

## SUPPLEMENTAL TABLES

Table S1. Salt concentrations (mg/L) added to deionized waters for generation of dilution waters used in acute toxicity testing with *Neocloeon triangulifer*. 0.05 mg NaBr/L was added to each water as well. The “Recon” waters required bubbling of CO<sub>2</sub> to dissolve CaCO<sub>3</sub>, and then bubbling of air to drive off acidity.

Water name	KCl	KHCO <sub>3</sub>	NaHCO <sub>3</sub>	MgSO <sub>4</sub> (an)	MgCl <sub>2</sub> *6H <sub>2</sub> O	CaSO <sub>4</sub>	CaCl <sub>2</sub>	NaCl
Duluth 100 <sup>a</sup>	0	9.9	125.1	38.0	0	40.2	43.2	0
High Ca:Mg	0	9.9	125.1	21.0	15.0	60.0	35.0	0
Low Ca:Mg	0	9.9	125.1	73.5	31.3	0	25.8	0
High K	21.3	9.9	125.1	38.0	0	40.2	43.2	0
High Na	0	9.9	125.1	38.0	0	40.2	43.2	295.0

  

Water name	KCl	NaHCO <sub>3</sub>	MgSO <sub>4</sub> *7H <sub>2</sub> O	MgCl <sub>2</sub> *6H <sub>2</sub> O	CaCO <sub>3</sub>	NaCl	Na <sub>2</sub> SO <sub>4</sub>
Recon 30	2.5	6.2	23.3	0	20.5	7.8	1.7
Recon 90	3.6	18.0	60.0	8.3	61.6	10.2	0
Recon 150	5.0	25.9	107.7	7.4	102.6	20.7	0
Recon 210	6.6	24.3	163.4	0	143.6	40.6	10.8

<sup>a</sup>Duluth 100 water was also used as “Low K” and “Low Na”.

Table S2. Nominal major ion concentrations (mg/L) for various dilution waters used in acute toxicity testing with *Neocloeon triangulifer*. Each water also had 0.04 mg Br/L.

Water name	K	Na	Ca	Mg	SO <sub>4</sub>	Cl	HCO <sub>3</sub>
Duluth 100 <sup>a</sup>	3.9	34.3	27.4	7.7	58.6	27.6	96.9
Recon 30	1.3	5.3	8.2	2.3	10.2	5.9	29.5
Recon 90	1.9	9.0	24.7	6.9	23.4	10.8	88.1
Recon 150	2.6	15.3	41.1	11.5	41.9	17.5	143.9
Recon 210	3.4	26.1	57.5	16.1	70.9	27.7	192.7
High Ca:Mg	3.9	34.3	30.3	6.0	59.1	27.6	96.9
Low Ca:Mg	3.9	34.3	9.3	18.6	58.6	27.4	96.9
High K	15.0	34.3	27.4	7.7	58.6	37.7	96.9
High Na	3.9	150.3	27.4	7.7	58.6	206.5	96.9

<sup>a</sup>Duluth 100 water was also used as “Low K” and “Low Na”.

Table S3. Test conditions for acute toxicity tests with *Neocloeon triangulifer*

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1. Temperature (°C)	25 ± 1
2. Photoperiod (L:D)/light intensity	16:8h/~100 lux
3. Test chamber size	30 ml
4. Test solution volume	20 ml
5. Age of organisms	<24 h
6. Dilution water	various
7. Substrate	none
8. # organisms per chamber	5
9. # chambers/treatment	4
10. Food	scraping of live diatom biofilm
11. Aeration	none
12. Test type	static
13. Renewal frequency	none
14. Test duration	96 h
15. Control survival	≥ 90%
16. Endpoint	survival

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Table S4. Major ion concentrations<sup>1,2</sup> (mM) at 96-h median lethal concentration levels for the mayfly *Neocloeon triangulifer*.

Hardness comparisons									
Salt tested	Dilution water	K	Na	Ca	Mg	SO <sub>4</sub>	Cl	HCO <sub>3</sub>	pH
NaCl	Recon 30	0.033	13.886	0.205	0.095	0.106	13.821	0.484	7.7
NaCl	Recon 90	0.048	23.693	0.615	0.284	0.243	23.609	1.444	7.8
NaCl	Recon 150	0.067	31.986	1.025	0.473	0.437	31.817	2.358	8.3
NaCl	Recon 210	0.088	31.831	1.435	0.663	0.739	31.478	3.159	8.3
Na <sub>2</sub> SO <sub>4</sub>	Recon 30	0.033	15.185	0.205	0.095	7.583	0.166	0.484	7.7
Na <sub>2</sub> SO <sub>4</sub>	Recon 90	0.048	27.778	0.615	0.284	13.938	0.305	1.444	7.8
Na <sub>2</sub> SO <sub>4</sub>	Recon 150	0.067	36.415	1.025	0.473	18.313	0.495	2.358	8.3
Na <sub>2</sub> SO <sub>4</sub>	Recon 210	0.088	37.616	1.435	0.663	18.979	0.782	3.159	8.4
K <sub>2</sub> SO <sub>4</sub>	Recon 30	21.008	0.231	0.205	0.095	10.594	0.166	0.484	7.7
K <sub>2</sub> SO <sub>4</sub>	Recon 90	21.853	0.389	0.615	0.284	11.146	0.305	1.444	7.8
K <sub>2</sub> SO <sub>4</sub>	Recon 150	20.526	0.664	1.025	0.473	10.667	0.495	2.358	8.3
K <sub>2</sub> SO <sub>4</sub>	Recon 210	36.277	1.135	1.435	0.663	18.833	0.782	3.159	8.4
K <sub>2</sub> SO <sub>4</sub>	Recon 210	24.882	1.135	1.435	0.663	13.135	0.782	3.159	8.2
MgSO <sub>4</sub>	Recon 30	0.033	0.231	0.205	14.030	14.042	0.166	0.484	7.8
MgSO <sub>4</sub>	Recon 90	0.048	0.389	0.615	16.926	16.885	0.305	1.444	7.8
MgSO <sub>4</sub>	Recon 150	0.067	0.664	1.025	22.037	22.000	0.495	2.358	8.3
MgSO <sub>4</sub>	Recon 210	0.088	1.135	1.435	19.049	19.125	0.782	3.159	8.2
Ca:Mg comparisons									
Salt tested	Dilution water	K	Na	Ca	Mg	SO <sub>4</sub>	Cl	HCO <sub>3</sub>	pH
NaCl	low Ca:Mg	0.099	26.245	0.232	0.764	0.611	25.527	1.589	8.3
NaCl	high Ca:Mg	0.099	31.344	0.756	0.248	0.615	30.632	1.589	8.2
Na <sub>2</sub> SO <sub>4</sub>	low Ca:Mg	0.099	25.873	0.232	0.764	12.802	0.771	1.589	8.3
Na <sub>2</sub> SO <sub>4</sub>	high Ca:Mg	0.099	29.989	0.756	0.248	14.865	0.778	1.589	8.3
K <sub>2</sub> SO <sub>4</sub>	low Ca:Mg	20.066	1.490	0.232	0.764	10.594	0.771	1.589	8.3
K <sub>2</sub> SO <sub>4</sub>	high Ca:Mg	23.119	1.490	0.756	0.248	12.125	0.778	1.589	8.3
MgSO <sub>4</sub>	low Ca:Mg	0.099	1.490	0.232	9.237	9.083	0.771	1.589	8.2
MgSO <sub>4</sub>	high Ca:Mg	0.099	1.490	0.756	14.591	14.958	0.778	1.589	8.2
Na/K interactions									
Salt tested	Dilution water	K	Na	Ca	Mg	SO <sub>4</sub>	Cl	HCO <sub>3</sub>	pH
KCl	low Na	33.903	1.490	0.684	0.316	0.611	34.581	1.589	8.4
KCl	high Na	28.714	6.538	0.684	0.316	0.611	34.440	1.589	8.3
NaCl	low K	0.099	26.380	0.684	0.316	0.611	25.668	1.589	8.3
NaCl	low K	0.099	33.234	0.684	0.316	0.611	32.522	1.589	8.3
NaCl	high K	0.384	28.972	0.684	0.316	0.611	28.545	1.589	8.3

<sup>1</sup> Concentrations are based on LC50s calculated from measured anion concentrations for each salt tested, and nominal concentrations in dilution water.

<sup>2</sup> In addition to the other ions, all solutions had 0.00051 mM Br<sup>-</sup>.

Table S5. Major ion activities<sup>1,2</sup> (mM) at 96-h median lethal levels for the mayfly *Neocloeon triangulifer*.

Hardness comparisons								
Salt tested	Dilution water	K	Na	Ca	Mg	SO <sub>4</sub>	Cl	HCO <sub>3</sub>
NaCl	Recon 30	0.029	12.214	0.121	0.056	0.061	12.156	0.421
NaCl	Recon 90	0.041	20.098	0.313	0.143	0.117	20.022	1.205
NaCl	Recon 150	0.055	26.495	0.468	0.214	0.187	26.354	1.859
NaCl	Recon 210	0.073	26.265	0.634	0.292	0.306	25.979	2.438
Na <sub>2</sub> SO <sub>4</sub>	Recon 30	0.028	12.838	0.076	0.038	3.995	0.143	0.411
Na <sub>2</sub> SO <sub>4</sub>	Recon 90	0.039	22.347	0.176	0.089	6.081	0.251	1.173
Na <sub>2</sub> SO <sub>4</sub>	Recon 150	0.052	28.560	0.260	0.132	7.250	0.399	1.818
Na <sub>2</sub> SO <sub>4</sub>	Recon 210	0.068	29.377	0.357	0.181	7.319	0.628	2.358
K <sub>2</sub> SO <sub>4</sub>	Recon 30	17.200	0.190	0.066	0.033	5.046	0.140	0.406
K <sub>2</sub> SO <sub>4</sub>	Recon 90	17.797	0.319	0.195	0.098	5.101	0.255	1.202
K <sub>2</sub> SO <sub>4</sub>	Recon 150	16.760	0.545	0.329	0.165	4.816	0.414	1.914
K <sub>2</sub> SO <sub>4</sub>	Recon 210	28.127	0.888	0.363	0.184	7.149	0.629	2.464
K <sub>2</sub> SO <sub>4</sub>	Recon 210	19.943	0.916	0.422	0.212	5.503	0.645	2.517
MgSO <sub>4</sub>	Recon 30	0.027	0.187	0.065	4.775	4.758	0.136	0.371
MgSO <sub>4</sub>	Recon 90	0.038	0.311	0.181	5.371	5.290	0.246	1.093
MgSO <sub>4</sub>	Recon 150	0.052	0.519	0.271	6.318	6.223	0.390	1.627
MgSO <sub>4</sub>	Recon 210	0.069	0.895	0.398	5.719	5.631	0.622	2.213
Ca:Mg comparisons								
Salt tested	Dilution water	K	Na	Ca	Mg	SO <sub>4</sub>	Cl	HCO <sub>3</sub>
NaCl	low Ca:Mg	0.084	22.074	0.112	0.366	0.285	21.475	1.284
NaCl	high Ca:Mg	0.083	26.057	0.350	0.114	0.272	25.481	1.264
Na <sub>2</sub> SO <sub>4</sub>	low Ca:Mg	0.080	20.939	0.069	0.246	5.685	0.638	1.265
Na <sub>2</sub> SO <sub>4</sub>	high Ca:Mg	0.079	23.968	0.210	0.075	6.323	0.637	1.249
K <sub>2</sub> SO <sub>4</sub>	low Ca:Mg	16.390	1.225	0.075	0.266	4.884	0.646	1.298
K <sub>2</sub> SO <sub>4</sub>	high Ca:Mg	18.675	1.213	0.231	0.082	5.381	0.647	1.285
MgSO <sub>4</sub>	low Ca:Mg	0.082	1.242	0.085	3.592	3.510	0.646	1.221
MgSO <sub>4</sub>	high Ca:Mg	0.079	1.200	0.231	4.806	4.897	0.632	1.155
Na/K interactions								
Salt tested	Dilution water	K	Na	Ca	Mg	SO <sub>4</sub>	Cl	HCO <sub>3</sub>
KCl	low Na	27.966	1.229	0.307	0.140	0.256	28.531	1.276
KCl	high Na	23.692	5.393	0.308	0.140	0.257	28.423	1.273
NaCl	low K	0.083	22.179	0.329	0.151	0.283	21.593	1.268
NaCl	low K	0.082	27.519	0.311	0.142	0.266	26.945	1.246
NaCl	high K	0.321	24.197	0.322	0.147	0.275	23.853	1.271

<sup>1</sup> Activities modelled with Visual MINTEQ using mM concentrations listed in Table S4.

<sup>2</sup> In addition to the other ions, all solutions had ~0.0004 mM Br<sup>-</sup>.