

Soil

Soil is the naturally occurring, unconsolidated organic and mineral material that serves as a medium for plant growth.

The significance of soil to human survival

The thin soil layer that covers Earth's land surface is a life-support system that connects the atmosphere, vegetation and water in all ecosystems. Biologically diverse macro- and micro-organism communities in soils process water, nutrients and contaminants, in this way providing environmental filtering, buffering and transforming functions essential to human survival.

On top of that, soils are critical for the production of food, fibre (including the wood fibre vital to the forest industry) and, more recently, fuel made from biomass.

In Canada's forests, soils play a key role in sustaining a varied range of other ecosystem goods, services and values, too. Clean lakes and rivers, rich biodiversity, spiritual values tied to the land—all of these benefits and more are grounded, literally and figuratively, in soil.

Responding to threats to forest soil health

Human activities as well as changing climate conditions can have local, regional and global impacts on the environment, including soils.

Research by the federal government and others on the role that soils play in forest ecosystems is helping address three current issues tied to forest soil health:



- *Clean water* – Clean water is largely a product of water percolating through the soil profile in forested watersheds. Better understanding of soil's role in the water cycle and how best to manage waste from human activity is leading to more effective methods of protecting water quality from damage during disturbance at various environmental scales.

- *Biomass harvesting* – International market demand for forest-derived biofuels is growing. What are the immediate and cumulative effects on long-term soil quality and biodiversity of removing increased amounts of organic matter from the forest during harvesting? Ongoing and new research initiatives are providing forest managers with answers to this question.
- *Impact of climate change* – Soil processes in forest ecosystems will be affected by climate change as shifting climate trends lead to changes in soil biological communities, nutrient cycling and organic matter decomposition. Research into the impacts of such changes on forest soil health—and ultimately on the growth and productivity of forests—is giving forest managers better information on which to base policies and guidelines.

The knowledge gained from research such as this informs the federal government’s environmental policy and leads to improvements in forest management practices. Healthy soils are an important component of healthy forest ecosystems and vital to maintaining the many benefits that Canadians derive from their forests.