

Soil vulnerability to physical clogging of subsurface drains

The long-term economic viability of subsurface drainage depends on the risk of physical clogging of the lines with fine soil particles, as well as the risk of ferric clogging. The two following maps show soil classifications based on these two types of clogging. They will be useful to designers of drainage plans (for agricultural, residential, recreational and other applications). The design and placement of subsurface drainage require particularly careful attention in areas of moderate to high vulnerability if the system is to function satisfactorily for an extended period of time (e.g. consideration should be given to protecting the drains with some sort of filter (sock or envelope) (CPVQ 1984). An important point to note is that these classification models are applicable to soils in which subsurface drainage is deemed desirable, i.e. soils with natural drainage that is imperfect, poor or very poor.

The physical clogging vulnerability interpretation model uses substratum particle size class (in the study area, the substratum is usually located at a depth of more than 75 cm) and dominant sandy fraction type in the C horizon (Table 1).

Table 1. Assessment model for soil vulnerability to physical clogging of subsurface drains

Substratum (≥ 75 cm) particle size class	Vulnerability
Fragmentary and skeletal	Nil to low
Sandy	Sandy fraction of C horizon: coarse medium fine very fine
Loamy	Texture class of C horizon: Loam Silty Loam Silt
Coarse loamy	Moderate
Fine loamy	Nil to low
Coarse silty	High
Fine silty	Moderate
Clayey	Nil to low
Organic	Nil to low

Adapted from Martin and Nolin 1991

Soils with nil to low vulnerability account for 58.7% of the study area. They occur mainly in Chambly and Verchères Counties, with the exception of the sandy soils of Saint-Amable. Moderately vulnerable soils account for 24.7% of the total (e.g. Du Bourrelet series). They occur mainly in Richelieu and Saint-Hyacinthe Counties and sporadically in the other counties. Lastly, 13.6% of the soils of the study area are highly vulnerable to physical clogging of subsurface drainage (e.g. Saint-Aimé series). These soils consist of fine loamy or silty sand. They occur mainly in Richelieu and Saint-Hyacinthe Counties near the Yamaska River and on the sandy terraces of the Lanoraie delta and the Bois de Verchères in Verchères County.