Rock Weirs

a practical option to improve instream habitat

Most manmade drains are straight and narrow, with fast moving shallow water providing little instream cover or habitat for instream life.

Rock weirs provide a practical option for landowners wanting to improve instream habitat in their waterways.

Considerations for site selection

- Straight section with shallow flow, uniform depth and velocity will see the most benefit from increased habitat diversity
- Weirs can be installed as single structures or in a series down a stretch of stream
- Weirs should not have any influence on tile drains, as long as they are higher than the area behind the weir which has increased water level
- To date weirs have been successful in drains with annual average flows up to 200 L/s and maximum flows up to 5,190 L/s.
- If your waterway carries larger flows discuss the project design with your local river engineer at Environment Canterbury on 03 365 3828 to understand if you will require any permissions to undertake the works.

Image 1: *Shallow flow, uniform depth and velocity in Windermere Drain prior to weir installation*

Image 2: *Installed rock weir showing placement of boulders creating slight slope downstream and armouring of stream banks*

DIY steps to install a rock weir

› STEP 1

Dig a trench

Dig a trench approx. 0.5m deep, 2 metres long and the width of the stream bed. **See figure 1.**

› STEP 2

Install boulders

Install a layer of large boulders (0.3-0.5m in diameter) in the trench to form a foundation below the original bed level.

› STEP 3

Another layer

Add another layer of large boulders on top of these to create a weir which sits 0.3-0.5m above the bed of the stream.

› STEP 4

Create slope

Place boulders on the stream bed below the weir for an additional 0.5m-1.5m to create a sloping face to the weir and reduce erosion on the downstream side of the weir in floods.

› STEP 5

Spread shingle

Spread the shingle that was excavated from the stream bed trench on top of the weir to help cement it together.

› STEP 6

Armour banks

Armour the banks along the weir with large boulders.

› STEP 7

Mark site

Mark the site and ensure that you tell your drain cleaning contractors not to remove the weirs.

› STEP 8

Series of weirs

If installing a series of weirs, install the bottom weir first. The distance between them should be twice the distance of raised water level due to the bottom weir.

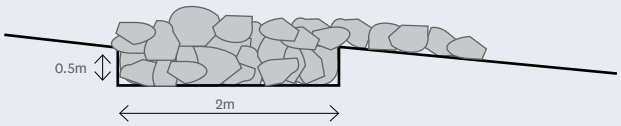

Figure 1: Diagram of stream bed trench and rock placement

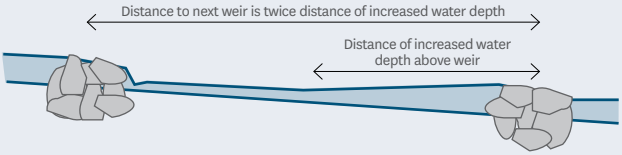

Figure 2: showing distance between weirs when installing them in series

Benefits of Rock Weirs

- Immediately after you install the weir you will see an increase in water level above the weir, creating quiet, deeper water.
- In the trial reaches, flood flows have eroded gravels from below the weir to create pools up to 1.5m deep; this gravel has been deposited furtherr downstream to create shallow faster flowing sections.
- These features provide greatly increased instream habitat diversity which is usually lacking in man-made waterways.

Costs

The 41 weirs installed in Windermere & Taylors Drains required approximately 2 cubic metres of boulders each. In 2015 cost of boulder purchase and digger time per weir was around $125.

Image 3: *Digger excavating trench in stream bed for weir installation*

Fish & Game has led a project with the Hinds Drains Working Party and local farmers to install rock weirs in Windermere and Talyors Drains. These weirs have proven very successful in creating a range of water depths, velocities and habitat types more reflective of a natural stream.

Image 4: *Sites are being annually monitored by Fish & Game to determine changes in fish populations. You can see here the deep pool created immediately below the weir following a 1 in 50 year flood. The weir has not moved in the flood and there was no erosion of the banks around the weirs.*

Need more information?

If you want to discuss your project with a local river engineer contact Environment Canterbury on **03 3653828** to understand if you will require any permissions to undertake the works.

The Ashburton Water Zone Committee is a community led committee supported by councils.

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E19/7377

Fish & Game NEW ZEALAND

Ashburton DISTRICT COUNCIL

Environment Canterbury Regional Council *Kaunihera Taiao ki Waitaha*