Managing outback floodplains

Western Local Land Services

The creek and river floodplains of the outback are important for agricultural production and ecological biodiversity. These areas are often the most productive parts of the catchment, drying out last and staying green for longer. They need to be managed within a catchment context as increased flows onto them and concentration of grazing can exacerbate degradation issues.

How healthy floodplains function

A healthy floodplain is regularly flooded from flows exiting the main creek/river channel as a result of moderate to large rain events.

This occurs because the channel has limited capacity to hold all of the flow and so water exits at natural points resulting in calm flows which spread away from the main channel.

This water is held on the floodplain, filling all the billabongs, pans and swamps. The whole floodplain remains waterlogged long after the flow event has ended.

Prolonged waterlogging is supported by natural sandy levee banks that act as dam walls for floodplain water, preventing water prematurely re-entering the main channel.

These levee banks are base levels that hold up the ponding of the floodpain and are often subtle sediment sills.

The primary base level along a stretch of floodplain is the main channel base.

The channel base level may be held by a rock bar that prevents the channel lowering, ensuring that even moderate rain events result in flows out to the floodplain.

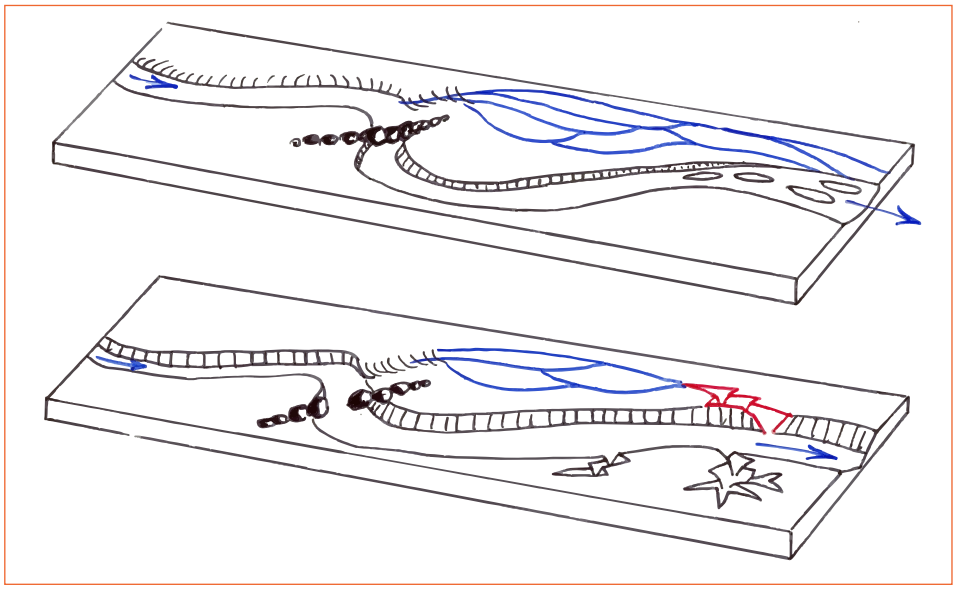

Figure 1: How a rock bar across a river can enhance overbank flow. Once the rock bar is breached the channel cuts down leaving the outflow channel "high and dry" except for major rain events.

Figure 2: A breached rock bar across the Murchison River.

Unhealthy floodplains and their causes

Erosion drains floodplains

Unhealthy floodplains result from the expansion of the channel and from the breaching of natural levee banks. These unhealthy floodplains generally receive episodic and strong flows out from channels only when large rain events occur.

Moderate rain events don't cause any flooding, since all the flow is contained within the channel. This occurs because the channel has become deeper and wider, increasing its capacity to hold flows.

The channel can expand because of increased flows down the channel due to a lack of ground cover in the catchment area. Also the channel can expand if a natural rock bar is breached, lowering the channel's base level which starts the erosion process. The natural sandy levee banks, which act as dam walls, can be breached by livestock pads and vehicle tracks.

Once the natural levee bank has been worn away, any water that was held back can now exit the floodplain via the breach. This breaching "unplugs" the floodplain and starts the formation of gully heads and erosion gullies. Flows are taken away and given a fast exit route from the floodplain, rushing into the main channel and out of the system. The area of healthy floodplain shrinks in size as erosion expands and takes away flows.

The smaller area of healthy floodplain becomes increasingly at risk of overgrazing and further degradation.

Excessive deposition from upslope catchments

Excessive erosion in the upper catchment causes large amounts of sediment to be washed down and deposited onto the floodplain. This large amount of deposited sediment can alter the way the floodplain functions. If there is excessive sediment deposition, the area that was originally the channel can be built up above the surrounding floodplain.

The built up sediment acts as a bank, which diverts flows from their original course. The diverted flows can dehydrate areas of the floodplain or direct flows to areas that never bore flood flows, sometimes causing erosion gullies.

It is common to see lines of old dead river gums on the floodplain that have died because flows have been diverted away due to excessive sediment deposition.

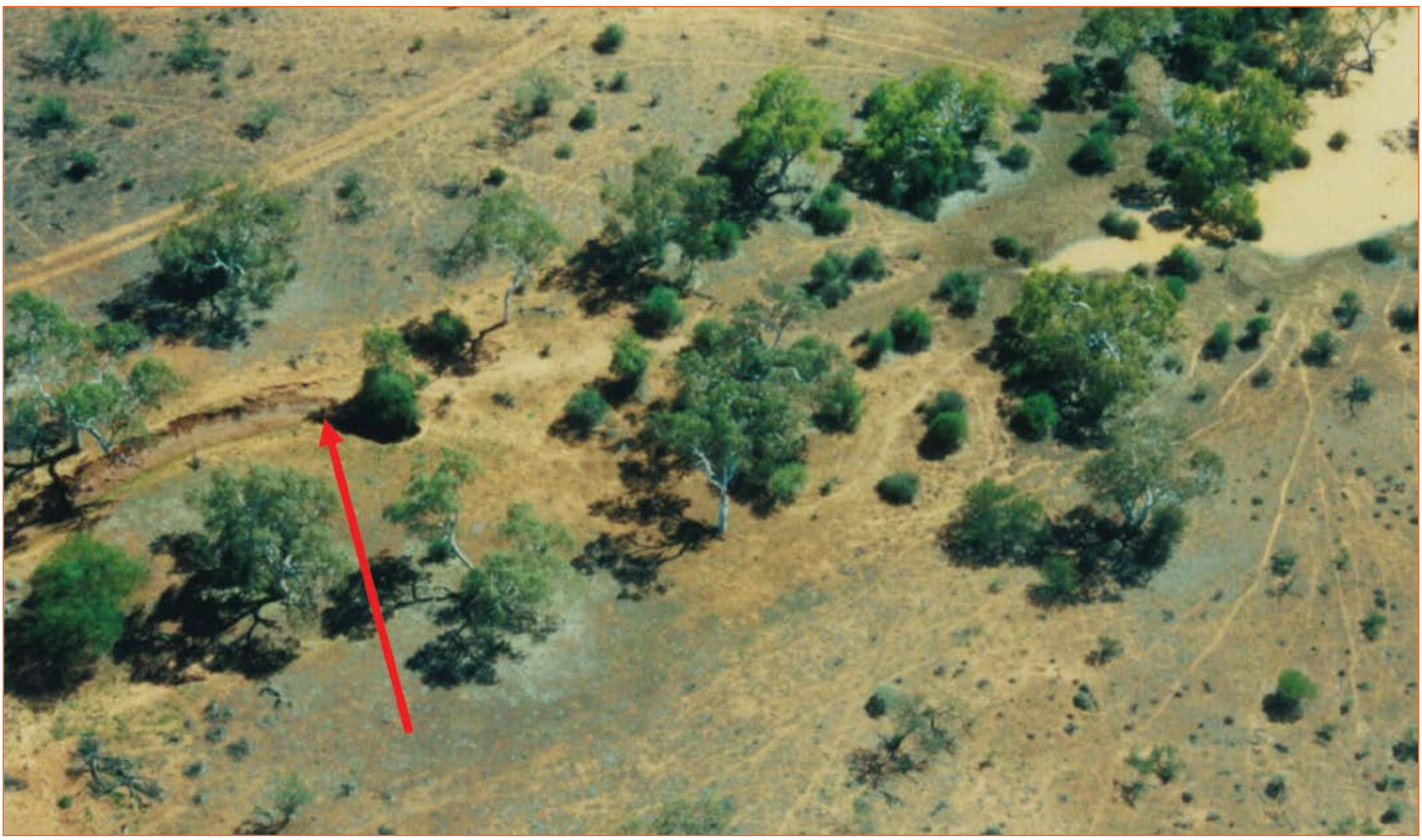

Figure 3: A gully head cutting up from a river about to breach a floodplain billabong.

Floodplain repair in a catchment context

Floodplain repair should include planning, repair and ongoing preventative management.

This needs to be done in a catchment context, often requiring collaboration with adjoining land managers since the systems are large and extend over property boundaries.

A systems approach is required to repair floodplains. Some guiding principles include:

1. Maintain groundcover within the catchment.
2. Ensure flows are calm coming onto floodplains from the surrounding catchment.
3. Reinstate natural levee banks.
4. Plug unnatural and eroded re-entry points into the main channel to stop the draining of the floodplain into the main channel.
5. Encourage flows within the channel to exit and spread over the floodplain.
6. Stabilise and regenerate active gully heads.
7. Restore flows to dehydrated floodplain areas that have been cut off by a build-up of sediment.

Figure 4: This floodplain is dying because flows to it have been diverted away due to excessive deposition of sediments.

Figure 5: A repaired floodplain with calm and spreading water. Before repair works were completed, all flows were completely contained within the main channel causing further degradation of the channel and floodplain.

Ongoing floodplain management

Before any repair works are undertaken on floodplains, it is important to first address the causes of unhealthy floodplains. The primary causes are:

1. Poor management of groundcover in the surrounding catchment.
2. Poor management of groundcover on the floodplain, reducing the health of perennial species. It is important to allow for periodic resting of floodplain areas, particularly during times of flooding and waterlogging. This helps to maintain the health of perennial species.
3. Poorly located infrastructure, such as water points, that focus livestock impacts in sensitive areas.
4. Access tracks and fences that alter surface flows and take water away from the floodplain.

Healthy floodplains support sustainable agricultural production and ecological biodiversity. Ongoing management should encourage the key ecological processes that underpin healthy floodplains.

For more information contact your nearest Western Local Land Services office:

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