Maintaining erosion control structures

The Track is always vulnerable to the effects of surface water flow. The impacts of water – such as pooling and erosion channels – are one of the most difficult issues to manage on the Track.

The Track is likely to be the path of least resistance for sheet flow down slopes. Good trail design minimises erosion by careful alignment across slopes. Where this hasn't occurred, surface runoff can be diverted away from the trail by structures built into the tread.

There are differences in drainage and erosion along the Track, varying with soil type:

- Most problems in laterite soils of Darling Scarp
- Minimal problems in loamy soils of karri forest
- Minimal problems in the free-draining sand of the south coast (other than seasonal inundation!)

> Please report major water damage or erosion on your section. Give the location, form and extent in as much detail as possible. Photos are extremely useful in this case, to help us triage the problem for remediation.

Sustaining the benefit of erosion control structures is a key maintenance goal. See the factsheet ***The Trail Corridor*** for context and big-picture strategy. Good erosion control helps to retain the tread.

To minimise ongoing water damage on your section, it helps to understand the placement, purpose, functional form and maintenance needs of erosion control structures…

Water bars

Where are they installed?

- On sloping ground, usually where the Track is also following the slope up/down.
- They are less useful on flat ground, or on slopes where the Track is continuing along the contour (at a constant height).
- Ideally placed where the Track turns away from a downslope course to follow the contour (ejected water then effectively spills off the trail rather than turning with the Track).
- Most useful towards the top of a slope (removing water early may reduce the need for further installations down the slope).

What is their purpose?

- Water is ejected to the downhill side of the Track.
- Water flow along the tread is interrupted.

What form do they take?

- Usually timber; may be concrete.
- Partially buried to prevent water flowing underneath.
- Upper part sits proud of the tread surface.

- The tread surface may be slightly excavated uphill of the bar, to assist in directing water to the ejection point.
- Bars should not be straight across the trail; usually angled at 30 degrees to the perpendicular.
- One end (the 'bottom end') must be lower than the other (the 'top end') to produce directional run-off.

How can you tell whether a water bar is fulfilling its purpose?

The most direct way would be to walk your section during/immediately after a downpour! That may not be your first choice…

Alternatively, look carefully at the tread downhill of a water bar to identify erosion channels.

You are aiming to 'read' the way water is travelling and the impact of that flow on the tread.

Water bars need to be regularly maintained to work as intended. Wooden water bars – completely choked with soil and debris – effectively become a low step with no beneficial effect for erosion control.

When should I focus on water bars?

- Ideally, focus your annual visit after the first rains to identify bars needing maintenance.
- Water bar maintenance is best carried out from late autumn through to spring. At this time of year, the damp soil – when dug and redistributed – compacts down and coheres well.
- At this time of year, however, many volunteers will need to keep in mind their DRA access restrictions (no entry within 3 days of rain). You'll need to allow for that, especially when considering where you park to carry your tools in and out.

What are the main elements of water bar maintenance?

What to look for	Likely cause	What to do
Water is running over the top of the bar	Debris and soil build up on the top side	• Clear away debris and soil on the top side of the bar. • If the bar is not very high above the tread surface, construct a broad but shallow trench along the top side to promote runoff. Do not remove any more than 50% of the bar height. • Soil cleared may be placed against the lower side of the bar to stabilise it and enhance the barrier effect. • Increase the time the bar remains functional by extending your clearance of debris and soil uphill of the bar.
Water is running past the top end of the bar and continuing down the Track	The tread may have shifted since the bar was installed*	• Lift and replace the water bar in the centre of the tread. • Remediate any erosion channel which might continue to direct water down the Track.
Water is running past the bottom end of the bar and continuing down the Track	The ground at (and immediately beyond) the bottom end is not lower than the tread. The tread may have shifted since the bar was installed.	• Lift and replace the water bar in the centre of the tread. • Create a broad trench downhill of the bottom end to encourage the runoff to disperse.
Timber bar is disintegrating or loose (support pins moved)	Effects of time and repeated impact	• Replacement of the bar is required

* Tread shift is caused by walker behaviour – people will always choose the apparently easiest option! Tread shift may be promoted by suboptimal clearance of vegetation, so make a point to keep vegetation appropriately cleared adjacent to water bars.

What tools will I need?

- A rake hoe (fire rake) – please get in touch if you need one for your section. You can also use a shovel or mattock.
- You may need a heavy hammer to drive in water bar pins.

Rolling Grade Dips (RGDs)

These erosion control structures are essentially sophisticated water bars made of dirt. Instead of a simple barrier across the tread, there is further alteration of the tread surface both uphill and downhill. They are a more recent trail-building technique and are thought to have several benefits over water bars. However, the location and purpose are the same.

What form do they take?

- Constructed of the soil on site.
- Consist of a dished 'apron' dammed at the downhill end by a ramp – these elements together collect, slow down and divert water; and a ditch on the downhill side for drainage.
- The ramp may be internally reinforced with a timber log or plank.
- The entire structure may be 2-3m long.

RGDs also need to be regularly maintained to work as intended. Assessment and identification of deterioration or poor function follows the same basic principles as for water bars.

So far, RGDs have been constructed only in limited sections of the Track. If you have RGDs on your section and would like help to understand their maintenance, please reach out to us!

Knicks

Knicks are a very subtle erosion control structure; their purpose is to promote drainage from the tread where pooling may occur. They may be found on flat sections of Track.

They comprise a slight, semicircular 'cupping' of the tread, with the long edge on the downhill side to allow for drainage. A depression may be constructed to enhance drainage, and surplus soil distributed on the tread downhill of the knick to assist with diversion of water.

Function is dependent on the drainage route remaining clear of soil and debris, so this should be cleared as required.

Where required, we can look at installing/upgrading erosion control structures. To discuss erosion on your section, please get in touch.

Tip!

Identify the early development of a new erosion channel.

Better nipped in the bud than allowed to develop into a problem requiring significant remediation.