

Lake Tuz mineral nutrient concentrations (from Nilhan et al., 2008)

Soluble (me/L)		March	April	May	June	July	August	September	October	November	Average	Average	
		March - August											
Na	Min	24.5	87	33	68	14	37	15	28	178	Min	53.8	
	Max	1440	1320	1650	3307	1050	1010	860	1450	1850	Max	1548.6	
	Mean	799	664	719	1011	508	390.9	468.5	697.7	1080	Mean	704.2	
K	Min	3.5	5	6	0.38	3	6	0.37	3.25	7	Min	3.8	4.0
	Max	34	31	30	122	18	24	134	72	48	Max	57.0	43.2
	Mean	16.3	14.75	13.8	16.4	9.75	10.6	26.3	22.5	26.75	Mean	17.5	13.6
Na/K	Min	7.0	17.4	5.5	178.9	4.7	6.2	40.5	8.6	25.4	Min	32.7	36.6
	Max	42.4	42.6	55.0	27.1	58.3	42.1	6.4	20.1	38.5	Max	37.0	44.6
	Mean	49.0	45.0	52.1	61.6	52.1	36.9	17.8	31.0	40.4	Mean	42.9	49.5
Ca	Min	1.53	1.94	2	6.8	0.92	4	5.61	3.67	3.1	Min	3.3	2.9
	Max	79.6	35	66.2	43.86	44.1	61.2	66.3	93.8	81.6	Max	63.5	55.0
	Mean	31.4	17.56	30.3	26.18	22.7	24.9	32.3	33.2	35.3	Mean	28.2	25.5
Mg	Min	1.8	3.95	2.16	5.52	6.23	4.47	4.46	9.22	10.98	Min	5.4	
	Max	206	192	196	196.7	276.7	306	216	348.6	228.9	Max	240.8	
	Mean	90.8	65.7	106	68.5	113	125	103	131	115.5	Mean	102.1	
Mg/Ca	Min	1.2	2.0	1.1	0.8	6.8	1.1	0.8	2.5	3.5	Min	2.2	2.2
	Max	2.6	5.5	3.0	4.5	6.3	5.0	3.3	3.7	2.8	Max	4.1	4.5
	Mean	2.9	3.7	3.5	2.6	5.0	5.0	3.2	3.9	3.3	Mean	3.7	3.8
Total Cations	Min	34.7	103.8	47.3	93.0	31.3	59.9	35.5	57.0	213.2	Min	75.1	61.7
	Max	2045.2	1805.0	2204.4	3910.1	1709.6	1768.4	1558.6	2406.8	2519.0	Max	2214.1	2240.5
	Mean	1059.7	845.3	1005.4	1216.8	789.2	701.3	765.4	1048.6	1408.4	Mean	982.2	936.3
Cl	Min	25	0.9	35	75	10	47.5	20	37.4	175	Min	47.3	32.2
	Max	1000	1050	1000	3350	1250	562.5	1000	1750	2000	Max	1440.3	1368.8
	Mean	481.25	356	511	990.6	566	317.5	541	859	959.4	Mean	620.2	537.1
% of C+ bal b	Min	72.1	0.9	74.0	80.6	31.9	79.2	56.3	65.6	82.1	Min	60.3	56.5
	Max	48.9	58.2	45.4	85.7	73.1	31.8	64.2	72.7	79.4	Max	62.1	57.2
	Mean	45.4	42.1	50.8	81.4	71.7	45.3	70.7	81.9	68.1	Mean	61.9	56.1
SO4	Min	3.9	36.1	6.12	1.1	0.75	0.3	5.89	2.88	20.4	Min	8.6	8.0
	Max	1210	720	958	548	253	714	352	75.8	925	Max	639.5	733.8
	Mean	452	401	352	136.3	84.5	217	86	22.9	293.87	Mean	227.3	273.8
SO4 by subtr	Min	4.8	51.4	6.2	9.0	10.7	6.2	7.8	9.8	19.1	Min	13.9	14.7
	Max	522.6	377.5	602.2	280.1	229.8	603.0	279.3	328.4	259.5	Max	386.9	435.9
	Mean	289.2	244.6	247.2	113.1	111.6	191.9	112.2	94.8	224.5	Mean	181.0	199.6
HCO3	Min	0.42	0.36	1.04	1.46	0.88	0.73	1.51	0.52	0.78	Min	0.9	0.8
	Max	7.3	7.28	13.52	14.56	5.15	7.64	6.14	6.24	6.55	Max	8.3	9.2
	Mean	3.6	4.73	5.62	4.9	2.98	3.99	3.54	2.79	3.55	Mean	4.0	4.3
B (ppm)	Min	7.45	7.28	10.2	4.2	1.7	7.52	0.17	7.4	11.3	Min	6.4	6.4
	Max	60.3	44.73	63.3	54	60.9	29.45	20.27	41.95	54.34	Max	47.7	52.1
	Mean	26.52	29.52	28.8	27	25.4	18.73	10.69	19.26	25.68	Mean	23.5	26.0

Artificial Lake Tuz medium

"invented" by John Cheeseman, ca. 2010

Ion	Target for 1x solution (meq/L)	Composition for			1000x stock			
		Solution no.	recipe	meq/L	FW	g/L	g/10 L (g/L)	
Na	500	1	NaCl	370	58.44	21.62	216.23	
K	15	2	Na ₂ SO ₄	65	142.04	9.23	92.33	
Ca	25	3	KCl	10	74.56	0.75	7.46	
Mg	100	4	CaCl ₂ ·2H ₂ O	25	147	3.68	36.75	
Total cations	765	5	MgSO ₄ (anhydrous)	100	120.37	12.04	120.37	
Cl	430	6	LiCl	2	42.39	0.08	0.85	
SO ₄	167.5	7	NaHCO ₃	10	84.01	0.84	8.40	
pH	8	8	Na ₂ B ₄ O ₇	0.4375	381.4	0.17	1.67	
B	2							
Li	2	9	NH ₄ Cl	0.25	53.49	0.0134	10 mL of 1000x	13.37
		10	NaNO ₃	0.25	84.99	0.0212		21.25
		11	K ₂ HPO ₄	0.05	136.1	0.0068		6.81

Weigh salts 1-8 into separate containers (or only 1-7 if your freak out about Boron)

Dissolve all salts but the CaCl₂ by adding with stirring to 8L of deionized or distilled water.

Add a little at a time and/or use a magnetic stirrer, wooden spoon or long spatula to stir off the bottom as needed.

Dissolve the CaCl₂ in about 700-800 mL dW then pour it slowly into the main solution.

Note: CaSO₄ is only sparingly soluble and not to 25 mM so it is important that it not precipitate at this step.

Add 1000x micronutrients and Fe using a Hoaglands or MS recipe (in lieu of better information) when making the stocks (add 10 mL/10 L)

The natural pH of this seems to be almost exactly 8.

Dissolve the N and P salts (#9-11) in 200 mL DW and store at 4°C for addition at the time of use.

Concentrations of N and P are intentionally very low. The plants don't care and the solutions take longer to turn green.