

A longer frost-free season is bringing new opportunities – and some problems.

The frost-free season begins on the first day in spring when temperatures remain above freezing and ends on the first day in fall when freezing temperatures return. The earlier the frost-free season starts or the later it ends, the longer the growing season will be. A longer frost-free season is of interest to farmers and home gardeners alike because it gives them more choice in what they can grow and a better chance of seeing their annual crops and flowers survive to maturity.

The flip side of a longer frost-free season is a shorter frost season, and that is a benefit to governments that have to keep roads ice-free and for individuals and transportation companies that have to deal with ice hazards. It also means a longer season for construction. It is a disadvantage, however, to northern communities and to businesses like logging and oil and gas exploration that rely on frozen ground and waterways for moving goods and heavy equipment.

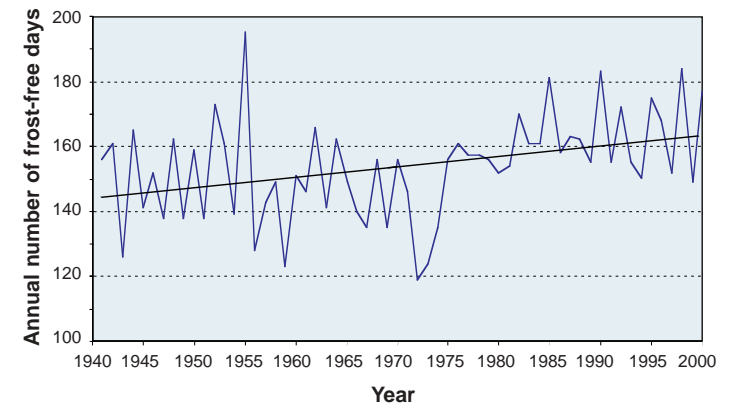
A number of factors can affect the persistence of frost. These include elevation, exposure to sunlight, vegetation, and proximity to water bodies or cities. As a result, even locations that are quite close to each other can have very different frost seasons. Air temperature, particularly the overnight low, is the dominant force, however, and regions that are becoming warmer can also expect to see shorter frost seasons.

FOCUS: Southwestern Ontario

Southwestern Ontario, with its mild climate and rich soils is prime farming country. Over the past century, it has warmed by about 0.5°C, somewhat less than the national average. Still, this has been enough to have a noticeable impact on the length of the frost-free period.

Temperature records for London airport, in the centre of the region, show that the average length of the frost-free season has increased by more than 18 days since the 1940s. The increase reflects a strong rise in winter and spring temperatures and especially in overnight lows.

Length of Frost-Free Period at London Airport, Ontario



Source: J. Klaassen, Environment Canada

A new soybean crop is off to a good start on this farm near London.

THE BIGGER PICTURE

The frost-free season has been getting longer in most other parts of Canada too. The biggest increases over the past 100 years have been seen in B.C. and on the Prairies. For most of Canada, spring has

warmed more than any other season. Not surprisingly, then, the frost-free season has been getting longer largely because the last spring frosts are happening earlier.

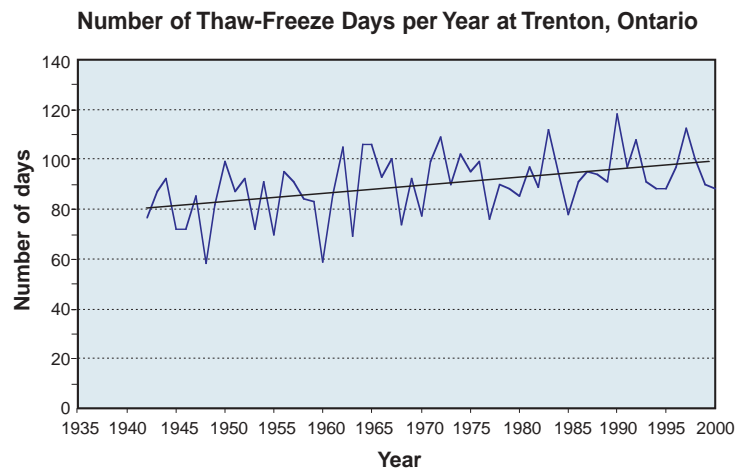
While the frost-free season is getting longer on average, it can still vary considerably from one year to another, and unusually late spring or early fall frosts can still occur. While farmers thus face a smaller risk of losing a crop to frost, they still have to be cautious about planting too early or shifting production to varieties that require a longer growing season.

THE THAW-FREEZE-THAW-FREEZE SEASON

The transition from the frost to the frost-free season and back again is neither smooth nor sudden. As spring temperatures warm or fall temperatures cool, days with temperatures above freezing typically alternate with nights when temperatures are below the freezing point. Repeated cycles of thawing and freezing can be hard on trees and plants, especially in late winter or early spring. Large herbivores like deer and caribou suffer too, because refreezing puts a hard, icy crust on the snow that makes moving about and feeding difficult. When they occur in combination with rain and snow, thaw-freeze cycles also contribute to the weathering of building materials.

Preliminary studies indicate that in much of Canada thaw-freeze cycles are happening more often. Most of the stronger trends have been found in southern Ontario. The weakest have been in British Columbia. At Trenton, Ontario, thaw-freeze events have been increasing at the rate of 3.2 days per decade. At Swift Current, Saskatchewan, the rate is 3.9 days per decade. An interesting exception is the city of Toronto, where thaw-freeze cycles have been decreasing, possibly because of warming effects related to the city's growth.

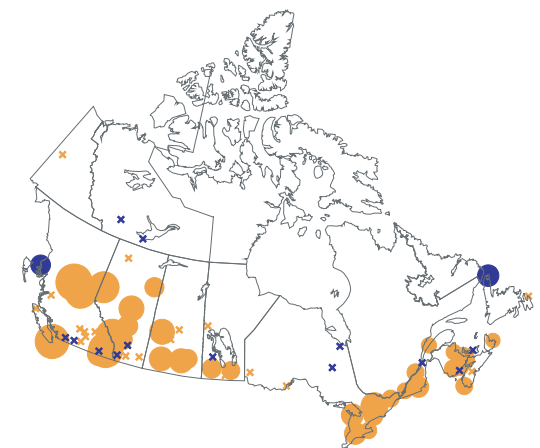
Since the early 1980s, the construction industry has noticed that materials such as bricks and concrete are not lasting as long as expected in some parts of the country. Faster weathering as a result of more frequent thaw-freeze cycles is believed to be contributing to this problem, and because of it, building owners and taxpayers are facing added maintenance costs for buildings and other structures that use these materials.



Source: J. Klaassen, Environment Canada

A day with a thaw-freeze cycle is one in which the daily high is above freezing and the overnight low is below freezing. In the 1940s Trenton averaged about 80 days with thaw-freeze cycles. By the 1980s and 1990s that number had climbed to about 95.

Trends in Length of Frost-free Period (days/100 years)



Source: Environment Canada

Orange dots indicate a longer frost-free season, blue dots a shorter. The larger the dots, the greater the change in the length of the season. The 'x's indicate changes that are not statistically significant. The largest increase (about 50 days per century) has occurred in central B.C. The largest decrease (about 30 days per century) has been in St. Anthony's, Newfoundland.