

Section 2.3: Erosion and Sedimentation

WHAT IS THE ISSUE?

Erosion of the Australian continent has resulted in a low, weathered landscape with relatively infertile soils. Erosion is the wearing away of the land by flowing water, rainfall, or wind. It is a natural process that results in the movement of soil and organic material from one place to another. It can occur rapidly or over a long period of time. Natural processes are in a constant state of change but at times are sped up to unsustainable and damaging levels due to influencing factors such as increased velocity of flow and sediment transportation resulting in erosion issues.

Waterways are dynamic landforms and sediments will naturally be moved regularly. The channel size, shape, and bed material (silt, sand, gravel) change, both over time and in response to changes in water flow and sediment load. A channel is relatively stable when its water flow and sediment flux are in balance over time. If there is a change in either of these factors, then the channel will adjust its slope, depth, width, meander pattern, bed composition and vegetation density accordingly. There are many landholders in the Upper Torrens that are experiencing sedimentation or “silting up” of their watercourses, which is of course just the “receiving end” of an erosion process from somewhere in the landscape.

While erosion and sedimentation are natural processes, some land-use and management practices in the catchment and direct damage to a waterway's channels or banks can accelerate these processes and stimulate sudden adjustments in the channel with far-reaching negative effects. Most watercourses in the Mount Lofty Ranges have experienced an accelerated rate of erosion since colonisation and the broad-scale changes in land use that came with it.

Soil erosion can be hastened by extreme events such as fire, drought, flood, over-grazing, and loss of vegetation cover. Specifically, those events that reduce complexity in the landscape and cause water to flow with higher velocity after rainfall. However, less extreme events such as change in

land use has also contributed to an increase in soil erosion.

The loss of bared topsoil to wind and water erosion and the formation of gullies has resulted in the loss of valuable farming land and a degraded environment.

The rate of erosion can be slowed by the adoption of sound land management practices.

HOW DOES IT AFFECT YOU AND YOUR CATCHMENT?

Traditionally watercourses dealt with a reduced but more consistent year-round flow of water. Now due to historical and current land clearance in the surrounding area and an increase in water usage, bank and bed erosion is much more prevalent in areas like the Mount Lofty Ranges. Watercourses have become incised (e.g. bank widening and bed deepening). Refer to Appendix 2 for diagrams of Changes in Channel Morphology.

The loss of soils, particularly the nutrient-rich topsoil, is an important issue for land managers. Areas prone to erosion may be found over every land class but the most sensitive are riparian areas, drainage lines, slopes, livestock focal points (watering points, feedlots etc.) and cultivated land. Land class mapping shows where you can and cannot graze and allows fencing to land class. This separates an agricultural area from biodiversity areas or of environmental value, such as a watercourse which may be prone to erosion or be revegetated.

Wetlands and meandering streams serve to slow water flow and filter out sediments. A river system with its associated wetlands intact will trap more silt and retain more water in the catchment for longer. The riparian zone should provide a haven for wildlife in times of drought. Excessive silting in dams and watercourses may lead to lower water quality and toxic algal blooms.

The loss of soil by erosion can be a highly visible sign of environmental degradation. Soil

conservation measures have long been recognised as essential for sustainable land use.

Watercourse management should not aim to halt erosion altogether but maintain it within natural levels. Under natural conditions a stream will vary in shape and form after extreme events. Overhanging and undercut banks, scour holes and sediment deposits are natural components of a stream and are valuable habitats for many aquatic species.

Erosion and sedimentation can occur after a bushfire as plants and organic matter gets burnt resulting in less cover and protection, making the soil more prone to erosion. When heavy rainfall occurs after a bushfire, water run-off can carry ash, soil, sediment, silt, and manure in to dams and creeks.

MANAGEMENT OPTIONS

- ‘Slow the flow’, slower flowing water causes less erosion. Seek opportunities to reduce the velocity of water as it flows across the landscape and through watercourses.
- Maintain grassy cover and increase native vegetation in the landscape and leave large woody debris and woody snags in place. They reduce in-stream velocity and provide habitat to macroinvertebrates, frogs, and fish.
- The maintenance of perennial pasture species provides more permanent groundcover than annual pastures.
- Erosion-prone areas should be managed differently from adjoining, lower-risk land classes. This is particularly important for riparian areas and cultivated land.
- Fence your property to land class for grazing purposes – fencing to land class.
- Native vegetation in and around streams and wetlands should be conserved. Revegetation can be used to manage erosion using riparian plant species to stabilise the banks.
- Minimal tillage is an established method of maximising cropping production while minimising the potential for erosion.
- Overgrazing of livestock should always be avoided. Feral herbivores (rabbits, hares, goats, kangaroos, deer) should be controlled.
- Farm forestry or revegetation using native species should be considered for land where grazing results in erosion. This will also improve ground and surface water quality.
- Manage significant erosion that threatens valuable farmland or buildings.
- Engineered erosion solutions are expensive and should only be considered in situations where stock exclusion and revegetation haven been proven ineffective, or expensive infrastructure is at risk.
- Prevent and manage erosion issues after a bushfire. Sediment fencing is an option for managing erosion issues after a fire. See small-scale erosion control options referenced below for specific solutions.
- Both the construction of erosion control structures and the desilting of watercourses may be subject to Water Affecting Activity Permitting. Contact your local Landscape SA Board Office for advice.

FURTHER RESOURCES

Landscape SA documents & websites:

[Landscape Board Offices](#)
[Adelaide and Mount Lofty Ranges NRM Board Watercourse Restoration](#) – video
[Best practice land management guidelines for small grazing properties](#) (2017)
Bushfire recovery, erosion and water supply, [factsheet](#), January 2020. Adelaide and Mt Lofty Ranges Resources NRMB.

Bushfire recovery and your property, [factsheet](#), January 2020, Adelaide and Mt Lofty Ranges Resources NRMB.

Fire Management/Bushfire recovery:

<https://landscape.sa.gov.au/hf/land/fire-management/cudlee-creek-fire-recovery/land-livestock-pasture-care-after-fire>

Other resources:

Catchments and Creeks (June 2010)

<https://www.catchmentsandcreeks.com.au/docs/Watercourse-erosion-1.pdf>

Manual for Small Scale Watercourse Control Works, Earth Tech Engineering, May 2003.

Moore, Steve. (2003). Watercourse Erosion and Low Cost Solutions. Formerly of PIRSA Rural Solutions. Supported by PIRSA, Environment Protection Authority and Department for Environment and Water.

[Primary Industries and Resources South Australia](#)

[Water Wise Factsheet No. 6](#). Watercourses and Earthworks, EPA, South Australia

Datasheets provided:

Structures for Stabilising Watercourses

Best Practice Guidelines for Culvert Crossings