

Table S1. Grain size distribution of the top 12 cm sediment layer of Cock Soda Lake.

Classification	Proportion sample (%)
Gravel	0.0
Sand	79.7
Mud	20.3
Coarse sand	2.2
Medium sand	29.9
Fine sand	9.4
Very fine sand	38.2
Very coarse silt	10.6
Coarse silt	3.1
Medium silt	2.4
Fine silt	1.4
Very fine silt	0.6
Clay	2.2

Table S2. Element composition of dry sediment determined by inductively coupled plasma mass spectrometry (ICP-MS).

Sediment layer	Fe (mg/kg)	Mn (mg/kg)	P (mg/kg)
0-2cm	7014	187	198
2-4cm	7462	154	162
4-6 cm	6393	124	134
6-8 cm	6781	121	125
8-10 cm	7850	170	128
10-12 cm	7840	167	141

Table S3. Metrics on the metagenomic raw sequence reads and assembled contigs obtained from Cock Soda Lake in 2016. The raw sequence reads were deposited to the NCBI Sequence Read Archive (SRA, Accession Number SRP144042).

Metagenome ID	CS-Br16	CS-Sed16-2cmA	CS-Sed16-2cmB	CS-Sed16-5cm
Sample type	brine	Top 2cm sediment	Top 2cm sediment	Top 5cm sediment
Number of read pairs	321209669	320027988	314554411	333806161
Number of assembled contigs ≥ 1 kb	380600	1002855	1046590	998484
Average contig length (bp)	2412	2560	2537	2578
Maximum contig length (bp)	289008	267788	248036	338372
Total assembly length (bp)	917990274	2567058321	2654929585	2573987824
N50 (bp)	2720	3018	2966	3048
Number of contigs ≥ 2.5 kb	88700	263745	268963	259716
Number of contigs ≥ 5kb	28152	87605	88336	86835

Table S4. Metrics on the metatranscriptomic raw sequence reads and assembled transcripts obtained from the top 2cm sediment layer from Cock Soda Lake in 2016. The raw sequence reads were deposited to the NCBI Sequence Read Archive (SRA, Accession Number SRP144042).

Metatranscriptome ID	CS-Sed16-2cmA-RNA
Number of read pairs	348450220
% of read pairs rRNA (SortMeRNA)	42 %
% of read pairs used for assembly (non rRNA)	58 %
Number of assembled contigs ≥ 200 b	1056776
Average contig length (bp)	719
Maximum contig length (bp)	43306
Total assembly length (bp)	760312569
N50 (bp)	833