

SUPPLEMENTARY MATERIAL TABLE S6 | Statistic parameters of the Generalized Additive Mixed Models (GAMMs) used to model the abundance of *Hyphessobrycon vilmae* in streams from Aripuanã river basin (Mato Grosso State, Brazil); *s* = smooth term for GAMM; *te* = smoothing full tensor for GAMM; *ti* = smoothing interaction tensor for GAMM; SCS = Spatial Correlation Structure; FC = false convergence; NC = no convergence; SC = singular convergence; † = best-fitting model based on the AIC. Pink mark indicates the best model.

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{H.v.} \sim te(Phi) + te(Current) + te(DO) + te(Grass) + te(Trees)$	---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Exponential: NC	---
	---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Gaussian: SC	---
	---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Linear: FC	---
	---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Rational: FC	---
	---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Spherical: SC	---
$A_{H.v.} \sim te(Phi) + te(Current) + te(DO) + te(Grass)$	0.784	Intercept: 0.355 <i>te</i> (Phi): 3.331 <i>te</i> (Current): 2.501 <i>te</i> (DO): 3.387 <i>te</i> (Grass): 3.874	Intercept: 0.163 <i>te</i> (Phi): <0.001* <i>te</i> (Current): 0.132 <i>te</i> (DO): <0.001* <i>te</i> (Grass): <0.001*	Exponential: 1.78e-03	227.423
	---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): ---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): ---	Gaussian: singularity at 0	---
	---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): ---	Intercept: --- <i>te</i> (Phi): --- <i>te</i> (Current): --- <i>te</i> (DO): --- <i>te</i> (Grass): ---	Linear: FC	---
	0.776	Intercept: 0.453 <i>te</i> (Phi): 1.000 <i>te</i> (Current): 2.807 <i>te</i> (DO): 3.339 <i>te</i> (Grass): 3.921	Intercept: 0.044* <i>te</i> (Phi): <0.001* <i>te</i> (Current): 0.002* <i>te</i> (DO): <0.001* <i>te</i> (Grass): <0.001*	Rational: 1.43e-06	242.493
	0.721	Intercept: 0.560 <i>te</i> (Phi): 3.204 <i>te</i> (Current): 2.273 <i>te</i> (DO): 3.508 <i>te</i> (Grass): 3.890	Intercept: 0.046 <i>te</i> (Phi): <0.001* <i>te</i> (Current): 0.085 <i>te</i> (DO): <0.001* <i>te</i> (Grass): <0.001*	Spherical: 0.117	169.970



TABLE S6 | (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{H.v.} \sim te(PHI) + te(Current) + te(DO) + te(Trees)$	---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Exponential: SC	---
	---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Gaussian: SC	---
	---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Linear: FC	---
	---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Rational: FC	---
	---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(DO): --- te(Trees): ---	Spherical: SC	---
$A_{H.v.} \sim te(PHI) + te(Current) + te(Grass) + te(Trees)$	0.710	Intercept: 0.890 te(PHI): 3.895 te(Current): 1.000 te(Grass): 3.828 te(Trees): 1.000	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001* te(Grass): <0.001* te(Trees): <0.001*	Exponential: 3.27e-03	278.270
	0.711	Intercept: 0.942 te(PHI): 3.902 te(Current): 1.000 te(Grass): 3.848 te(Trees): 1.000	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001* te(Grass): <0.001* te(Trees): <0.001*	Gaussian: 7.36e-03	273.412
	---	Intercept: --- te(PHI): --- te(Current): --- te(Grass): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(Grass): --- te(Trees): ---	Linear: NC	---
	---	Intercept: --- te(PHI): --- te(Current): --- te(Grass): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(Grass): --- te(Trees): ---	Rational: NC	---
	0.712	Intercept: 0.945 te(PHI): 3.903 te(Current): 1.000 te(Grass): 3.848 te(Trees): 1.000	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001* te(Grass): <0.001* te(Trees): <0.001*	Spherical: 1.68e-02	272.741



TABLE S6 | (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{H.v.} \sim te(PHI) + te(DO) + te(Grass) + te(Trees)$	---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): --- te(Trees): ---	Exponential: NC	---
	0.893	Intercept: -0.201 te(PHI): 3.595 te(DO): 3.398 te(Grass): 3.761 te(Trees): 2.926	Intercept: 0.599 te(PHI): <0.001* te(DO): <0.001* te(Grass): <0.001* te(Trees): <0.001*	Gaussian: 7.24e-03	227.675
	---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): --- te(Trees): ---	Linear: FC	---
	---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): --- te(Trees): ---	Rational: NC	---
	0.893	Intercept: -0.189 te(PHI): 3.600 te(DO): 3.402 te(Grass): 3.762 te(Trees): 2.928	Intercept: 0.614 te(PHI): <0.001* te(DO): <0.001* te(Grass): <0.001* te(Trees): 0.062	Spherical: 1.64e-02	227.088
$A_{H.v.} \sim te(Current) + te(DO) + te(Grass) + te(Trees)$	---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Exponential: NC	---
	---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Gaussian: FC	---
	---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Linear: FC	---
	---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Rational: SC	---
	---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(DO): --- te(Grass): --- te(Trees): ---	Spherical: NC	---



TABLE S6 | (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{H.v.} \sim te(PHI) + te(Current) + te(DO)$	0.242	Intercept: 1.205 tw(PHI): 3.377 te(Current): 3.730 te(DO): 3.841	Intercept: <0.001* te(PHI): 0.023* te(Current): 0.015* te(DO): 0.002*	Exponential: 3.58e-03	406.814
	---	Intercept: --- tw(PHI): --- te(Current): --- te(DO): ---	Intercept: --- te(PHI): --- te(Current): --- te(DO): ---	Gaussian: NC	---
	---	Intercept: --- tw(PHI): --- te(Current): --- te(DO): ---	Intercept: --- te(PHI): --- te(Current): --- te(DO): ---	Linear: FC	---
	---	Intercept: --- tw(PHI): --- te(Current): --- te(DO): ---	Intercept: --- te(PHI): --- te(Current): --- te(DO): ---	Rational: NC	---
	0.221	Intercept: 1.248 tw(PHI): 3.404 te(Current): 3.738 te(DO): 3.841	Intercept: <0.001* te(PHI): 0.017* te(Current): 0.011* te(DO): 0.001*	Spherical: 1.68e-02	387.490
$A_{H.v.} \sim te(PHI) + te(Current) + te(Grass)$	0.648	Intercept: 0.991 te(PHI): 3.796 te(Current): 1.000 te(Grass): 3.763	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001* te(Grass): <0.001*	Exponential: 2.09e-03	331.653
	0.650	Intercept: 1.020 te(PHI): 3.797 te(Current): 1.000 te(Grass): 3.783	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001* te(Grass): <0.001*	Gaussian: 5.74e-03	328.634
	0.650	Intercept: 1.040 te(PHI): 3.783 te(Current): 1.000 te(Grass): 3.796	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001* te(Grass): <0.001*	Linear: 1.17e-02	331.171
	0.648	Intercept: 0.984 te(PHI): 3.796 te(Current): 1.000 te(Grass): 3.760	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001* te(Grass): <0.001*	Rational: 1.75e-05	332.434
	0.650	Intercept: 1.040 te(PHI): 3.803 te(Current): 1.000 te(Grass): 3.796	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001* te(Grass): <0.001*	Spherical: 1.52e-02	327.155
$A_{H.v.} \sim te(PHI) + te(DO) + te(Grass)$	0.809	Intercept: 0.621 te(PHI): 3.718 te(DO): 3.360 te(Grass): 3.855	Intercept: 0.004* te(PHI): <0.001* te(DO): <0.001* te(Grass): <0.001*	Exponential: 1.40e-03	235.507
	---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): ---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): ---	Gaussian: NC	---
	---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): ---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): ---	Linear: FC	---
	---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): ---	Intercept: --- te(PHI): --- te(DO): --- te(Grass): ---	Rational: NC	---
	0.809	Intercept: 0.659 te(PHI): 3.709 te(DO): 3.347 te(Grass): 3.859	Intercept: 0.003* te(PHI): <0.001* te(DO): <0.001* te(Grass): <0.001*	Spherical: 1.51e-02	232.983 «



TABLE S6 | (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{Hv} \sim te(PHI) + te(Current) + te(Trees)$	0.685	Intercept: 0.660 te(PHI): 3.867 te(Current): 1.000 te(Trees): 3.899	Intercept: 0.011* te(PHI): <0.001* te(Current): <0.001* te(Trees): <0.001*	Exponential: 9.33e-03	279.678
	0.699	Intercept: 0.657 te(PHI): 3.878 te(DO): 1.000 te(Trees): 3.897	Intercept: 0.011* te(PHI): <0.001* te(Current): <0.001* te(Trees): <0.001*	Gaussian: 9.22e-03	284.032
	---	Intercept: --- te(PHI): --- te(Current): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(Trees): ---	Linear: FC	---
	0.679	Intercept: 0.689 te(PHI): 3.865 te(Current): 1.000 te(Trees): 3.903	Intercept: 0.011* te(PHI): <0.001* te(Current): <0.001* te(Trees): <0.001*	Rational: 7.44e-03	273.297
	---	Intercept: --- te(PHI): --- te(Current): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Current): --- te(Trees): ---	Spherical: SC	---
$A_{Hv} \sim te(PHI) + te(DO) + te(Trees)$	0.815	Intercept: 0.492 Te(PHD): 3.851 te(DO): 3.533 te(Trees): 3.905	Intercept: 0.073 Te(PHI): <0.001* te(DO): <0.001* te(Trees): <0.001*	Exponential: 5.68e-03	324.070
	0.809	Intercept: 0.526 Te(PHD): 3.848 te(DO): 3.554 te(Trees): 3.919	Intercept: 0.052 Te(PHI): <0.001* te(DO): <0.001* te(Trees): <0.001*	Gaussian: 9.21e-03	308.392
	---	Intercept: --- Te(PHD): --- te(DO): --- te(Trees): ---	Intercept: --- Te(PHI): --- te(DO): --- te(Trees): ---	Linear: FC	---
	0.814	Intercept: 0.513 Te(PHD): 3.848 te(DO): 3.528 te(Trees): 3.907	Intercept: 0.063 Te(PHI): <0.001* te(DO): <0.001* te(Trees): <0.001*	Rational: 5.02e-03	317.412
	0.810	Intercept: 0.523 te(PHI): 3.849 te(DO): 3.549 te(Trees): 3.914	Intercept: 0.054 Te(PHI): <0.001* te(DO): <0.001* te(Trees): <0.001*	Spherical: 1.92e-02	310.927
$A_{Hv} \sim te(PHI) + te(Grass) + te(Trees)$	0.722	Intercept: 0.596 te(PHI): 3.847 te(Grass): 3.871 te(Trees): 3.870	Intercept: 0.019* te(PHI): <0.001* te(Grass): <0.001* te(Trees): 0.002*	Exponential: 4.54e-03	293.351
	0.721	Intercept: 0.624 te(PHI): 3.858 te(Grass): 3.883 te(Trees): 3.875	Intercept: 0.016* te(PHI): <0.001* te(Grass): <0.001* te(Trees): 0.001*	Gaussian: 8.54e-03	286.198
	---	Intercept: --- te(PHI): --- te(Grass): --- te(Trees): ---	Intercept: --- te(PHI): --- te(Grass): --- te(Trees): ---	Linear: ---	---
	0.719	Intercept: 0.628 te(PHI): 3.847 te(Grass): 3.870 te(Trees): 3.876	Intercept: 0.014* te(PHI): <0.001* te(Grass): <0.001* te(Trees): 0.001*	Rational: 4.78e-03	287.664
	0.721	Intercept: 0.631 te(PHI): 3.855 te(Grass): 3.878 te(Trees): 3.874	Intercept: 0.014* te(PHI): <0.001* te(Grass): <0.001* te(Trees): 0.001*	Spherical: 1.80e-02	285.948



TABLE S6 | (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{Hv} \sim te(\text{Current}) + te(\text{DO}) + te(\text{Trees})$	---	Intercept: --- te(Current): --- te(DO): --- te(Trees): ---	Intercept: --- te(Current): --- te(DO): --- te(Trees): ---	Exponential: NC	---
	0.258	Intercept: 1.015 te(Current): 3.710 te(DO): 3.710 te(Trees): 3.764	Intercept: <0.001* te(Current): <0.001* te(DO): <0.001* te(Trees): <0.001*	Gaussian: NC	---
	---	Intercept: --- te(Current): --- te(DO): --- te(Trees): ---	Intercept: --- te(Current): --- te(DO): --- te(Trees): ---	Linear: FC	---
	---	Intercept: --- te(Current): --- te(DO): --- te(Trees): ---	Intercept: --- te(Current): --- te(DO): --- te(Trees): ---	Rational: NC	---
	0.272	Intercept: 1.000 te(Current): 3.707 te(DO): 3.732 te(Trees): 3.757	Intercept: <0.001* te(Current): <0.001* te(DO): <0.001* te(Trees): <0.001*	Spherical: 1.98e-02	302.005
$A_{Hv} \sim te(\text{Current}) + te(\text{DO}) + te(\text{Grass})$	0.662	Intercept: 0.897 te(Current): 3.076 te(DO): 3.866 te(Grass): 3.792	Intercept: <0.001* te(Current): <0.001* te(DO): <0.001* te(Grass): <0.001*	Exponential: 2.85e-03	357.902
	---	Intercept: --- te(Current): --- te(DO): --- te(Grass): ---	Intercept: --- te(Current): --- te(DO): --- te(Grass): ---	Gaussian: NC	---
	---	Intercept: --- te(Current): --- te(DO): --- te(Grass): ---	Intercept: --- te(Current): --- te(DO): --- te(Grass): ---	Linear: FC	---
	0.665	Intercept: 0.877 te(Current): 3.088 te(DO): 3.869 te(Grass): 3.797	Intercept: <0.001* te(Current): <0.001* te(DO): <0.001* te(Grass): <0.001*	Rational: 5.58e-07	364.923
	0.651	Intercept: 0.946 te(Current): 3.064 te(DO): 3.857 te(Grass): 3.781	Intercept: <0.001* te(Current): <0.001* te(DO): <0.001* te(Grass): <0.001*	Spherical: 1.58e-02	340.569
$A_{Hv} \sim te(\text{Current}) + te(\text{Grass}) + te(\text{Trees})$	---	Intercept: --- te(Current): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(Grass): --- te(Trees): ---	Exponential: NC	---
	-0.307	Intercept: 1.470 te(Current): 3.638 te(Grass): 2.379 te(Trees): 3.866	Intercept: <0.001* te(Current): <0.001* te(Grass): 0.032 te(Trees): <0.001*	Gaussian: 2.83e-02	351.394
	---	Intercept: --- te(Current): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(Grass): --- te(Trees): ---	Linear: FC	---
	---	Intercept: --- te(Current): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(Grass): --- te(Trees): ---	Rational: NC	---
	---	Intercept: --- te(Current): --- te(Grass): --- te(Trees): ---	Intercept: --- te(Current): --- te(Grass): --- te(Trees): ---	Spherical: NC	---



TABLE S6 | (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{Hv} \sim te(DO) + te(Grass) + te(Trees)$	0.707	Intercept: -0.764 te(DO): 3.954 te(Grass): 3.939 te(Trees): 3.930	Intercept: 0.077 te(DO): <0.001* te(Grass): <0.001* te(Trees): <0.001*	Exponential: 2.56e-03	575.937
	0.703	Intercept: -0.732 te(DO): 3.953 te(Grass): 3.939 te(Trees): 3.930	Intercept: 0.086 te(DO): <0.001* te(Grass): <0.001* te(Trees): <0.001*	Gaussian: 5.16e-03	562.857
	---	Intercept: --- te(DO): --- te(Grass): --- te(Trees): ---	Intercept: --- te(DO): --- te(Grass): --- te(Trees): ---	Linear: FC	---
	0.712	Intercept: -0.784 te(DO): 3.955 te(Grass): 3.939 te(Trees): 3.930	Intercept: 0.709 te(DO): <0.001* te(Grass): <0.001* te(Trees): <0.001*	Rational: 1.45e-06	586.417
	0.703	Intercept: -0.732 te(DO): 3.953 te(Grass): 3.939 te(Trees): 3.930	Intercept: 0.086 te(DO): <0.001* te(Grass): <0.001* te(Trees): <0.001*	Spherical: 1.09e-02	562.734
$A_{Hv} \sim te(PHI) + te(Current)$	0.266	Intercept: 1.175 te(PHI): 3.825 te(Current): 2.739	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001*	Exponential: 3.92e-03	423.927
	0.257	Intercept: 1.170 te(PHI): 3.841 te(Current): 2.820	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001*	Gaussian: 7.16e-03	420.248
	---	Intercept: --- te(PHI): --- te(Current): ---	Intercept: --- te(PHI): --- te(Current): ---	Linear: FC	---
	0.259	Intercept: 1.188 te(PHI): 3.833 te(Current): 2.785	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001*	Rational: 4.12e-03	420.037
	0.256	Intercept: 1.178 te(PHI): 3.840 te(Current): 2.823	Intercept: <0.001* te(PHI): <0.001* te(Current): <0.001*	Spherical: 1.62e-02	417.125
$A_{Hv} \sim te(PHI) + te(DO)$	0.271	Intercept: 1.352 te(PHI): 3.628 te(DO): 3.755	Intercept: <0.001* te(PHI): <0.001* te(DO): <0.001*	Exponential: 3.13e-03	403.756
	0.265	Intercept: 1.364 te(PHI): 3.637 te(DO): 3.741	Intercept: <0.001* te(PHI): <0.001* te(DO): <0.001*	Gaussian: 5.86e-03	398.423
	---	Intercept: --- te(PHI): --- te(DO): ---	Intercept: --- te(PHI): --- te(DO): ---	Linear: FC	---
	0.269	Intercept: 1.372 te(PHI): 3.663 te(DO): 3.783	Intercept: <0.001* te(PHI): <0.001* te(DO): <0.001*	Rational: 3.96e-03	397.606
	0.273	Intercept: 1.336 te(PHI): 3.612 te(DO): 3.766	Intercept: <0.001* te(PHI): <0.001* te(DO): <0.001*	Spherical: 6.19e-03	410.766
$A_{Hv} \sim te(PHI) + te(Grass)$	0.492	Intercept: 1.260 te(PHI): 3.782 te(Grass): 3.891	Intercept: <0.001* te(PHI): <0.001* te(Grass): <0.001*	Exponential: 2.25e-03	328.347
	0.496	Intercept: 1.289 te(PHI): 3.794 te(Grass): 3.900	Intercept: <0.001* te(PHI): <0.001* te(Grass): <0.001*	Gaussian: 6.12e-03	325.680
	---	Intercept: --- te(PHI): --- te(Grass): ---	Intercept: --- te(PHI): --- te(Grass): ---	Linear: FC	---
	0.490	Intercept: 1.253 te(PHI): 3.779 te(Grass): 3.890	Intercept: <0.001* te(PHI): <0.001* te(Grass): <0.001*	Rational: 7.69e-07	329.322
	0.497	Intercept: 1.304 te(PHI): 3.802 te(Grass): 3.904	Intercept: <0.001* te(PHI): <0.001* te(Grass): <0.001*	Spherical: 1.59e-02	323.420



TABLE S6 | (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{Hv} \sim te(PHI) + te(Trees)$	0.446	Intercept: 1.138 <i>te</i> (PHI): 3.868 <i>te</i> (Trees): 3.944	Intercept: <0.001* <i>te</i> (PHI): <0.001* <i>te</i> (Trees): <0.001*	Exponential: 1.65e-02	250.561
	---	Intercept: --- <i>te</i> (PHI): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (PHI): --- <i>te</i> (Trees): ---	Gaussian: NC	---
	---	Intercept: --- <i>te</i> (PHI): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (PHI): --- <i>te</i> (Trees): ---	Linear: FC	---
	0.458	Intercept: 1.123 <i>te</i> (PHI): 3.870 <i>te</i> (Trees): 3.940	Intercept: <0.001* <i>te</i> (PHI): <0.001* <i>te</i> (Trees): <0.001*	Rational: 9.14e-03	---
	0.391	Intercept: 1.178 <i>te</i> (PHI): 3.871 <i>te</i> (Trees): 3.955	Intercept: <0.001* <i>te</i> (PHI): <0.001* <i>te</i> (Trees): <0.001*	Spherical: 5.38e-02	246.777
$A_{Hv} \sim te(Current) + te(DO)$	0.288	Intercept: 1.120 <i>te</i> (Current): 3.761 <i>te</i> (DO): 3.919	Intercept: <0.001* <i>te</i> (Current): 0.002* <i>te</i> (DO): <0.001*	Exponential: 3.09e-03	389.402
	0.287	Intercept: 1.130 <i>te</i> (Current): 3.773 <i>te</i> (DO): 3.915	Intercept: <0.001* <i>te</i> (Current): 0.002* <i>te</i> (DO): <0.001*	Gaussian: 6.92e-03	382.135
	---	Intercept: --- <i>te</i> (Current): --- <i>te</i> (DO): ---	Intercept: --- <i>te</i> (Current): --- <i>te</i> (DO): ---	Linear: FC	---
	0.291	Intercept: 1.134 <i>te</i> (Current): 3.763 <i>te</i> (DO): 3.921	Intercept: <0.001* <i>te</i> (Current): 0.002* <i>te</i> (DO): <0.001*	Rational: 2.97e-03	388.042
	0.284	Intercept: 1.141 <i>te</i> (Current): 3.771 <i>te</i> (DO): 3.914	Intercept: <0.001* <i>te</i> (Current): 0.002* <i>te</i> (DO): <0.001*	Spherical: 1.59e-02	379.016
$A_{Hv} \sim te(Current) + te(Grass)$	-0.115	Intercept: 1.667 <i>te</i> (Current): 1.692 <i>te</i> (Grass): 3.246	Intercept: <0.001* <i>te</i> (Current): <0.001* <i>te</i> (Grass): <0.001*	Exponential: 2.11e-02	388.071
	-0.098	Intercept: 1.735 <i>te</i> (Current): 1.000 <i>te</i> (Grass): 2.998	Intercept: <0.001* <i>te</i> (Current): <0.001* <i>te</i> (Grass): <0.001*	Gaussian: 1.51e-02	404.467
	---	Intercept: --- <i>te</i> (Current): --- <i>te</i> (Grass): ---	Intercept: --- <i>te</i> (Current): --- <i>te</i> (Grass): ---	Linear: FC	---
	-0.105	Intercept: 1.706 <i>te</i> (Current): 1.324 <i>te</i> (Grass): 3.238	Intercept: <0.001* <i>te</i> (Current): <0.001* <i>te</i> (Grass): <0.001*	Rational: 1.31e-02	381.246
	-0.120	Intercept: 1.691 <i>te</i> (Current): 1.486 <i>te</i> (Grass): 2.995	Intercept: <0.001* <i>te</i> (Current): <0.001* <i>te</i> (Grass): <0.001*	Spherical: 4.22e-02	401.867
$A_{Hv} \sim te(Current) + te(Trees)$	---	Intercept: --- <i>te</i> (Current): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Current): --- <i>te</i> (Trees): ---	Exponential: NC	---
	-0.199	Intercept: 1.518 <i>te</i> (Current): 3.687 <i>te</i> (Trees): 3.924	Intercept: <0.001* <i>te</i> (Current): <0.001* <i>te</i> (Grass): <0.001*	Gaussian: 2.45e-02	364.040
	---	Intercept: --- <i>te</i> (Current): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Current): --- <i>te</i> (Trees): ---	Linear: FC	---
	-0.216	Intercept: 1.585 <i>te</i> (Current): 3.745 <i>te</i> (Trees): 3.938	Intercept: <0.001* <i>te</i> (Current): <0.001* <i>te</i> (Grass): <0.001*	Rational: 2.16e-02	327.139
	-0.188	Intercept: 1.516 <i>te</i> (Current): 3.670 <i>te</i> (Trees): 3.930	Intercept: <0.001* <i>te</i> (Current): <0.001* <i>te</i> (Grass): <0.001*	Spherical: 6.73e-02	360.180



TABLE S6 I (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{Hv} \sim te(DO) + te(Grass)$	0.363	Intercept: 1.332 <i>te</i> (DO): 3.916 <i>te</i> (Grass): 3.370	Intercept: <0.001* <i>te</i> (DO): <0.001* <i>te</i> (Grass): <0.001*	Exponential: 7.79e-03	344.420
	0.339	Intercept: 1.373 <i>te</i> (DO): 3.907 <i>te</i> (Grass): 3.337	Intercept: <0.001* <i>te</i> (DO): <0.001* <i>te</i> (Grass): <0.001*	Gaussian: 8.34e-03	328.121
	---	Intercept: --- <i>te</i> (DO): --- <i>te</i> (Grass): ---	Intercept: --- <i>te</i> (DO): --- <i>te</i> (Grass): ---	Linear: FC	---
	0.362	Intercept: 1.344 <i>te</i> (DO): 3.917 <i>te</i> (Grass): 3.367	Intercept: <0.001* <i>te</i> (DO): <0.001* <i>te</i> (Grass): <0.001*	Rational: 7.14e-03	339.848
	0.337	Intercept: 1.366 <i>te</i> (DO): 3.908 <i>te</i> (Grass): 3.355	Intercept: <0.001* <i>te</i> (DO): <0.001* <i>te</i> (Grass): <0.001*	Spherical: 1.75e-02	327.864
$A_{Hv} \sim te(DO) + te(Trees)$	-0.008	Intercept: 1.498 <i>te</i> (DO): 3.787 <i>te</i> (Trees): 3.895	Intercept: <0.001* <i>te</i> (DO): <0.001* <i>te</i> (Trees): <0.001*	Exponential: 1.85e-02	369.970
	-0.015	Intercept: 1.516 <i>te</i> (DO): 3.708 <i>te</i> (Trees): 3.904	Intercept: <0.001* <i>te</i> (DO): <0.001* <i>te</i> (Trees): <0.001*	Gaussian: 1.61e-02	374.665
	---	Intercept: --- <i>te</i> (DO): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (DO): --- <i>te</i> (Trees): ---	Linear: FC	---
	-0.007	Intercept: 1.516 <i>te</i> (DO): 3.775 <i>te</i> (Trees): 3.899	Intercept: <0.001* <i>te</i> (DO): <0.001* <i>te</i> (Trees): <0.001*	Rational: 1.26e-02	362.013
	-0.013	Intercept: 1.516 <i>te</i> (DO): 3.678 <i>te</i> (Trees): 3.907	Intercept: <0.001* <i>te</i> (DO): <0.001* <i>te</i> (Trees): <0.001*	Spherical: 4.25e-02	377.359
$A_{Hv} \sim te(Grass) + te(Trees)$	---	Intercept: --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Exponential: NC	---
	-0.353	Intercept: 1.773 <i>te</i> (Grass): 2.934 <i>te</i> (Trees): 3.927	Intercept: <0.001* <i>te</i> (Grass): 0.012* <i>te</i> (Trees): <0.001*	Gaussian: 2.07e-02	392.284
	---	Intercept: --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Linear: FC	---
	-0.343	Intercept: 1.780 <i>te</i> (Grass): 2.903 <i>te</i> (Trees): 3.930	Intercept: <0.001* <i>te</i> (Grass): 0.009* <i>te</i> (Trees): <0.001*	Rational: 1.90e-02	349.485
	---	Intercept: --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Intercept: --- <i>te</i> (Grass): --- <i>te</i> (Trees): ---	Spherical: NC	---
$A_{Hv} \sim te(PHI)$	0.072	Intercept: 1.484 <i>te</i> (PHI): 3.853	Intercept: <0.001* <i>te</i> (PHI): <0.001*	Exponential: 2.76e-03	394.155
	0.073	Intercept: 1.472 <i>te</i> (PHI): 3.851	Intercept: <0.001* <i>te</i> (PHI): <0.001*	Gaussian: 1.42e-03	396.775
	---	Intercept: --- <i>te</i> (PHI): ---	Intercept: --- <i>te</i> (PHI): ---	Linear: FC	---
	0.069	Intercept: 1.517 <i>te</i> (PHI): 3.864	Intercept: <0.001* <i>te</i> (PHI): <0.001*	Rational: 4.43e-03	388.763
	0.073	Intercept: 1.472 <i>te</i> (PHI): 3.851	Intercept: <0.001* <i>te</i> (PHI): <0.001*	Spherical: 6.19e-03	396.775



TABLE S6 | (Continued)

Formula (RV_EV)	Adj. R ²	Estimate	P	SCS: Range	AICc
$A_{Hv} \sim te(\text{Current})$	-0.018	Intercept: 1.339 <i>te</i> (Current): 3.780	Intercept: <0.001* <i>te</i> (Current): <0.001*	Exponential: 1.25e-02	471.212
	----	Intercept: ---- <i>te</i> (Current): ----	Intercept: ---- <i>te</i> (Current): ----	Gaussian: NC	----
	-0.026	Intercept: 1.419 <i>te</i> (Current): 3.790	Intercept: <0.001* <i>te</i> (Current): <0.001*	Linear: 2.39e-02	476.621
	-0.018	Intercept: 1.326 <i>te</i> (Current): 3.795	Intercept: <0.001* <i>te</i> (Current): <0.001*	Rational: 8.75e-03	459.102
	-0.016	Intercept: 1.214 <i>te</i> (Current): 3.818	Intercept: <0.001* <i>te</i> (Current): <0.001*	Spherical: 1.66e-02	460.586
$A_{Hv} \sim te(\text{DO})$	0.115	Intercept: 1.558 <i>te</i> (DO): 3.903	Intercept: <0.001* <i>te</i> (DO): <0.001*	Exponential: 1.13e-02	399.077
	0.115	Intercept: 1.581 <i>te</i> (DO): 3.876	Intercept: <0.001* <i>te</i> (DO): <0.001*	Gaussian: 8.03e-03	404.796
	----	Intercept: ---- <i>te</i> (DO): ----	Intercept: ---- <i>te</i> (DO): ----	Linear: FC	----
	0.116	Intercept: 1.569 <i>te</i> (DO): 3.900	Intercept: <0.001* <i>te</i> (DO): <0.001*	Rational: 7.69e-03	391.964
	0.115	Intercept: 1.582 <i>te</i> (DO): 3.875	Intercept: <0.001* <i>te</i> (DO): <0.001*	Spherical: 1.74e-02	403.762
$A_{Hv} \sim te(\text{Grass})$	-0.077	Intercept: 1.768 <i>te</i> (Grass): 3.538	Intercept: <0.001* <i>te</i> (Grass): <0.001*	Exponential: 1.71e-02	429.906
	-0.073	Intercept: 1.799 <i>te</i> (Grass): 3.579	Intercept: <0.001* <i>te</i> (Grass): <0.001*	Gaussian: 9.45e-03	440.334
	-0.068	Intercept: 1.803 <i>te</i> (Grass): 3.521	Intercept: <0.001* <i>te</i> (Grass): <0.001*	Linear: 1.59e02	439.441
	-0.087	Intercept: 1.789 <i>te</i> (Grass): 3.651	Intercept: <0.001* <i>te</i> (Grass): <0.001*	Rational: 1.07e-02	413.827
	-0.035	Intercept: 1.792 <i>te</i> (Grass): 2.814	Intercept: <0.001* <i>te</i> (Grass): <0.001*	Spherical: 1.82e-02	460.850
$A_{Hv} \sim te(\text{Trees})$	-0.232	Intercept: 1.741 <i>te</i> (Trees): 3.947	Intercept: <0.001* <i>te</i> (Trees): <0.001*	Exponential: 2.56e-02	429.206
	-0.204	Intercept: 1.791 <i>te</i> (Trees): 3.930	Intercept: <0.001* <i>te</i> (Trees): <0.001*	Gaussian: 1.55e-02	437.023
	-0.224	Intercept: 1.781 <i>te</i> (Trees): 3.944	Intercept: <0.001* <i>te</i> (Trees): <0.001*	Linear: 3.60e-02	435.617
	-0.235	Intercept: 1.773 <i>te</i> (Trees): 3.946	Intercept: <0.001* <i>te</i> (Trees): <0.001*	Rational: 1.51e-02	413.695
	-0.205	Intercept: 1.772 <i>te</i> (Trees): 3.929	Intercept: <0.001* <i>te</i> (Trees): <0.001*	Spherical: 4.14e-02	439.153

Neotropical Ichthyology



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