

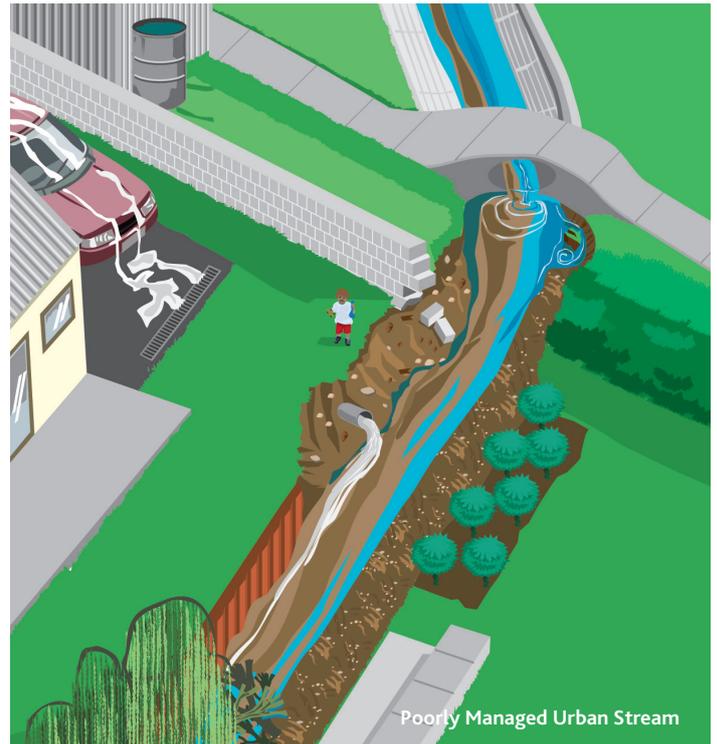
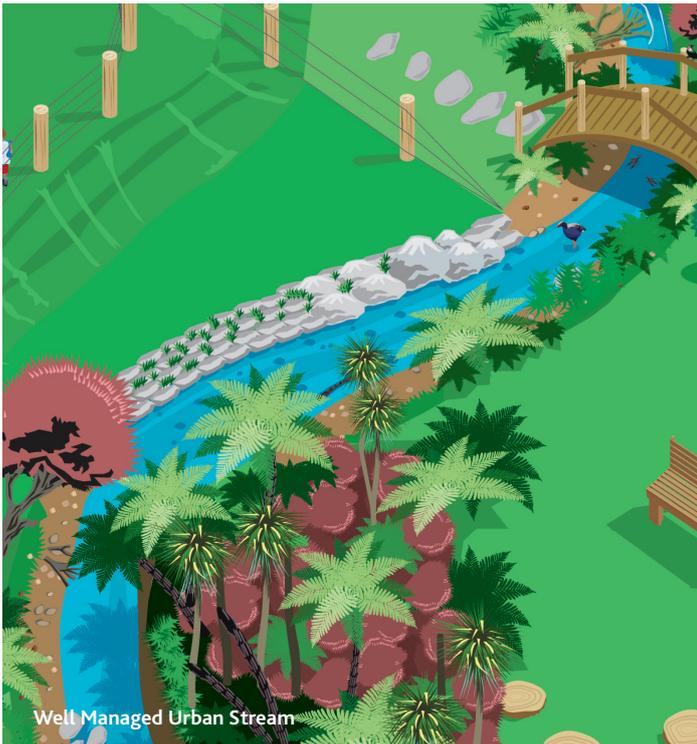
# Caring for Urban Streams – Guide 2: Erosion

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This guide forms part of a larger series of documents under the banner "Caring for Urban Streams". To get an overall understanding of the issues related to stream management it is recommended that people read through the complete set of guides, and as a starting point look at the Quick Reference Guide.

If you have any questions about this information sheet please contact Auckland Council on 09 301 0101



Erosion and sediment deposition are natural and important aspects of streams, however sometimes these processes can result in significant problems in an urban setting, especially when unnatural flows occur in streams.

Urban stream systems often have to deal with extra sediment from surrounding land development and faster and higher flows of rain run off as a result of land becoming covered in hard impermeable surfaces.

Ongoing excess erosion and sedimentation in urban streams can cause significant damage to property, natural freshwater and marine habitats. This guide describes how to manage erosion in urban streams.

## STREAM SOLUTIONS

Below are several solutions to help manage erosion and sedimentation.

Remove obstructions and slow flows. Are flows concentrated in some areas? Obstructions and narrow channels increase the speed of flow and erosive power, especially during rainfall events.

- Remove litter, large logs and bulky rigid plant species if these narrow the streambed or restrict flow. Replace with dense planting of softer plants such as rushes and reeds.

- Carefully dig out by hand and reinstate bankside soil that has slumped into the streambed, but do not dredge the streambed using machinery.
- Leave small rocks and gravel in the streambed as these help slow flows and protect the streambed. Place small rocks along the stream bank, especially on outside bends, to reduce erosive power. Larger rocks and logs secured across a streambed can slow flows in areas where flooding is not a risk, and can protect stream beds. (A log should be longer than the width of the stream, of diameter of 100mm or more, set diagonal to stream flows and fixed at upstream end to prevent movement.)
- Check that flood plain areas are clear of obstructions – erosion controls can slow water flows, making it easier for streams to overflow during heavy rain.

Stabilise banks. Are the stream banks eroding or slipping? Supporting the stream banks and bed can reduce erosion. Some of this work will require engineering advice and resource consents.

- Stabilise slipped or eroded banks using geotextiles to support soil, and then plant. Gently rework the slope of steep-sided stream banks; however remember to put in silt fences and other sediment control protection to keep soil out of the stream.



- Prevent erosion by careful placement of rocks, planting or by using gabion baskets (heavy wire netting filled with rocks) at the toe of the stream bank, especially on outside bends. These measures can also be used to support collapsing streambanks.
- Flatten steep sections of streambed to slow flows, by placing piles of rocks across the width of the stream bed to form a shallow weir. Use geotextiles under rocks to stop scouring during high flows.
- Saturated soils at risk of ongoing slumping may need to be drained using buttress drains (small trenches in bank dug below slip level, filled with free draining gravel or scoria, and fitted with slotted drain pipe) – seek engineering advice.

Plants and mulch. Are plants supporting the stream banks? Native waterside plants, especially on the outside bends of the stream, help prevent erosion of stream banks and nearby ground by slowing flows, spreading runoff and protecting surface soil.

- Remove pest species – willow trees can worsen erosion over time so should be carefully removed.
- Protect bare ground to avoid soil loss. Use geotextiles if possible. Planning earthworks. Before starting works, is a permit or consent needed? Is good weather forecasted?
- Always check with Auckland Council Resource Consents before undertaking any stream works.
- When possible, work in late summer to avoid overlap with fish migration and spawning, and high water flows.
- Check if consent is needed for earthworks. Earthworks can include digging out streambed material, putting in rocks or weirs and supporting stream banks.
- Get engineering advice – severe erosion threatening property, services, and health and safety may require structural engineering work such as retaining walls, hard lining or gabion baskets.

### Maintenance and Monitoring Checklist

Regular maintenance and monitoring is important in preventing erosion, as flow rates vary over time and changes up or down stream can change the behaviour of the stream significantly.

#### Maintain:

- Check erosion controls (rocks, plants, logs) have not washed downstream.
- Check for slippages after heavy rainfall.
- Check retaining structures are in good condition.

#### Monitor:

Erosion control on a small section of a stream will not solve upstream erosion problems; however it can help slow flows and reduce silt build-up downstream and in marine areas. Monitoring changes to the stream during and after erosion control helps identify what is happening to the stream along its entire length.

- Record changes to stream bed and banks – erosion, slumping, flooding, muddy sediment. You can make notes, take photos, draw a plan of the stream.
- Annotate the plan, recording changes in stream position and character over time. If there are problems concerning the stream these records may be very important.
- Watch for streambed being smothered in silt – and if it is, record any changes of depth of silt.

### WORKING IN STREAMS

Disturbing streambeds and banks can cause more erosion and sediment loss. By working carefully, this can be avoided.

- Manually dig out slipped material, or slope stream banks to protect against further erosion and sediment loss.
- Work in late summer to avoid migrating and spawning fish
- Complete work in the dry season (summer) and protect bare areas as soon as possible to avoid washout during works.
- Put in temporary rock weirs to settle sediment during works so it does not wash downstream.
- Use sediment controls such as silt fences when working on stream banks (when removing slipped areas, supporting toe of bank, while planting, fixing logs, rocks, and geotextile materials).
- Leave as much streamside planting as possible, or replant with suitable varieties (non-bulky native plants, with dense root systems and flexible stems or leaves, that will lay flat during overflows).

### Links/Further Information

Further information on erosion and sedimentation can be obtained by entering the following search terms on internet search engines:

- Auckland Council
- Erosion
- Sediment
- Stormwater
- Stream facts – Works Within a Watercourse – Erosion and Sediment Controls
- Technical Publication 90
- Erosion Control Auckland

#### There are more guides available in this series.

The complete set includes the following:

- Caring for Urban Streams Quick Reference Guide
- Guide 1: Flooding
- Guide 2: Erosion
- Guide 3: Stream water quality
- Guide 4: Stream side planting
- Guide 5: Stream life
- Guide 6: Fish passage

*The activities described in this document include some activities that are minor and easy to do, but may also involve significant construction activity such as the use of machinery, moving large volumes of material and extensive changes to the shape and character of a stream. Such activities are likely to require resource consents. Professional advice should always be sought before commencing any work. If in doubt, please contact the Auckland Council stormwater team.*

*Remember, private landowners are responsible for maintaining the streams passing through or adjacent to their property and for ensuring that any work is done in a legal and safe manner.*

For access to this information sheet and to find the other information sheets, search for "Caring for Urban Streams" at [www.aucklandcouncil.govt.nz](http://www.aucklandcouncil.govt.nz)

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