

FACTSHEET

Sediment 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 sediment loss from drystock farms. At the end of this document there is a link to the other three factsheets in this series.

Sediment is arguably the biggest risk to water from sheep and beef farms. The risk varies between farms due to both the underlying characteristics of the land but also the farming system. Sheep, beef and deer farms are more likely to be located on sloping land and on vulnerable soils which is why, in many regions, sediment is the largest risk to water from drystock farms.

Regional Council plans have specific rules and in-stream targets to meet. The National Policy Statement for Freshwater Management 2020 (NPS-FM) currently has national bottom-line (NBL) values for sediment concentration in streams. It is the role of Regional Councils to set rules and plans so that they can meet these NBLs. Currently the majority of waterways in NZ exceed the NBL values for sediment.

Summary

We hear a lot about sediment in waterways. Sediment is basically soil, rock and organic particles that have been transported to waterways. While sediments are a natural part of a waterway, farming and practices that occur on land can add more sediment than would occur naturally. This, in turn, can reduce the water quality, impact fish, bird and bug habitats, increase flooding risk, and carry contaminants that can harm human health.

Not all soil that is lost from a paddock enters waterways, however, you want to keep your valuable topsoil where it belongs to maximise pasture production. Erosion and loss of topsoil can have both short- and long-term impacts on pasture production.

The risks of soil loss are individual to each farm, as are the best ways to manage and mitigate those risks. To protect your productivity and support healthy ecosystems, it is important to understand erosion and sediment loss risk on your farm and to have a comprehensive long-term risk management plan. It is also important to monitor erosion and adapt management practices to prevent erosion and soil loss when new risks emerge.

Sediment loss is bad for waterways because:

- It decreases water clarity.
- It can alter habitat and suffocate fish and invertebrates.
- It can carry nutrients which can result in undesirable plants and animals.
- It can increase flooding.

Sediment/soil loss is bad for the farm because:

- It decreases fertility and removes high quality topsoil.
- It can reduce pasture production.
- It increases the risk of further soil loss.

How is sediment lost?

Sediment is lost when fine particles of soil are washed into waterways during rainfall, flood and overland flow events.

Sediment can also be lost from wind erosion.

What causes sediment loss?

(See graphic on risk factors for sediment loss)

- Erosion. 1
- Run off from critical source areas (CSAs) or stock camps. 3
- Damage to stream banks when animals have access to waterways or when flood events scour them out. 5
- Runoff from poorly maintained tracks or yards, heavy machinery use near waterways or other high traffic areas such as supplementary feed storage. 6

On low slopes or flat land, streambank erosion is likely to be the primary source of sediment to waterways, however, on steep land erosion in the form of slips and landslides is likely to be the biggest source. The degree of erosion is heavily influenced by rainfall intensity and duration, soil type, parent material and vegetation cover.

Inherent risks: the risks associated with land and location

(See graphic on risk factors for sediment loss)

- Soil type. 1
- Parent material. 1
- Climate (including wind, intensive rainfall events, season).
- Topography – steepness. 1
- Vegetation cover and root depth.

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

(See graphic on risk factors for sediment loss)

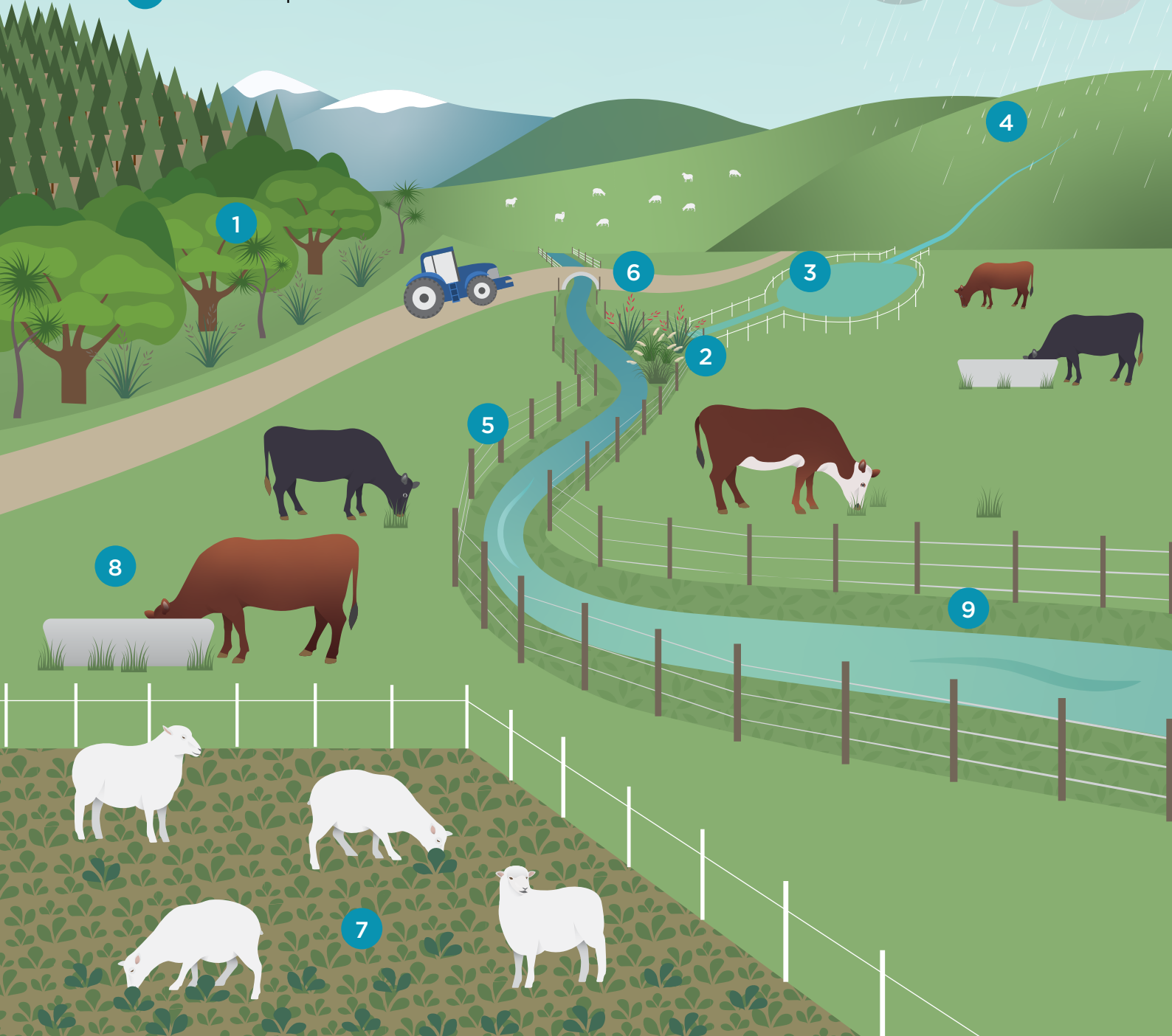
- Cultivation and bare soil/winter grazing. 2 7 8
- Stock management
 - Grazing practices (residual, ground cover). 2
 - Stock type (larger animals) on high-risk areas. 4
 - Access to waterways. 5
 - Stocking density. 8
 - Fence pacing.
 - Wallowing.
- Irrigation (occurrence of ponding and runoff).
- Management of CSAs. 3
- Location and maintenance of troughs, gateways, lanes, tracks and stock camps. 6
- Irrigation (occurrence of ponding and runoff).

➤ In summary, the main drivers of sediment loss are:

- Factors associated with soil disturbance such as cultivation, heavy animals on steep slopes or vulnerable soils.
- Inherent characteristics of the soil and climate.

Management actions to reduce the risk of sediment loss

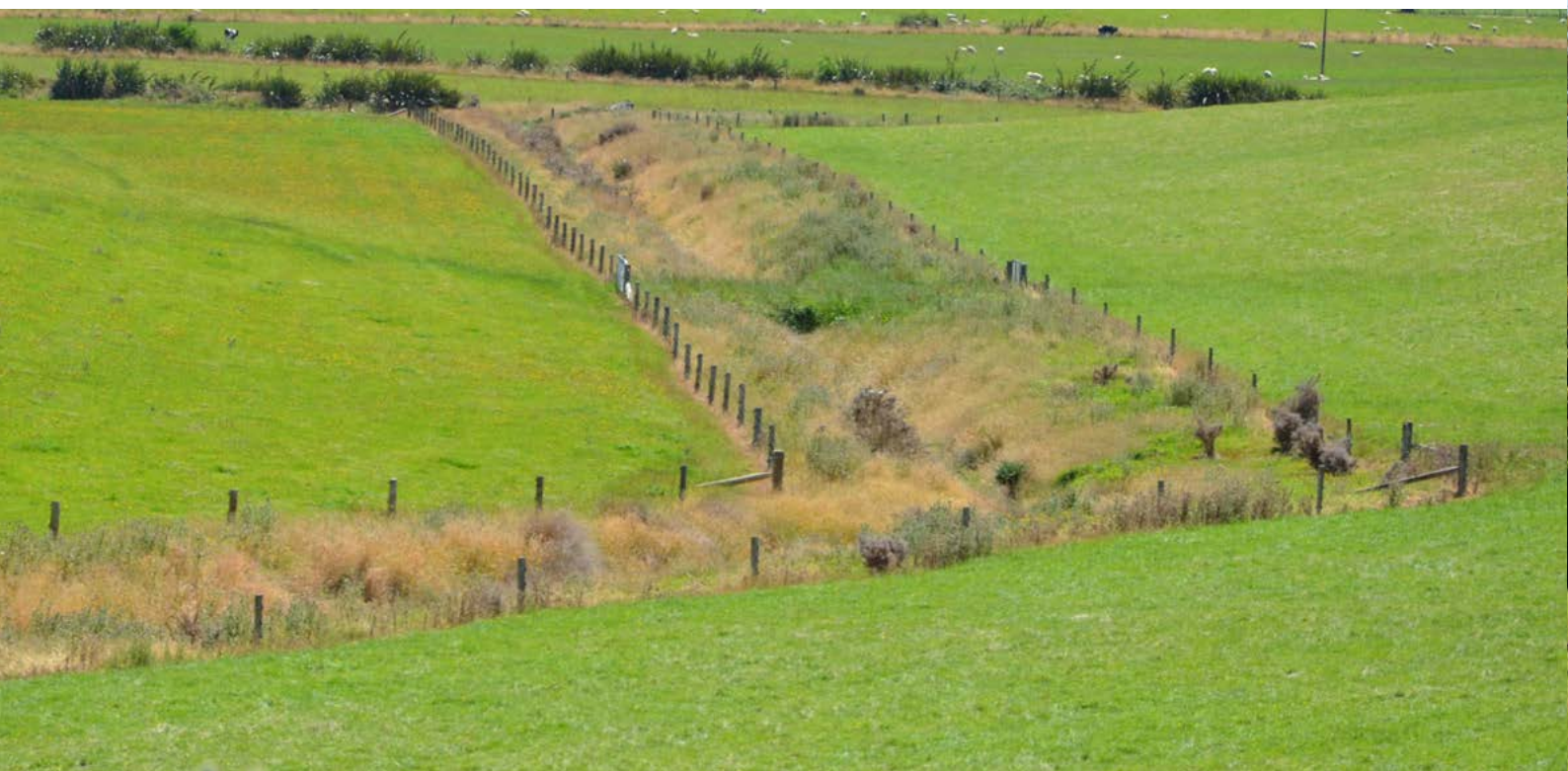
- 1 Retirement of erosion-prone areas
- 2 Riparian protection and increased buffer widths in high-risk areas
- 3 Stock exclusion from critical source areas
- 4 No heavy animals on high-risk areas during high-risk times
- 5 Stock exclusion from waterways
- 6 Location of tracks, troughs, gateways and high traffic areas
- 7 Winter crop location and management
- 8 Avoid soil damage from pugging or working soils when wet
- 9 Buffer strips to filter sediment



Management actions to reduce the risk of sediment loss

(See graphic on management actions to reduce risk of sediment loss)

- Managing the risk of erosion
 - Pole planting on erodible hillsides.
 - Maintaining soil cover. 1
 - Retirement of unproductive and highly erosion prone areas. 1
- Livestock and cropping management practices
 - CSA management. Stock exclusion at high-risk times. 3 Variable buffer width with wider buffers in areas where CSA pathways connect with waterways. 2 9
 - Avoid grazing animals (either all animals or heavier animals) on high-risk areas at high-risk times of the year. 4
 - Avoiding soil damage e.g from pugging or working soils when it is too wet. 8
 - Stock exclusion from waterways. 5
 - Using minimum or no-till cultivation practices particularly on slopes. 8
 - Re-sowing areas of bare or damaged soil as soon as possible. 7
- Maintenance and location of tracks, yards and other high traffic area to prevent sediment loss through runoff. 6
- Intercepting sediment
 - Buffer strips near waterways and critical source areas to slow and capture sediment in overland flow. 2 9
 - Leaving buffers when cultivating, oversowing or topdressing. 9
 - Sediment traps or detainment bunds.
 - Natural and constructed wetlands.



Links to further information

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

DairyNZ reducing sediment loss page with additional links

www.dairynz.co.nz/environment/nutrients-and-contaminants/reduce-sediment-loss/#:~:text=The%20primary%20sources%20of%20sediment,source%20areas%2C%20and%20streambank%20erosion.

Manaaki Whenua Landcare Research Factsheet on sediment loss and erosion control

www.landcareresearch.co.nz/assets/Discover-Our-Research/Land/Soil-health-resilience/factsheet-erosion-sediment.pdf

Landcare Trust - factsheet on sediment traps

www.landcare.org.nz/wp-content/uploads/2022/09/Sediment-Trap-Factsheet.pdf

Landcare Trust - CSA management

<https://landcare.org.nz/wp-content/uploads/2023/01/Nutrients-Critical-Source-Areas.pdf>

Landcare Trust - sediment mitigation

<https://landcare.org.nz/wp-content/uploads/2023/12/12-Sediment-Mitigation.pdf>

Landcare Trust - erosion

<https://landcare.org.nz/wp-content/uploads/2023/12/3-Soil-Erosion.pdf>

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