APPENDIX B. Model comparison table and regression coefficients for parameters included in the five best, overall stream signature prediction models.

USAGE

Given input data for the variables listed, each of the models listed in Table B1 may be used individually or in concert (using weighted averaging) to compute stream signatures. As a simple example, stream signatures may be computed from Model 1 given site data on study method (i.e., whether organism dispersal, food web incorporation of subsidies, etc. is of interest), study organism (i.e., the dominant organism or organism of interest), and aquatic productivity.

From Table B1, all 3 of these terms will be included in the model as both interaction and additive) terms, and the model structure would be as follows:

$$ln(Response) = \beta_0 + Method + Organism + Productivity + \beta_1 * ln(Distance) + Method*ln(Distance) + Organism*ln(Distance) + Productivity*ln(Distance) \quad \text{(Eq. B.1)}$$

If, for example, the study in question was interested in the dispersal of caddisflies from a low productivity stream, then the model 1 output would be as follows:

$$ln(Response) = -0.3716 - 0.3818 + 0.3611 - 0.0949 - 0.1161*ln(Distance) - 0.1160*ln(Distance) + 0.0110*ln(Distance) - 0.1456*ln(Distance) \quad \text{(Eq. B.2)}$$

This equation can then be rearranged and simplified as follows:

$$ln(Response) = -0.3667*ln(Distance) - 0.4872 \quad \text{(Eq. B.3)}$$

Removing the natural logarithms, the equation can then be expressed as the following:

$$Response = e^{-0.4872} * Distance^{-0.3667} \quad \text{(Eq. B.4)}$$

To compute stream signatures, the equation can be further rearranged as follows:

$$Distance = (Response / 0.6143)^{-2.7270} \quad \text{(Eq. B.5)}$$

Thus, the 50% stream signature in this example would be calculated using the following equation:

$$Distance = (0.5 / 0.6143)^{-2.7270} \quad \text{(Eq. B.6)}$$

and the 50% stream signature for this example would be 1.75 m. Similarly, the corresponding 10% stream signature (substituting 0.1 for 0.5 in the previous equation) would be 141 m.

TABLE B1. Model comparison table of the best models from a suite of candidates containing reasonable permutations of the explanatory variables. Model inclusion in this table was based on $\Delta_i < 4$ ($\Delta_i = AICc_{model} - AICc_{min}$). β_0 and β_1 values are the intercept and slope terms, respectively, in the negative power model of the form $ln(Response) = \beta_0 + \beta_1 * ln(Distance)$. Variables with * or + symbols are included in models as both additive and interaction terms (*ln(Distance) + variable +ln(Distance)*variable*), or as additive terms only, respectively. Model weight calculation included the entire suite of candidate models, so the values listed here do not add to 1.

Model	β_0	β_1	Study method	Study organism	Aquatic productivity	Stream order	Channel geomorphology	Bank type	df	AICc	Δ_i	Model weight
1	-0.3716	-0.1161	*	*	*				22	819.50	0.00	0.3379
2	-0.2944	-0.1679	+	*	*				20	821.62	2.11	0.1175
3	-0.3132	-0.1170	*	*	*			+	24	822.61	3.10	0.0716
4	-0.5025	-0.1161	*	*	*	+			25	822.96	3.46	0.0601
5	-0.4713	-0.1155	*	*	*		+		24	823.42	3.91	0.0477

TABLE B2. Regression coefficients for each parameter included in the 5 best predictive models from Table B1. β_0 and β_1 values are the intercept and slope terms, respectively, in the negative power model of the form $ln(Response) = \beta_0 + \beta_1 * ln(Distance)$. Variables with * or + symbols are included in models as both additive and interaction terms (*ln(Distance) + variable +ln(Distance)*variable*), or as additive terms only, respectively.

Parameter	Model 1	Model 2	Model 3	Model 4	Model 5
β_0	-0.3716	-0.2944	-0.3132	-0.5025	-0.4713
β_1	-0.1161	-0.1679	-0.1170	-0.1161	-0.1155
+ Method: Food web	0	0	0	0	0
+ Method: Dispersal	-0.3818	-0.5664	-0.3875	-0.3909	-0.3786
+ Method: Predator abundance	0.1265	0.1920	0.1044	0.1326	0.1373
+ Organism: All aquatic insects	0	0	0	0	0
+ Organism: Mayflies	0.3858	0.5086	0.3561	0.4095	0.3689
+ Organism: Stoneflies	0.6835	0.8081	0.6702	0.7201	0.6651
+ Organism: Caddisflies	0.3611	0.4796	0.3365	0.4132	0.3514
+ Organism: Chironomids	0.9405	1.0554	0.9072	0.9603	0.9228
+ Organism: Terrestrial predators	-0.3113	-0.4107	-0.3080	-0.3120	-0.3152
+ Productivity: High	0	0	0	0	0
+ Productivity: Medium	-0.3246	-0.3389	-0.2981	-0.3775	-0.4089
+ Productivity: Low	-0.0949	-0.1205	-0.0886	-0.0988	-0.1312
+ Stream order: 1–2	0	0	0	0	0
+ Stream order: 3–4	0	0	0	0.3121	0
+ Stream order: 5–6	0	0	0	-0.1050	0
+ Stream order: 7+	0	0	0	0.3426	0
+ Geomorphology: Meandering	0	0	0	0	0
+ Geomorphology: Straight/Meandering	0	0	0	0	0.2246
+ Geomorphology: Straight	0	0	0	0	0.1417
+ Bank type: Gradual	0	0	0	0	0
+ Bank type: Gradual/Steep	0	0	-0.2085	0	0
+ Bank type: Steep	0	0	0.1106	0	0
* Method: Food web	0	0	0	0	0
* Method: Dispersal	-0.1160	0	-0.1149	-0.1162	-0.1164
* Method: Predator abundance	0.0416	0	0.0437	0.0409	0.0387
* Organism: All aquatic insects	0	0	0	0	0
* Organism: Mayflies	-0.0868	-0.1613	-0.0868	-0.0834	-0.0855
* Organism: Stoneflies	-0.1215	-0.1967	-0.1215	-0.1180	-0.1200
* Organism: Caddisflies	0.0110	-0.0618	0.0102	0.0122	0.0115
* Organism: Chironomids	-0.0021	-0.0708	-0.0028	0.0004	-0.0021
* Organism: Terrestrial predators	-0.1734	-0.1029	-0.1732	-0.1742	-0.1734
* Productivity: High	0	0	0	0	0
* Productivity: Medium	0.0203	0.0311	0.0209	0.0183	0.0198
* Productivity: Low	-0.1456	-0.1336	-0.1449	-0.1455	-0.1466