

FACT SHEET: Erosion



Erosion – What is it?

Erosion affects many areas of land in Nillumbik on slopes, near dams and along waterways. In simple terms, soil erosion is the wearing away of the Earth's surface.

Erosion is the process by which soil particles are detached, transported and subsequently deposited in another location. It is the result of various agents including wind, water, ice, gravity and a range of living organisms (e.g. rabbits, wombats, lichen).

Soil erosion by water has played a major role in creating the Nillumbik landscape, its hills, valleys and mountain ranges.

A certain level of erosion is 'natural' and essential to maintain the physical and biological health of the landscape and river systems. Yet in the last 250 years, human activity has increased the rate of erosion to the point where it is degrading our natural and productive environment.

Types of erosion

Gully erosion occurs along drainage lines when surface water passes over a vertical drop in the bed of the drainage line, splashing down onto the exposed and 'dispersive subsoils', soils that by their very nature are easily dissolved and washed away.

This falling water saturates and undercuts the vertical face ('gully head') causing more soil to slump away.

Once started, if no action is taken, the gully will continue to cut its way 'upstream', degrading the otherwise stable valley floor and depositing the dislodged sediment into downstream aquatic systems.



Tunnel erosion is similar to gully erosion although the process happens 'underground' i.e. within the subsoil.

Tunnel erosion may not become evident until the tunnel becomes large enough to cause the covering topsoil to collapse, typically causing localised 'sink-holes' to open up (sometimes beneath the unwitting legs of a prize horse).

Tunnel erosion is prevalent in situations where:

- the subsoil clay layer is dispersive in nature and lies on a gradient which is sufficient to drive the flow of water sideways, through cracks which eventually erode away to form tunnels
- there is a regular supply of water (even just a frequent trickle) that has found an easy way to access the dispersive subsoil e.g. via a rabbit hole or from the base of a leaking dam.



Tunnel erosion can be detected by looking for signs of surface collapse or sink holes. But before collapse occurs, tunnels can be identified by noticing concentrated flows of water coming out of 'exit holes' (especially after heavy rain) or looking for localised deposits of fine clays on the soil surface just below a suspected exit hole.

Sheet erosion is the removal of soil in layers caused by the impact of raindrops and surface flow. It results in loss of the finest soil particles that contain most of the available nutrients and organic matter in the soil.

Soil loss is so gradual that you may not even notice it at first but the cumulative impact accounts for large soil losses. (DPI 1999).

Sheet erosion can be avoided by:

- maintaining a healthy cover of vegetation across the landscape
- adopting land management options that increase topsoil health and depth.

Erosion in Nillumbik

Nillumbik soils are typically highly prone to erosion on account of the following factors.

- Naturally shallow topsoils, with subsequent low water-holding capacity and high rainfall runoff rates (especially noted post 2009 bushfires).

- Naturally dispersive subsoils that readily lose structure upon wetting, after which the dislodged particles are easily washed away.

A history of land use options that have depleted the topsoil, altered water-flow patterns and provided easy access paths for water to reach the erosion-prone subsoil (e.g. vegetation clearance, rabbit infestation, overgrazing and a range of earthworks that have disrupted and concentrated the surface flow of water).



How to minimise erosion

1. Monitor your property for early signs of erosion and take immediate and appropriate action. Nillumbik Shire Council can give you technical advice on the appropriate prevention and control methods.

The likelihood of erosion is greater in areas that have:

- steep slopes
- dispersive (easily dissolved) subsoils
- disturbed topsoil
- concentrated flows of water
- poor coverage of vegetation
- vertical drops in the bed of drainage lines.

Note: a combination of these factors further increases the risk.

2. Preparing a property management plan for your property will help you to understand the best ways to minimise erosion and maximise the biodiversity and productivity of your land.

'Preventative' action will include:

- maintaining a healthy vegetative cover across your property

- working towards increasing the health and depth of your topsoil via sound land management practices
- maintaining debris (logs, stick and leaves) in bushland areas
- undertaking an active integrated rabbit control program (rabbits cause serious erosion via vegetation removal and topsoil disturbance).

3. Know what not to do – especially in areas that may be susceptible to erosion. For instance, avoid:

- actions that change the natural flow of water over the land surface or within waterways. In particular, avoid changing broad surface flow into concentrated 'channelized flow'
- soil disturbance such as removal of topsoil or any earthworks that might provide water with easy access to the subsoil.

Useful links

[Melbourne Water and Stream Frontage Management Program](#)

[Department of Economic Development, Jobs, Transport and Resources – soil/water erosion](#)