Section 2 of 22 (2j - Irrigation Water Salinity & Sodium Adsorption Ratio (SAR) Assessment Guide)

Irrigation Water Lab Analysis for Soluble Salts and SAR (mg/l = milligrams/liter; meq/l = milliequivalents/liter)

	Major Cations (ions with a positive charge)	example		Enter Lab Results			Major Anions (ions with a negative charge)	example		Enter Lab Results	
		mg/l	meq/l	mg/l	meq/l			mg/l	meq/l	mg/l	meq/l
Hardness	Calcium (Ca^{++}) **20.04 mg/meq**	80	4				Chloride (Cl^{-}) **35.46 mg/meq**	92	2.6		
Hardness	Magnesium (Mg^{++}) **12.16 mg/meq**	14	1.2				Sulfate ($SO4^{--}$) **48.03 mg/meq**	192	4		
	Sodium (Na^{+}) **22.99 mg/meq**	115	5			Alkalinity	Bicarbonate (HCO_3^{-}) **61.02 mg/meq**	183	3		
	Potassium (K^{+}) **39.10 mg/meq**	8	0.2			Alkalinity	Carbonate (CO_3^{--}) **30.01 mg/meq**	6	0.2		
	Sum of Total Cations:	**217**	**10.4**				Sum of Total Anions:	**473**	**9.8**		

Total Dissolved Solids (i.e., Soluble Salts) is: 217 mg/l + 473 mg/l = 690 mg/l (or 690 ppm). 0.23 x TDS (ppm) = lbs. of salts/ac-in
690 mg/l ÷ 640 ≈ ECiw of 1.1 dS/m (i.e., Electrical Conductivity of Irrigation Water in decisiemens/meter)

Irrigation Water Salinity Assessment

Salinity (Soluble Salts): affects crop water availability
Note: Be sure to compare the Irrigation Salinity (ECiw) with the Soil Test (ECe), in order to evaluate the potential yield reduction of your crop (i.e., Refer to a Crop Threshold Soil Salinity (ECe(ct)) Table)

Degree of Restriction on Use – ECiw (dS/m)		
None	**Slight to Moderate**	**Severe**
< 0.7	**0.7 – 3.0**	**> 3.0**

Irrigation Water Quality and its potential effects on Infiltration

The amount of **Sodium** and **soluble salts** in the Irrigation Water affects the rate of water infiltration into the soil. This is evaluated using the **SAR** (**Sodium Adsorption Ratio**) and Electrical Conductivity of the Irrigation Water **(ECiw in dS/m)**.

Use meq/l for calculating the SAR

SAR = Na/√(Ca + Mg)/2

SAR	Degree of Restriction on Use – ECiw (dS/m)		
	None	Slight to Moderate	Severe
0 – 3	> 0.7	0.7 – 0.2	< 0.2
3 – 6	> 1.2	1.2 – 0.3	< 0.3
6 – 12	> 1.9	1.9 – 0.5	< 0.5
12 – 20	> 2.9	2.9 – 1.3	< 1.3
20 - 40	> 5.0	5.0 – 2.9	< 2.9

Agronomy Tech Note 76 (http://www.nm.nrcs.usda.gov/technical/handbooks/iwm/nmiwm.html) **rudy.garcia.2009**