

Soil water erosion vulnerability (surface water pollution)

Water erosion is a natural process consisting in the detachment of soil particles by water under the impact of raindrops and runoff, followed by the transport and redeposit of the particles concerned. The scale of the process is proportional to the intensity, duration and frequency of precipitation and to the rate of snowmelt. The scale of water erosion is also affected by the presence or absence of vegetation cover. Soil conditions that influence the erosion process are degree of water-saturation, soil infiltrability and aggregate stability (Lavoie et al. 1995). A soil's intrinsic capacity to minimize losses from erosion depends on its erodibility and the local relief (Table 1).

Table 1. Soil water erosion vulnerability assessment model

Slope (%)	Erodibility (K factor)			
	Negligible to low (K<0.039)	Moderate (K = 0.039-0.053)	High (K = 0.053-0.066)	Very high (K>0.066)
Nil (<0,5)	Negligible to low	Negligible to low	Moderate	High
Very gentle (0,5-2)	Negligible to low	Negligible to low	Moderate	High
Gentle (2-5)	Negligible to low	Moderate	Moderate	High
Moderate (5-9)	Moderate	High	High	High
Steep (9-15)	High	High	High	High
Very steep (15-30)	High	High	High	High
Abrupt (>30)	High	High	High	High

Adapted from Lavoie and Nolin 1997

The map identifies areas that are vulnerable to water erosion on the basis of the criteria selected for the assessment model. Those areas are also more sensitive to surface water pollution. In view of the relatively flat relief of the southeastern part of the Montreal plain, its soils are hardly vulnerable at all to water erosion (92.6% of the surface area), according to the assessment criteria used. Moderately vulnerable soils (e.g. Saint-Hyacinthe series) account for 6.9% of the total and occur mainly in Saint-Hyacinthe County. Highly vulnerable soils (0.5%) are found mainly on Mount Saint-Bruno (e.g. Mount Rougemont). Mapping units representing different land types (ravines, landslides and escarpments) should also be classified as highly vulnerable. In reality, however, there is little likelihood of such units actually being subjected to water erosion, since their main use (forest) tends to minimize the erosive action of rainfall.

Other factors that have not been considered here may also affect the scale of water erosion and surface water pollution risks; these include sheet floods in flat terrain, ditch and watercourse bank instability, size and intensity of rainfall events and type and intensity of farmland use.