

# Floodplains

Spreading the flow in the Lockyer Valley

## Floodplain management – work together to reduce risk



Binding the banks – A site near the Gatton Racecourse where the stream banks have collapsed, except for the area under trees. Unfortunately, isolated patches of trees can increase turbulence both up stream and downstream thus increasing local erosion. Banks need revegetation along their full reach.

There are approximately 61,000 hectares of alluvial plains in the Lockyer catchment. Considerable parts of these areas are prone to flooding and are subject to high erosion risk.

The active floodplain area of the Lockyer catchment is concentrated along Lockyer Creek and lower sections of the main tributaries Flagstone, Ma Ma, Tenthil, Sandy and Laidley Creeks. In the lower area of the catchment the floodplain is characterised by soils with a high clay content, and in the upper reaches, by soils with better draining characteristics.

Erosion processes on the floodplain are driven by land use activities in the

immediate area but also can be influenced by activities some distance or upstream from the site. For instance, the construction of levee banks to prevent flooding in one area can result in floods being directed to areas some kilometres downstream.

A dominant land use on these alluvial plains is horticulture, using approximately 15 000 hectares. However, other activities can play an equally important role in determining the flow of water and hence the contribution of sediment to waterways.

Addressing the problem requires co-operative action of a number of different land users working together in order to reduce the erosion risk.



A very large erosion gully near Gatton – the result of a small well grassed table drain alongside a public road having been directed to the creek via a new flowpath through a natural levee bank. The direction of runoff from the land has been changed by roads and railways. Avoiding such problems requires coordination between all the land users.

## Spreading the flow slows the flow

The key to reducing the soil erosion potential on floodplains is to keep the water spread out and slow moving. Lowering roads, removing fences, ensuring crop orientation is at right angles to the flow, minimising man-made levee banks, grassing water flow lines and slowing flows from upland areas can all contribute to the reduction of risks posed by flooding.

The key to effective prevention of flood erosion however is the co-operation of local government, landholders, companies responsible for infrastructure, and state governments all working proactively together in order to minimise such erosion.

### Roads

Roads are generally raised 300–600 millimetres above natural ground level. When located on floodplains, these roads seldom cause problems when running in the same direction as flood flow. However when they are at a different orientation to the direction of flood flow, water can be concentrated contributing to erosion.

Mostly the problems can be overcome by using low road formations or by constructing long floodway sections. If a road runs directly across the flow path of water lowering the profile to no more than 200–250 millimetres above natural ground level will reduce most erosion problems. Low sections need to be well marked with depth indicators and constructed with adequate camber in order to prevent water pooling on the road.

Excessive growth of grass along roadsides can have similar effects to raised roads in diverting flood flows. Roadside verges should therefore be slashed regularly.

### Fences

Flood water can often be diverted along fence lines due to a build-up of material and vegetation along the fence line.

The ideal solution is to remove all fences where flooding occurs. Where this is not possible keeping fence areas cleared of blocking debris is desirable.

### Constructed Levee Banks

Levee banks have been constructed in many areas in the Lockyer Valley in an effort to control flooding. They can be locally successful, but can also transfer problems to areas downstream. Levee banks tend to concentrate higher volumes of water, thus increase flow speed and erosion potential.

Levee banks, however, can be beneficial by diverting flows away from unstable gullies to more stable areas. They can also be

beneficial if placed along short sections of major watercourses that are prone to excessive surcharging or overtopping risking infrastructure. In general, levee banks counter the basic principle of spreading out and slowing down floodwaters and their construction and maintenance requires careful consideration and good technical advice.



Keeping roads with a low profile is important to avoid concentrating flows.



A well grassed roadside table drain reduces erosion in high flow periods.

## Natural levees



Natural levee: The road at Lockrose rises up over the natural levee bank, protecting its integrity and ensuring that this is not a point of concentrated flow and potential erosion site.

Natural levees exist along many major watercourses. They tend to cause overland flow to turn away from the creek and travel to backwaters or along flow lines adjacent to the creek until a natural entry point to the major watercourse is reached. Excavating through these natural levees in an effort to reduce the movement or accumulation of water on the floodplain can create additional problems. Discharge areas into watercourses are often difficult to stabilise and gullies are likely to cut back into the floodplain. Additionally, more frequent break out of flood water from the watercourse into adjoining land can occur.

Natural levees are best left alone. If water does need to be diverted through one, advice should be sought on specialist structures that are available.

After a 1979 study of land degradation within the Lockyer catchment it was recommended that natural levees should be restored and stabilised with vegetation.

### Concentrated flow areas

Some floodplain areas are naturally susceptible to concentrated flows. Such areas occur:

- where upland streams enter the plains;
- where hills have narrowed the alluvial plains;
- adjacent to major streams where secondary channels and parallel flow areas are subjected to deep flows.

Best management of these areas is the establishment and maintenance of permanent pasture.

### Residual flow areas

Flows often persist in floodplain areas for a time after rain stops. Residual flow drains are often constructed to confine these flows to a single channel. Residual flow drains however are prone to erosion. To minimise such erosion problems drains should be constructed with flat bases and very broad side-batters that can be kept pastured or cropped part way down to avoid scours developing from the channel sides back into the cultivation.

### Streams

Stream bank erosion can be a problem along creeks with insufficient stabilising vegetation or where obstructions to flow cause turbulence. Both trees and grass cover are needed to stabilise banks. Tree roots strengthen and consolidate the banks while grass protects the soil surface.

## Key points for managing sediment and nutrient movement on floodplains:

- Ground depressions or low points should not be used for cultivation since they carry runoff during storms and rainfall events. Maintain good grass cover in these areas of concentrated flow;
- A minimum groundcover of 30% by crop or 70% pasture should be maintained on floodplains;
- Apply fertilisers to meet actual crop requirements at the time of application to minimise potential runoff of nutrients;
- Maintain buffer strips on all watercourses and major gullies to help maintain bank stability. Deep rooted vegetation is recommended for providing long term stability for stream banks;
- Where livestock are involved, grass or vegetated areas should be maintained between watercourses and high risk areas such as animal stockyards and watering points or stock camps;
- Use fencing to manage livestock access to creeks and waterways;
- Encourage stock away from stream banks and buffer strips, by providing watering points at a distance from the bank. If this is not possible, provide stock with access via a properly constructed rock or concrete pad, or allow stock to cross the water course in stable areas away from steep banks.



Grassed waterway: A broad well grassed waterway in the Ma Ma Creek area protects the soil in areas of concentrated flow.



Groundcover: Lucerne grown on a low alluvial flat in the Tenthill Creek area provides good soil protection and minimises erosion potential of floods.



Buffer strip: Trees and grass form a buffer strip along Tenthill Creek in order to help protect the banks.

The horticultural industry, through its grower group Growcom, has established a set of general guidelines for horticultural producers which covers a wide range of issues relating to the sustainable use of the land and protection of the environment.

These guidelines are fully set out in the Growcom publication *Farmcare: Environmental Code of Practice for Fruit and Vegetable Growers*.