

## Soil Salinity

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### Abstract

Soil salinity problems on the Canadian Prairies are simple in concept and could be reclaimed easily, but not cheaply. Saline soils are simply soils with a high concentration of soluble salts. Sulphates of magnesium and sodium are the main culprits in Western Canada. Calcium sulphate (gypsum) is also common but at low concentrations because of its limited solubility.

The two fundamental processes of soil salinization are:

- (1) evaporation that exceeds precipitation and
- (2) a water table close enough to the soil surface to deliver water to the surface by capillary action.

Any desert will give us condition (1) but to satisfy the second condition requires groundwater movement from one location to another.

The three processes of groundwater movement that cause soil salinization are:

- (1) formation of groundwater mounds around sloughs – probably the most common situation in Manitoba
- (2) artesian discharge from glacial and bedrock aquifers – several examples in Manitoba, the main mechanism in Saskatchewan and also common in Alberta.
- (3) Side-hill seeps caused by near surface impermeable strata – rare in Manitoba, occasional in Saskatchewan but more common in Alberta and Montana where the glacial deposits are thin.

Reclamation of saline soil is simple in concept but difficult in practice. Tile drainage accompanied by extensive leaching will quickly reclaim saline soils where sodium is not excessive. The problem is economic - drainage is expensive and water for leaching is seldom easy to obtain.

Managing saline soils by continuous cropping, salt tolerant crops or permanent forage plantings will minimize the salts that are “in your face”, but it does not eliminate the problem. Salts that we see at the soil surface will fluctuate with climatic cycles, but they never go away unless we flush them away. Where slough rings are the primary cause of salinity, the water table will rise in wet years and the salts appear in the dry years. Cycles of soil salinity may be viewed as dramatic increases if the “other side of the average” has not been experienced by the farm manager.