

# Landslides in New Zealand

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[Listen](#) [2]

Landslides are a natural process that removes material from hills, mountains and coastlines. Landslides are common in New Zealand and can range from small events to damaging large scale events.

Landslides remove material from hills, mountains and coastlines. Landslides are common in New Zealand and can be small events or damaging large events.

## Unstable land

Compared to many other countries, New Zealand has a high number of landslides because:

- land is still being uplifted
- rocks are often weakened by geological folding and faulting
- there are frequent earthquakes
- much of the land is hill country, formed by rivers cutting into soft clay rocks
- slopes can be unstable, weak layers of volcanic ash or loess

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- rainfall can be high

Some landslides move whole mountain sides, taking millions of cubic metres of material, at up to 200 kilometres per hour. Others are shallow or slow, moving only a few centimetres a year.

## Causes

On unstable slopes, three things are important in producing large landslides:

1. land conditions, such as weak rock and steep slopes
2. processes which further weaken the slope, such as deforestation or undercutting by streams
3. triggering factors such as intense rainstorms (100 millimetres or more in 24 hours) and large earthquakes (magnitude 7 or greater)

## Human impact

Deforestation has had the largest impact on the stability of hillsides. Clearing land for farming has increased landslide activity by about seven times its natural rate. Road construction and subdivision earthworks can also

destabilise slopes and increase landslide rates.

## Types of landslides

There are different types of landslides, these include:

- alpine landslides - in the mountains, rock avalanches, rock slides, lahars, rock falls and debris flows
- low mountain landslides - in lower mountain ranges, can be single events or gradual movement over a long period of time
- layered rock landslides - where one hard layer of rock slips off a soft layer of rock due to its weight and a build-up of groundwater between the layers
- rotational landslides - common in New Zealand's hill country where a series of rigid blocks slump downwards, often rotating on a curved surface
- creeping earthflows - where the ground on gentle slopes moves a few metres each year, often during winter months when the ground is very wet
- regolith landslides - one of New Zealand's most widespread types of landslide. These occur when the loose rock and soil above bedrock slides. Often large numbers of these slides will occur at the same time during rainstorms.
- submarine landslides - occur offshore on the continental slope. These can be bigger than those seen on land and even trigger tsunamis.

## Cost

Each year local councils, roading authorities, private landowners and railway operators spend millions of dollars clearing slips from roads and railway lines. It is a never-ending task - there are always more floods or

earthquakes to come, and there is plenty of rock and soil waiting to tumble down.

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In general, landslides are more common in New Zealand than many countries because of the terrain and less stable conditions. However, landslides cause few deaths in New Zealand because there are few settlements in

mountainous areas and the population density is relatively low.

## Unstable land

New Zealand has a high number of landslides because:

- land is still being pushed up by plate [tectonics](#) [3]
- rocks are often weak from this movement
- there are lots of earthquakes
- the land is hilly and cut by rivers
- slopes can be unstable, weak layers of volcanic [ash](#) [4] or loess
- rainfall can be high

Some landslides move whole mountain sides, suddenly. Others are small or slow, moving only a few centimetres a year.

## Causes

On unstable slopes, three things are important in causing large landslides:

1. type of land, such as weak rock and steep slopes
2. processes such as deforestation or stream [erosion](#) [5]
3. large rainstorms and large earthquakes

## Human impact

Clearing forest has had the most impact on how stable the land is. Clearing land for farming has increased landslide activity. Building roads and subdivision earthworks can also increase landslide rates.

## Types of landslides

There are different types of landslides, these include:

- alpine landslides – in the mountains, rock avalanches, rock slides, lahars, rock falls and debris flows
- low mountain landslides – in lower mountain ranges, can be single events or slow movement over a long period of time
- layered rock landslides – where one hard, heavy layer of rock slips off a soft layer of rock when there is a lot of groundwater between the layers
- rotational landslides – common in New Zealand's hill country where a series

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- of blocks slump downwards, often rotating on a curved surface
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- regolith landslides - one of New Zealand's most widespread types of landslide. These occur when the loose rock and soil above bedrock slides. Often lots of these slides will occur at the same time during rainstorms.
- submarine landslides - happen under the sea. These can be bigger than those seen on land and even start [tsunamis](#) [6].

## Cost

Each year millions of dollars is spent clearing slips from roads and railway lines. It is a never-ending task - there are always more floods or earthquakes to come, and there is plenty of rock and soil waiting to fall down.

In general, landslides are more common in New Zealand than many countries because of the steep land, weak layers and high rainfall. However, landslides cause few deaths in New Zealand because there are not many people living in steep, mountain areas.

Māori keywords:

whenua	land
horo	landslide
pakaru	damage
pāhekeheke	slip, unstable
kōwhatu	rock
hoepapa	destroy

Audio Māori keywords:

- [whenua](#) [7]
- [horo](#) [8]
- [pakaru](#) [9]
- [pāhekeheke](#) [10]
- [kōwhatu](#) [11]
- [hoepapa](#) [12]

You could find out if and where there has been a landslide in your local area and what caused it.

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[13]

A massive rock avalanche changed the height of New Zealand's highest mountain, Aoraki Mount Cook, in December 1991. Can you find out about other large rock avalanches in New Zealand? Image: Loyd Homer, GNS Science.



[14]

Landslides are common in New Zealand. This landslide is in Whakatāne. Can you find out what large landslides there have been in New Zealand recently. Image: LEARNZ.

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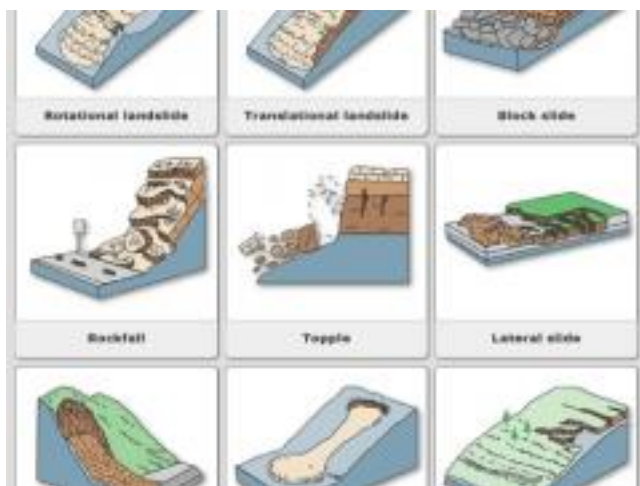
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[15]

One of New Zealand's most well known landslides was the 1979 Abbotsford landslide in Dunedin which left 69 houses uninhabitable. What type of landslide was this and was anyone hurt? Image: GNS Science.



[16]

There are different types of landslides. Sometimes landslides can be a combination of different types. What are the most common landslides in New Zealand? Image: United States Geological Survey. Art work by Margot Johnson.

**Source URL:** <http://www.learnz.org.nz/geohazards152/landslides-in-new-zealand>

## Links

[1] <http://www.learnz.org.nz/sites/learnz.org.nz/files/bg-landslides.mp3?uuid=5cea81d175c2e>

[2] <http://www.learnz.org.nz/sites/learnz.org.nz/files/bg-easy-landslides.mp3?uuid=5cea81d175662>

[3] <http://www.learnz.org.nz/geohazards152/glossary#tectonic>

[4] <http://www.learnz.org.nz/geohazards152/glossary#ash>

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[5] <http://www.learnz.org.nz/geohazards152/glossary#erosion>

[6] <http://www.learnz.org.nz/geohazards152/glossary#tsunami>

[7] [http://www.learnz.org.nz/sites/learnz.org.nz/files/whenua\\_2.mp3?uuid=5cea81d175d77](http://www.learnz.org.nz/sites/learnz.org.nz/files/whenua_2.mp3?uuid=5cea81d175d77)

[8]

[http://www.learnz.org.nz/sites/learnz.org.nz/files/horo\\_0.mp3?uuid=5cea81d175e7c](http://www.learnz.org.nz/sites/learnz.org.nz/files/horo_0.mp3?uuid=5cea81d175e7c)

[9]

<http://www.learnz.org.nz/sites/learnz.org.nz/files/pakaru.mp3?uuid=5cea81d175f74>

[10] <http://www.learnz.org.nz/sites/learnz.org.nz/files/pahekeheke.mp3?uuid=5cea81d176069>

[11] [http://www.learnz.org.nz/sites/learnz.org.nz/files/kowhatu\\_0.mp3?uuid=5cea81d17615c](http://www.learnz.org.nz/sites/learnz.org.nz/files/kowhatu_0.mp3?uuid=5cea81d17615c)

[12] <http://www.learnz.org.nz/sites/learnz.org.nz/files/hoepapa.mp3?uuid=5cea81d17624c>

[13] <http://www.learnz.org.nz/sites/learnz.org.nz/files/b-gh141-01-landslides.jpg>

[14] <http://www.learnz.org.nz/sites/learnz.org.nz/files/b-gh141-d03-08.jpg>

[15] <http://www.learnz.org.nz/sites/learnz.org.nz/files/b-gh141-03-landslides.jpg>

[16] <http://www.learnz.org.nz/sites/learnz.org.nz/files/b-gh141-04-landslides.jpg>