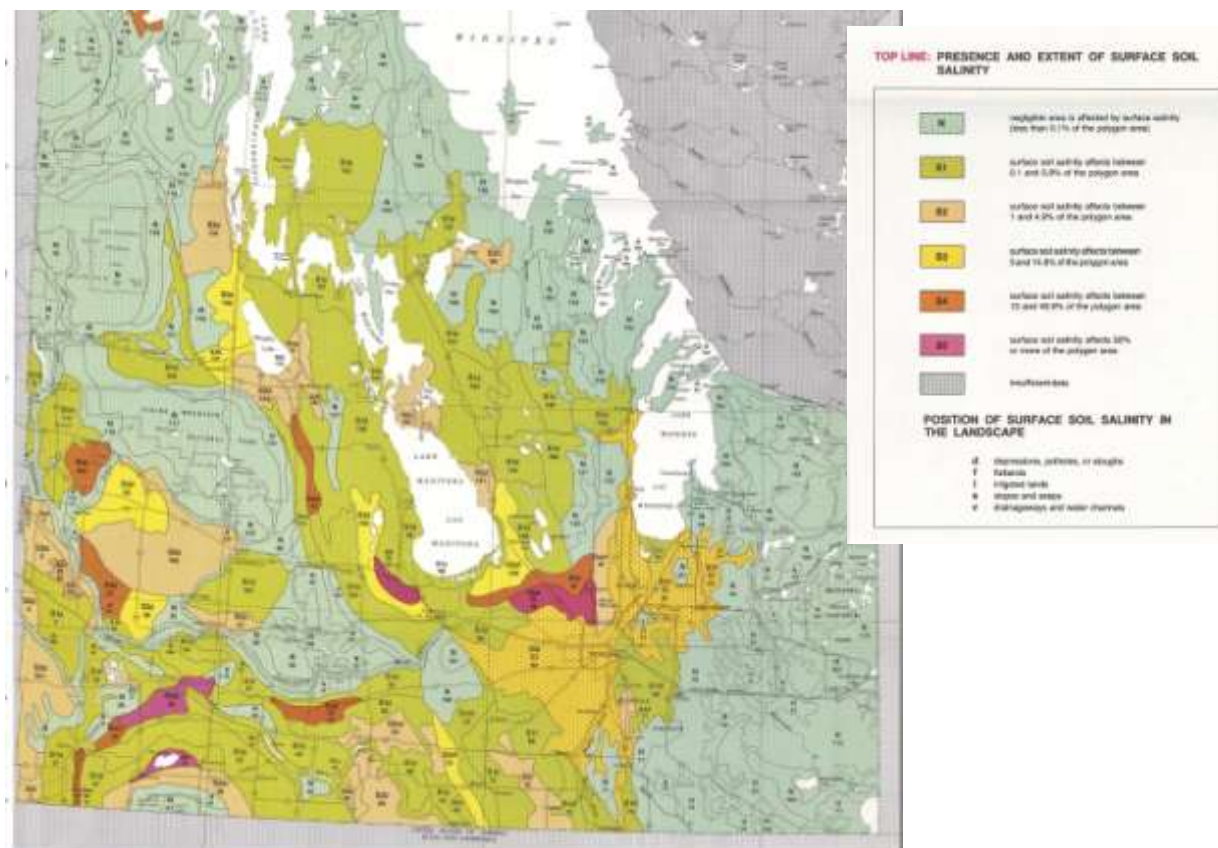


Perennial Forages to Manage Salinity

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Soil salinity is considered a threat to long-term sustainable production in many parts of Manitoba. Manitoba Agriculture estimates approximately 0.6 million acres of agricultural land in Manitoba are effected by saline soils.



Soil salinity levels can range from non-saline (zero decisiemens per metre (dS/m)) to very severely saline (greater than 16 dS/m). As soil salinity levels increase, the stress on germinating seedlings also increases. Soluble salts prevent plants from taking up the proper balance of nutrients and water required for growth. To account for a decline in seed germination and an increase in the time required for germination, it is recommended that seeding rates be increased by 30 percent in saline areas. Table 1 gives a good indication of crop tolerance for varying levels of salinity but taking a crop that has a low tolerance and trying to establish it in a medium or high saline area - even

increasing seeding rates by 30 percent - won't guarantee a good establishment population.

In general, perennial plants can handle salinity better than annual plants. Perennial forages have various levels of salt tolerance. Species such as tall wheatgrass, green wheatgrass, altai wild rye, Russian wild rye, slender and western wheatgrass, all have high salt tolerance (<16 dS/m). Slightly less saline tolerant forages include sweet clover, established alfalfa, tall fescue, and smooth brome grass (<8 dS/m) as well as crested wheatgrass, intermediate wheatgrass and meadow brome grass (<4 dS/m). Seedling alfalfa, white, red and alsike clovers have very low salt tolerance (2 dS/m). In comparison, barley has a salt tolerance of 8 dS/m.

Table 1: Relative Tolerance of Crops and Weeds to Salt

Salt Tolerance Level	Forages	Speed of Forage Establishment	Weed/Crop
Very High	Tall Wheatgrass	Slow	Red Samphire
Very High	Beardless Wild-rye	Medium	Sea Blight
Very High	Slender Wheatgrass	Fast	
High	Altai Wild-rye	Slow	Kochia
High	Russian Wild-Rye	Slow	Foxtail Barley
High	Western Wheatgrass	Slow	
High	Tall Fescue	Fast	
Moderate	Alfalfa	Fast	Barley
Moderate	Sweetclover	Medium	Wheat
Moderate	Birdsfoot Trefoil	Slow	Fall Rye
Moderate	Brome grass	Slow	Oats
Low Tolerance	Timothy		Flax
Low Tolerance	Alsike Clover		Canola
Low Tolerance	Red Clover		Corn
Low Tolerance	Reed Canary Grass		Beans
Low Tolerance	Sainfoin		Peas

As salinity can vary within a small area, one strategy when establishing forages in saline areas is to seed a complex mix of grasses and legumes with various levels of salt tolerance. The result is greater establishment success and lessens the likelihood of establishment of weedy species such as foxtail barley or kochia.

“The only real reclamation procedure for saline soils is to drain the excess water off the bottom and pour fresh water on the top to flush the salts out and away.” Les Henry, 1990

There are no quick or easy solutions to soil salinity. Saline soils can only be reclaimed by rinsing the salts down and out of the root zone. Preventing capillary rise involves adopting water management practices which improve drainage, lower the water table and promote the downward movement of salts in a saline soil.

Although salinity will not disappear, effective water management can reduce or stop salts from reaching the soil surface where they inhibit plant growth. Practices should be implemented that reduce water from reaching the water table, intercept lateral water movement, or prevent water from reaching the soil surface.

Recent forage breeding programs have recognized the challenge salinity poses to agricultural production and efforts have been made to develop forage varieties or species with improved salt tolerance. For example, newly-developed varieties of alfalfa and green wheatgrass exceed the salt tolerance levels of their predecessors.

Late-fall plantings are often the best time to establish forages in saline soils when drier soils permit machinery to cross with minimal difficulty. Seeds will germinate early the following spring. Once established, perennial forages can have water-depleting characteristics that can be used to draw down the water table, leading to decreased soil salinity near the surface.

In operations where forages are not a standard crop, seeding perennials may appear to be an inconvenience and pose challenges with equipment. However, the majority of saline acres are on field margins (particularly along roads) and near wetlands. Squaring off fields and seeding one or two passes to forages along roadways and around or between wetlands, can reduce some of the inconvenience and access concerns of harvesting forage in-crop during the growing season.

For additional information on managing saline soils:

[Soil Management Guide -Soil Salinity](#)