimately smothering the wetland below. It is important to stabilise gully sides and also to stop the vertical erosion in the gully. This prevents the further lowering of the water table. You may use a variety of materials: herbaceous or woody plants, hay bales, clay plugs, gabions filled with rock, a geo-textile lining, soil, or even just packing loose rock against head-cut faces. Your choice will depend on the availability of resources and finances, and what you are familiar with.

Heal the banks

Plants are the best and cheapest solution to solving riverbank erosion. When using plants the key questions to ask are:

- Should you use herbaceous (grasses, bulrushes or reeds) or woody (trees) vegetation?
- Which species are best for the job?

A large variety of herbaceous plants with rapidly spreading capabilities and dense near surface root mat, and surface cover, are extremely effective. Examples include papyrus, bulrushes, reeds, sedges and couch grass (however you should consult an expert or the MWP series, Wetland Fix and choose species that suit the soil, hydrology and so on). Firstly herbaceous plants protect against scouring of riverbeds and wetlands. Secondly they enhance the stability of gentle or shallow banks. The plant stems induce sediment deposition tending to raise the floor of eroded channels, even widening the channel profile. Herbaceous plants absorb the energy of fast flowing water rather than reflecting it. The combination of these factors, plus the ability of many herbaceous plants to thrive in direct sunlight, of being fire tolerant and having strong regenerative powers, makes them ideal for rehabilitating streambanks.

Whilst herbaceous cover plants are probably the most effective for gentle and shallow banks, they have little effect on the stability of steep banks due to their shallow roots. Trees contribute cohesion and stability to steep banks – providing the roots reach down to full bank height, and the toe hold and bank face are protected from undercutting by tree roots and an established cover. In some instances, such as in KwaZulu-Natal coastal regions, certain tree species grown in narrow channels will develop entwined root ‘weirs’, forming an effective channel plug for gully and channel erosion. Unfortunately unlike herbaceous plants, trees do not generally tolerate frequent fire.

For rehabilitation it is important to select and correctly place plants with vigorous rooting growth characteristics that will accelerate natural plant succession and deal directly with the problem on site. Local plant species native to streambanks and wetlands should be used. Look around and see what indigenous species are growing in the area you are about to rehabilitate. An excellent list of suitable trees and herbaceous plants is provided in the MWP Wetland Fix series found on our website (www.wetland.org.za).

Monitor to make a difference

Once the rehabilitation has been completed a monitoring programme should be implemented to ensure the rehabilitation is successful. You will be interested in two aspects: the structures’ effectiveness at stopping the erosion; and a vegetation assessment which will reflect the return of the water table. ie assessing the change in the species composition from dryland to wetland species as the rehabilitation becomes more successful.

A monitoring programme will involve regular site visits to assess progress and also repairing any damage to the rehabilitation. Remember to set realistic objectives. Monitoring is best done by:

Fixed point photography

Take pictures at the same sites at certain fixed times of the year (for example, a set before the rains and a set afterwards). This will help you assess the effectiveness of any structures built and the development of wetland vegetation.

Placing stakes in the field.

The rehabilitation site can be measured and staked accordingly in the field.

The soil conservation measures should be monitored for stability (that is a visual check on the stabilisation of the active erosion sites). If damage is detected, measures must be taken to ensure the effectiveness of the structure.

Remember to take some ‘before’ pictures to use as a benchmark. These more than anything else will remind you of how much good your rehabilitation work has achieved. If you need extra encouragement, remember this that in a water-poor country such as South Africa, continued destruction of wetlands will result in:

- lower agricultural productivity;
- less pure water;
- less reliable water supplies;
- increased downstream flooding; and
- increasingly threatened plant and animal resources.

So, look out over your repaired and correctly managed wetland and toast yourself. Enjoy the benefits. You deserve them.

A BASIC MANAGEMENT FRAMEWORK

1. Delineate the wetlands of concern.
2. Assess the condition of the wetland.
3. Assess the present management of the land in terms of the possible impacts
4. Source information from organisations that can help.
5. Develop wetland management objectives from the information gathered from the wetland assessment if needed.
6. Rehabilitate problem areas.
7. Monitor the wetland and the rehabilitation sites.
8. Ensure that the correct legislation is being adhered to.

From the discussion on wetland values and land-use impacts we have seen that the hydrology of a wetland is the most important factor determining its functioning. **Thus, as a general rule, the more you alter the hydrology of a wetland the greater will be the effect on its functioning.**