Appendix S1

Food web interaction strength distributions are conserved by greater variation between than within predator-prey pairs

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Abiotic stream variables

We measured stream width, water temperature, stream discharge, canopy cover, and substrate size at each reach on each sampling date (Fig. S7). We recorded stream widths every 5 m along the length of the reach using a tape measure and then calculated the reach-level mean for analyses. We measured water temperature as the 24 hr. mean value from the time period prior to the survey time from data loggers deployed at each site (TidbiT loggers by HOBO). We measured stream discharge using a handheld water flow meter (OTT MF Pro by OTT Hydromet). Canopy cover was measured every 5 m along the reach using a spherical densitometer and then the mean values was used in analyses. Lastly, after dividing each reach into habitat types of pools or riffles, we estimated the embeddedness of substrate cobble on a relative scale from one (low embeddedness) to five (high embeddedness) in each habitat type.

Mark-recapture surveys to estimate sculpin density

We conducted mark-recapture surveys at each stream (Oak, Soap, Berry) to determine the electrofishing catch efficiency of reticulate sculpin. We calculated habitat-specific (pool or riffle) catch efficiencies by setting up block nets at the ends of each reach and between each habitat unit. On the first day of each mark-recapture survey, we used three-pass electrofishing to capture sculpin with a four-person crew. We used a backpack electroshocker (Smith-Root LR20B), a block net (1.0 x 1.0 m) and two dip nets (0.30 x 0.25 m) to remove sculpin from each habitat unit. Each captured sculpin was anesthetized with Aqui-S and then marked with a clip on the tail fin using sterilized scissors. The sculpin were given time to recover in aerated stream water and then released in the same habitat unit where they were collected. Twenty-four hours after the initial surveys, we re-surveyed each site with single-pass electroshocking. We followed Krebs (1989) to estimate sculpin abundance within each habitat unit based on the number of fish marked on the first visit, the total caught on the second visit, and the number marked on the second visit. We used the 'FSA' package in R (Ogle 2017) to conduct the mark-recapture analyses.

As reported in Preston et al. (2018), the mean sculpin capture efficiencies were 31% for pools and 36% for riffles. The total numbers of sculpin captured per habitat at each site during our feeding rate surveys were therefore adjusted by these catch efficiencies to estimate sculpin density, which was then used in our analysis of drivers of feeding rate variation.

Model diagnostics

Our analysis involves two sets of model comparisons: the first asks what are the relative roles of space versus time in driving feeding rate variation for 25 prey taxa, and the second asks how prey density, prey mass, predator density, and abiotic factors affect prey-specific feeding rates.

The first model comparison involves a generalized linear mixed model (GLMM) that predicts log-tranformed feeding rates as a function of reach identity (three reaches per stream) and season (summer, fall, spring), with random intercept terms for stream (Oak, Soap, or Berry) and for prey taxon identity (n = 25 taxa). To address whether the random intercept terms improved the model fit, we compared AICc scores of the GLMM to a linear model without random effects. Dropping the random effects strongly decreased the model performance (ΔAICc = 421.8), which was consistent with the large differences in feeding rates observed between prey taxa (see Fig. 1 main text). Residuals patterns from the full GLMM are shown in Fig. S1.

For the prey-specific models predicting feeding rates as a function of prey density, predator density, prey body mass, and abiotic factors, we used general linear models without random effects of reach or stream. We compared each linear model to a GLMM including a random intercept for reach nested with stream and found that on average, the general linear models had an AICc score that was 14.5 units lower. For 19 of 20 taxa, the linear models provided a better relative fit. (Only Glossosomatidae caddisflies showed slightly more support for the GLMMs, with an AICc that was 0.8 lower for the model with the random intercept term.) Correlations among predictors are shown in Fig. S2.

References

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Table S1. Sources for length-to-drymass regressions for 25 focal prey taxa (listed in the first three columns). The 'L-M Regression' column indicates the taxa for which the equation was derived. Equations include length in mm (L) and predict drymass in mg.

Order	Family	Life Stage	L-M Regression	L-M Regression Equation	L-M Source
Achatinoidea	Semisulcospiridae	Adult	Species (*Juga plicifera*)	0.0182*L^2.6534	Preston et al. 2018
Annelida		Adult	Family (Lumbriculidae)	exp(-9.19+3.25*log(L))	Miserendino 2001
Coleoptera	Elmidae	Adult	Family (Elmidae)	exp(-2.0076+3.2271*log(L))	Towers et al. 1994
Coleoptera	Elmidae	Larvae	Family (Elmidae)	0.0074*L^2.879	Benke et al. 1999
Copepod		Adult	Order (Amphipoda)	0.0058*L^3.015	Benke et al. 1999
Diptera	Ceratopogonidae	Larvae	Family (Ceratopogonidae)	0.0025*L^2.469	Benke et al. 1999
Diptera	Chironomidae	Larvae	Family (Chironomidae)	0.0018*L^2.617	Benke et al. 1999
Diptera	Dixidae	Larvae	Family (Dixidae)	0.0025*L^2.692	Benke et al. 1999
Diptera	Empididae	Larvae	Family (Empididae)	0.0054*L^2.546	Benke et al. 1999
Diptera	Psychodidae	Larvae	Family (Psychodidae)	0.0025*L^2.692	Benke et al. 1999
Diptera	Simuliidae	Larvae	Family (Simuliidae)	0.002*L^3.011	Benke et al. 1999
Diptera	Tipulidae	Larvae	Family (Tipulidae)	0.0029*L^2.681	Benke et al. 1999
Ephemeroptera	Baetidae	Larvae	Family (Baetidae)	0.0053*L^2.875	Benke et al. 1999
Ephemeroptera	Heptageniidae	Larvae	Family (Heptageniidae)	0.0108*L^2.754	Benke et al. 1999
Ephemeroptera	Leptophlebiidae	Larvae	Family (Leptophlebiidae)	0.0047*L^2.686	Benke et al. 1999
Hydracarina		Adult	Order (Hydracarina)	exp(-2.02+1.66*log(L))	Baumgartner and Rothhaupt 2003
Ostracoda		Adult	Order (Amphipoda)	0.0058*L^3.015	Benke et al. 1999
Plecoptera	Chloroperlidae	Larvae	Family (Chloroperlidae)	0.0065*L^2.724	Benke et al. 1999
Plecoptera	Nemouridae	Larvae	Family (Nemouridae)	0.0056*L^2.762	Benke et al. 1999
Plecoptera	Perlidae	Larvae	Family (Perlidae)	0.0099*L^2.879	Benke et al. 1999
Trichoptera	Glossosomatidae	Larvae	Family (Glossosomatidae)	0.0082*L^2.958	Benke et al. 1999
Trichoptera	Hydropsychidae	Larvae	Family (Hydropsychidae)	0.0046*L^2.926	Benke et al. 1999
Trichoptera	Lepidostomatidae	Larvae	Family (Lepidostomatidae)	0.0079*L^2.649	Benke et al. 1999
Trichoptera	Polycentropodidae	Larvae	Family (Polycentropodidae)	0.0047*L^2.705	Benke et al. 1999
Trichoptera	Rhyacophilidae	Larvae	Family (Rhyacophilidae)	0.0099*L^2.48	Benke et al. 1999

Table S2. Sample sizes and body lengths for seven prey taxa that were fed to reticulate sculpin in laboratory feeding trials and used to estimate prey identification times (table modified from Preston et al. 2018). Lengths are in millimeters. Multiple invertebrate families were included within some orders as follows: mayflies (Ameletidae, Baetidae, Heptageniidae, Leptophlebiidae), caddisflies (Calamoceratidae, Glossosomatidae, Hydropsychidae, Rhyacophilidae), stoneflies (Perlidae, Perlodidae, Nemouridae, Chloroperlidae), and flies (Chironomidae, Simulidae, Athericidae, Ceratopogonidae, Tipulidae).

Prey Identity	Sample Size	Min. Length	Max. Length	Mean Length (SD)
Mayflies (Ephemeroptera)	141	0.5	9.0	5.35 (1.59)
Caddisflies (Trichoptera)	116	2.0	15.0	5.75 (2.46)
Stoneflies (Plecoptera)	106	2.0	22.0	8.2 (3.20)
Flies (Diptera)	148	2.0	26.0	6.06 (4.07)
Worms (Annelida)	74	4.0	52.0	25.4 (8.27)
Beetles (Coleoptera)	51	1.5	4.0	2.87 (0.66)
Snails (Juga plicifera)	86	3.0	15.0	4.7 (1.5)

Table S3. The 25 focal prey taxa, including total counts of individuals recovered from sculpin (‘Count’), the number of replicate feeding rates estimated (‘Feeding Rates’), the prey identification equation that was applied to estimate prey identification times (‘Prey ID Time Source’), and whether each taxon was included in the analysis of drivers of variation (‘Drivers of Variation’).

Order	Family	Life Stage	Count	Feeding Rates	Prey ID Time Source	Drivers of Variation
Achatinoidea	Semisulcospiridae	Adult	198	23	Semisulcospiridae	x
Annelida		Adult	20	13	Annelida	x
Coleoptera	Elmidae	Adult	203	19	Coleoptera	x
Coleoptera	Elmidae	Larvae	119	20	Coleoptera	x
Copepod		Adult	402	20	Ephemeroptera	
Diptera	Ceratopogonidae	Larvae	88	13	Diptera	x
Diptera	Chironomidae	Larvae	4264	27	Diptera	
Diptera	Dixidae	Larvae	70	15	Diptera	
Diptera	Empididae	Larvae	52	17	Diptera	x
Diptera	Psychodidae	Larvae	19	12	Diptera	x
Diptera	Simuliidae	Larvae	203	23	Diptera	x
Diptera	Tipulidae	Larvae	131	23	Diptera	x
Ephemeroptera	Baetidae	Larvae	4343	27	Ephemeroptera	x
Ephemeroptera	Heptageniidae	Larvae	1208	25	Ephemeroptera	x
Ephemeroptera	Leptophlebiidae	Larvae	309	23	Ephemeroptera	x
Hydracarina		Adult	106	24	Ephemeroptera	x
Ostracoda		Adult	81	18	Trichoptera	
Plecoptera	Chloroperlidae	Larvae	185	24	Plecoptera	x
Plecoptera	Nemouridae	Larvae	401	27	Plecoptera	x
Plecoptera	Perlidae	Larvae	117	23	Plecoptera	x
Trichoptera	Glossosomatidae	Larvae	419	24	Trichoptera	x
Trichoptera	Hydropsychidae	Larvae	217	23	Trichoptera	x
Trichoptera	Lepidostomatidae	Larvae	225	19	Trichoptera	x
Trichoptera	Polycentropodidae	Larvae	82	15	Trichoptera	
Trichoptera	Rhyacophilidae	Larvae	102	21	Trichoptera	x

Table S4. Distribution parameters for the sculpin feeding rate distributions in each survey.

Stream	Round	Reach	Mean	S.D.	Skewness	Kurtosis	Sample Size
Berry	Summer	R1	0.077	0.321	5.43	30.98	34
Berry	Summer	R2	0.045	0.174	5.34	30.01	33
Berry	Summer	R3	0.071	0.209	4.41	21.50	26
Berry	Fall	R1	0.030	0.049	2.07	6.50	15
Berry	Fall	R2	0.029	0.079	4.14	20.16	31
Berry	Fall	R3	0.077	0.105	1.35	3.10	12
Berry	Spring	R1	0.059	0.102	2.25	7.80	20
Berry	Spring	R2	0.043	0.080	1.84	4.89	24
Berry	Spring	R3	0.051	0.100	2.11	6.24	20
Oak	Summer	R1	0.044	0.107	4.21	20.88	31
Oak	Summer	R2	0.062	0.236	5.26	29.34	33
Oak	Summer	R3	0.080	0.286	4.94	25.97	29
Oak	Fall	R1	0.045	0.083	2.97	11.09	17
Oak	Fall	R2	0.020	0.039	3.25	13.26	23
Oak	Fall	R3	0.033	0.088	4.45	21.55	25
Oak	Spring	R1	0.020	0.044	3.01	11.87	31
Oak	Spring	R2	0.020	0.045	2.54	7.80	30
Oak	Spring	R3	0.038	0.084	2.71	8.70	33
Soap	Summer	R1	0.049	0.189	4.73	24.10	28
Soap	Summer	R2	0.051	0.173	4.12	18.45	38
Soap	Summer	R3	0.040	0.146	5.19	29.55	37
Soap	Fall	R1	0.020	0.059	3.97	17.73	23
Soap	Fall	R2	0.035	0.088	3.19	11.64	28
Soap	Fall	R3	0.028	0.072	3.89	18.12	30
Soap	Spring	R1	0.033	0.090	3.84	17.25	37
Soap	Spring	R2	0.025	0.073	3.99	18.54	38
Soap	Spring	R3	0.021	0.059	4.12	20.54	43

Table S5. Model comparison results for GLMMs predicting sculpin feeding rates on 25 prey taxa combined. The models include 1) a full model that includes reach identity and season as fixed effects, and stream identity and prey taxon as random intercept terms, 2) the full model without reach identity, 3) the full model without season, and 4) and intercept only null model that includes the random intercept terms but no fixed effects. Marginal R-squared represents variance explained by fixed effects and conditional R-squared represents variance explained by fixed and random effects.

Model	-LogLike	AICc	ΔAICc	Marginal R^2	Conditional R^2
Without reach identity	-805.5	1623.3	0.0	0.04	0.63
Full model	-801.6	1632.1	8.9	0.05	0.68
Intercept only	-831.6	1669.3	46.1	-	0.58
Without season	-827.0	1678.6	55.4	0.02	0.64

Table S6. Regression coefficients from general linear models predicting prey-specific sculpin feeding rates as a function of prey density, prey mass, predator density, and abiotic variables (PC1). Coefficients are shown for the full models with all four predictors.

Prey Taxon	Term	Coefficient	Std. Error	t value	P value
Aranae					
Hydracharina	Intercept	-1.64	2.21	-0.74	0.467
Hydracharina	Log (prey density)	-0.06	0.20	-0.29	0.775
Hydracharina	Log (prey mass)	1.03	0.85	1.21	0.242
Hydracharina	Log (predator density)	-0.23	0.64	-0.36	0.725
Hydracharina	Abiotic PC1	-0.14	0.12	-1.20	0.245
Coleoptera					
Elmidae (larvae)	Intercept	-5.73	1.30	-4.40	0.001
Elmidae (larvae)	Log (prey density)	0.35	0.21	1.67	0.116
Elmidae (larvae)	Log (prey mass)	1.30	0.36	3.61	0.003
Elmidae (larvae)	Log (predator density)	0.53	0.65	0.81	0.433
Elmidae (larvae)	Abiotic PC1	0.14	0.10	1.37	0.191
Elmidae (adult)	Intercept	-8.18	1.71	-4.77	0.000
Elmidae (adult)	Log (prey density)	0.68	0.32	2.14	0.051
Elmidae (adult)	Log (prey mass)	1.24	0.88	1.42	0.178
Elmidae (adult)	Log (predator density)	0.14	1.25	0.11	0.911
Elmidae (adult)	Abiotic PC1	-0.13	0.22	-0.59	0.562
Diptera					
Chironomidae	Intercept	-3.91	1.37	-2.86	0.009
Chironomidae	Log (prey density)	0.48	0.23	2.10	0.048
Chironomidae	Log (prey mass)	0.24	0.36	0.67	0.511
Chironomidae	Log (predator density)	0.17	0.54	0.32	0.754
Chironomidae	Abiotic PC1	0.03	0.10	0.27	0.790
Empididae	Intercept	-4.13	0.86	-4.82	0.001
Empididae	Log (prey density)	-0.26	0.27	-0.97	0.356
Empididae	Log (prey mass)	0.89	0.28	3.21	0.009
Empididae	Log (predator density)	0.33	0.83	0.39	0.701
Empididae	Abiotic PC1	-0.46	0.15	-3.02	0.013
Psychodidae	Intercept	-5.77	3.10	-1.86	0.137
Psychodidae	Log (prey density)	0.35	0.34	1.04	0.358
Psychodidae	Log (prey mass)	0.17	0.64	0.27	0.801
Psychodidae	Log (predator density)	-0.50	1.30	-0.39	0.719
Psychodidae	Abiotic PC1	-0.20	0.24	-0.83	0.451
Simulidae	Intercept	-6.67	0.87	-7.69	0.000
Simulidae	Log (prey density)	0.28	0.16	1.83	0.086
Simulidae	Log (prey mass)	-0.33	0.31	-1.07	0.300

Simulidae	Log (predator density)	0.77	0.61	1.25	0.230
Simulidae	Abiotic PC1	0.01	0.13	0.06	0.954
Tipulidae	Intercept	-6.38	0.99	-6.45	0.000
Tipulidae	Log (prey density)	0.70	0.33	2.14	0.048
Tipulidae	Log (prey mass)	-0.10	0.16	-0.66	0.516
Tipulidae	Log (predator density)	0.08	0.79	0.10	0.923
Tipulidae	Abiotic PC1	-0.24	0.14	-1.74	0.101
Ephemeroptera					
Baetidae	Intercept	-6.36	1.81	-3.50	0.002
Baetidae	Log (prey density)	0.65	0.30	2.18	0.041
Baetidae	Log (prey mass)	-0.71	0.48	-1.48	0.154
Baetidae	Log (predator density)	0.81	0.58	1.40	0.177
Baetidae	Abiotic PC1	-0.07	0.13	-0.57	0.576
Heptageniidae	Intercept	-7.27	1.53	-4.75	0.000
Heptageniidae	Log (prey density)	0.95	0.26	3.65	0.002
Heptageniidae	Log (prey mass)	0.73	0.24	3.00	0.007
Heptageniidae	Log (predator density)	0.51	0.76	0.67	0.509
Heptageniidae	Abiotic PC1	0.30	0.16	1.90	0.072
Leptophlebiidae	Intercept	-6.47	2.10	-3.07	0.007
Leptophlebiidae	Log (prey density)	0.88	0.33	2.69	0.015
Leptophlebiidae	Log (prey mass)	0.17	0.53	0.33	0.748
Leptophlebiidae	Log (predator density)	-0.71	0.92	-0.77	0.448
Leptophlebiidae	Abiotic PC1	0.30	0.22	1.34	0.196
Gastropoda					
Semisulcospiridae	Intercept	-8.51	1.28	-6.65	0.000
Semisulcospiridae	Log (prey density)	0.21	0.23	0.92	0.377
Semisulcospiridae	Log (prey mass)	-0.11	0.11	-1.01	0.334
Semisulcospiridae	Log (predator density)	1.30	1.00	1.30	0.219
Semisulcospiridae	Abiotic PC1	-0.42	0.27	-1.58	0.143
Oligochaeta					
Annelida	Intercept	-3.35	6.03	-0.56	0.594
Annelida	Log(prey density)	0.70	1.03	0.68	0.513
Annelida	Log (prey mass)	0.14	0.48	0.30	0.774
Annelida	Log (predator density)	-2.52	3.78	-0.67	0.523
Annelida	Abiotic PC1	-0.77	0.38	-2.01	0.079
Plecoptera					
Chloroperlidae	Intercept	-7.31	1.56	-4.69	0.000
Chloroperlidae	Log (prey density)	0.86	0.44	1.96	0.066
Chloroperlidae	Log (prey mass)	-0.43	0.66	-0.65	0.525
Chloroperlidae	Log (predator density)	-1.25	1.10	-1.14	0.268

Chloroperlidae	Abiotic PC1	0.08	0.21	0.36	0.720
Nemouridae	Intercept	-2.48	2.60	-0.95	0.351
Nemouridae	Log (prey density)	0.89	0.32	2.81	0.010
Nemouridae	Log (prey mass)	1.16	0.67	1.73	0.098
Nemouridae	Log (predator density)	-1.15	0.78	-1.47	0.156
Nemouridae	Abiotic PC1	0.24	0.17	1.43	0.167
Perlidae	Intercept	-7.46	1.06	-7.02	0.000
Perlidae	Log(prey density)	0.79	0.24	3.30	0.004
Perlidae	Log (prey mass)	-0.05	0.15	-0.33	0.748
Perlidae	Log (predator density)	-0.06	0.52	-0.12	0.906
Perlidae	Abiotic PC1	-0.16	0.10	-1.63	0.121
Trichoptera					
Glossosomatidae	Intercept	-4.76	1.20	-3.97	0.001
Glossosomatidae	Log (prey density)	0.20	0.29	0.68	0.505
Glossosomatidae	Log (prey mass)	0.16	0.27	0.59	0.560
Glossosomatidae	Log (predator density)	-0.17	0.99	-0.18	0.863
Glossosomatidae	Abiotic PC1	-0.33	0.21	-1.62	0.122
Hydropsychidae	Intercept	-6.25	1.44	-4.33	0.001
Hydropsychidae	Log (prey density)	0.33	0.29	1.13	0.276
Hydropsychidae	Log (prey mass)	0.27	0.23	1.17	0.260
Hydropsychidae	Log (predator density)	0.39	1.17	0.33	0.746
Hydropsychidae	Abiotic PC1	-0.71	0.22	-3.22	0.005
Lepidostomatidae	Intercept	-7.48	1.05	-7.12	0.000
Lepidostomatidae	Log (prey density)	0.42	0.26	1.65	0.126
Lepidostomatidae	Log (prey mass)	-0.49	0.38	-1.28	0.225
Lepidostomatidae	Log (predator density)	-0.09	1.11	-0.08	0.938
Lepidostomatidae	Abiotic PC1	-0.55	0.40	-1.36	0.198
Rhyacophilidae	Intercept	-5.03	0.70	-7.18	0.000
Rhyacophilidae	Log (prey density)	0.10	0.14	0.71	0.493
Rhyacophilidae	Log (prey mass)	0.14	0.20	0.70	0.494
Rhyacophilidae	Log (predator density)	-1.27	0.83	-1.52	0.152
Rhyacophilidae	Abiotic PC1	-0.52	0.16	-3.16	0.007

Table S7. Comparisons of general linear models predicting prey-specific sculpin feeding rates. For each prey taxon, the models include 1) a full model with prey density, prey mass, predator density, and abiotic variables, 2) a model with prey density, 3) a model with prey mass, 4) a model with predator density, 5) a model with abiotic factors, and 6) an intercept only null model.

Prey Taxon	Model	-LogLike	AICc	ΔAICc	R2
Aranae					
Hydracharina	Prey Mass	-21.3	49.9	0.0	0.16
Hydracharina	PC1	-21.6	50.4	0.5	0.14
Hydracharina	Intercept Only	-23.4	51.4	1.5	0.00
Hydracharina	Predator Density	-22.8	52.8	3.0	0.05
Hydracharina	Prey Density	-23.4	54.0	4.1	0.00
Hydracharina	Full Model	-20.3	57.6	7.7	0.23
Coleoptera					
Elmidae (larvae)	Prey Mass	-19.2	45.9	0.0	0.34
Elmidae (larvae)	Full Model	-16.5	51.4	5.5	0.50
Elmidae (larvae)	Intercept Only	-23.4	51.5	5.6	0.00
Elmidae (larvae)	Predator Density	-23.0	53.6	7.7	0.03
Elmidae (larvae)	Prey Density	-23.3	54.0	8.1	0.01
Elmidae (larvae)	PC1	-23.4	54.3	8.4	0.00
Elmidae (adult)	Prey Density	-29.6	66.7	0.0	0.23
Elmidae (adult)	Intercept Only	-32.1	68.9	2.2	0.00
Elmidae (adult)	Prey Mass	-30.9	69.4	2.7	0.12
Elmidae (adult)	PC1	-31.1	69.8	3.0	0.10
Elmidae (adult)	Predator Density	-32.1	71.8	5.0	0.00
Elmidae (adult)	Full Model	-27.6	74.1	7.4	0.38
Diptera					
Chironomidae	Prey Density	-22.0	51.1	0.0	0.18
Chironomidae	Intercept Only	-24.6	53.7	2.6	0.00
Chironomidae	PC1	-24.2	55.5	4.5	0.03
Chironomidae	Predator Density	-24.5	56.2	5.1	0.00
Chironomidae	Prey Mass	-24.5	56.2	5.1	0.00
Chironomidae	Full Model	-21.7	59.8	8.8	0.20
Empididae	PC1	-18.4	45.0	0.0	0.39
Empididae	Prey Mass	-20.0	48.1	3.1	0.25
Empididae	Full Model	-12.9	48.3	3.3	0.71
Empididae	Intercept Only	-22.1	49.3	4.3	0.00
Empididae	Predator Density	-21.4	51.0	6.0	0.09
Empididae	Prey Density	-21.8	51.8	6.8	0.04
Psychodidae	Intercept Only	-7.9	21.7	0.0	0.00
Psychodidae	Prey Density	-6.8	24.4	2.7	0.21

Psychodidae	PC1	-7.3	25.5	3.7	0.11
Psychodidae	Prey Mass	-7.7	26.1	4.4	0.04
Psychodidae	Predator Density	-7.9	26.5	4.8	0.00
Psychodidae	Full Model	-6.0	66.0	44.3	0.34
Simulidae	Prey Mass	-21.6	50.7	0.0	0.14
Simulidae	Intercept Only	-23.2	51.0	0.3	0.00
Simulidae	Prey Density	-22.0	51.4	0.7	0.11
Simulidae	Predator Density	-22.1	51.5	0.8	0.10
Simulidae	PC1	-22.4	52.3	1.6	0.07
Simulidae	Full Model	-19.2	56.3	5.7	0.32
Tipulidae	Prey Density	-25.8	59.0	0.0	0.26
Tipulidae	PC1	-25.8	59.0	0.0	0.26
Tipulidae	Intercept Only	-29.0	62.6	3.6	0.00
Tipulidae	Full Model	-22.7	63.4	4.4	0.45
Tipulidae	Prey Mass	-29.0	65.4	6.4	0.00
Tipulidae	Predator Density	-29.0	65.4	6.4	0.00
Ephemeroptera					
Baetidae	Full Model	-23.3	63.1	0.0	0.50
Baetidae	Predator Density	-28.3	63.8	0.7	0.27
Baetidae	Prey Mass	-28.7	64.5	1.4	0.25
Baetidae	PC1	-29.5	66.1	3.0	0.20
Baetidae	Prey Density	-29.8	66.6	3.5	0.18
Baetidae	Intercept Only	-32.4	69.3	6.2	0.00
Heptageniidae	Full Model	-24.5	65.9	0.0	0.81
Heptageniidae	PC1	-33.8	74.8	8.9	0.58
Heptageniidae	Prey Density	-33.8	74.9	8.9	0.58
Heptageniidae	Prey Mass	-37.6	82.3	16.4	0.42
Heptageniidae	Predator Density	-42.8	92.8	26.8	0.11
Heptageniidae	Intercept Only	-44.2	93.0	27.0	0.00
Leptophlebiidae	Prey Density	-33.5	74.2	0.0	0.17
Leptophlebiidae	Intercept Only	-35.7	76.0	1.7	0.00
Leptophlebiidae	Predator Density	-35.2	77.7	3.4	0.04
Leptophlebiidae	Prey Mass	-35.7	78.6	4.3	0.00
Leptophlebiidae	PC1	-35.7	78.6	4.4	0.00
Leptophlebiidae	Full Model	-31.2	79.7	5.4	0.32
Gastropoda					
Semisulcospiridae	Full Model	-16.0	53.3	0.0	0.70
Semisulcospiridae	PC1	-23.7	54.6	1.4	0.62
Semisulcospiridae	Prey Mass	-23.8	55.7	2.4	0.20
Semisulcospiridae	Prey Density	-29.9	67.1	13.8	0.35

Semisulcospiridae	Intercept Only	-34.8	74.3	21.0	0.00
Semisulcospiridae	Predator Density	-33.9	75.0	21.7	0.08
Oligochaeta					
Annelida	PC1	-22.7	54.0	0.0	0.38
Annelida	Prey Density	-23.3	55.2	1.2	0.32
Annelida	Intercept Only	-25.8	56.8	2.7	0.00
Annelida	Prey Mass	-25.7	60.0	6.0	0.01
Annelida	Predator Density	-25.8	60.2	6.2	0.00
Annelida	Full Model	-19.3	64.6	10.6	0.63
Plecoptera					
Chloroperlidae	Intercept Only	-27.6	59.8	0.0	0.00
Chloroperlidae	Prey Density	-26.6	60.4	0.6	0.08
Chloroperlidae	Prey Mass	-27.4	62.2	2.4	0.01
Chloroperlidae	Predator Density	-27.5	62.2	2.5	0.01
Chloroperlidae	PC1	-27.5	62.3	2.5	0.01
Chloroperlidae	Full Model	-24.7	66.6	6.8	0.22
Nemouridae	Prey Density	-34.3	75.6	0.0	0.14
Nemouridae	Intercept Only	-36.2	77.0	1.3	0.00
Nemouridae	Predator Density	-35.5	78.1	2.4	0.06
Nemouridae	Full Model	-31.1	78.6	2.9	0.33
Nemouridae	PC1	-36.2	79.5	3.9	0.00
Nemouridae	Prey Mass	-36.2	79.6	3.9	0.00
Perlidae	Prey Density	-19.4	46.1	0.0	0.54
Perlidae	Full Model	-17.7	52.7	6.6	0.60
Perlidae	PC1	-25.5	58.3	12.2	0.21
Perlidae	Prey Mass	-26.7	60.6	14.6	0.13
Perlidae	Intercept Only	-28.3	61.1	15.1	0.00
Perlidae	Predator Density	-28.2	63.8	17.7	0.00
Trichoptera					
Glossosomatidae	PC1	-36.2	79.7	0.0	0.17
Glossosomatidae	Prey Density	-37.0	81.1	1.5	0.11
Glossosomatidae	Intercept Only	-38.4	81.4	1.8	0.00
Glossosomatidae	Predator Density	-38.3	83.9	4.2	0.01
Glossosomatidae	Prey Mass	-38.4	84.0	4.3	0.00
Glossosomatidae	Full Model	-35.4	87.7	8.0	0.22
Hydropsychidae	PC1	-25.4	58.2	0.0	0.62
Hydropsychidae	Full Model	-24.2	66.3	8.1	0.66
Hydropsychidae	Prey Density	-29.9	67.2	9.0	0.42
Hydropsychidae	Prey Mass	-32.1	71.7	13.5	0.28
Hydropsychidae	Intercept Only	-35.6	75.9	17.6	0.00

Hydropsychidae	Predator Density	-34.9	77.1	18.9	0.07
Lepidostomatidae	Prey Density	-23.1	54.0	0.0	0.49
Lepidostomatidae	PC1	-25.9	59.7	5.7	0.28
Lepidostomatidae	Intercept Only	-28.7	62.3	8.4	0.00
Lepidostomatidae	Predator Density	-27.5	62.8	8.8	0.14
Lepidostomatidae	Full Model	-21.6	63.7	9.7	0.57
Lepidostomatidae	Prey Mass	-28.7	65.2	11.2	0.01
Rhyacophilidae	PC1	-19.8	47.3	0.0	0.44
Rhyacophilidae	Intercept Only	-25.0	54.9	7.5	0.00
Rhyacophilidae	Full Model	-18.2	56.0	8.6	0.53
Rhyacophilidae	Prey Mass	-24.2	56.2	8.8	0.08
Rhyacophilidae	Prey Density	-24.3	56.2	8.9	0.08
Rhyacophilidae	Predator Density	-25.0	57.7	10.4	0.00

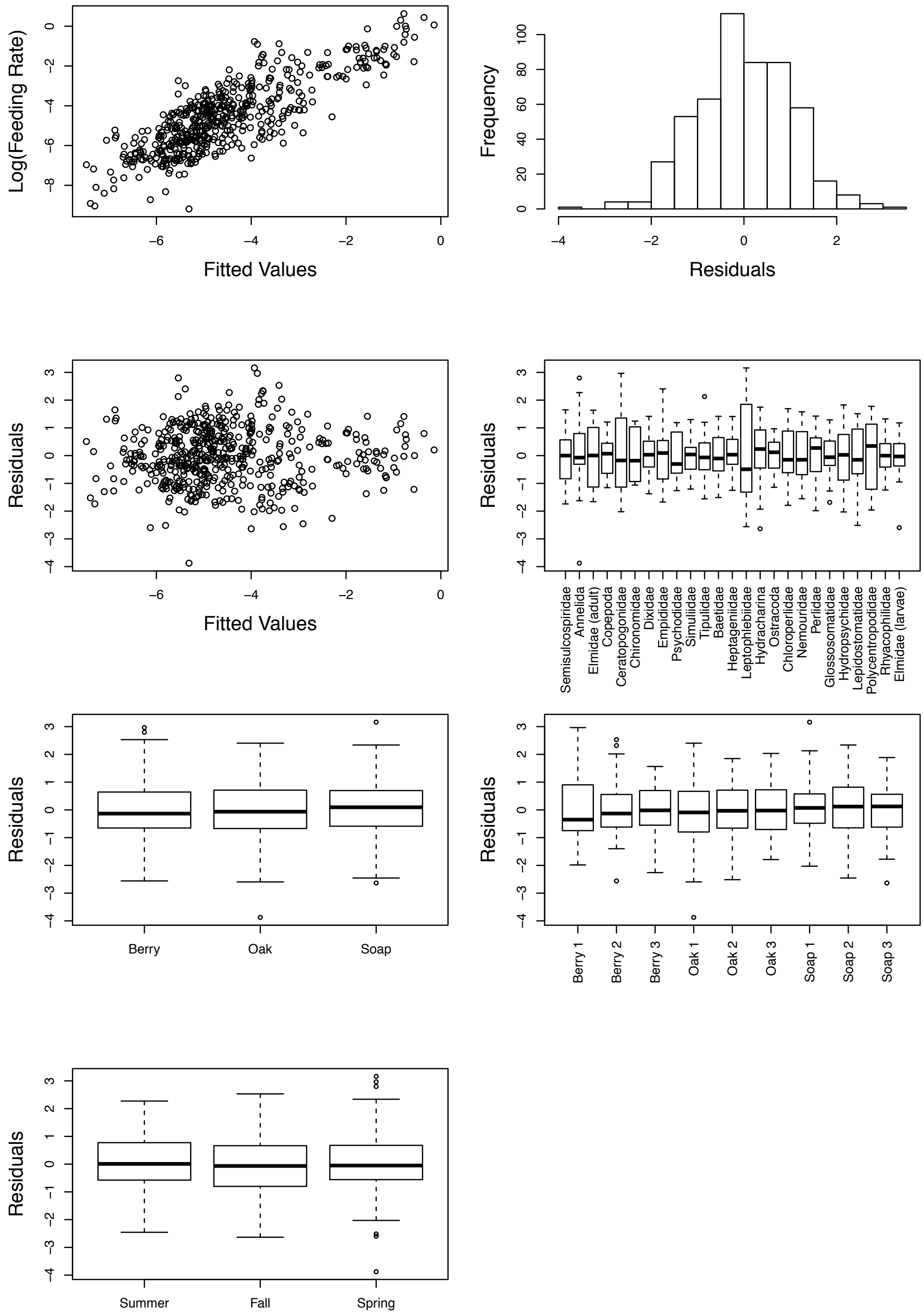

Figure S1. Residual patterns for the GLMM predicting sculpin feeding rates that includes fixed effects of reach identity and season, and random intercept terms for prey taxon and stream (the ‘full model). The plots include: fitted values versus the response variable; a histogram of the residuals; residuals versus fitted values; and residuals for each prey taxon, each stream, each reach, and each season.

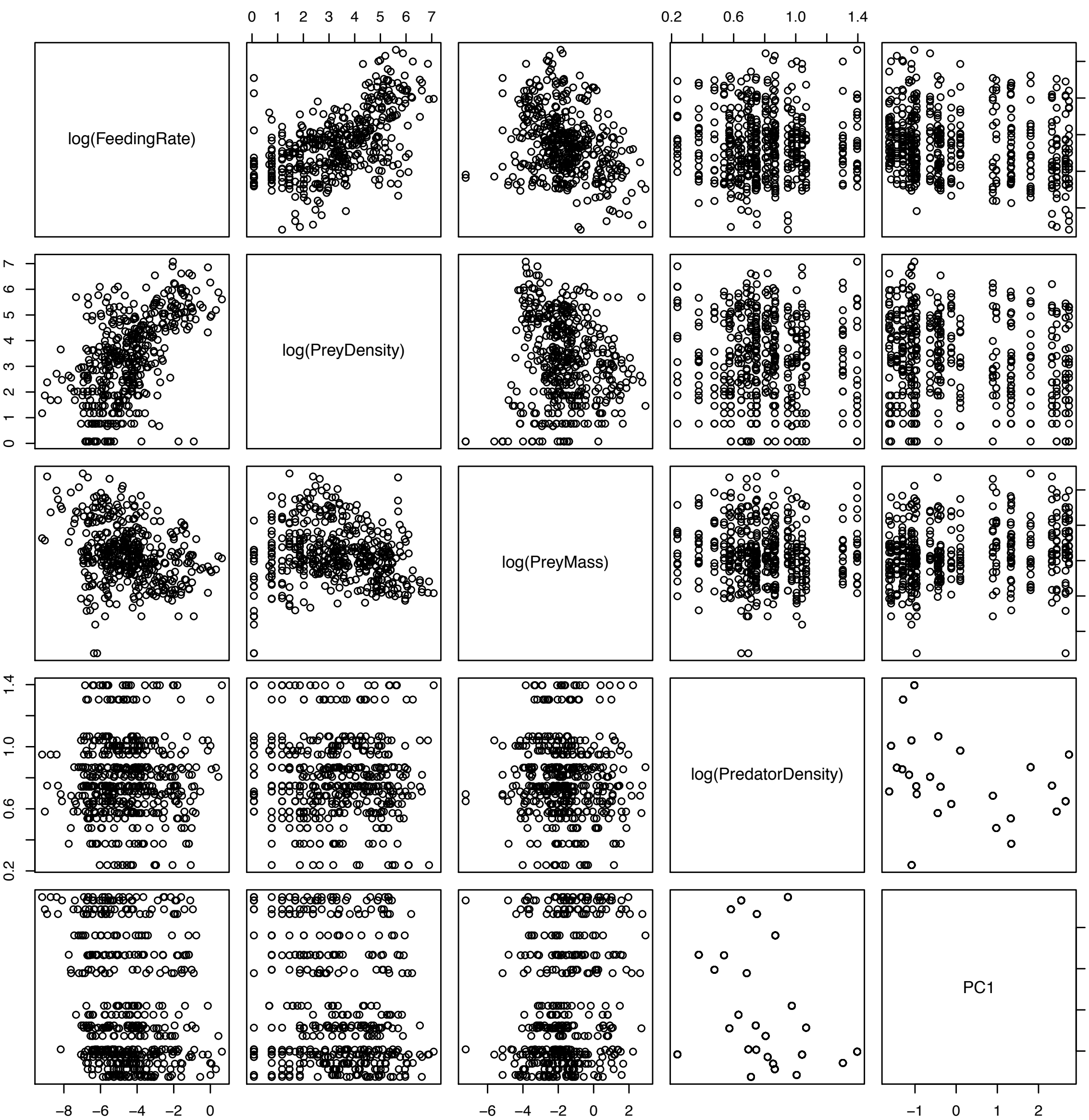

Figure S2. Correlations among predictor variables for the general linear models predicting prey-specific sculpin feeding rates as a function prey density, prey mass, predator density, and abiotic variables (PC1).

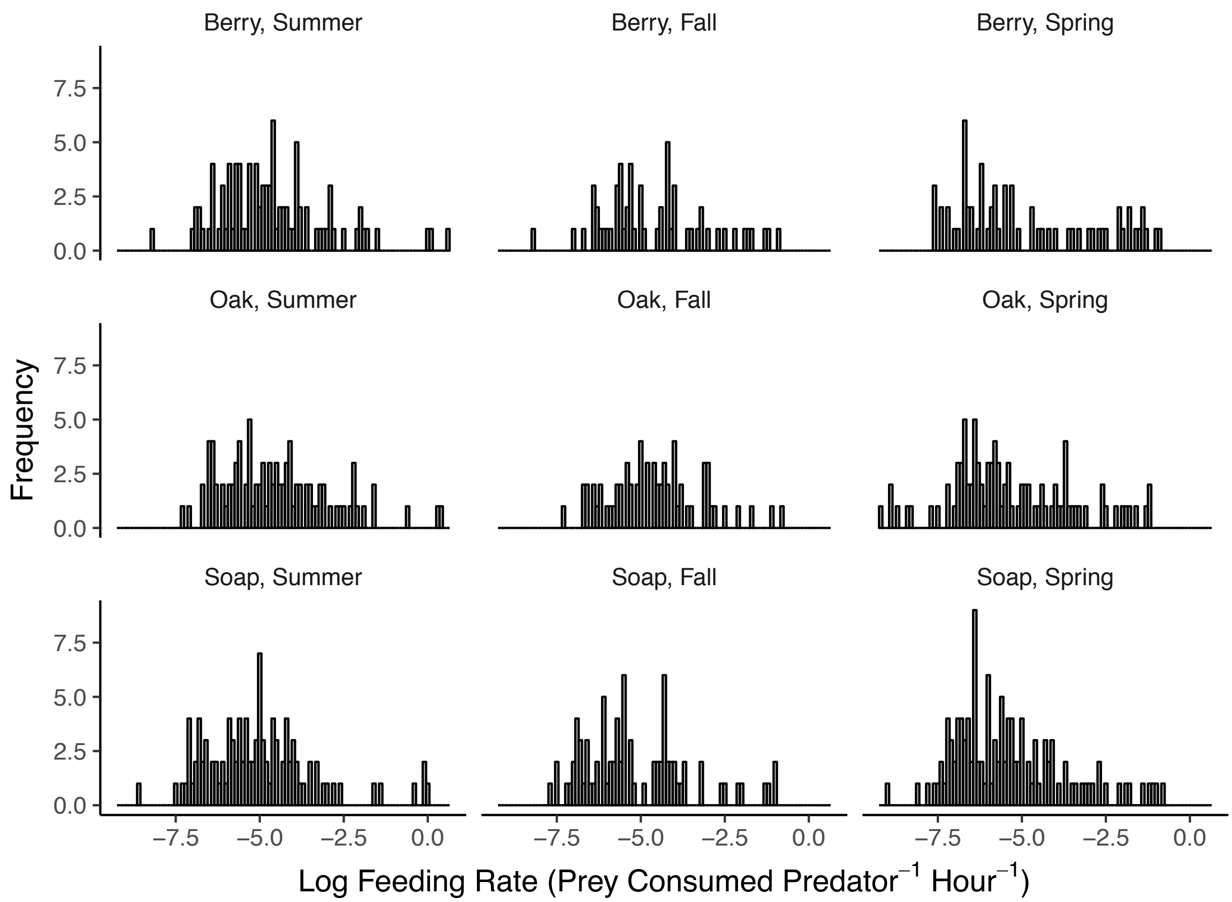

Figure S3. Frequency distributions of sculpin feeding rates at each stream (three reaches combined) in each season.

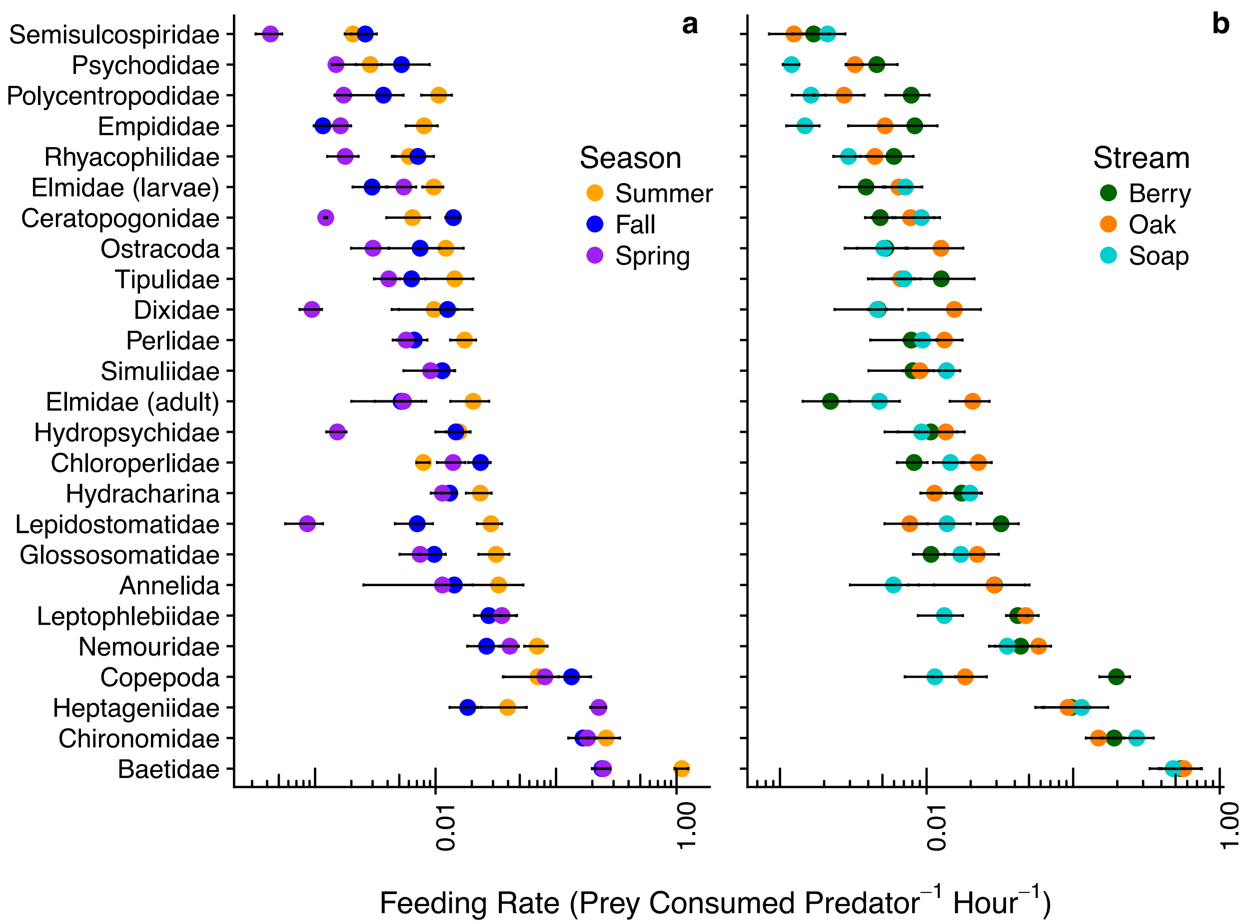

Figure S4. Mean prey-specific feeding rates for the three seasons (a) and three streams (b). Feeding rates are ordered by their means across all surveys. This figure corresponds to the Spearman rank correlations presented in the main text for seasonal and stream-level differences in the rank order of feeding rates.

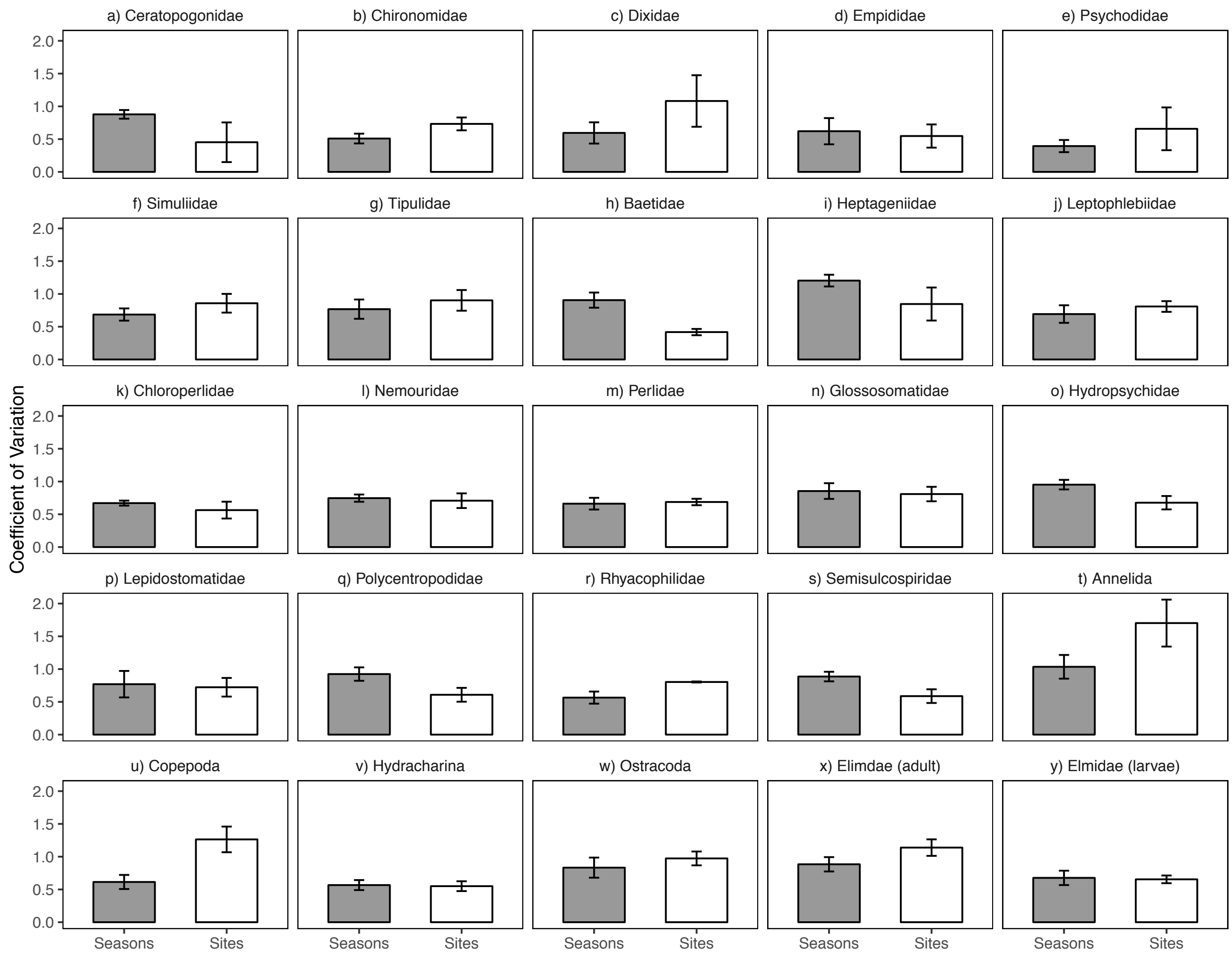

Figure S5. Coefficient of variation for prey-specific sculpin feeding rates across seasons (n = 3 seasons) and across stream reaches (n = 9 sites). Bars show means with standard errors.

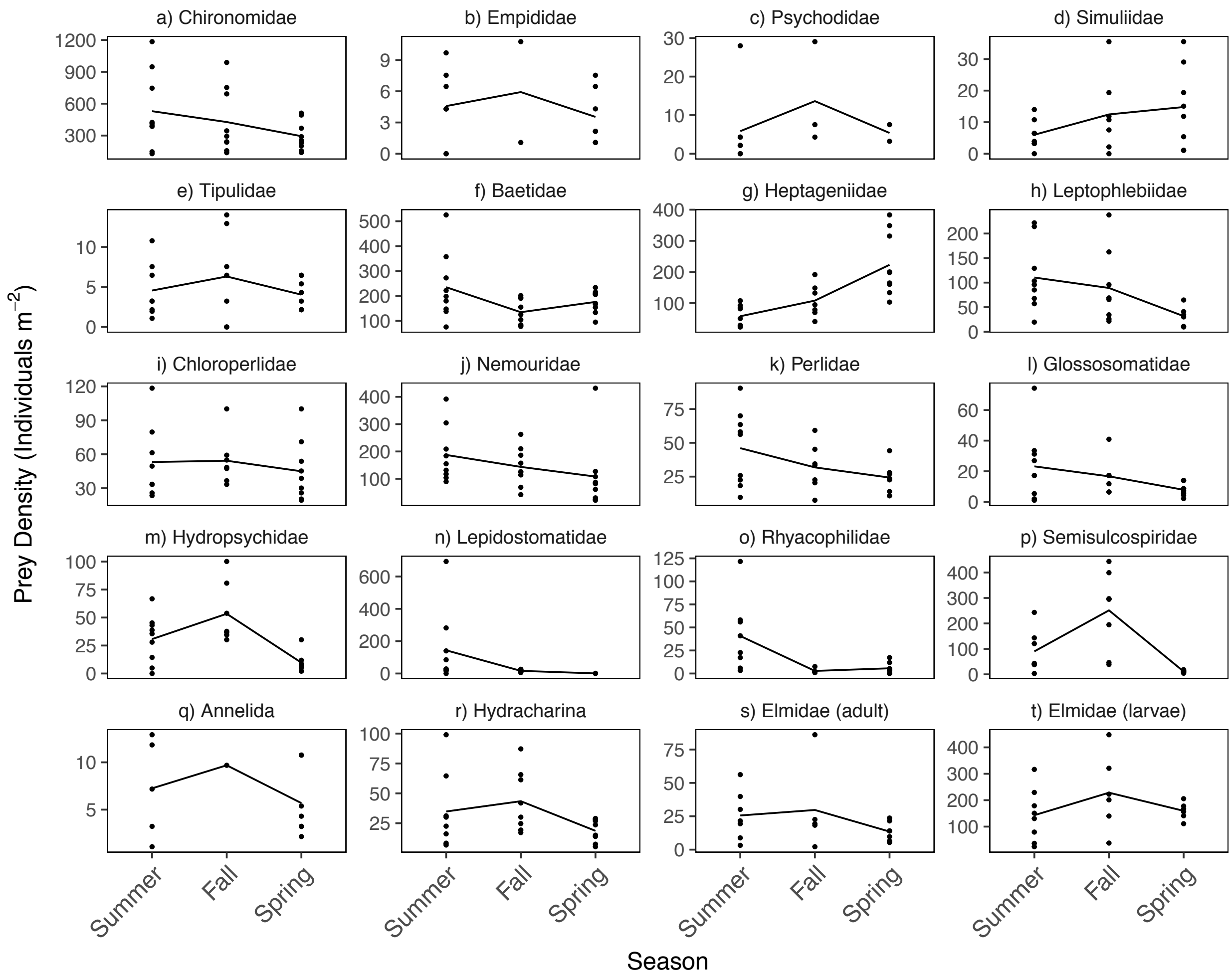

Figure S6. Seasonal changes in prey density. The line shows seasonal means and each point represents a stream reach. Note the varying y-axis.

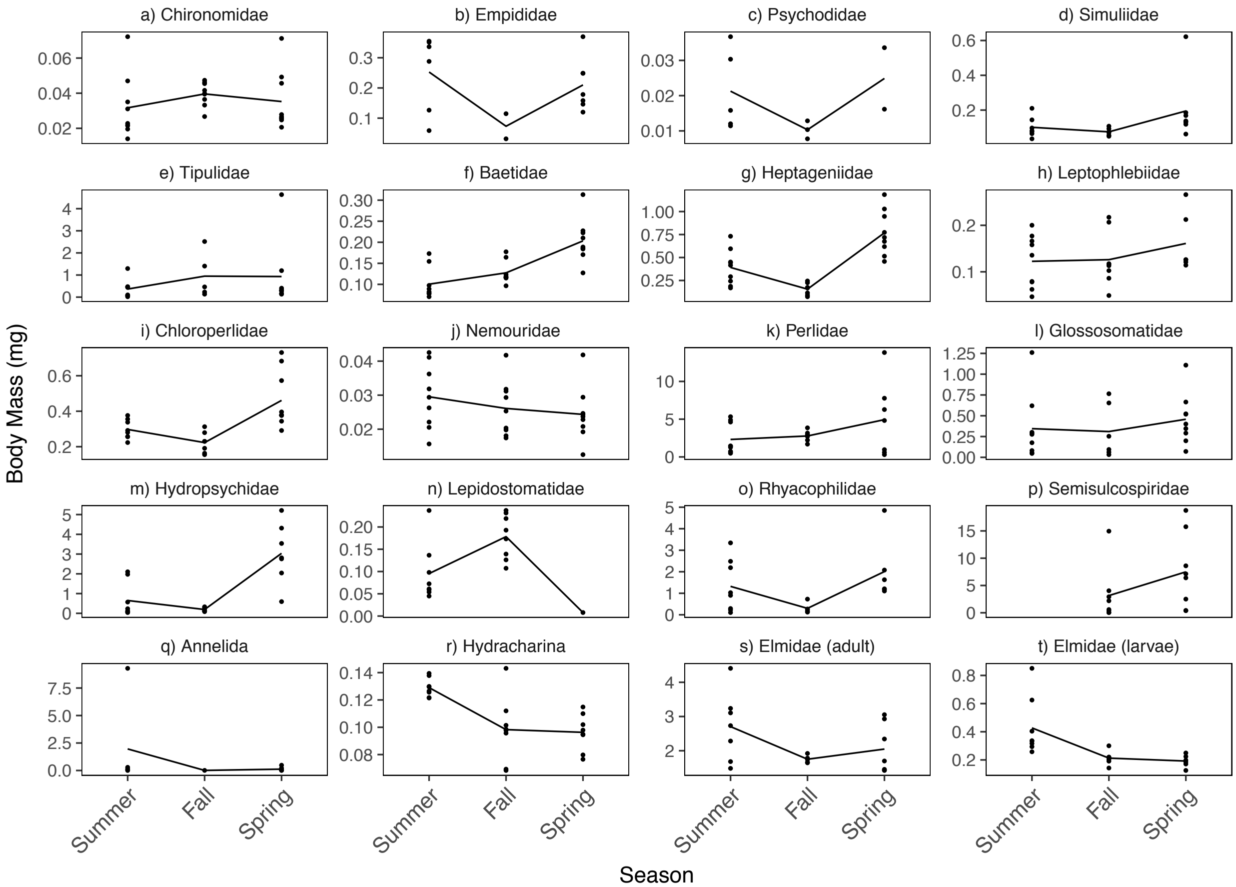

Figure S7. Seasonal changes in prey dry biomass. The line shows seasonal means and each point represents a stream reach. Note the varying y-axis.

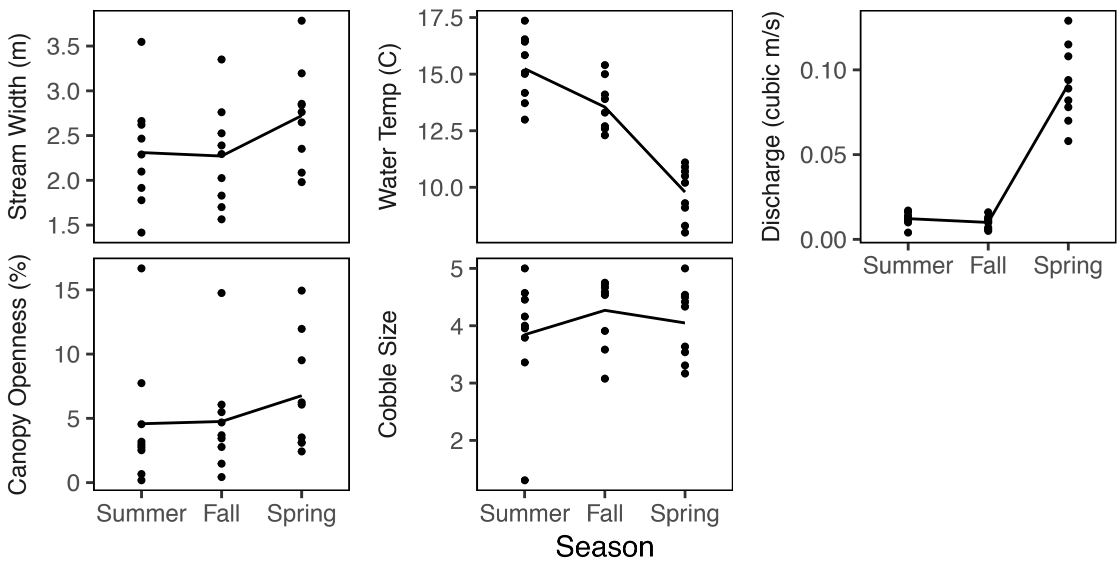

Figure S8. Seasonal changes in abiotic variables. The line shows seasonal means and each point represents a stream reach. Cobble size was scored on a relative scale from one (low embeddedness) to five (high embeddedness).

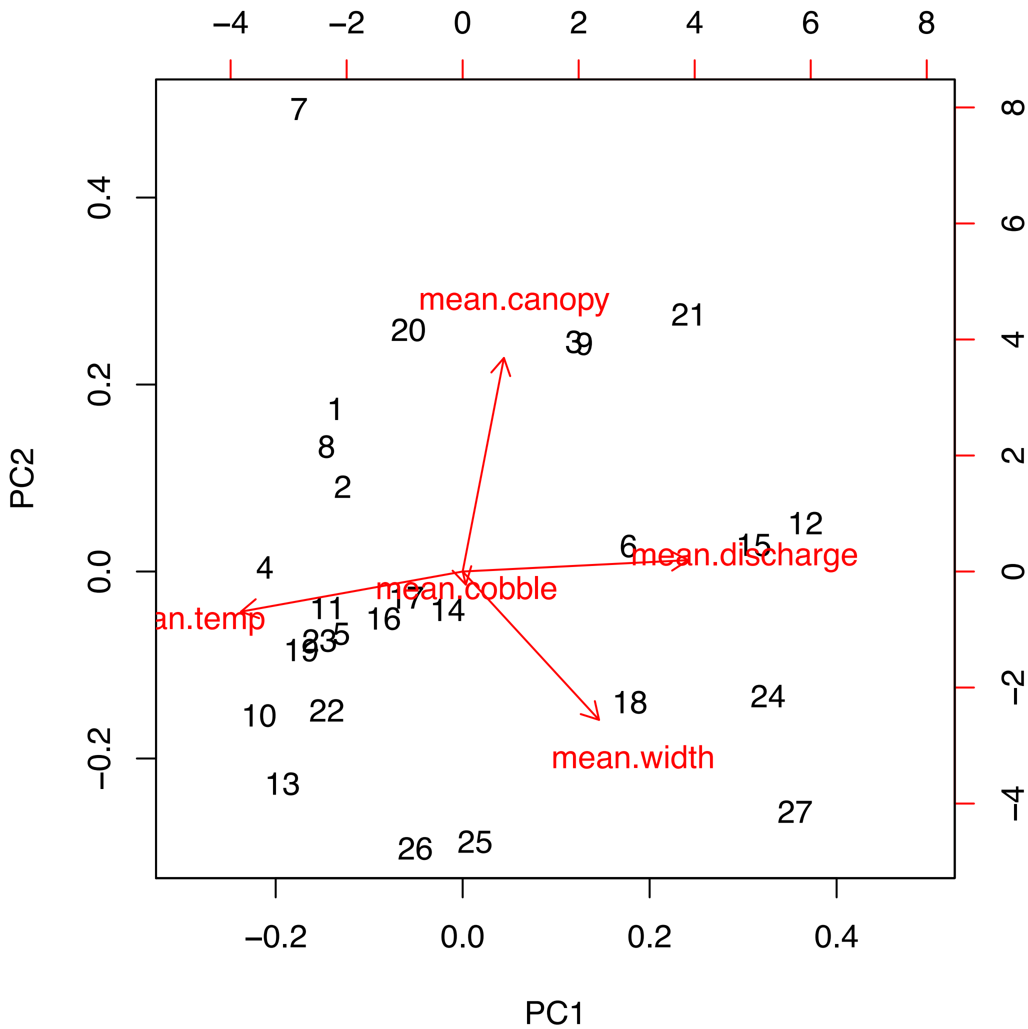

Figure S9. Results from a principal components analysis of the five abiotic stream variables (using means per stream reach).

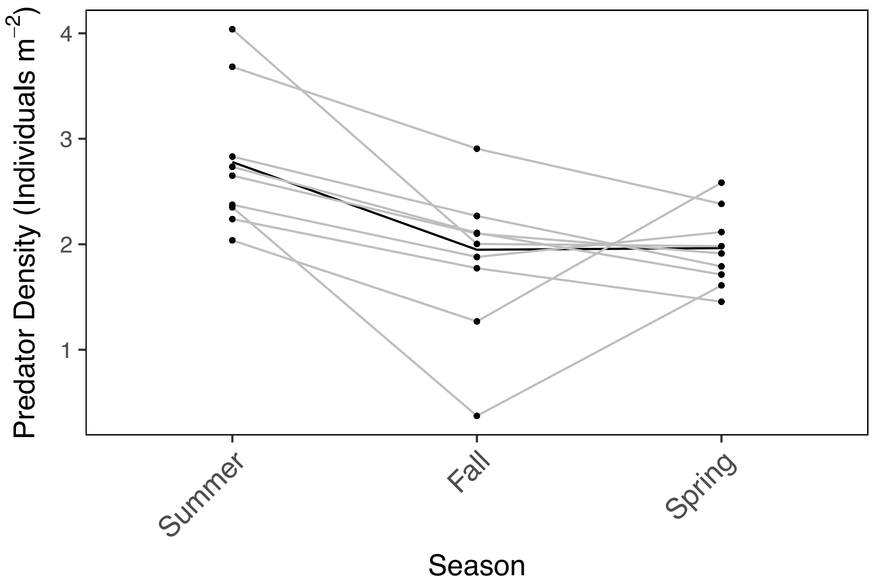

Figure S10. Changes in sculpin density estimated from mark-recapture corrected one-pass electroshock surveys at each stream reach. The dark line shows the mean and the grey lines connect each individual site.