Ecography

ECOG-00002
Phillipsen, I. C. and Lytle, D. A. 2012. Aquatic insects in a sea of desert: population genetic structure is shaped by limited dispersal in a naturally fragmented landscape. – Ecography 35: xxx–xxx.

Supplementary material

Appendix 1

Microsatellite loci for *Abedus herberti.* Primer sequences are given 5' to 3'. The loci were amplified using multiplex PCR and were divided into three multiplex sets.

Locus	Forward Primer	Reverse Primer	Multiplex Set
A10	GTTCCGCATATAACAAACAATC	AATCGACCCCTACAAGTTAATC	A
A114	AATAATTTTCTCCCCCCTATCA	TTGGCTACTTGACGCATATAGA	A
B9	GCCTTCTGTATCGCCAATAC	TCAGGTAGAGGAAAACATTGTG	A
D6	CTCCTGAGGCTCTATTTTATCA	GCCCAAACAGATTTGAATC	A
A103	ACGATTTCGGGTGGAGATAG	AAAGCCTCCCTTTGAAGTCC	B
A106	GCATTATTGGCGTCTGCTA	GCTATCTGTTGCTGTCTCATTC	B
A112	GGGTTGCGAATGTTATCTC	CGGGCTTTTCCTTATGTAG	B
A2	GCGAGGGTGTCTCACTTTG	GCCGATAGAGTCGTTGTCG	C
A111	TCGTCGTACAATTCGCAAAC	CCCCGTGTTCCCACTTAA	C
B107	GCCCCATTATCCTCATAGTC	GTGGCTGTGAAAGCGTAAC	C

Appendix 2

Results of Mantel correlation tests between pairs of landscape variables. Significant correlations greater than 0.70 are marked with asterisks.

	Canopy Cover	Curvature	Elevation	Perennial Habitats	Stream - Resistance	Stream - Strict
Canopy Cover	-					
Curvature	0.59	-				
Elevation	0.55	0.78*	-			
Perennial Habitats	0.37	0.64	0.66	-		
Stream - Resistance	0.13	0.39	0.40	0.75	-	
Stream - Strict	0.15	0.40	0.23	0.50	0.24	-

Appendix 3

Estimates of effective population size and results of bottleneck tests. For each population, estimated effective population sizes from both the sibship analysis method ($\widehat{N}_{e(SA)}$) and the LD method ($\widehat{N}_{e(LD)}$) are reported. Negative $\widehat{N}_{e(LD)}$ are interpreted as infinity. Results of the Wilcoxon sign-rank (WSR) test for population bottlenecks are given as *P*-values (none were significant). *M* (the number of alleles divided by the range in allele size) was calculated for each population. For each population, the value of *M* was compared to a critical *M* value (M_c) that was derived from 10,000 simulations of an equilibrium population. Populations with *M* less than M_c (marked with asterisks) have likely gone through a population bottleneck (Garza and Williamson 2001). Simulations were performed under four combinations of the θ and p_g parameters (see text for explanation), resulting in a value of M_c for each parameter combination.

						θ = 0.4		θ = 2	
						p_g = 0.1	p_g = 0.3	p_g = 0.1	p_g = 0.3
Population	Name	$\widehat{N}_{e(SA)}$	$\widehat{N}_{e(LD)}$	*P* (WSR)	*M*	M_c	M_c	M_c	M_c
1	Upper Huachuca	28 (14-79)	-529.4 (15.1-Inf)	0.652	0.5115	0.7905*	0.6396*	0.7009*	0.5517*
2	Lower Huachuca	37 (22-67)	-1853.5 (86.7-Inf)	0.577	0.5054	0.7908*	0.6422*	0.7202*	0.5770*
3	Garden	61 (42-91)	669 (141.6-Inf)	0.920	0.5191	0.7976*	0.6393*	0.7333*	0.6042*
4	Ramsey	46 (31-73)	95.6 (50.6-334.1)	0.991	0.5481	0.7976*	0.6382*	0.7291*	0.5925*
5	Empire	30 (19-53)	74.1 (23-Inf)	0.246	0.5883	0.7929*	0.6381*	0.7208*	0.5814
6	Mattie	38 (21-73)	109.5 (42.1-Inf)	0.500	0.6530	0.7932*	0.6429	0.7155*	0.5706
7	Sonoita	23 (12-47)	67.8 (17.1-Inf)	0.903	0.6478	0.7932*	0.6408	0.7085*	0.5652
8	French Joe	19 (10-43)	9 (3.3-21.1)	0.188	0.4646	0.7921*	0.6415*	0.7088*	0.5617*
9	Chulo	20 (11-42)	40.6 (13.7-Inf)	0.385	0.6285	0.7938*	0.6413*	0.7143*	0.5692
10	Dixie	27 (16-51)	91.9 (32.1-Inf)	0.754	0.6102	0.7908*	0.6437*	0.7174*	0.5725
11	Cave	23 (13-46)	19.4 (11.1-41.1)	0.500	0.5813	0.7952*	0.6421*	0.7185*	0.5758
12	Carr	13 (5-79)	3 (0.9-Inf)	0.410	NA	NA	NA	NA	NA
13	Sunnyside	27 (15-55)	25.3 (15.7-50.3)	0.216	0.5172	0.7908*	0.6429*	0.7137*	0.5670*
14	Scotia	36 (22-64)	101.2 (53.1-480.3)	0.862	0.5649	0.7917*	0.6408*	0.7202*	0.5763*
15	San Pedro	23 (12-64)	20 (10.6-60.7)	0.385	0.5331	0.7918*	0.6389*	0.7022*	0.5573*
16	Gardner	58 (40-88)	684.1 (168.4-Inf)	0.991	0.5747	0.7976*	0.6446*	0.7273*	0.5892*
17	Big Casa Blanca	55 (20-∞)	-228.8 (23.7-Inf)	0.813	NA	NA	NA	NA	NA
18	Florida	28 (17-48)	36.5 (23.6-64.6)	0.839	0.6493	0.7969*	0.6422	0.7262*	0.5859
19	Madera	39 (25-63)	149.2 (70.3-2999.6)	0.920	0.6623	0.7976*	0.6404	0.7245*	0.5904
20	Wakefield	NA	NA	NA	NA	NA	NA	NA	NA

Appendix 4

Pairwise measures of genetic distance between populations of *Abedus herberti*. Conditional genetic distances (*cGD*) are given below the diagonal, F_{ST} are given above the diagonal. All exact tests of pairwise genetic differentiation were significant after applying a Bonferroni correction.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	-	0.08	0.18	0.13	0.37	0.16	0.15	0.16	0.13	0.24	0.17	0.23	0.20	0.24	0.17	0.14	0.13	0.22	0.17
2	14.95	-	0.10	0.06	0.23	0.08	0.07	0.08	0.06	0.16	0.07	0.10	0.08	0.12	0.10	0.07	0.05	0.13	0.09
3	19.19	19.34	-	0.08	0.27	0.14	0.12	0.15	0.11	0.23	0.14	0.17	0.14	0.22	0.15	0.16	0.17	0.16	0.18
4	26.53	13.47	15.71	-	0.23	0.07	0.06	0.11	0.06	0.15	0.08	0.13	0.09	0.14	0.09	0.11	0.08	0.14	0.10
5	17.44	19.61	6.63	9.08	-	0.19	0.23	0.21	0.22	0.31	0.18	0.23	0.23	0.32	0.25	0.21	0.25	0.27	0.30
6	22.21	13.25	9.36	11.65	9.58	-	0.05	0.09	0.04	0.16	0.07	0.14	0.08	0.15	0.09	0.10	0.04	0.16	0.12
7	19.82	19.96	5.66	21.37	12.28	15.02	-	0.10	0.04	0.15	0.07	0.16	0.09	0.14	0.10	0.07	0.03	0.15	0.10
8	19.80	19.56	6.54	19.18	13.17	15.90	7.02	-	0.08	0.18	0.08	0.14	0.13	0.18	0.10	0.09	0.09	0.12	0.11
9	11.89	12.03	7.31	16.66	7.58	10.32	7.93	7.91	-	0.13	0.08	0.11	0.07	0.13	0.09	0.09	0.05	0.12	0.09
10	19.87	11.70	16.98	19.08	23.61	19.45	22.64	17.19	23.73	-	0.14	0.17	0.14	0.15	0.16	0.17	0.12	0.15	0.18
11	24.11	12.18	20.09	10.36	19.44	10.73	25.75	25.92	21.05	8.72	-	0.11	0.08	0.12	0.08	0.05	0.03	0.11	0.09
12	8.37	23.32	25.55	28.00	18.92	28.50	28.19	28.05	20.26	16.81	25.54	-	0.08	0.15	0.14	0.14	0.11	0.17	0.13
13	10.64	20.93	21.64	24.10	15.01	24.59	27.30	24.14	22.53	9.23	17.95	7.58	-	0.10	0.13	0.12	0.07	0.17	0.13
14	13.85	25.97	20.06	22.52	13.44	23.02	25.72	22.56	21.02	15.79	24.51	5.49	6.56	-	0.18	0.15	0.10	0.16	0.12
15	23.74	19.99	7.95	11.01	14.58	17.32	13.61	8.17	15.26	9.03	17.75	25.84	18.25	23.00	-	0.10	0.08	0.15	0.13
16	13.30	13.32	18.40	21.46	21.39	11.81	24.06	18.61	22.13	19.47	22.47	21.67	23.94	27.15	10.45	-	0.05	0.13	0.10
17	18.49	11.48	14.61	19.52	14.67	23.98	15.10	8.07	15.98	17.54	21.18	19.97	16.07	14.49	8.51	18.96	-	0.13	0.06
18	13.13	21.68	24.81	21.34	24.87	21.71	25.29	18.27	25.02	10.25	10.98	21.50	19.47	24.68	18.71	11.49	10.20	-	0.14
19	10.63	19.35	13.44	15.89	6.81	16.39	19.09	15.93	14.39	17.43	26.16	12.11	8.20	6.63	16.37	23.93	7.86	18.06	-

Appendix 5

Estimated migration rates from BayesAss analysis. 95% credible sets are given in parentheses. Non-zero rates (i.e. those whose credible set did not include zero) are shown in red. Rates above the diagonal represent gene flow from a population listed in the left column to a population list in the top row. Rates below the diagonal represent the reverse situation.

		Upper Huachuca	Lower Huachuca	Ramsey	Garden	Carr	San Pedro	Sunnyside	Cave	Scotia	Sonoita	Gardner	Empire	Mattie	French Joe	Florida	Madera	Big Casa Blanca	Chulo	Dixie
		Pop 1	Pop 2	Pop 4	Pop 3	Pop 12	Pop 15	Pop 13	Pop 11	Pop 14	Pop 7	Pop 16	Pop 5	Pop 6	Pop 8	Pop 18	Pop 19	Pop 17	Pop 9	Pop 10
Upper Huachuca	Pop 1	*0.678 (0.657-0.699)*	**0.161 (0.106-0.217)**	0.01 (-0.008-0.028)	0.01 (-0.009-0.028)	0.01 (-0.009-0.028)	0.009 (-0.008-0.026)	0.01 (-0.008-0.028)	0.01 (-0.008-0.027)	0.009 (-0.008-0.027)	0.009 (-0.009-0.027)	0.01 (-0.009-0.028)	0.009 (-0.008-0.026)	0.01 (-0.008-0.028)	0.009 (-0.009-0.027)	0.01 (-0.008-0.027)	0.009 (-0.008-0.027)	0.009 (-0.008-0.026)	0.01 (-0.008-0.027)	0.01 (-0.009-0.028)
Lower Huachuca	Pop 2	0.007 (-0.007-0.02)	*0.832 (0.775-0.889)*	0.008 (-0.006-0.021)	0.023 (-0.008-0.054)	0.007 (-0.006-0.019)	0.006 (-0.006-0.019)	0.007 (-0.006-0.02)	0.008 (-0.007-0.024)	0.014 (-0.011-0.039)	0.007 (-0.006-0.02)	0.013 (-0.011-0.037)	0.008 (-0.007-0.023)	0.007 (-0.006-0.02)	0.006 (-0.006-0.019)	0.014 (-0.005-0.034)	0.009 (-0.008-0.026)	0.007 (-0.006-0.019)	0.01 (-0.008-0.027)	0.008 (-0.007-0.023)
Ramsey	Pop 4	0.004 (-0.004-0.012)	0.005 (-0.004-0.013)	*0.924 (0.893-0.954)*	0.006 (-0.005-0.017)	0.004 (-0.004-0.012)	0.004 (-0.004-0.012)	0.004 (-0.004-0.012)	0.004 (-0.004-0.012)	0.004 (-0.004-0.013)	0.004 (-0.004-0.011)	0.004 (-0.004-0.013)	0.004 (-0.003-0.012)	0.004 (-0.004-0.012)	0.004 (-0.003-0.012)	0.004 (-0.004-0.013)	0.004 (-0.004-0.012)	0.004 (-0.004-0.012)	0.004 (-0.004-0.012)	0.004 (-0.004-0.012)
Garden	Pop 3	0.003 (-0.003-0.009)	0.003 (-0.003-0.01)	0.005 (-0.004-0.013)	*0.934 (0.907-0.961)*	0.005 (-0.004-0.014)	0.003 (-0.003-0.009)	0.003 (-0.003-0.008)	0.003 (-0.003-0.009)	0.003 (-0.003-0.01)	0.003 (-0.003-0.009)	0.003 (-0.003-0.009)	0.004 (-0.003-0.01)	0.003 (-0.002-0.009)	0.007 (-0.005-0.018)	0.006 (-0.004-0.016)	0.003 (-0.003-0.009)	0.003 (-0.003-0.009)	0.003 (-0.003-0.01)	0.003 (-0.003-0.01)
Carr	Pop 12	0.011 (-0.009-0.031)	0.011 (-0.011-0.033)	0.011 (-0.009-0.032)	0.012 (-0.01-0.034)	*0.688 (0.653-0.722)*	0.011 (-0.009-0.032)	0.011 (-0.01-0.031)	0.011 (-0.01-0.032)	**0.108 (0.045-0.171)**	0.011 (-0.009-0.031)	0.013 (-0.013-0.039)	0.013 (-0.012-0.037)	0.011 (-0.009-0.03)	0.022 (-0.015-0.059)	0.011 (-0.009-0.032)	0.011 (-0.01-0.032)	0.012 (-0.01-0.035)	0.011 (-0.01-0.032)	0.011 (-0.01-0.032)
San Pedro	Pop 15	0.009 (-0.008-0.026)	0.01 (-0.009-0.028)	0.009 (-0.008-0.026)	0.009 (-0.008-0.026)	0.013 (-0.01-0.035)	*0.678 (0.657-0.699)*	0.01 (-0.008-0.027)	0.01 (-0.009-0.028)	**0.145 (0.09-0.201)**	0.009 (-0.007-0.025)	0.017 (-0.009-0.042)	0.01 (-0.009-0.028)	0.009 (-0.008-0.026)	0.015 (-0.009-0.039)	0.009 (-0.008-0.027)	0.009 (-0.009-0.027)	0.01 (-0.009-0.028)	0.01 (-0.009-0.028)	0.01 (-0.009-0.03)
Sunnyside	Pop 13	0.008 (-0.007-0.023)	0.008 (-0.007-0.024)	0.008 (-0.007-0.022)	0.011 (-0.008-0.029)	0.008 (-0.007-0.022)	0.008 (-0.007-0.023)	*0.677 (0.658-0.695)*	0.009 (-0.008-0.026)	**0.166 (0.108-0.223)**	0.008 (-0.007-0.024)	0.013 (-0.011-0.037)	0.011 (-0.009-0.03)	0.008 (-0.007-0.022)	0.008 (-0.006-0.022)	0.009 (-0.008-0.026)	0.009 (-0.009-0.027)	0.008 (-0.007-0.023)	0.01 (-0.007-0.027)	0.016 (-0.012-0.043)
Cave	Pop 11	0.007 (-0.006-0.019)	0.009 (-0.008-0.025)	0.008 (-0.007-0.023)	0.008 (-0.007-0.023)	0.006 (-0.005-0.018)	0.007 (-0.006-0.019)	0.007 (-0.006-0.02)	*0.841 (0.791-0.891)*	0.02 (-0.012-0.052)	0.007 (-0.006-0.02)	0.008 (-0.007-0.024)	0.007 (-0.006-0.019)	0.007 (-0.006-0.02)	0.007 (-0.007-0.02)	0.015 (-0.007-0.038)	0.015 (-0.006-0.036)	0.007 (-0.006-0.02)	0.007 (-0.006-0.02)	0.009 (-0.008-0.025)
Scotia	Pop 14	0.007 (-0.007-0.021)	0.008 (-0.008-0.025)	0.008 (-0.006-0.021)	0.012 (-0.008-0.032)	0.007 (-0.007-0.021)	0.007 (-0.006-0.02)	0.007 (-0.007-0.02)	0.014 (-0.008-0.036)	*0.846 (0.79-0.901)*	0.008 (-0.006-0.022)	0.011 (-0.009-0.031)	0.009 (-0.007-0.026)	0.006 (-0.006-0.019)	0.008 (-0.007-0.023)	0.007 (-0.006-0.02)	0.01 (-0.009-0.028)	0.007 (-0.007-0.02)	0.011 (-0.009-0.03)	0.008 (-0.007-0.023)
Sonoita	Pop 7	0.008 (-0.007-0.024)	0.009 (-0.008-0.025)	0.009 (-0.009-0.026)	0.01 (-0.01-0.03)	0.008 (-0.007-0.024)	0.008 (-0.008-0.025)	0.008 (-0.008-0.024)	0.009 (-0.008-0.025)	0.01 (-0.009-0.03)	*0.834 (0.775-0.892)*	0.011 (-0.01-0.032)	0.009 (-0.008-0.026)	0.009 (-0.008-0.026)	0.008 (-0.007-0.024)	0.011 (-0.01-0.031)	0.01 (-0.008-0.028)	0.009 (-0.007-0.024)	0.011 (-0.01-0.032)	0.01 (-0.008-0.028)
Gardner	Pop 16	0.005 (-0.005-0.015)	0.006 (-0.005-0.017)	0.005 (-0.005-0.015)	0.007 (-0.006-0.02)	0.005 (-0.005-0.014)	0.005 (-0.004-0.014)	0.005 (-0.005-0.016)	0.006 (-0.005-0.016)	0.01 (-0.008-0.029)	0.006 (-0.005-0.016)	*0.888 (0.845-0.93)*	0.006 (-0.005-0.016)	0.005 (-0.005-0.015)	0.005 (-0.005-0.014)	0.009 (-0.007-0.025)	0.009 (-0.008-0.026)	0.005 (-0.005-0.015)	0.005 (-0.005-0.016)	0.009 (-0.006-0.024)
Empire	Pop 5	0.006 (-0.005-0.017)	0.006 (-0.005-0.017)	0.006 (-0.005-0.016)	0.007 (-0.006-0.019)	0.006 (-0.005-0.017)	0.006 (-0.006-0.018)	0.006 (-0.005-0.016)	0.006 (-0.005-0.017)	0.006 (-0.006-0.018)	0.006 (-0.006-0.018)	0.007 (-0.007-0.021)	*0.893 (0.852-0.935)*	0.006 (-0.006-0.018)	0.005 (-0.005-0.016)	0.006 (-0.005-0.017)	0.006 (-0.005-0.017)	0.006 (-0.006-0.017)	0.006 (-0.005-0.017)	0.006 (-0.006-0.018)
Mattie	Pop 6	0.008 (-0.007-0.022)	0.008 (-0.007-0.023)	0.008 (-0.006-0.022)	0.008 (-0.006-0.022)	0.01 (-0.008-0.028)	0.008 (-0.007-0.022)	0.008 (-0.007-0.022)	0.008 (-0.007-0.023)	0.008 (-0.007-0.022)	0.009 (-0.008-0.027)	**0.168 (0.114-0.223)**	0.021 (-0.01-0.051)	*0.676 (0.658-0.695)*	0.013 (-0.008-0.034)	0.008 (-0.007-0.022)	0.008 (-0.006-0.021)	0.008 (-0.007-0.023)	0.008 (-0.007-0.022)	0.011 (-0.008-0.029)
French Joe	Pop 8	0.008 (-0.007-0.023)	0.009 (-0.008-0.025)	0.008 (-0.008-0.024)	0.009 (-0.008-0.025)	0.009 (-0.008-0.025)	0.008 (-0.007-0.023)	0.009 (-0.008-0.025)	0.008 (-0.007-0.023)	0.008 (-0.007-0.024)	0.009 (-0.007-0.025)	0.01 (-0.009-0.028)	0.009 (-0.007-0.025)	0.008 (-0.007-0.024)	*0.68 (0.655-0.704)*	0.009 (-0.008-0.026)	0.008 (-0.007-0.023)	0.008 (-0.008-0.024)	0.009 (-0.007-0.025)	**0.175 (0.121-0.228)**
Florida	Pop 18	0.006 (-0.005-0.016)	0.005 (-0.005-0.016)	0.005 (-0.005-0.016)	0.01 (-0.006-0.027)	0.005 (-0.005-0.015)	0.005 (-0.005-0.015)	0.005 (-0.005-0.015)	0.005 (-0.005-0.015)	0.007 (-0.006-0.019)	0.006 (-0.005-0.016)	0.015 (-0.006-0.036)	0.005 (-0.006-0.016)	0.005 (-0.005-0.015)	0.006 (-0.005-0.016)	*0.88 (0.84-0.92)*	0.012 (-0.005-0.03)	0.005 (-0.005-0.015)	0.005 (-0.005-0.016)	0.006 (-0.005-0.017)
Madera	Pop 19	0.005 (-0.005-0.014)	0.006 (-0.006-0.018)	0.005 (-0.005-0.015)	0.011 (-0.005-0.027)	0.005 (-0.005-0.014)	0.005 (-0.005-0.014)	0.005 (-0.004-0.014)	0.005 (-0.005-0.015)	0.007 (-0.006-0.02)	0.005 (-0.004-0.014)	0.007 (-0.007-0.022)	0.005 (-0.004-0.014)	0.005 (-0.005-0.015)	0.005 (-0.005-0.015)	0.006 (-0.005-0.016)	*0.899 (0.86-0.938)*	0.005 (-0.005-0.014)	0.006 (-0.005-0.016)	0.005 (-0.005-0.016)
Big Casa Blanca	Pop 17	0.011 (-0.009-0.031)	0.011 (-0.01-0.032)	0.011 (-0.009-0.03)	0.013 (-0.011-0.036)	0.011 (-0.01-0.032)	0.011 (-0.01-0.032)	0.011 (-0.009-0.031)	0.015 (-0.011-0.041)	0.017 (-0.012-0.046)	0.013 (-0.01-0.037)	**0.103 (0.035-0.172)**	0.011 (-0.01-0.032)	0.011 (-0.009-0.03)	0.015 (-0.01-0.04)	0.012 (-0.01-0.034)	0.019 (-0.016-0.054)	*0.68 (0.655-0.705)*	0.012 (-0.009-0.033)	0.014 (-0.011-0.039)
Chulo	Pop 9	0.007 (-0.008-0.023)	0.008 (-0.008-0.025)	0.009 (-0.008-0.025)	0.008 (-0.008-0.024)	0.008 (-0.007-0.022)	0.008 (-0.007-0.022)	0.008 (-0.007-0.023)	0.008 (-0.007-0.024)	0.011 (-0.01-0.031)	0.008 (-0.008-0.025)	0.01 (-0.009-0.028)	0.009 (-0.008-0.026)	0.008 (-0.007-0.023)	0.008 (-0.007-0.022)	0.008 (-0.007-0.022)	0.008 (-0.008-0.024)	0.008 (-0.007-0.023)	*0.85 (0.796-0.904)*	0.01 (-0.009-0.029)
Dixie	Pop 10	0.007 (-0.006-0.021)	0.007 (-0.006-0.02)	0.008 (-0.007-0.022)	0.008 (-0.007-0.022)	0.008 (-0.007-0.022)	0.007 (-0.006-0.021)	0.008 (-0.006-0.021)	0.007 (-0.007-0.02)	0.008 (-0.009-0.025)	0.007 (-0.007-0.022)	0.007 (-0.007-0.022)	0.008 (-0.006-0.022)	0.007 (-0.006-0.021)	0.007 (-0.006-0.02)	0.008 (-0.008-0.024)	0.008 (-0.007-0.023)	0.007 (-0.007-0.021)	0.008 (-0.007-0.022)	*0.866 (0.818-0.913)*

Appendix 6

Results of information-theoretic model selection procedure. Models are ranked by AIC, from smallest to largest. A total of 47 models were included in the analysis; only those models with ΔAIC < 2 are shown here. Model weights (w_i) were calculated from this smaller set of models. Landscape variables are abbreviated as follows: *Canopy Cover* (Canopy), *Curvature* (Curv), *Elevation* (Elev), *Perennial Habitats* (Peren), *Stream-Resistance* (Str-R) *Stream-Strict* (Str-S).

Model	Log-likelihood	AIC	ΔAIC	w_i
Curv	-544.519	1091.038	0	0.195239781
Curv + Str-R	-543.92	1091.839	0.801273	0.130789889
Curv + Elev	-543.985	1091.97	0.931749	0.122529768
Curv + Canopy	-544.073	1092.146	1.108187	0.112183395
Curv + Elev + Str-R	-543.161	1092.321	1.283177	0.102785041
Curv + Peren	-544.261	1092.523	1.484593	0.092937938
Curv + Str-S	-544.362	1092.725	1.686953	0.083994535
Curv + Elev + Peren	-543.365	1092.73	1.691773	0.08379238
Curv + Elev + Str-S + Peren	-542.466	1092.932	1.893651	0.075747322