



Water quality guidelines

Table 1. Key irrigation water quality factors, and the likelihood (low, medium or high) that water with each factor will cause soil problems. Guidelines are based upon FAO handbook 29 and PACE Turf observations. Note that for each range of SAR values, the potential for soil problems is related to the ECw of the irrigation water as well.

	Likelihood of Soil Problems		
	Low	Medium	High
ECw (dS/m,mmhos/cm)	< 0.7	0.7 - 3.0	> 3.0
TDS (mg/l, ppm)	< 450	450 - 2000	>2000
SAR 0 - 3	ECw > 0.7	ECw 0.7 - 0.2	ECw < 0.2
SAR 3 - 6	ECw > 1.2	ECw 1.2 - 0.3	ECw < 0.3
SAR 6 - 12	ECw > 1.9	ECw 1.9 - 0.5	ECw < 0.5
SAR 12 - 20	ECw > 2.9	ECw 2.9 - 1.3	ECw < 1.3
Sodium Na (me/l)	< 3	3 - 9	> 9
Sodium Na (mg/l, ppm)	< 70	70 - 200	> 200
RSC (me/l)	< 1.25	> 1.25	
Nitrate NO3 - N (mg/l, ppm)	< 5	5 - 20	> 30
Ammonium NH4 - N (mg/l,ppm)	<5	5 - 20	> 20
Boron B (mg/l, ppm)	< 0.5	0.5 - 3.0	> 3.0
Bicarbonate HCO3 (me/l)	< 1.5	1.5 - 8.5	> 8.5
Bicarbonate HCO3 (mg/l, ppm)	92	92 - 520	> 520
Chloride Cl (me/l)	< 3	> 3	
Chloride Cl (mg/l, ppm)	< 105	> 105	

ECw = Electrical conductivity of the irrigation water

TDS = Total Dissolved Salts

SAR = Sodium Adsorption Ratio

RSC = Residual Sodium Carbonate

NOTE on SAR values: For the most accurate estimate of sodium hazard, we suggest that you use adj RNA values instead of SAR values and compare them against the SAR guidelines above to predict sodium hazard. If you are using water quality report estimates of adj SAR and the report lists pHc, you may be using values that overestimate the sodium hazard by as much as two-fold.

Table 2. Examples of water quality from a variety of sources. Note that, depending on the quality of well water, recycled water may have higher quality than well water.

	No restriction	Domestic	Rain	Recycled	Poor quality well	Good quality well
EC dS/m	<0.8	0.7	0.1	1.1	4.02	0.6
TDS ppm	<525	499	46	723	2573	378
pH	6.5-7.8	7.8	6.3	7.2	7.5	8.1
SAR	<3.0	2.7	0.5	4	5.2	0.9
Bicarbonate (HCO ₃ ppm)	<50	134	26	201	364	266
Sodium (Na ppm)	<100	85	5.6	147	407	30.5
RSC meq/l	<1.0	0.04	0	0.12	0	0
Boron (B ppm)	<0.5	0.22	0.03	0.42	0.41	0.06
Chloride (Cl ppm)	<90	74	0.7	149	1004	45
Nitrate (NO ₃ -N ppm)	<8.0	3.2	---	7.3	---	3.6

Table 3. Examples of water quality from California and Arizona desert sources. Note that, depending on the quality of well water, recycled water may have higher quality than well water.

	Canal (CA)	Good well (CA)	Poor well (CA)	Recycled (CA)	Estrella Mountain Ranch (AZ)	CAP (AZ)
EC dS/m	1.07	0.6	1.1	0.7	4.5	1.0
TDS ppm	685	352	707	467	2867	680
pH	8.2	8.0	7.4	6.6	7.1	7.6
SAR	3.7	1.9	2.6	2.8	15.3	2.6
HCO ₃ ppm	137	100	299	104	90	
Na ppm	74	34	109	50	703	110
RSC meq/l	0	0	0	0	0	
B ppm	0.4	0.1	0.3	0.5	1.1	0.1
Cl ppm	102	41	62	99	1174	99

ECw = Electrical Conductivity of irrigation water
TDS = Total Dissolved Salts
SAR = Sodium Adsorption Ratio
RSC = Residual Sodium Carbonate