National SCIENCE Challenges

FACTSHEET

Science-based advice for
Excluding stock from smaller streams

Science-based advice

Mitigating contaminant loads in exempt streams

Sloped, shallow, narrow streams are exempt from stock exclusion regulations (referred to as 'exempt streams, below). When looking at on-farm mitigations to reduce contaminant loads in streams on pastoral land, consider that:

- Exempt streams are mostly headwaters. Not excluding stock from these waterways can make it more difficult for land stewards downstream to improve water quality.
- To substantially reduce contaminant losses to exempt streams, mitigations such as stock exclusion are needed, particularly on farms where fencing larger streams is not effective.
- Where stock exclusion is prohibitively expensive, less costly strategies should be considered, such as reducing fertiliser rates, using less water-soluble forms of fertiliser, and grazing gullies later in the winter. Such measures can also act as a backstop if fencing fails to exclude stock.

Stream size and contaminant load

When developing regional policy to reduce contaminant loads in streams on pastoral land, consider that:

- Across New Zealand, exempt streams may in fact account for more of the national freshwater contaminant load (kg per year) than larger streams.
- Modelling indicates an average of 77% of the national contaminant load (nitrogen, phosphorus, sediment, and *E. coli*) comes from exempt streams in flat catchments dominated by pasture. This varies from 73% for total nitrogen and dissolved reactive phosphorus to 84% for suspended sediment.

Fencing is effective long-term

Fencing is an expensive mitigation strategy in the short term. However, when implemented well and with good stock management practices, fencing effectively excludes livestock from waterways for many years after it is erected. Over a lifespan of 20–30 years the cost-effectiveness of fencing improves, and can sustain good water quality for decades.

Questions and answers

How was the figure of 77% of the national contaminant load originating from exempt streams arrived at?

The national River Environment Classification system (which captures catchment characteristics such as land cover, climate, topography and geology) was used to model the contaminant concentration, load and yield according to the size of a stream. The model tested if regulation requiring stock to be excluded from larger streams would substantially decrease contaminant loads.

The modelling also found that in catchments dominated by agriculture, contaminant yields (kg per hectare per year) increased with increasing stream size.

What types of land did the modelling include?

Catchments dominated by pastoral land were modelled, and areas such as public conservation land were removed. Despite this, in some regions, large proportions of the total contaminant load were from 'exempt catchments' only containing exempt streams (see table below).

Region	Total contaminant load from exempt catchments (%)
Canterbury	68
Southland	71
Nelson	88
Hawkes Bay	72

Why does this matter?

Most of the contaminant load in waterways across New Zealand originates from small, steeply sloping streams that, under national regulations, stock can access.

Under the Essential Freshwater stock exclusion regulations, cattle, deer and pigs must be excluded from waterways over 1m wide by certain dates (depending on stock type, slope and grazing intensity), and new fences to achieve this must be setback at least 3m.

Steeply sloping shallow streams 1m or less wide are exempt from these regulations.

Who's this factsheet for?

This factsheet is for farmers, industry bodies and regional authorities developing regional freshwater policy.

What's this advice based on?

The information below is sourced from two Our Land and Water research papers:

Assessing the yield and load of contaminants with stream order: Would policy requiring livestock to be fenced out of high-order streams decrease catchment contaminant loads?

doi: 10.2134/jeq2017.05.0212

The longevity of fencing out livestock as a method of decreasing contaminant concentrations in a headwater stream

doi: 10.1002/jeq2.20417