

1 Supplementary Information for

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3 **A Quantitative Framework to Assess Hydrologic Connectivity**

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Table S1: Geochemistry PCA Eigenvectors and % Variance Explained

Ions	PC1	PC2	PC3	PC4	PC5	PC6
Na	-0.48	0.13	-0.01	0.55	-0.30	-0.59
K	-0.46	0.01	0.42	-0.36	0.63	-0.29
Mg	-0.44	-0.30	-0.39	0.41	0.41	0.48
Ca	-0.40	-0.36	-0.44	-0.60	-0.38	-0.11
Cl	-0.44	0.23	0.51	-0.05	-0.42	0.56
SO4	-0.13	0.84	-0.47	-0.18	0.13	0.06
% Variance Explained	0.62	0.18	0.13	0.05	0.02	0.01

Table S2: Root Mean Square Error of Residuals for Logistic and Null Models.

Sites	Geochemistry		Microbial	
	Logistic	Null	Logistic	Null
Main-Braid	0.095	0.215	0.056	0.181
Main-Mid	0.127	0.159	0.052	0.072
Outflow	0.088	0.094	0.075	0.110
Pond-Con-01	0.050	0.123	0.075	0.187
Pond-Con-02	0.054	0.138	0.084	0.215
Pond-Iso	0.035	0.062	0.052	0.056
Side-01	0.085	0.162	0.033	0.227
Side-02	0.092	0.182	0.102	0.248
Side-03	0.087	0.227	0.053	0.229
Side-04	0.067	0.162	0.094	0.201

29 Table S3: Logistic Parameters (\pm standard errors) for Geochemical Metric.

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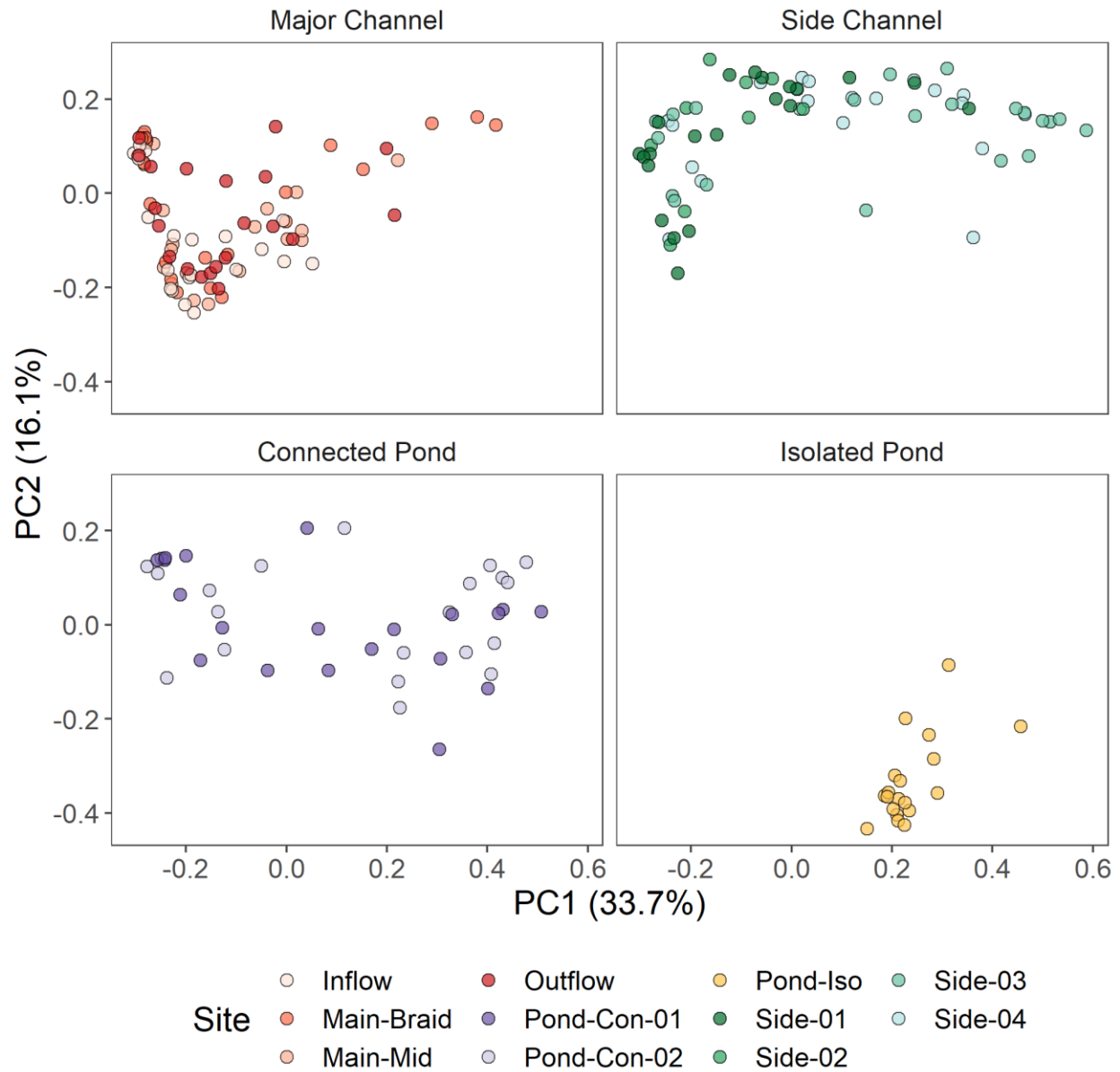
		Geochemistry				
<i>Site</i>	<i>Site Type</i>	<i>c</i>	<i>d</i>	Δ	<i>v</i>	<i>e</i>
Main-Braid	Major Channel	0.27 \pm 0.07	0.78 \pm 0.03	0.5 \pm 0.08	0.11 \pm 0.05	223.86 \pm 5.86
Main-Mid	Major Channel	0.56 \pm 0.06	0.81 \pm 0.04	0.24 \pm 0.07	0.77 \pm 1.04	228.32 \pm 3.09
Outflow	Major Channel	0.6 \pm 0.04	0.7 \pm 0.03	0.1 \pm 0.05	0.22 \pm 0.33	209.73 \pm 14.6
Pond-Con-01	Connected Pond	0.22 \pm 0.19	0.63 \pm 0.03	0.42 \pm 0.19	0.07 \pm 0.05	232.98 \pm 14.41
Pond-Con-02	Connected Pond	0.37 \pm 0.02	0.64 \pm 0.02	0.27 \pm 0.03	0.44 \pm 0.32	178.33 \pm 1.97
Pond-Iso	Isolated Pond	0 \pm 0.05	0.18 \pm 0.01	0.18 \pm 0.05	0.15 \pm 0.07	245.25 \pm 6.89
Side-01	Side Channel	0.34 \pm 0.03	0.65 \pm 0.04	0.31 \pm 0.05	0.19 \pm 0.12	185.53 \pm 5.29
Side-02	Side Channel	0.38 \pm 0.03	0.71 \pm 0.04	0.34 \pm 0.05	0.87 \pm 0.85	176.02 \pm 1.6
Side-03	Side Channel	0.21 \pm 0.04	0.71 \pm 0.06	0.51 \pm 0.07	0.13 \pm 0.1	176.64 \pm 3.74
Side-04	Side Channel	0.19 \pm 0.02	0.53 \pm 0.03	0.34 \pm 0.04	0.31 \pm 0.23	172.99 \pm 2.61

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Table S4: Logistic Parameters (\pm standard errors) for Microbial Metric.

<i>Site</i>	<i>Site Type</i>	Microbial				
		<i>c</i>	<i>d</i>	Δ	<i>v</i>	<i>e</i>
Main-Braid	Major Channel	0.27 \pm 0.07	0.8 \pm 0.02	0.53 \pm 0.08	0.11 \pm 0.04	237.79 \pm 3.99
Main-Mid	Major Channel	0.67 \pm 0.03	0.8 \pm 0.02	0.14 \pm 0.03	0.22 \pm 0.16	231.73 \pm 7.1
Outflow	Major Channel	0.63 \pm 0.05	0.85 \pm 0.03	0.21 \pm 0.06	0.1 \pm 0.07	217.4 \pm 11.02
Pond-Con-01	Connected Pond	0.31 \pm 0.05	0.74 \pm 0.06	0.43 \pm 0.08	0.08 \pm 0.05	192.87 \pm 6.06
Pond-Con-02	Connected Pond	0.3 \pm 0.02	0.72 \pm 0.03	0.42 \pm 0.04	1.27 \pm 1.1	174.36 \pm 2.87
Pond-Iso	Isolated Pond	0.25 \pm 0.04	0.35 \pm 0.01	0.09 \pm 0.04	0.17 \pm 0.15	236.89 \pm 7.94
Side-01	Side Channel	0.37 \pm 0.01	0.86 \pm 0.01	0.49 \pm 0.02	0.21 \pm 0.04	182.78 \pm 1.13
Side-02	Side Channel	0.27 \pm 0.06	0.73 \pm 0.06	0.46 \pm 0.08	0.61 \pm 1.08	180.23 \pm 5.4
Side-03	Side Channel	0.25 \pm 0.02	0.73 \pm 0.02	0.48 \pm 0.03	0.7 \pm 0.49	175.88 \pm 1.19
Side-04	Side Channel	0.29 \pm 0.03	0.68 \pm 0.04	0.39 \pm 0.05	1.01 \pm 0.76	172.19 \pm 2.29



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38 Figure S1: PCOA of Site Microbiomes by Site Type

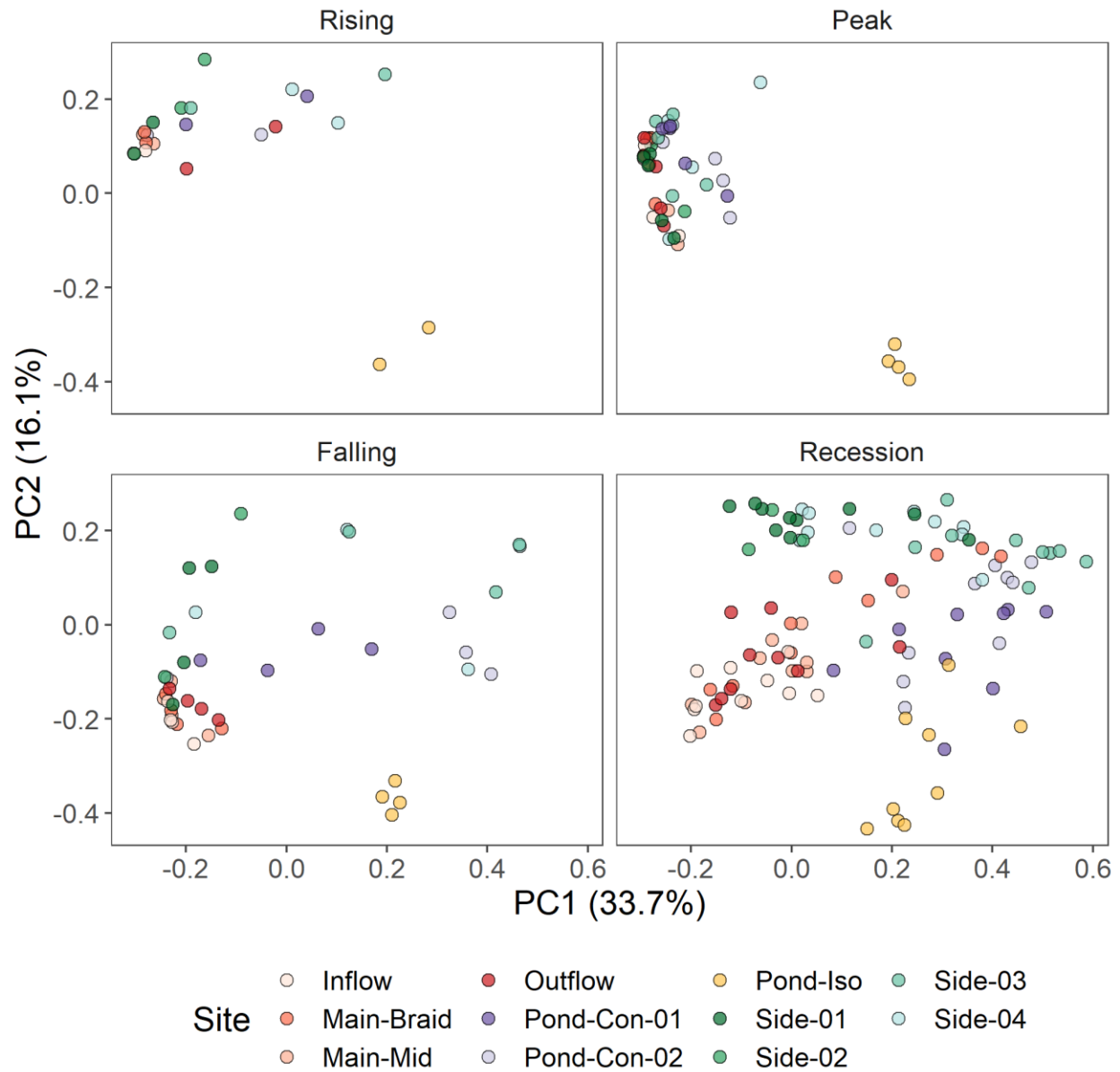


Figure S2: PCOA of Site Microbiomes by Hydro Period

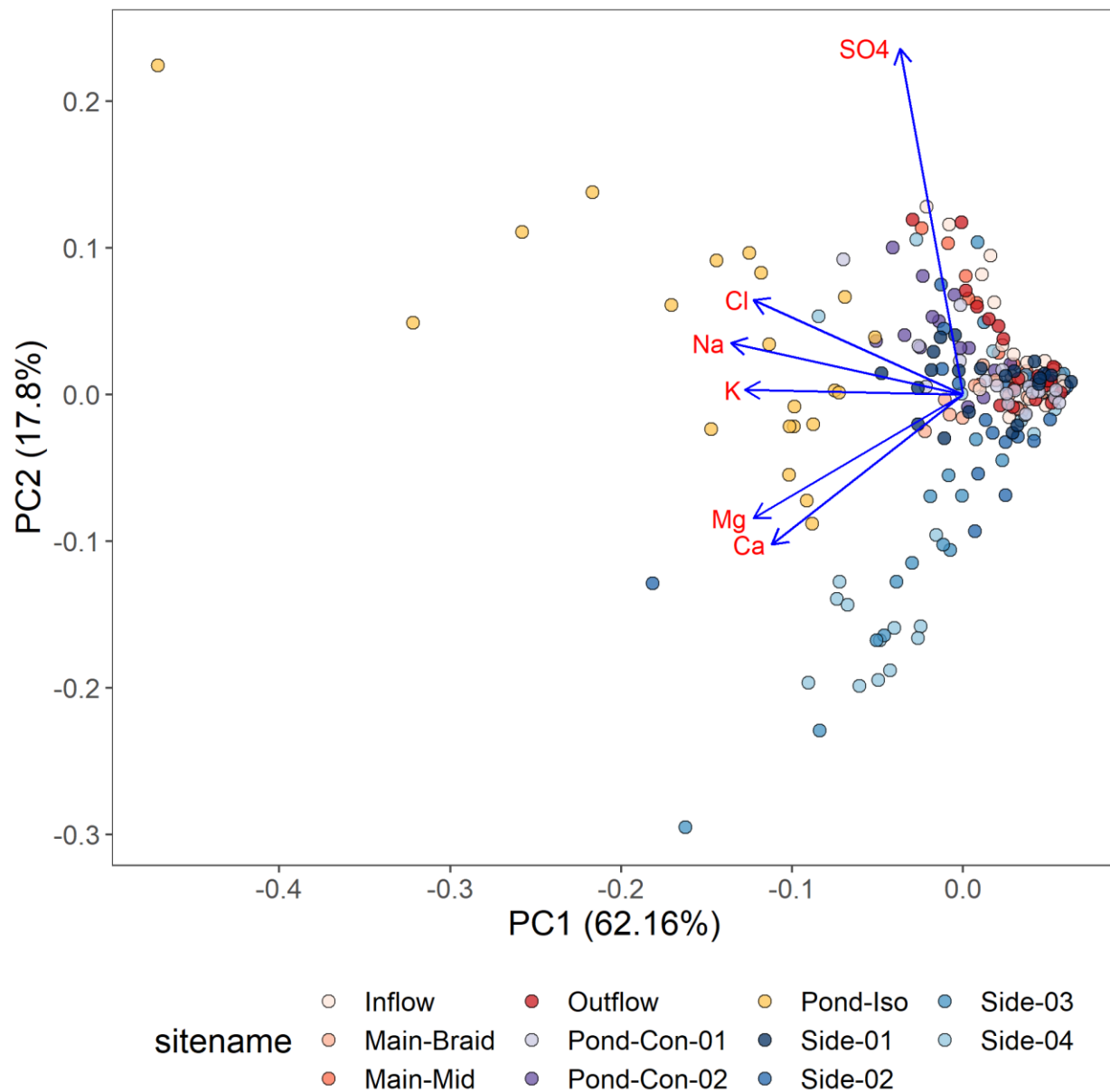


Figure S3: PCA of Geochemical Data with Loadings

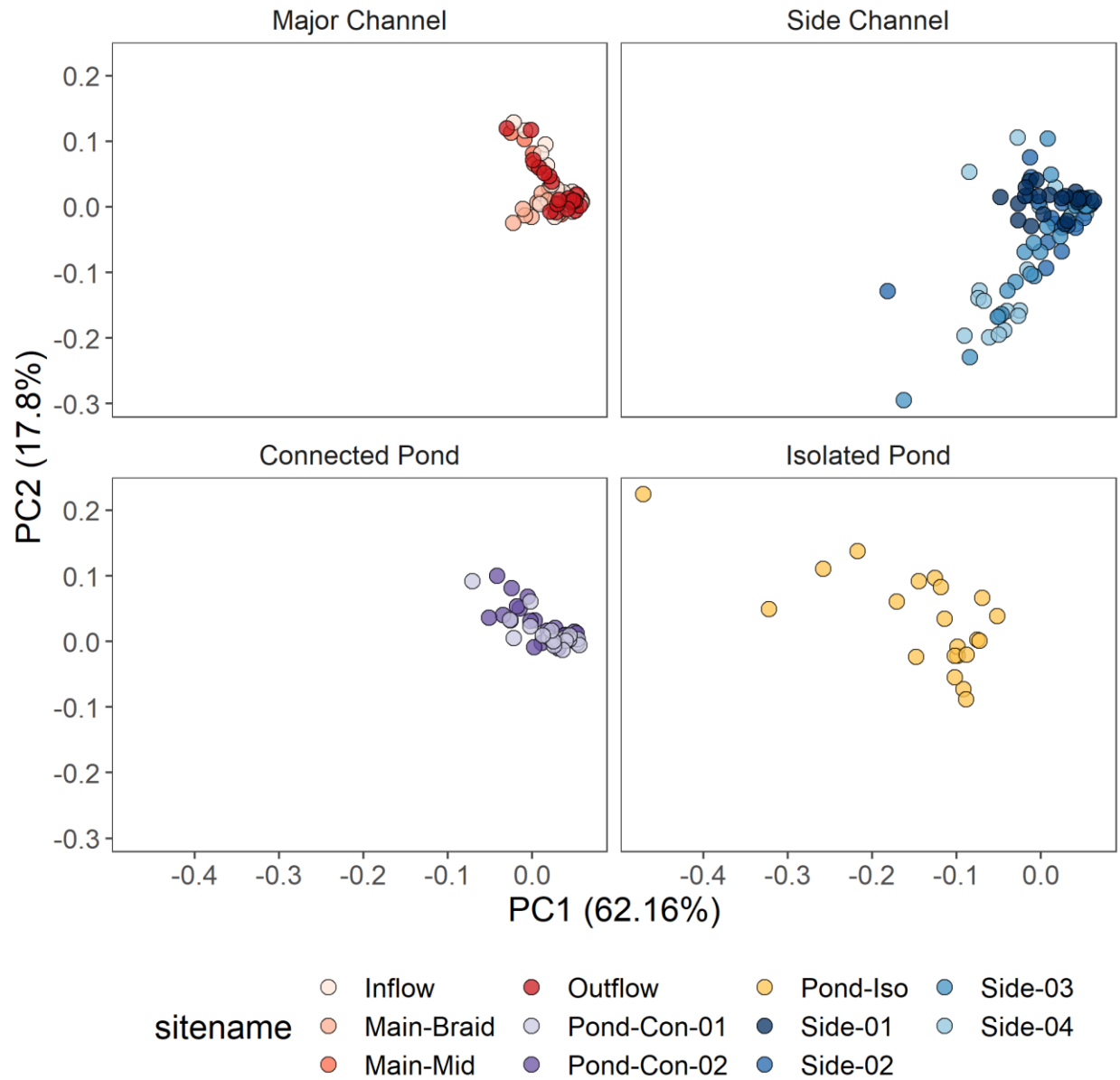


Figure S4: PCA of Geochemical Data by Site Type

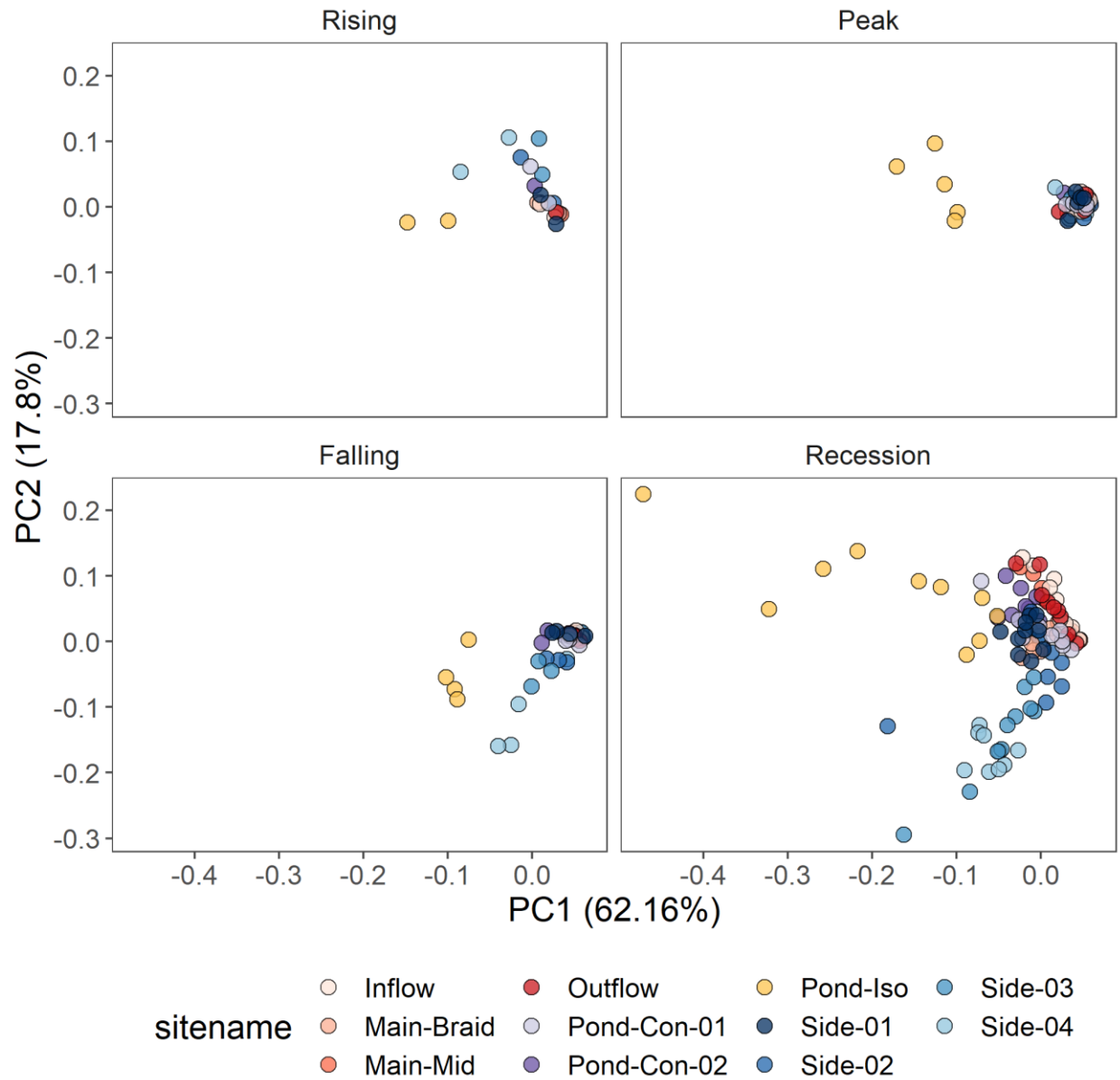


Figure S5: PCA of Geochemical Data by Hydro Period

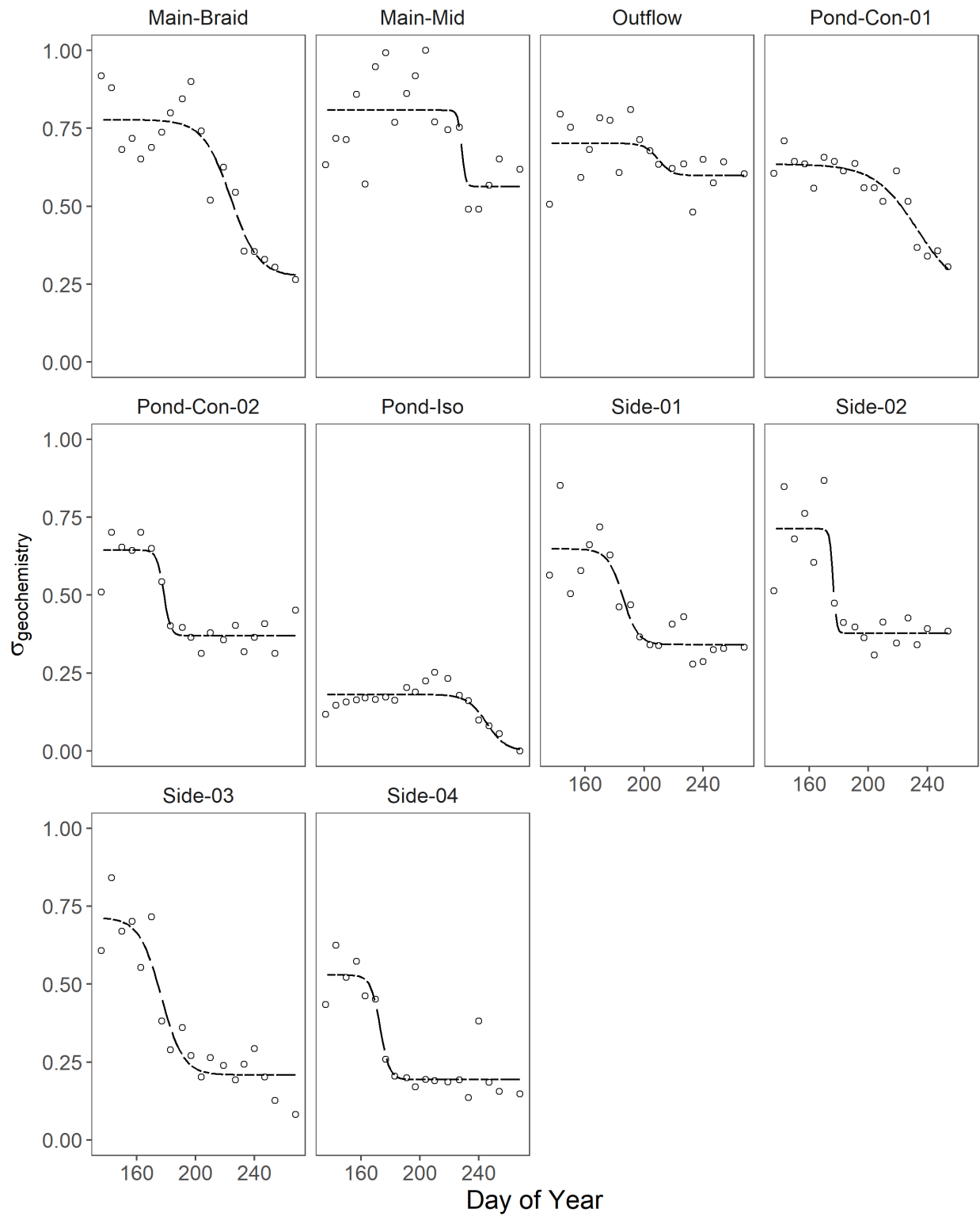


Figure S6: Logistic Curve Fits of Connectivity Strength Derived From Geochemical Metric

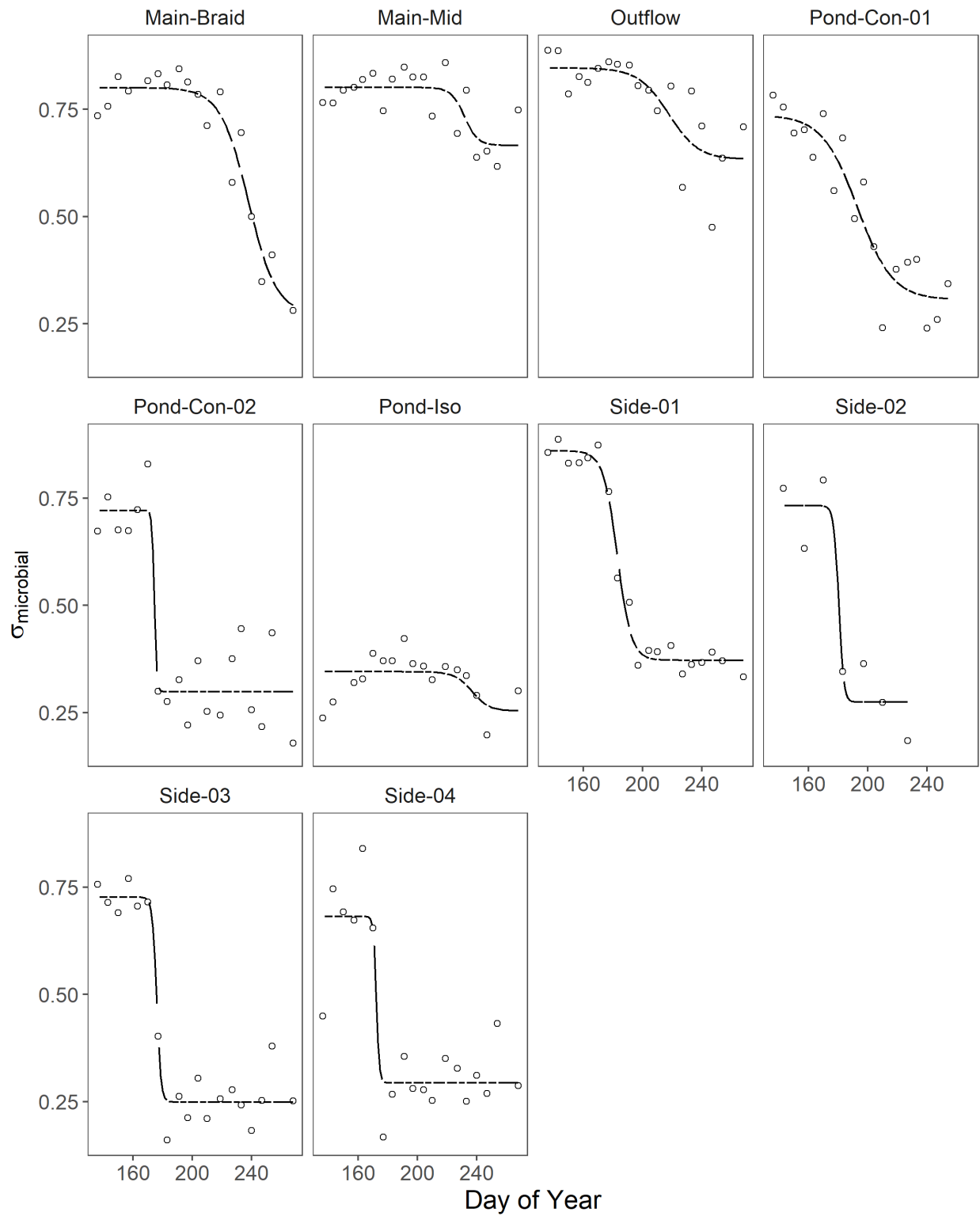


Figure S7: Logistic Curve Fits of Connectivity Strength Derived From Microbial Metric