

## FACTSHEET

# *E. coli* loss to water from sheep and beef farms

June 2024

Sheep and beef farming can impact freshwater quality and stream health. Predominantly the risk comes from the loss of four key contaminants to water. These are sediment, *E. coli*, phosphorus (P) and nitrogen (N). It is important to understand the risks to freshwater from your farming operation and to put into place actions to mitigate, minimise or eliminate those impacts.

This factsheet relates to *E. coli* loss from drystock farms. At the end of this document there is a link to the other three factsheets in this series.

The National Policy Statement for Freshwater Management 2020 (NPS-FM) tells Regional Councils to improve swimmability of waterways by setting targets for *E. coli* above the current attribute state. Regional Councils then set plans and rules to meet these in-stream targets.

## ► Summary

*Escherichia coli* (*E. coli*) are a type of bacteria that occur naturally in the gut of humans and warm-blooded animals. Most types of *E. coli* are usually not harmful themselves, but can be used as an indicator or faecal pollution in waterways or other illness-causing pathogenic organisms such as *Campylobacter*. Sources of *E. coli* include livestock, birds, feral wildlife, domestic animals and humans.

The risk of *E. coli* loss to water requires two things, firstly a source of *E. coli* and secondly a pathway to transport that *E. coli* to water. Thus, the ways to mitigate this risk are to intercept, eliminate or reduce the transport pathways that result in that *E. coli* entering a waterway.

*E. coli* risk to water is not just a dairy or cattle issue. While direct deposition of dung into waterways is possibly less of a risk from sheep than cattle, research conducted by AgResearch has shown that runoff from sheep grazed pasture has greater losses of *E. coli* than cattle at the same stocking rates.

The risks of *E. coli* loss are individual to each farm, as are the best ways to manage and mitigate those risks. To support healthy freshwater ecosystems, it is important to understand *E. coli* risk on your farm and to have a comprehensive long-term risk management plan.

## ***E. coli* loss to water is bad for the waterway because:**

- It is associated with the presence of faecal pollution and pathogens that can pose harm to humans and animals.

## ***E. coli* loss to water is bad for the farm because:**

- It impacts the social licence to farm if links between human illness are made to a farming enterprise.

## Risk factors for *E. coli* loss

- 1 Slope
- 2 Rainfall causing runoff
- 3 Critical source area management
- 4 Stock type. Stocking rate and density
- 5 Stock access to waterways
- 6 Poorly located or managed tracks and yards





## How is *E. coli* lost?

*E. coli* is lost when dung and faecal particles are transported to water. This can be via overland flow pathways (also known as surface flow or runoff) or direct deposition when animals (including feral animals and birdlife) have access to waterways. It can also be lost via drainage systems.

## What causes *E. coli* loss?

When water flows overland collecting any dung or faecal particles and transporting them into waterways. In addition, bird and feral animals in and around waterways are sources of *E. coli* loss.

## Inherent risks: the risks associated with the land and location

(See graphic on risk factors for *E. coli* loss)

- Slope. 1
- Rainfall resulting in overland flow. 2
- Presence of critical source areas. 3

## What are the risk factors associated with farm systems and management practices?

(See graphic on risk factors for *E. coli* loss)

- Stocking rate, more animals equals more dung. 4
- Stock type, recent research suggests that sheep are higher risk than cattle at similar stocking rates. 4
- Animal access to waterways. 5
- Management of critical source areas. The presence of dung in CSAs increases the risk of transport to water. 3
- Compacted or bare soil (resulting in increased risk of overland flow).
- Lack of riparian buffers which can filter out contaminants including *E. coli*. Buffer width impacts the level of efficiency.
- Poorly managed septic tanks.
- Poorly maintained or located tracks and yards leading to runoff to water. 6

### 🔍 In summary, the main drivers of *E. coli* loss are:

- Factors associated with livestock farming including stocking rate, direct access of animals to water and overland flow transporting *E. coli* to water.
- Presence of wild animals and birds.
- Inherent characteristics of the land and climate including slope and rainfall.







## Management actions to reduce *E. coli* loss to water

(See graphic on management actions to reduce the risk of *E. coli* loss)

- Stock exclusion from waterways. **1**
- Riparian planting or grass buffer strips. Including varying buffer widths with increasing width in areas of higher risk. Steeper slopes adjacent to waterways, or areas where overland flow waterways enter waterbodies, may require wider buffers. This slows down water flow and filters out contaminants including *E. coli*. **2**
- Critical source area management, including exclusion of stock to reduce the presence of *E. coli*. **3**
- Location and maintenance of tracks and yards to prevent the runoff of *E. coli* to water. **4**
- Location of high-risk management activities such as intensive winter grazing so that runoff to water is minimised. **5**
- Deer fencing of tree blocks and pest management so restrict access to waterways of feral animals. **6**





## Links to further information

For factsheets on Sediment, Phosphorus, *E. coli*, and Nitrogen loss to water from sheep and beef farms, visit the [B+L NZ webpage on managing stock near water](#)

### Risk of *E. coli* loss from sheep grazing

<https://www.agresearch.co.nz/news/new-research-sheds-new-light-on-the-risk-to-water-quality-from-sheep-grazing-and-nbsp/>

### Dung and waterways

<https://beeflambnz.com/knowledge-hub/environmental-management/dung-and-waterways>

## Acknowledgement

Thanks to Dr Richard Muirhead (AgResearch Ltd) for reviewing this factsheet.

---

Factsheets are made possible by sheep and beef farmer investment in the industry. Beef + Lamb New Zealand is not liable for any damage suffered as a result of reliance on the information contained in this document. Any reproduction is welcome provided you acknowledge Beef + Lamb New Zealand as the source.

