Aquarius Drilling Services
Water Bore Construction - Pump Installation - Irrigation - Water Treatment

P.O. Box 69
Oakleigh South Vic 3167
Website: www.aquariusdrilling.com.au

Tel: 03 9555 2524
Fax: 03 9553 2090
Email: aquariusdrilling@hotkey.net.au

What is Salinity

What is salinity?

Salinity is a loose term that indicates an unacceptable build up of damaging salts in soil.

It is also used as a term for water supplies considered to have a salinity problem, again with too many damaging salts.

What are these salts?

There are four major salts (or ions) that make up most water supplies. These are as listed below. There are two others, Potasium and Silica but are generally not a concern with salinity.

Sodium+	**Chlorides-**
Calcium++	
Magnesium++	

Each of the above has a charge factor that makes them either a cat-(ion), positive ion, or an-(ion) negative ion. The balance of these can influence the pH of water.

Sodium and Chlorides are damaging salts.
Calcium and Magnesium are hardness minerals.

Sodium and Chlorides are commonly found together as a compound in NaCl.

Calcium will bond very readily with available oxygen molecules and forms a carbonate or a white crystal and is most noticeable on the ground, on leaves, where it dries out on many surfaces when water has a dominance of calcium. This will also clog plumbing as a white crystal.

Calcium, when forming this compound or crystal , effectively acts like a glue and can be regarded as the molecular glue of water.

Magnesium is also a hardness mineral but reamains highly soluble even when formed as a carbonate. It will generally attack non-ferrous metals such as copper and brass and can leave a green or blue powder residue on the outside of the surface indicating an excess. Magnesium can also burn plants and attack root systems when in excess.

Sodium, chloride, and magnesium, apart from being major base ions, really have no ability to stick to surfaces, or remain in soil by their own merit, except by charge factor with some soils.

Calcium, as a carbonate becomes the bond in a water supply. It will precipitate quite readily and lock these other base ions together and trace minerals, such as iron and manganese and the problems start. When iron and or manganese are present the scale in pipes and on surfaces can be from red-iron to dark brown-black with the heavy presence of manganese.

The salinity issue.

When you water or irrigate with calcium laden water with a hardness level of 100ppm and above, you can be at risk, of salinity. Salinity is directly linked to calcium by the crystalisation of that ion. In warm conditions that ion increases its rate of precipitation.

The more you irrigate, the more calcium will drop out as a crystal. The higher the levels of all ions, the greater the damage caused. This behavior will create an impervious blanket of calcium and salts, and will become a salinity issue in that body of soil over time. That is salinity.

The further downside is that not only is water at this level and above damaging, but the major base ions of calcium and magnesium are often unavalaible to the plant and stock generally as they have formed compound’s called sulphates, carbonates or similar and have become

quite locked up. They will cause damage and be of little or no value to the plant or the soil.

Flushing rains

Realistically, high rainfall is not the answer to flush out the salts in the soil. This is because it does not rain consistently enough to be effective in many dry areas.

Shalom Ruze
Aquarius Drilling and Water Treatment