

CLIMATE CHANGE IMPACTS ON EROSION AND SEDIMENT LOADS IN NEW ZEALAND

Processes like erosion are harming land and ecological habitats by reducing soil resources. Climate change and land use are the main factors contributing to erosion and increased sediment loads in our rivers.

MODELLING CLIMATE IMPACTS FOR EFFECTIVE MITIGATION

- **Surficial erosion** is modelled for each climate scenario using the estimated change in mean annual rainfall.
- To estimate future changes in hillslope **mass movement**, changes in temperature were used to estimate changes in the magnitude and frequency of landslide-triggering storm events.”
- Predictions of **streambank erosion** changes in New Zealand are based on estimated changes in mean annual flood for each climate scenario.

THIS INFOSHEET IS FOR:

- Those interested in the future implications of climate change on erosion and sediment loads in New Zealand. Policymakers, catchment managers, farmers and landowners who rely on data for informed decision making.
- This research explores how climate change will impact sediment loads in our rivers through modelling changes to surficial erosion, mass movement and streambank erosion. The framework takes the impact of divergent future trajectories for mean annual rainfall (MAR), storm magnitude-frequency, and mean annual flood (MAF) to be expressed in future sediment loads through distinct changes in surficial, mass movement, and streambank erosion.

Climate Change



Both increases and decreases in surficial and streambank erosion across the country



Increases in shallow landside erosion

SURFICIAL EROSION

Surficial erosion involves the detachment of soil particles by raindrop impact and their transport by water flowing

TYPES OF EROSION MODELLING

MASS MOVEMENT

Is the erosion of masses of soil and regolith from hillslopes, triggered by rainfall. Shallow landslides are the most common form of mass movement erosion in New Zealand

STREAMBANK EROSION

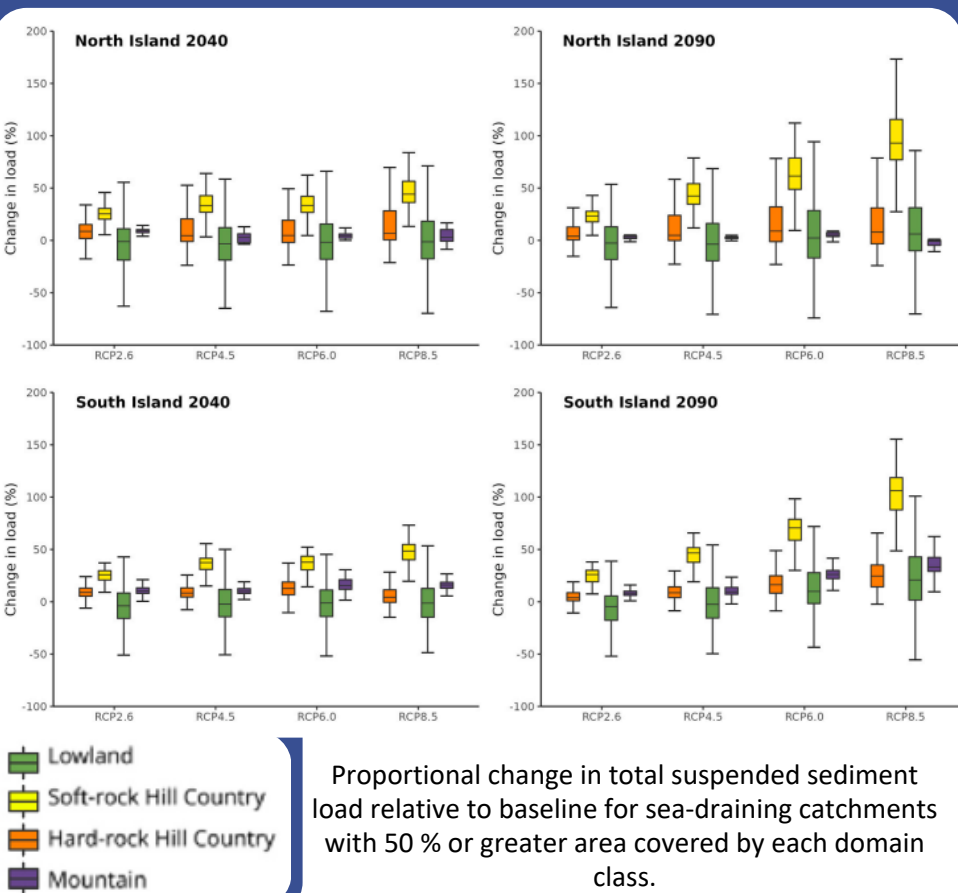
Is the process by which riverbanks or the sides of streams are worn away by the flow of the water. Changes in water velocity, the type of soil in the banks, and the presence of vegetation can contribute to streambank erosion.

RCP

The Representative Concentration Pathways (RCPs) are example global greenhouse gas emissions pathways that are used to explore possible trajectories for global and regional climate and help us understand how climate change may impact things like temperature, sea level, and storms in New Zealand. In general, the higher the number, the more greenhouse gases would be emitted globally, and the more extreme the climate impacts.

To find out more information on RCP click [here](#).

CHANGE IN SEDIMENT LOAD IN CATCHMENTS DRAINING INTO THE SEA



IMPACT OF INCREASED EROSION

Our modelling suggests that in New Zealand, sediment loads may increase by between 1 and 233% by 2090, depending on future greenhouse gas emissions pathways (RCPs).

- Hill Country soil erosion has been estimated to cost New Zealand over NZD \$100 million per year under contemporary climate
- Habitats for both land and aquatic animals could be affected due to increased erosion and sediment in waterways
- Targeted erosion mitigations may offset the increases in erosion rates and reduce sediment loads
- Food security could be affected due to the loss of productive soil
- The current infrastructure of dams may not be maintainable with increased rates of sediment in waterways
- To find more information on the dataset and methodology from this research, visit the Land Use Opportunities Data Supermarket, [here](#)

Changes in temperature, rainfall, and floods under future climate will influence erosion and sediment loads through:

- Increases and decreases in surficial and streambank erosion
- Increases in shallow landslide erosion through larger and more frequent storm events
- To find more information from the research article by Manaaki Whenua, [here](#).

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SPATIAL DISTRIBUTION OF THE EROSION DOMAIN CLASSES

