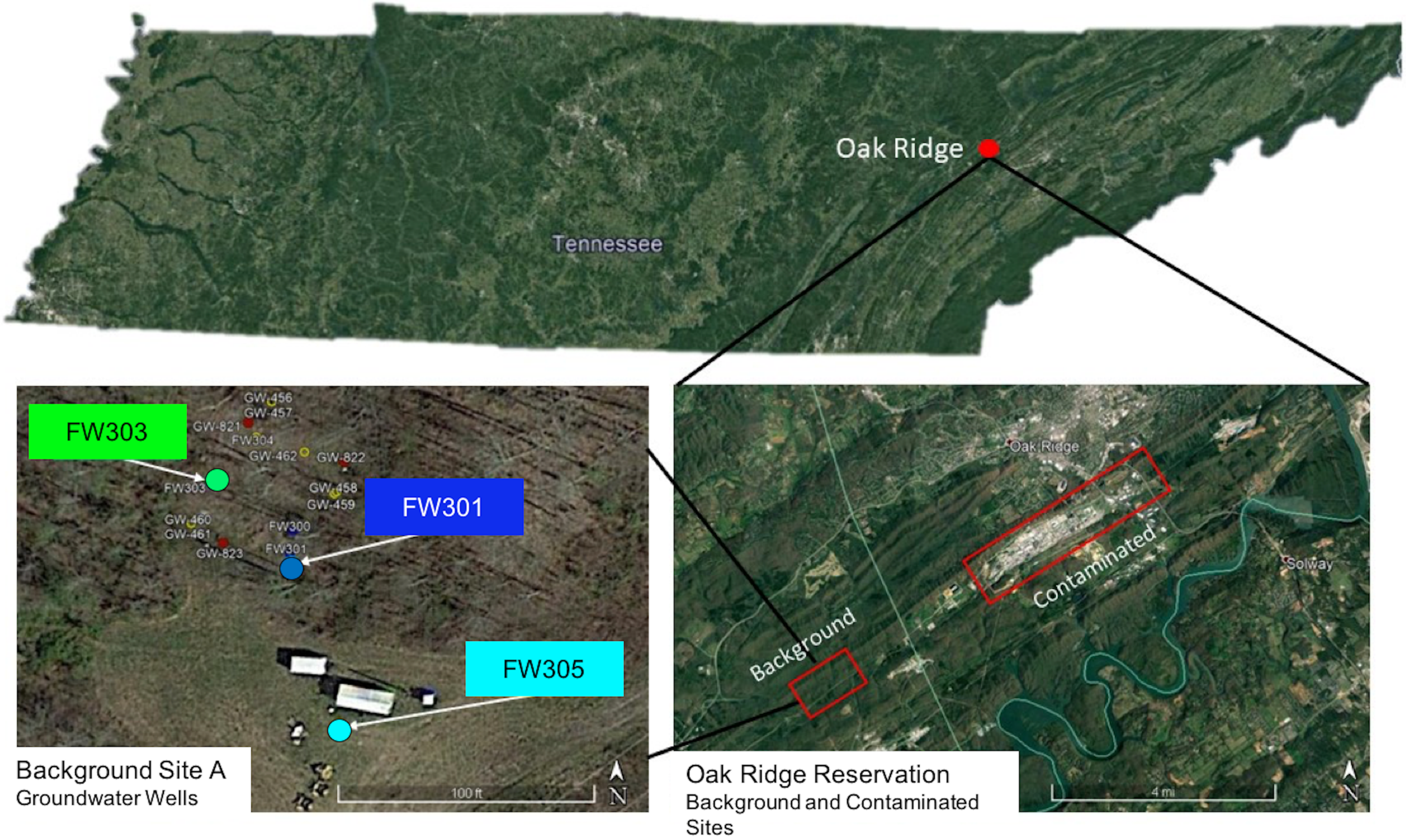

Fig. S1. Geographic location of non-contaminated background site of the EOR-FRC and chosen field wells. All field wells have the same underlying geology, and are located between 10 – 25m apart.

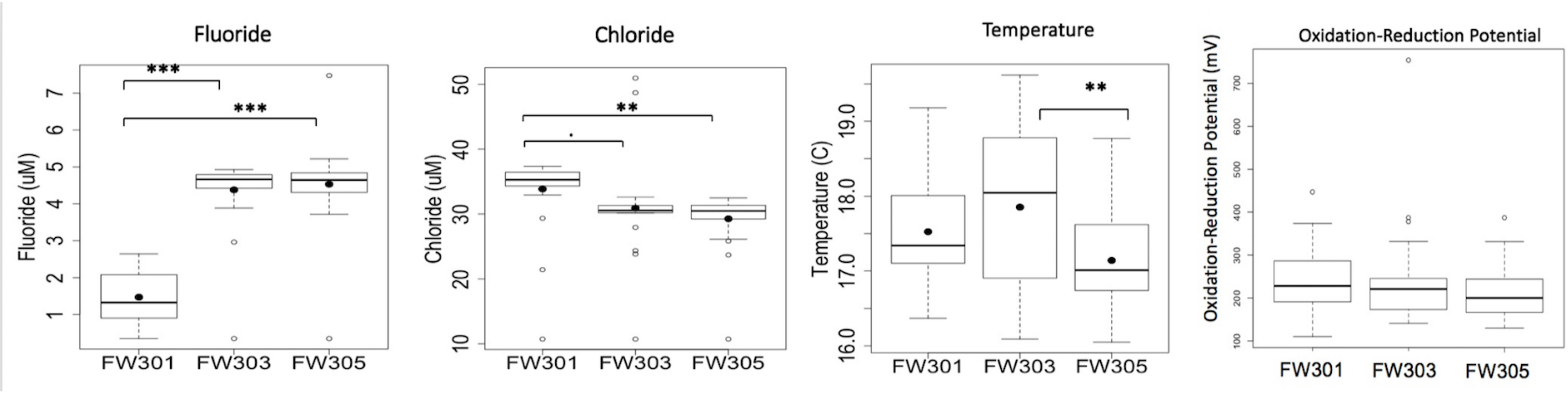

Fig. S2A-D. Tukey-style boxplots of within-well geochemistry for 3 wells with n=28 for each well. Mean and median are denoted by a filled-in dark circle and horizontal line, respectively, within each boxplot. Significance testing was carried out via a one-way ANOVA. Wells differed significantly in Fluoride ($F(2,81) = 106.6$, $p=2e-16$), chloride ($F(2,81)=151.19$, $p=0.01$), and temperature ($F(2,81)= 4.785$, $p=0.0109$), but not for ORP. Post-hoc analysis (pairwise t-tests with holm adjustment) were performed to differentiate differences between groups. FW301 was significantly different from both wells in Fluoride and Chloride levels, while FW303 and FW305 were not significantly different from each other. Temperature in FW305 was significantly different than FW303, but not FW301. Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

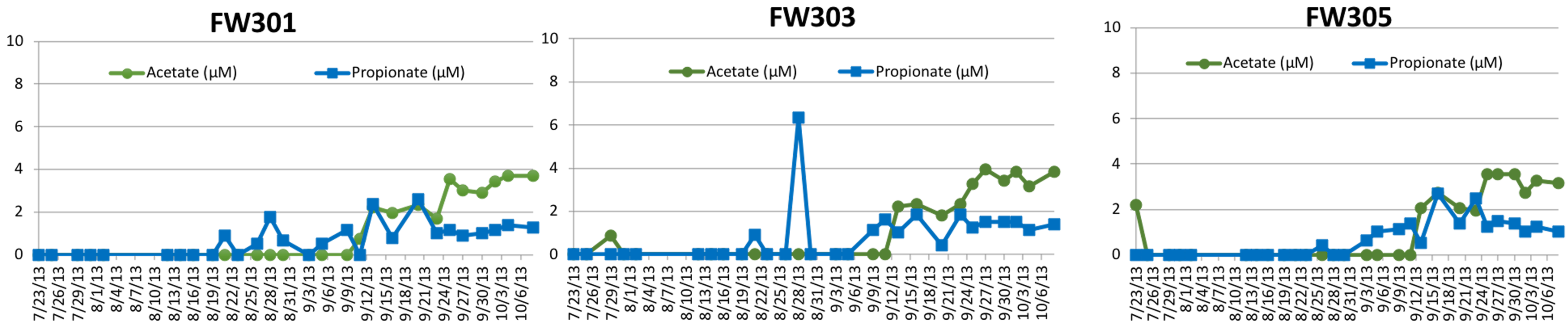

Fig. S2E-G. Scatter plots of measured organic acid concentrations over time in groundwater from each well.

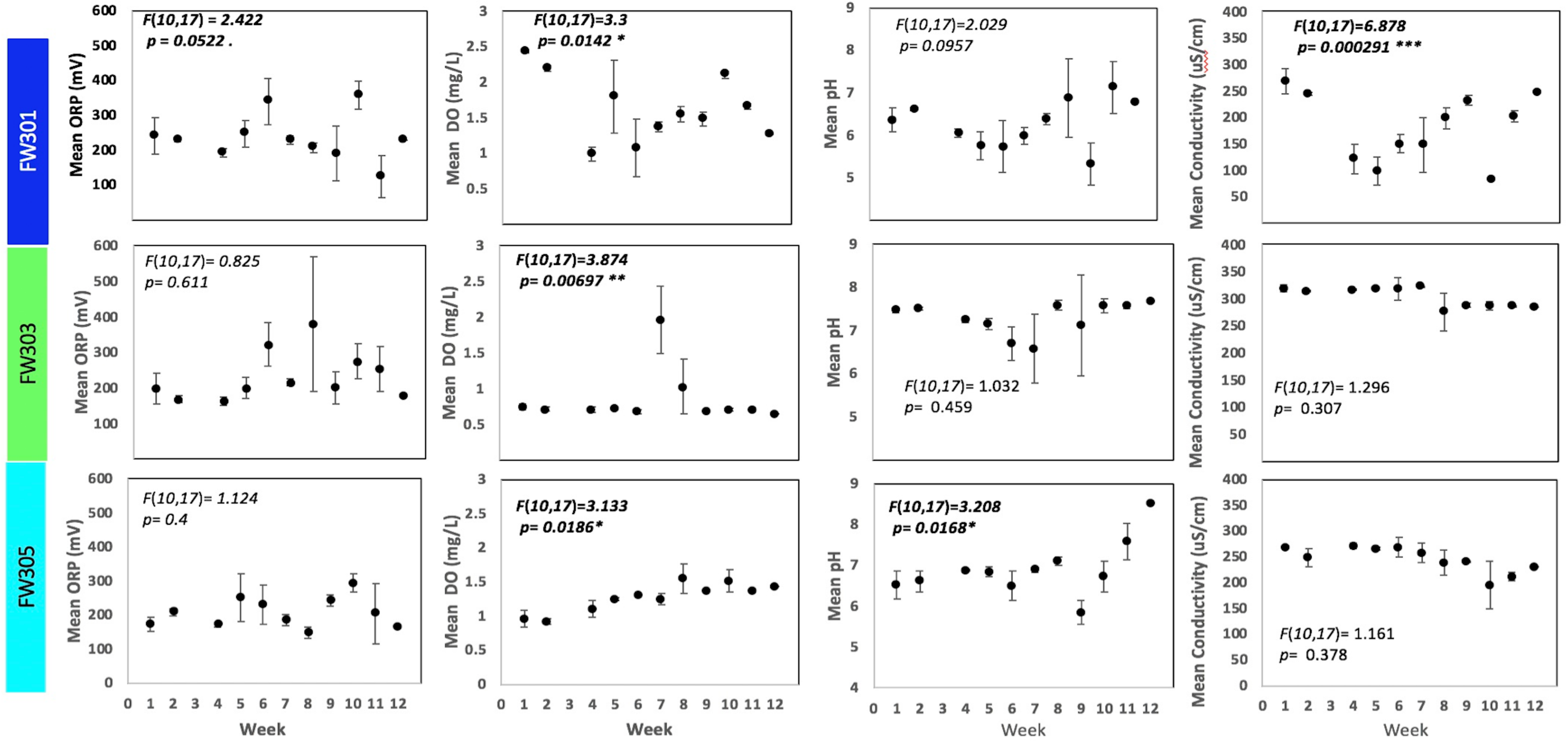

Fig. S3 Plots show weekly means and standard error bars (SEM) of within-well groundwater geochemistry over 11 weeks for Oxidation Reduction Potential, Conductivity, pH, and Dissolved Oxygen. Sample sizes per well are n=2 for weeks 1, 7, and 9, and n=3 for all other weeks except week 12 in which only 1 sampling event occurred (n=1). Week 3 has no plotted data because no samples were collected that week. Test of significance was carried out via a one-way ANOVA in R on all samples taken over 11 weeks for a total of 28 samples per well (N=28). FW301 shows significantly different weekly means for measured ORP ($F(10,17)= 2.422$, $p=0.0522$), DO ($F(10,17)= 3.33$, $p=0.0142$), and Conductivity ($F(10,17)= 6.878$, $p=0.000291$). FW303 and FW305 both varied significantly in measured dissolved oxygen ($F(10,17)= 3.874$, $p=0.00697$; and $F(10,17)= 3.133$, $p=0.0186$, respectively). Additionally, FW305 varied in measured pH ($F(10,17)= 3.208$, $p=0.0168$). Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

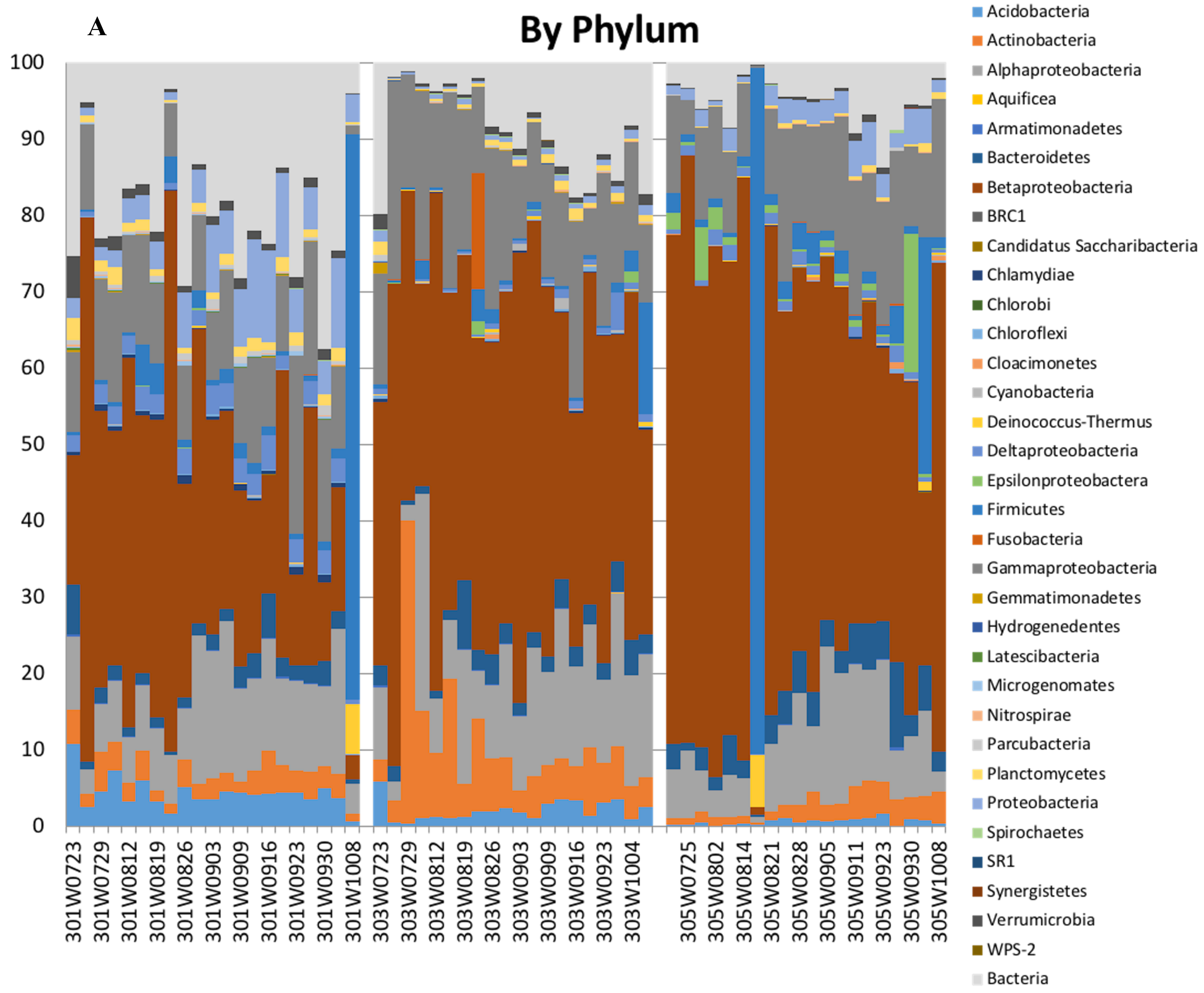

Fig. S4. Relative abundances by A) phylum and B) lowest classifiable taxa. Legend corresponds to Phylum bar chart. Phylum Proteobacteria is further broken down into classes.

B

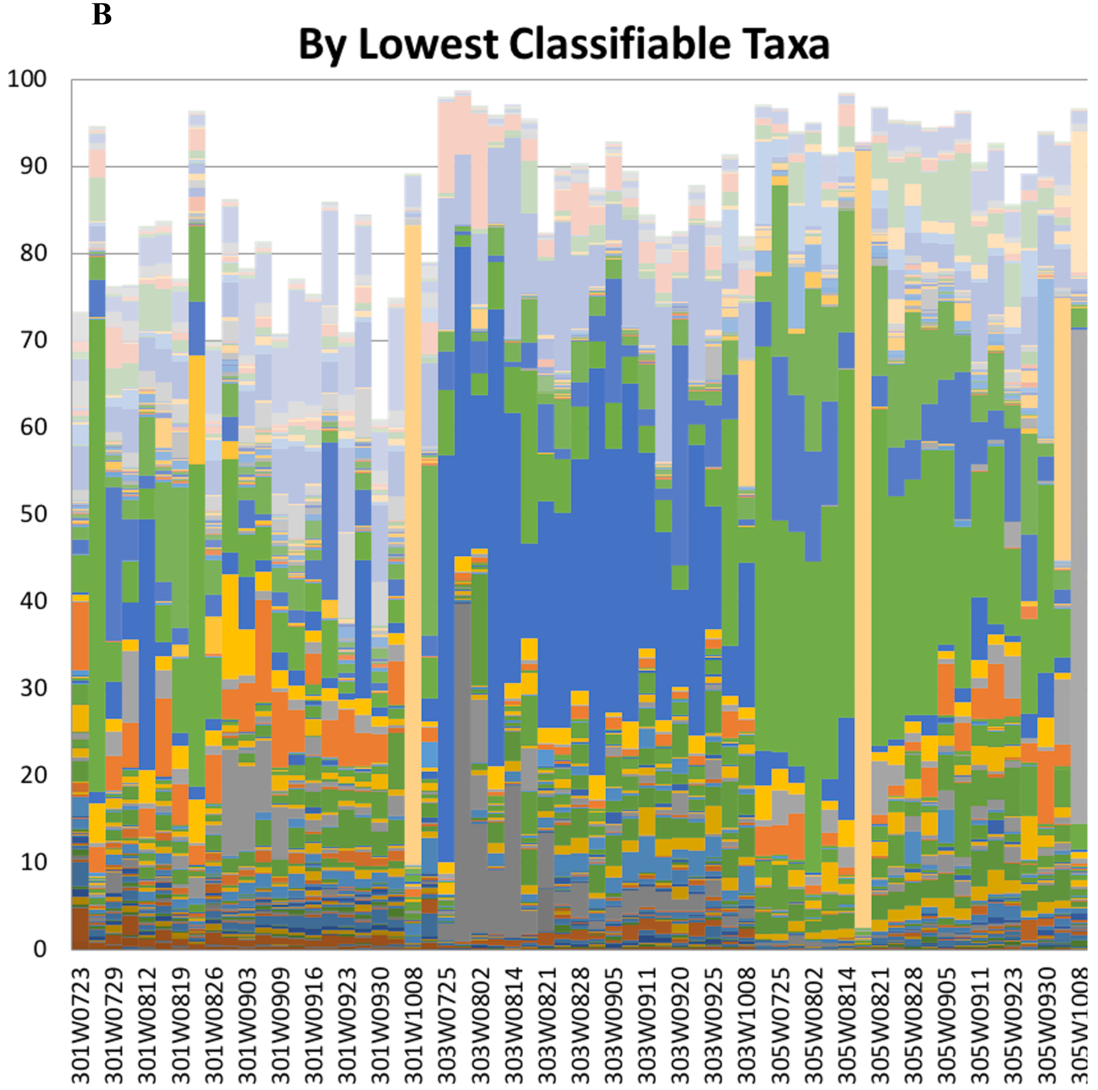

Fig. S4. Relative abundances by A) phylum and B) lowest classifiable taxa. Legend corresponds to Phylum bar chart. Phylum Proteobacteria is further broken down into classes.

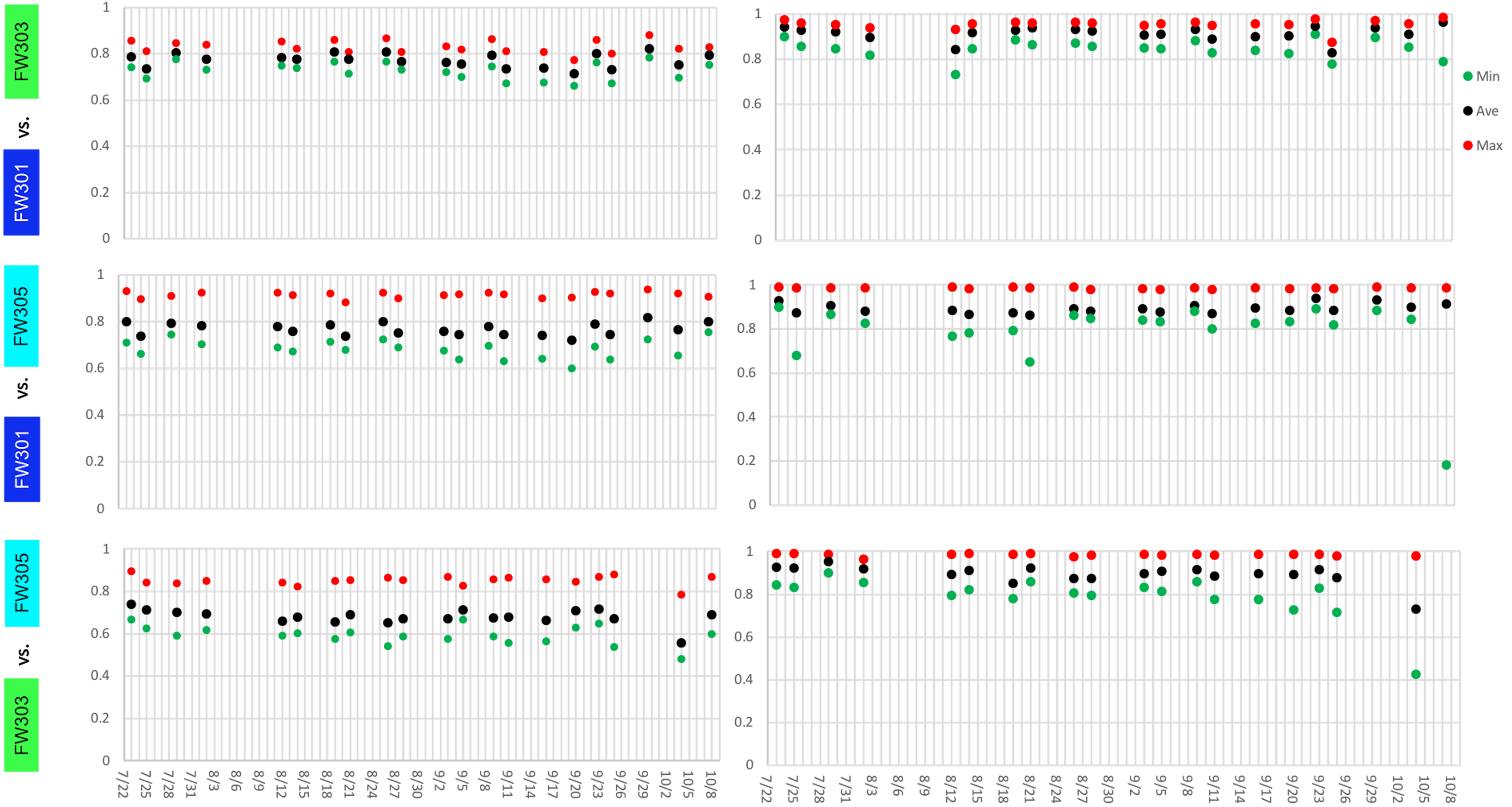

Fig. S5. Minimum, average, and maximum dissimilarities of sampled groundwater OTU diversity across wells. A) Sorensen dissimilarities shows that on average, wells are appx 80% dissimilar to each other based on OTUs present or absent over time. b) Bray-Curtis dissimilarities shows that on average, wells are between 68-96% dissimilar in the OTUs abundances of present OTUs from day to day. Rare OTUs (not present in >50% of all groundwater samples) were removed prior Bray-Curtis analysis.

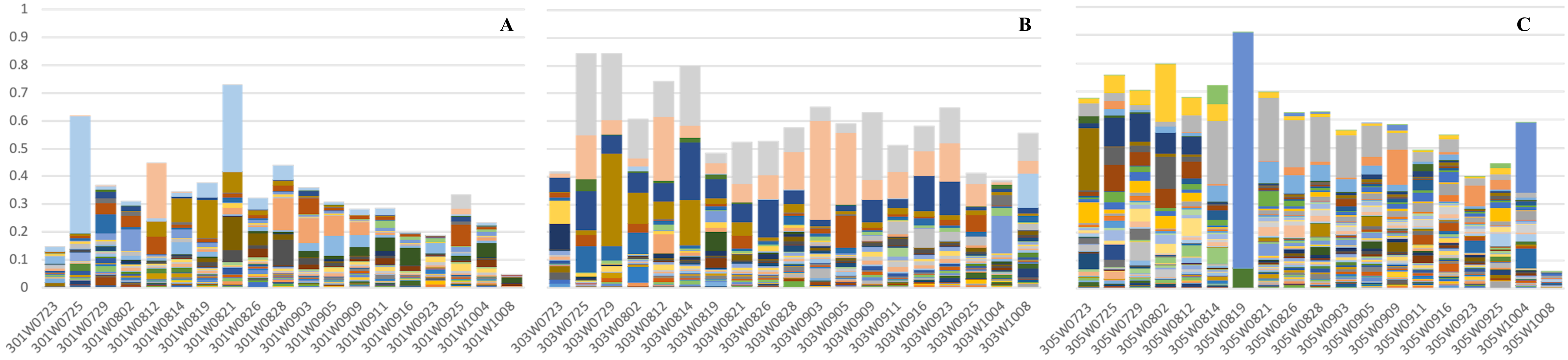

Fig. S6. Relative abundances per sample for the OTUs that contributed ≥ 1% in at least one paired-week bray-curtis dissimilarity based on SIMPER analysis for rarefied datasets. A total of 55 unique pair-wise dissimilarity pairings were possible. A) in FW301, the cumulative abundances of OTUs is typically less than 40% of the total measured abundance for any given date. This indicates that the majority of OTUs contributing to weekly dissimilarities are moderately to rarely abundant on any given day, with periodic blooms of different OTUs contributing largely to weekly dissimilarities. B) Unlike in FW301, the OTUs with the most contributions to weekly dissimilarities are often highly abundant in FW303. This indicates that differences in this well are attributed to changes in consistently abundant, and not rarely transient, populations. C) Similarly to FW303, differences in abundant OTUs contributed to weekly dissimilarities in FW305.

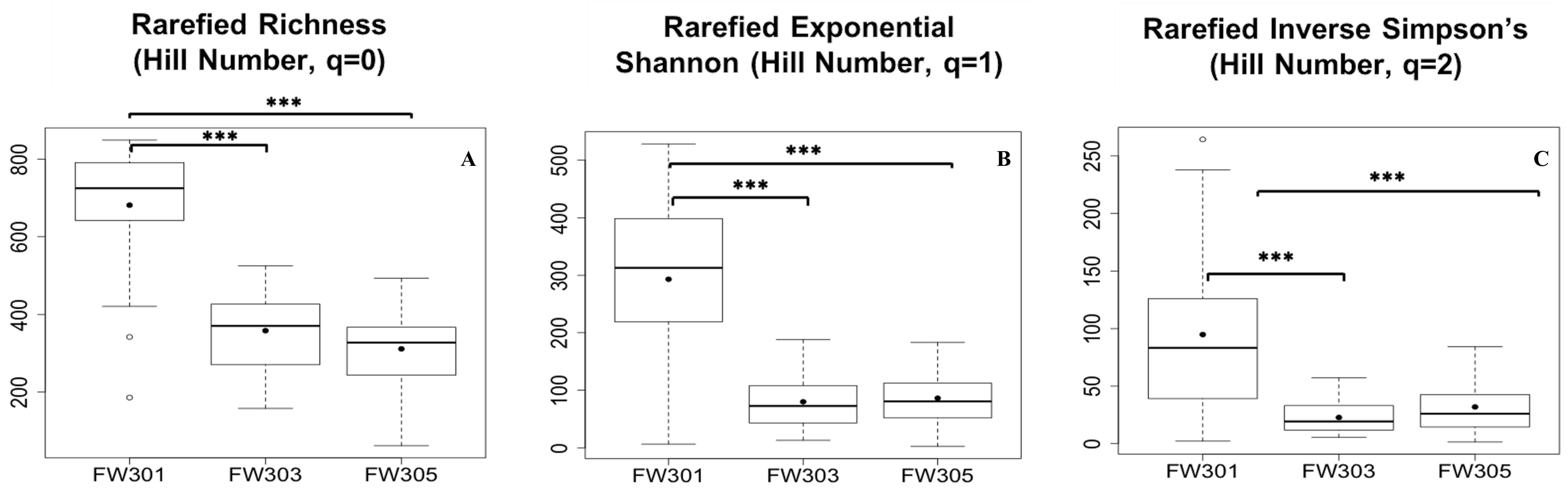

Fig. S7 and S8. Dataset was normalized (rarefied) to the smallest sample size and Effective Species Numbers (Hill Numbers) were calculated. Figure S7a-c compare the average Effective Species Numbers and standard deviations from rarefied dataset for each field well.

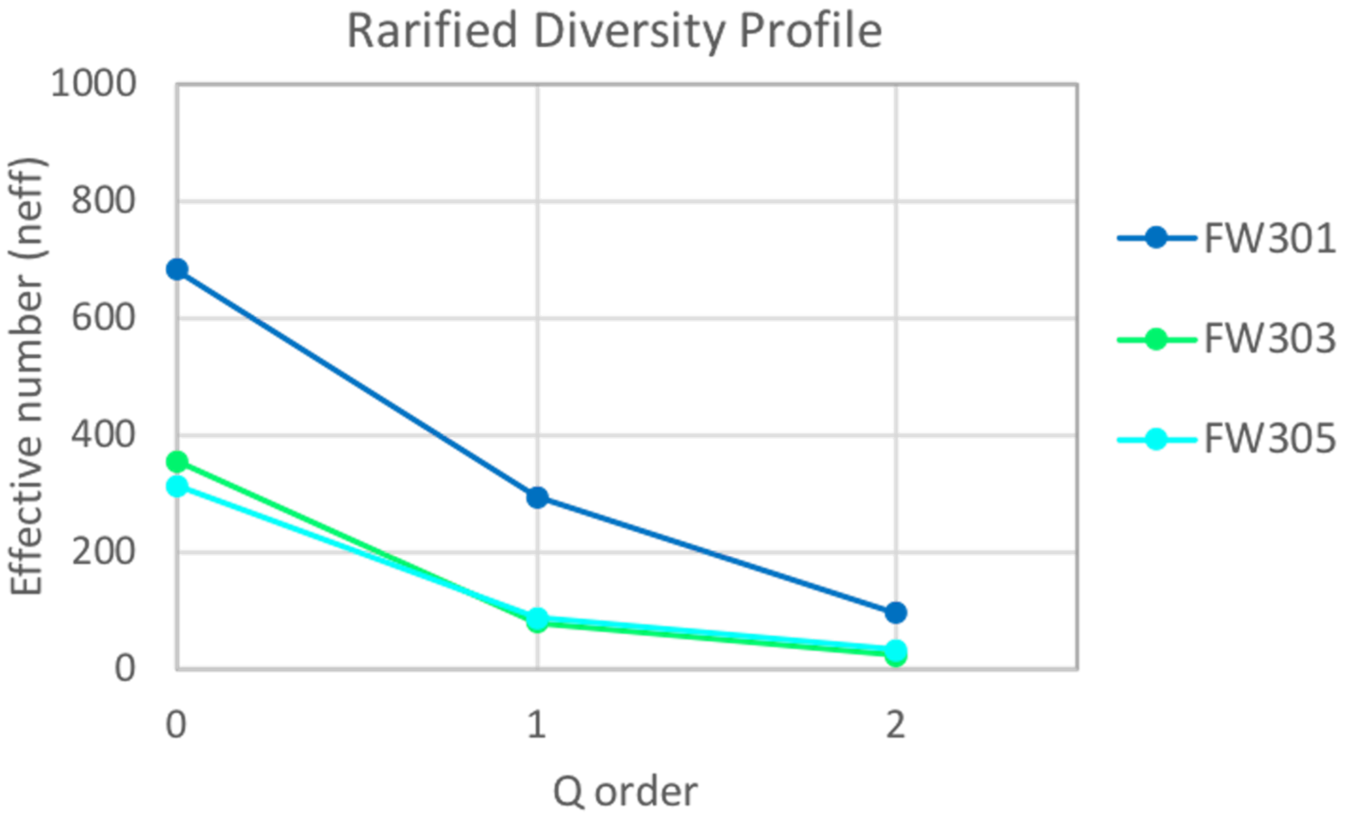

Fig. S8. Figure S8 displays resulting diversity profile rarefied dataset. Rarified data sets produce comparable results to non-rarified in terms of significantly higher richness and diversity in FW301 as compared to the other two wells.

Table S1. OTUs that contributed to ≥30 paired-week contributions in SIMPER analysis for each well.

OTUs within FW301	Paired Week Contributions	Ave % Contribution	SD±
OTU0661_Betaproteobacteria_c	46	2.70	1.44
OTU1136_Proteobacteria_p	43	1.81	0.45
OTU0100_Comamonadaceae_f	42	10.31	8.58
OTU0059_Burkholderiales_in._sed_f	42	3.75	1.47
OTU1028_Proteobacteria_p	40	4.12	1.71
OTU0637_Burkholderiaceae_f	38	2.54	1.80
OTU2520_Rhodospirillaceae_f	37	5.55	3.59
OTU0144_Burkholderiales_o	32	3.53	2.20
OTU0290_Rhodocyclaceae_f	31	6.73	4.25
Total Contributing OTUs (≥1% Ave)		51	

OTUs within FW303	Paired Week Contributions	Ave % Contribution	SD±
OTU0045_Burkholderiales_in_sed_f	55	10.20	3.74
OTU0024_Burkholderiales_in_sed_f	54	10.45	7.87
OTU0719_Gammaproteobacteria_c	51	7.58	2.49
OTU0172_Oxalobacteraceae_f	46	6.21	4.67
OTU0314_Micrococcaceae_f	43	7.92	7.94
OTU0196_Pseudomonadaceae_f	36	3.24	1.83
OTU2023_Bacteria_d	34	4.04	1.82
Total Contributing OTUs (≥1% Ave)	51		

OTUs within FW305	Paired Week Contributions	Ave % Contribution	SD+
OTU0089_Comamonadaceae_f	52	8.54	4.96
OTU0290_Rhodocyclaceae_f	48	3.21	1.67
OTU0172_Oxalobacteraceae_f	41	4.65	3.56
OTU0100_Comamonadaceae_f	41	4.24	3.04
OTU0176_Oxalobacteraceae_f	38	4.15	3.94
OTU0322_Geobacteraceae_f	37	3.00	1.86
OTU0094_Comamonadaceae_f	37	2.79	1.08
OTU0076_Comamonadaceae_f	34	3.93	1.37
OTU0021_Burkholderiales_inc_se_f	33	2.17	0.72
OTU0637_Burkholderiaceae_f	32	1.78	0.55
OTU0560_Caulobacteraceae_f	31	1.61	0.58
Total Contributing OTUs (≥ 1% Ave)		72	

Table S2. Estimated residence time for each well based on hydraulic conductivity K of varying orders of magnitude using previous field data (Watson et al 2004).

Well	Residence Time ($K= 1 \times 10^{-4}$ m/s)	Residence Time ($K=1 \times 10^{-5}$ m/s)	Residence Time ($K= 1 \times 10^{-6}$ m/s)
FW301	3.9 hrs	39hrs (1.6 days)	390hrs (16.25 days)
FW303	3.9 hrs	39hrs (1.6 days)	390hrs (16.25 days)
FW305	7.9 hrs	79hrs (3.2 days)	790hrs (32.9 days)

Table S3. Boxplot statistics of measured groundwater geochemistry per well over 12 weeks.

	Dissolved Oxygen (mg/L)			pH			Conductivity (µS/cm)			Sulfate (µM)			Nitrate (µM)		
	FW301	**FW303**	**FW305**	**FW301**	**FW303**	**FW305**	**FW301**	**FW303**	**FW305**	**FW301**	**FW303**	**FW305**	**FW301**	**FW303**	**FW305**
Min	0.32	0.65	0.83	5.14	6.92	5.54	73.74	275.80	213.80	60.92	34.02	36.63	0.40	2.63	1.99
L. quartile	1.28	0.70	1.13	5.86	7.08	6.38	107.40	284.40	237.00	64.24	50.88	42.82	0.40	3.51	2.38
Median	1.57	0.72	1.30	6.25	7.38	6.86	177.20	315.90	264.30	66.57	61.98	44.60	0.79	3.97	2.66
Mean ±	1.69 ±	0.83 ±	1.27 ±	6.35 ±	7.28 ±	6.84 ±	172.76 ±	303.45 ±	244.75 ±	66.48 ±	57.06 ±	45.48 ±	1.64 ±	3.83 ±	2.82 ±
SD	0.5	0.4	0.3	1.1	0.6	0.6	68.7	26.7	40.2	11.3	14.2	9.7	1.3	1.1	0.91
U. quartile	2.16	0.75	1.39	6.60	7.50	6.96	234.40	321.50	271.75	69.30	63.50	48.57	2.31	4.11	3.05
Max	2.78	0.79	1.47	6.77	7.91	7.27	291.00	356.40	300.90	71.40	74.92	54.79	4.32	4.95	4.04

Table S4. Physical properties of field wells in EOR-FRC used in this study.

Table S4. Physical properties of field wells in EOR-FRC used in this study

Property	FW301	FW303	FW305
EOR-FRC Area	Background	Background	Background
Latitude	35.94106884	35.94113923	35.94091048
Longitude	84.33618124	84.33627935	84.33614125
TOC Stickup (ft)	2.3	2	1.67
TOC Elevation (ft)	843.82	843.23	843.52
Ground Elevation (ft)	841.52	841.23	841.854
Installation Method	Auger	Auger	Auger
Boring Depth (ft)	21.9	20.58	25.6
Boring Refusal	No	Yes	Yes
Casing Type	PVC-40	PVC-40	PVC-40
Casing Diameter OD (in)	2	2	4
Casing Diameter ID (in)	1.7	1.7	NA
Casing Depth Bottom (ft)	21.4	20.41	23.5
Screen Type	PVC/SL/0.1	PVC/SL/0.1	PVC/SL/0.1
Screen Interval (ft)	15.2	5	9.65
Screen Depth Top (ft)	6.7	15.16	13.38
Screen Depth Bottom (ft)	21.9	20.16	23.03
Completion Date	12/7/00	9/19/01	5/29/13