Appendix P3

Table S1: Correlations of variables between the 5000m scale and the site scale (500m) and the two alternate landscape scales, here shown for UKBMS sites. Note that SOILDIV data were not available at the 500m scale. n = 1387.

Variable	**500m**	**2000m**	**10000m**
SOILDIV	-	0.60	0.78
HABDIV	0.34	0.78	0.89
ALT_STD	0.92	0.90	0.92
EAST_STD	0.15	0.61	0.73
NORTH_STD	0.14	0.61	0.71
COVER(W)	0.52	0.84	0.91
COVER(G)	0.59	0.91	0.96
COVER(H)	0.65	0.87	0.95
ISOLATION(W)	-0.06	0.16	0.37
ISOLATION(G)	-0.01	0.13	0.43
ISOLATION(H)	-0.04	0.07	0.18
PATCHES(W)	0.43	0.84	0.92
PATCHES(G)	0.27	0.82	0.93
PATCHES(H)	0.59	0.88	0.93
SHAPE(W)	0.27	0.57	0.70
SHAPE(G)	0.16	0.50	0.63
SHAPE(H)	0.40	0.69	0.76

Table S2 (supplement to Table 11): Summary of tests concerning hypothesis 4b (landscape- scale variation enhances robustness) based on covariates at a) 2000m or b) 10000m landscape scales. For each taxon/method of deriving events/variable, relationships are tallied according to the magnitude and direction of t-values. Cells shaded in grey indicate the expected relationship according to H_4. Expected is the number of relationships expected by chance (one-tailed $\alpha = 0.05$).

a) 2000m

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	ALT_STD	0.55	1	9	1	0.5	1	9	0
		EAST_STD	0.55	1	10	0	0.5	0	10	0
		HABDIV	0.55	0	10	1	0.5	0	10	0
		NORTH_STD	0.55	0	11	0	0.5	0	10	0
		SOILDIV	0.55	1	10	0	0.5	0	9	1
	Trend	ALT_STD	1.35	0	24	3	1.05	0	20	1
		EAST_STD	1.35	0	27	0	1.05	2	19	0
		HABDIV	1.35	0	24	3	1.05	0	20	1
		NORTH_STD	1.35	0	27	0	1.05	1	18	2
		SOILDIV	1.35	2	23	2	1.05	0	19	2
Bird	Weather	HABDIV	1.45	0	27	2	1.05	0	20	1
	Trend	HABDIV	0.6	0	12	0	0.55	0	9	2

b) 10000m

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	ALT_STD	0.55	0	11	0	0.5	1	9	0
		EAST_STD	0.55	2	8	1	0.5	0	9	1
		HABDIV	0.55	0	10	1	0.5	0	9	1
		NORTH_STD	0.55	0	9	2	0.5	0	10	0
		SOILDIV	0.55	1	10	0	0.5	0	10	0
	Trend	ALT_STD	1.35	2	22	3	1.05	0	21	0
		EAST_STD	1.35	2	21	4	1.05	0	20	1
		HABDIV	1.35	0	22	5	1.05	1	20	0
		NORTH_STD	1.35	2	25	0	1.05	1	19	1
		SOILDIV	1.35	0	26	1	1.05	0	21	0
Bird	Weather	HABDIV	1.45	2	27	0	1.05	0	21	0
	Trend	HABDIV	0.6	0	12	0	0.55	0	10	1

Table S3 (supplement to Table 12): Summary of tests concerning hypothesis 5b (landscape-scale area of key habitat enhances robustness) based on covariates at a) 2000m or b) 10000m landscape scales. For each taxon/method of deriving events/variable, relationships are tallied according to the magnitude and direction of t-values. For butterflies, tests were combined across habitats, but only including species known to be associated with each habitat (i.e. tallied woodland butterflies relationships with woodland cover, etc). Cells shaded in grey indicate the expected relationship according to H_5. Expected is the number of relationships expected by chance (one-tailed $\alpha = 0.05$).

a) 2000m

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	COVER(x)	1.05	2	17	2	1	1	19	0
	Trend	COVER(x)	2.45	0	42	7	2.1	1	38	3
Bird	Weather	COVER(W)	1.45	1	25	3	1.05	2	19	0
	Trend	COVER(W)	0.6	1	11	0	0.55	0	11	0

b) 10000m

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	COVER(x)	1.05	2	17	2	1	1	19	0
	Trend	COVER(x)	2.45	2	36	11	2.1	2	37	3
Bird	Weather	COVER(W)	1.45	2	24	3	1.05	0	19	2
	Trend	COVER(W)	0.6	0	11	1	0.55	0	9	2

Table S4 (supplement to Table 13): Summary of tests concerning hypothesis 6b (landscape-scale configuration of key habitat enhances robustness) based on covariates at a) 2000m or b) 10000m landscape scales. For each taxon/method of deriving events/variable, relationships are tallied according to the magnitude and direction of t-values. For butterflies, tests were combined across habitats, but only including species known to be associated with each habitat (i.e. tallied woodland butterflies relationships with woodland isolation, etc). Cells shaded in grey indicate the expected relationship according to H_6. Expected is the number of relationships expected by chance (one-tailed $\alpha = 0.05$).

a) 2000m

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	ISOLATION(x)	1.05	3	18	0	1	0	19	1
		PATCHES(x)	1.05	1	15	5	1	1	19	0
		SHAPE(x)	1.05	1	20	0	1	0	18	2
	Trend	ISOLATION(x)	2.45	9	38	2	2.1	1	39	2
		PATCHES(x)	2.45	1	41	7	2.1	5	36	1
		SHAPE(x)	2.45	1	45	3	2.1	2	38	2
Bird	Weather	ISOLATION(W)	1.45	0	29	0	1.05	0	20	1
		PATCHES(W)	1.45	0	29	0	1.05	0	21	0
		SHAPE(W)	1.45	1	27	1	1.05	1	20	0
	Trend	ISOLATION(W)	0.6	0	12	0	0.55	0	10	1
		PATCHES(W)	0.6	0	12	0	0.55	0	11	0
		SHAPE(W)	0.6	0	10	2	0.55	3	7	1

b) 10000m

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	ISOLATION(x)	1.05	3	17	1	1	1	19	0
		PATCHES(x)	1.05	2	15	4	1	1	19	0
		SHAPE(x)	1.05	2	18	1	1	1	19	0
	Trend	ISOLATION(x)	2.45	8	41	0	2.1	3	36	3
		PATCHES(x)	2.45	0	36	13	2.1	3	37	2
		SHAPE(x)	2.45	3	38	8	2.1	1	39	2
Bird	Weather	ISOLATION(W)	1.45	4	24	1	1.05	1	19	1
		PATCHES(W)	1.45	1	25	3	1.05	1	20	0
		SHAPE(W)	1.45	2	25	2	1.05	1	20	0
	Trend	ISOLATION(W)	0.6	1	11	0	0.55	0	11	0
		PATCHES(W)	0.6	0	10	2	0.55	1	10	0
		SHAPE(W)	0.6	1	10	1	0.55	1	8	2

Table S5: T-values equal or greater than |2| for tests relating to H_{1b} (Table 9). ΔDev is the change in deviance with the addition of the variable, and LR P-val the significance of this change in deviance. r is the correlation coefficient between observed and predicted values and Δr the change in correlation coefficient between models with and without the variable. Cells shaded in grey indicate relationships in the expected direction.

a) Vulnerability

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Dingy Skipper	EAST_STD	-1.052	4.2	0.0408	0.53	0.03
		Large White	HABDIV	0.466	7.1	0.0077	0.42	0.03
		Comma	NORTH_STD	-0.898	6.1	0.0132	0.39	0.03
		Dingy Skipper	NORTH_STD	1.066	4.6	0.0318	0.53	0.03
	Trend	Peacock	ALT_STD	-0.007	4.7	0.0303	0.35	0.03
		Small White	ALT_STD	-0.004	4.1	0.0417	0.36	0.01
		Small Copper	ALT_STD	0.012	10.8	0.001	0.47	0.13
		Common Blue	ALT_STD	0.006	6.7	0.0094	0.38	0.03
		Grizzled Skipper	ALT_STD	0.023	10.1	0.0015	0.65	0.05
		Red Admiral	EAST_STD	0.798	5.5	0.0193	0.35	0.02
		Dingy Skipper	NORTH_STD	-2.587	8.1	0.0044	0.59	0.09
		Small Heath	NORTH_STD	1.36	5.7	0.0167	0.35	0.05
Bird	Weather	Blackbird	HABDIV	0.957	4.4	0.0364	0.27	0.13
		Blackbird	HABDIV	1.176	8.6	0.0033	0.43	0.17
		Song Thrush	HABDIV	1.21	5.0	0.0261	0.3	0.18

b) Recovery time

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Speckled Wood	ALT_STD	-0.01	4.0	0.0446	0.15	0.11
		Small Tortoiseshell	EAST_STD	1.165	4.5	0.0336	0.61	0.02
		Green-veined White	HABDIV	-0.665	4.3	0.0392	0.2	0.06
		Small Tortoiseshell	HABDIV	0.806	6.5	0.0108	0.61	0.02
		Small Tortoiseshell	NORTH_STD	-1.288	5.2	0.0231	0.61	0.02
		Ringlet	NORTH_STD	-1.697	4.8	0.029	0.28	0.05
		Small White	NORTH_STD	-1.875	5.9	0.0148	0.41	0.03
	Trend	Small Copper	HABDIV	1.415	6.8	0.0089	0.49	0.1
		Ringlet	NORTH_STD	-1.536	4.4	0.0363	0.26	0.04

Table S6. T-values equal or greater than |2| for tests relating to H_{2b} (Table 10).. ΔDev is the change in deviance with the addition of the variable, and LR P-val the significance of this change in deviance. r is the correlation coefficient between observed and predicted values and Δr the change in correlation coefficient between models with and without the variable. Cells shaded in grey indicate relationships in the expected direction.

a) Vulnerability

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Large Skipper	COVER(W)	-0.736	4.5	0.033	0.25	0.03
		Small Tortoiseshell	COVER(W)	0.934	9.7	0.0018	0.18	0.18
		Green-veined White	COVER(W)	0.577	4.5	0.034	0.32	0.02
	Trend	Meadow Brown	COVER(W)	0.632	4.1	0.0421	0.26	0.04
		Gatekeeper / Hedge Brown	COVER(W)	0.671	5	0.0259	0.45	0.02
		Large White	COVER(W)	0.768	5	0.0258	0.35	0.03
		Green-veined White	COVER(W)	0.756	6.7	0.0095	0.26	0.06
		Brown Argus	COVER(G)	0.97	4.4	0.0355	0.37	0.04
		Meadow Brown	COVER(G)	0.693	5.2	0.0225	0.27	0.04
		Peacock	COVER(G)	0.718	4.1	0.042	0.35	0.03
		Speckled Wood	COVER(G)	0.926	6.7	0.0098	0.43	0.04
Bird	Weather	Song Thrush	COVER(W)	-1.656	3.9	0.0493	0.47	0.15
		Song Thrush	COVER(W)	1.065	5.2	0.0232	0.38	0.13
		Goldcrest	COVER(W)	1.489	5.3	0.0215	0.35	0.22
	Trend	Blue Tit	COVER(W)	-1.08	5.7	0.0166	0.35	0.09
		Blackcap	COVER(W)	0.781	4.1	0.044	0.43	0.04

b) Recovery time

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Speckled Wood	COVER(G)	-0.982	4.1	0.0439	0.16	0.12
	Trend	Orange Tip	COVER(W)	-2.057	14.1	0.0002	0.44	0.12
		Peacock	COVER(W)	-1.058	5.8	0.0162	0.42	0.04
		Small Tortoiseshell	COVER(W)	1.58	14.1	0.0002	0.44	0.05
		Orange Tip	COVER(G)	1.312	6	0.0141	0.37	0.06
		Meadow Brown	COVER(G)	1.235	5.8	0.0161	0.36	0.04
		Peacock	COVER(G)	1.283	8.9	0.0029	0.44	0.05
		Large White	COVER(G)	1.022	6.6	0.0102	0.5	0.02
		Gatekeeper / Hedge Brown	COVER(H)	3.331	4.8	0.0281	0.33	0.04
Bird	Weather	Song Thrush	COVER(W)	-2.695	4.8	0.0285	0.39	0.25
		Wren	COVER(W)	1.821	3.9	0.0476	0.42	0.09
		Wren	COVER(W)	1.821	3.9	0.0476	0.4	0.08

Table S7: T-values equal or greater than |2| for tests relating to H_{4b} (Table 11).. ΔDev is the change in deviance with the addition of the variable, and LR P-val the significance of this change in deviance. r is the correlation coefficient between observed and predicted values and Δr the change in correlation coefficient between models with and without the variable. Cells shaded in grey indicate relationships in the expected direction.

a) Vulnerability

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Large White	ALT_STD	0.005	4.1	0.0417	0.41	0.02
		Comma	ALT_STD	0.006	4	0.0462	0.38	0.02
		Ringlet	HABDIV	0.62	4.6	0.0323	0.28	0.04
		Speckled Wood	SOILDIV	-0.279	7.5	0.006	0.42	0.03
	Trend	Large White	ALT_STD	-0.007	4.2	0.0404	0.34	0.02
		Small Copper	ALT_STD	0.012	8.4	0.0037	0.44	0.11
		Grizzled Skipper	ALT_STD	0.017	6.2	0.0127	0.63	0.03
		Meadow Brown	EAST_STD	3.644	4.2	0.041	0.26	0.04
		Common Blue	EAST_STD	3.672	5.4	0.0206	0.37	0.03
		Ringlet	HABDIV	0.668	8.3	0.0039	0.31	0.04
		Speckled Wood	HABDIV	1.009	8.1	0.0045	0.44	0.05
		Comma	HABDIV	0.55	6.1	0.0132	0.35	0.03
		Chalk-hill Blue	NORTH_STD	-9.543	6.6	0.0105	0.54	0.1
		Common Blue	NORTH_STD	-3.601	5.1	0.0243	0.37	0.02
		Small Tortoiseshell	NORTH_STD	3.036	4.4	0.0354	0.3	0.02
		Brimstone	SOILDIV	0.674	4.9	0.0262	0.41	0.08
		Small Copper	SOILDIV	0.661	6.1	0.0132	0.42	0.08
		Marbled White	SOILDIV	0.582	8.7	0.0032	0.69	0.07
Bird	Trend	Blue Tit	HABDIV	-0.98	5.3	0.0212	0.34	0.09

b) Recovery time

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Green-veined White	ALT_STD	0.01	5.2	0.0228	0.21	0.07
		Comma	EAST_STD	8.251	6.5	0.0109	0.31	0.08
		Dingy Skipper	HABDIV	2.447	7.8	0.0052	0.47	0.14
		Comma	NORTH_STD	-6.929	4.2	0.0401	0.28	0.06
	Trend	Red Admiral	ALT_STD	0.008	5.9	0.0151	0.43	0.02
		Brown Argus	HABDIV	-1.826	5.2	0.0229	0.4	0.06
Bird	Trend	Blackbird	HABDIV	1.131	4.8	0.0289	0.4	0.11
		Chiffchaff	HABDIV	1.849	4.3	0.0383	0.31	0.27

Table S8: T-values equal or greater than |2| for tests relating to H_{5b} (Table 12). ΔDev is the change in deviance with the addition of the variable, and LR P-val the significance of this change in deviance. r is the correlation coefficient between observed and predicted values and Δr the change in correlation coefficient between models with and without the variable. Cells shaded in grey indicate relationships in the expected direction.

a) Vulnerability

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Small Tortoiseshell	COVER(H)	-3.426	7.1	0.0077	0.16	0.16
		Small Tortoiseshell	COVER(W)	2.724	9.9	0.0017	0.19	0.18
		Small White	COVER(G)	2.229	19.9	0	0.46	0.07
	Trend	Holly Blue	COVER(W)	-1.928	5.6	0.0183	0.36	0.02
		Dingy Skipper	COVER(G)	-2.755	6.3	0.012	0.57	0.07
		Meadow Brown	COVER(W)	1.802	4.2	0.0416	0.26	0.04
		Speckled Wood	COVER(W)	3.952	12.7	0.0004	0.46	0.08
		Large White	COVER(W)	3.2	10	0.0016	0.37	0.06
		Small White	COVER(W)	1.124	4.2	0.0395	0.36	0.01
		Comma	COVER(W)	2.402	11.2	0.0008	0.37	0.05
		Small Tortoiseshell	COVER(G)	0.951	5	0.0247	0.3	0.02
		Holly Blue	COVER(G)	2.258	21.5	0	0.42	0.08
		Meadow Brown	COVER(G)	1.235	6.6	0.0103	0.28	0.05
		Gatekeeper / Hedge Brown	COVER(H)	4.743	6.7	0.0098	0.45	0.03
Bird	Weather	Goldcrest	COVER(W)	-4.883	6.8	0.0091	0.64	0.11
		Goldcrest	COVER(W)	-3.362	4.8	0.0284	0.37	0.19
		Robin	COVER(W)	3.813	6.6	0.01	0.43	0.1
		Song Thrush	COVER(W)	3.973	6	0.0143	0.36	0.13
		Goldcrest	COVER(W)	3.04	4.1	0.0434	0.31	0.19
	Trend	Blue Tit	COVER(W)	-2.364	4.2	0.0396	0.32	0.07

b) Recovery time

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Speckled Wood	COVER(G)	-2.505	9.1	0.0026	0.23	0.19
	Trend	Orange Tip	COVER(W)	-5.062	9.9	0.0017	0.41	0.09
		Peacock	COVER(W)	-3.302	6.1	0.0136	0.42	0.04
		Small Tortoiseshell	COVER(W)	4.098	10.5	0.0012	0.43	0.04
		Red Admiral	COVER(W)	2.054	4	0.0448	0.42	0.01
		Holly Blue	COVER(G)	1.833	5.1	0.0234	0.34	0.03
		Small White	COVER(G)	1.415	4.3	0.0391	0.2	0.04
		Common Blue	COVER(H)	6.158	5.4	0.0204	0.52	0.03
Bird	Weather	Wren	COVER(W)	-5.453	4.2	0.0408	0.41	0.14
	Trend	Great Tit	COVER(W)	3.228	4.8	0.0284	0.31	0.16

Table S9: T-values equal or greater than |2| for tests relating to H_{6b} (Table 13). ΔDev is the change in deviance with the addition of the variable, and LR P-val the significance of this change in deviance. r is the correlation coefficient between observed and predicted values and Δr the change in correlation coefficient between models with and without the variable. Cells shaded in grey indicate relationships in the expected direction.

a) Vulnerability

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Small Tortoiseshell	ISOLATION(W)	-0.002	11.5	0.0007	0.2	0.2
		Small White	ISOLATION(G)	-0.009	15.9	0.0001	0.45	0.05
		Grayling	ISOLATION(H)	<0.001	8.2	0.0042	0.39	0.31
		Small Tortoiseshell	PATCHES(H)	-0.009	8.1	0.0044	0.17	0.17
		Small Tortoiseshell	PATCHES(W)	0.003	7.5	0.0061	0.16	0.16
		Large White	PATCHES(W)	0.003	7.8	0.0052	0.42	0.03
		Small White	PATCHES(W)	0.004	10.1	0.0015	0.43	0.04
		Small Tortoiseshell	PATCHES(G)	0.003	4.9	0.027	0.13	0.13
		Large White	PATCHES(G)	0.002	4.1	0.0417	0.41	0.02
		Small Tortoiseshell	SHAPE(G)	-1.545	10.5	0.0012	0.19	0.19
		Small White	SHAPE(G)	1.488	7.9	0.005	0.42	0.03
	Trend	Speckled Wood	ISOLATION(W)	-0.002	5.6	0.0181	0.42	0.04
		Large White	ISOLATION(W)	-0.003	8.1	0.0045	0.36	0.05
		Comma	ISOLATION(W)	-0.002	10.4	0.0013	0.37	0.04
		Red Admiral	ISOLATION(W)	-0.002	6.6	0.01	0.36	0.02
		Holly Blue	ISOLATION(G)	-0.007	10.3	0.0014	0.38	0.04
		Speckled Wood	ISOLATION(G)	-0.007	9.3	0.0022	0.44	0.06
		Common Blue	ISOLATION(G)	-0.003	4.9	0.0271	0.37	0.02
		Small Tortoiseshell	ISOLATION(H)	<0.001	4	0.0448	0.29	0.02
		White Admiral	PATCHES(W)	-0.007	4.2	0.0401	0.51	0.06
		Holly Blue	PATCHES(G)	-0.004	6.1	0.0136	0.37	0.03
		Holly Blue	PATCHES(W)	0.003	7.3	0.0071	0.37	0.03
		Meadow Brown	PATCHES(W)	0.004	13.1	0.0003	0.32	0.1
		Gatekeeper / Hedge Brown	PATCHES(W)	0.003	5.3	0.0213	0.45	0.02
		Large White	PATCHES(W)	0.004	8.9	0.0028	0.37	0.05
		Green-veined White	PATCHES(W)	0.003	4.5	0.0342	0.24	0.04
		Comma	PATCHES(W)	0.003	9	0.0027	0.36	0.04
		Red Admiral	PATCHES(W)	0.004	17.5	0	0.39	0.05
		Peacock	PATCHES(G)	0.004	5.6	0.0183	0.36	0.03
		Large White	PATCHES(G)	0.004	6.9	0.0086	0.36	0.04
		Small White	PATCHES(G)	0.003	9.9	0.0017	0.38	0.03
		Comma	PATCHES(G)	0.004	10.3	0.0014	0.37	0.04
		Common Blue	PATCHES(G)	0.003	4.1	0.0432	0.37	0.02
		Gatekeeper / Hedge Brown	PATCHES(H)	0.01	5.7	0.017	0.45	0.03
		Holly Blue	SHAPE(W)	-2.177	10.6	0.0011	0.38	0.04
		Dingy Skipper	SHAPE(G)	-4.697	6.5	0.0106	0.57	0.07
		Green-veined White	SHAPE(G)	-1.425	5.5	0.0195	0.25	0.05
		Small Tortoiseshell	SHAPE(H)	-0.181	5	0.0253	0.3	0.02
		Speckled Wood	SHAPE(W)	2.516	8.4	0.0037	0.44	0.05
		Small Tortoiseshell	SHAPE(G)	0.933	4.4	0.0357	0.3	0.02
		Holly Blue	SHAPE(G)	3.088	27.3	0	0.44	0.1

Table continued…

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Bird	Weather	Robin	ISOLATION(W)	-0.003	4.2	0.0403	0.4	0.07
		Robin	ISOLATION(W)	-0.004	4.4	0.0351	0.34	0.09
		Robin	ISOLATION(W)	-0.009	6.6	0.0102	0.53	0.23
		Goldcrest	ISOLATION(W)	0.006	6.2	0.0129	0.63	0.1
		Goldcrest	ISOLATION(W)	0.006	4.1	0.044	0.35	0.17
		Wren	PATCHES(W)	-0.006	3.9	0.0479	0.45	0.06
		Wren	PATCHES(W)	0.007	5.1	0.0233	0.37	0.09
		Wren	PATCHES(W)	0.01	6.1	0.0136	0.48	0.26
		Robin	PATCHES(W)	0.013	6.9	0.0085	0.54	0.23
		Blackbird	PATCHES(W)	0.006	4	0.045	0.33	0.09
		Blackbird	PATCHES(W)	0.012	5.8	0.0164	0.51	0.21
		Wren	SHAPE(W)	-3.132	3.8	0.0525	0.41	0.19
		Goldcrest	SHAPE(W)	-4.818	9.9	0.0017	0.68	0.15
		Goldcrest	SHAPE(W)	-4.713	10.4	0.0012	0.49	0.31
		Song Thrush	SHAPE(W)	3.216	5.6	0.0183	0.35	0.13
	Trend	Robin	ISOLATION(W)	-0.002	4.2	0.0397	0.34	0.05
		Coal Tit	PATCHES(W)	-0.007	5.1	0.024	0.32	0.1
		Song Thrush	SHAPE(W)	1.83	4.1	0.0417	0.27	0.11

b) Recovery time

Taxon	Method	Species	Variable	Parameter	□Dev	LR P-val	r	□r
Butterfly	Weather	Green Hairstreak	ISOLATION(G)	-0.021	3.9	0.0488	0.46	0.08
		Speckled Wood	PATCHES(W)	-0.006	11.1	0.0009	0.25	0.21
		Speckled Wood	SHAPE(G)	-1.949	6.4	0.0117	0.19	0.15
	Trend	Small Tortoiseshell	ISOLATION(W)	-0.003	6.2	0.0127	0.41	0.02
		Small Tortoiseshell	ISOLATION(G)	-0.009	12.1	0.0005	0.43	0.04
		Holly Blue	ISOLATION(G)	-0.008	5.4	0.0203	0.34	0.03
		Small Copper	ISOLATION(G)	-0.005	4.2	0.0411	0.46	0.06
		Comma	ISOLATION(W)	0.003	5.4	0.0201	0.26	0.05
		Gatekeeper / Hedge Brown	ISOLATION(G)	0.006	6.1	0.0135	0.34	0.05
		Peacock	PATCHES(W)	-0.004	4.5	0.0333	0.41	0.03
		Orange Tip	PATCHES(G)	-0.006	4.9	0.0268	0.36	0.05
		Peacock	PATCHES(G)	-0.007	10.9	0.001	0.45	0.07
		Small White	PATCHES(G)	-0.006	10.3	0.0013	0.24	0.08
		Common Blue	PATCHES(G)	-0.007	5.4	0.0202	0.52	0.03
		Small Tortoiseshell	PATCHES(W)	0.005	8.1	0.0043	0.42	0.03
		Small Tortoiseshell	PATCHES(G)	0.005	5	0.0258	0.41	0.02
		Orange Tip	SHAPE(W)	-3.658	7.1	0.0076	0.38	0.07
		Speckled Wood	SHAPE(G)	-2.412	4.2	0.0395	0.44	0.04
		Red Admiral	SHAPE(W)	1.808	5.2	0.0229	0.43	0.01
Bird	Weather	Robin	ISOLATION(W)	-0.007	6.3	0.0119	0.39	0.29
		Robin	ISOLATION(W)	0.006	4.1	0.0427	0.37	0.13
		Robin	PATCHES(W)	-0.013	7	0.0084	0.43	0.19
	Trend	Coal Tit	PATCHES(W)	-0.01	5.3	0.0207	0.4	0.13
		Great Tit	SHAPE(W)	3.495	5.7	0.0166	0.34	0.18

Table S10 (supplement to Table 9): Summary of tests concerning hypothesis 1b (site-scale variation enhances robustness) for all species. For each taxon/method of deriving events/variable, relationships are tallied according to the magnitude and direction of t-values. Here only results from the 500m scale are included so as to assess site-scale covariates. Cells shaded in grey indicate the expected relationship according to H_{1b}. Expected is the number of relationships expected by chance (one-tailed $\alpha = 0.05$).

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	ALT_STD	1.75	1	32	2	1	1	19	0
		EAST_STD	1.75	1	34	0	1	1	17	2
		HABDIV	1.75	0	34	1	1	1	18	1
		NORTH_STD	1.75	2	32	1	1	4	16	0
	Trend	ALT_STD	1.45	2	24	3	1.1	0	21	1
		EAST_STD	1.45	0	28	1	1.1	0	22	0
		HABDIV	1.45	0	29	0	1.1	0	21	1
		NORTH_STD	1.45	1	27	1	1.1	1	21	0
Bird	Weather	HABDIV	5.8	4	106	6	1.8	1	34	1
	Trend	HABDIV	1.05	0	21	0	0.6	0	12	0

Table S11 (supplement to Table 10): Summary of tests concerning hypothesis 2b (site-scale area of key habitat enhances robustness) for all species. For each taxon/method of deriving events/variable, relationships are tallied according to the magnitude and direction of t-values. For butterflies, tests were combined across habitats, but only including species known to be associated with each habitat (i.e. tallied woodland butterflies relationships with woodland cover, etc). Here only results from the 500m scale are included so as to assess site-scale covariates. Cells shaded in grey indicate the expected relationship according to H_{2b}. Expected is the number of relationships expected by chance (one-tailed $\alpha = 0.05$).

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	COVER(x)	3	2	55	3	2	2	38	0
	Trend	COVER(x)	2.65	1	43	9	2.2	2	36	6
Bird	Weather	COVER(W)	5.8	4	109	3	1.8	1	32	3
	Trend	COVER(W)	1.05	2	18	1	0.6	0	12	0

Table S12 (supplement to Table 11): Summary of tests concerning hypothesis 4b (landscape-scale variation enhances robustness) for all species. For each taxon/method of deriving events/variable, relationships are tallied according to the magnitude and direction of t-values. Here only results from the 5000m scale are included so as to assess landscape-scale covariates. Cells shaded in grey indicate the expected relationship according to H_{4b}. Expected is the number of relationships expected by chance (one-tailed $\alpha = 0.05$).

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	ALT_STD	1.75	3	28	4	1	0	19	1
		EAST_STD	1.75	1	33	1	1	0	19	1
		HABDIV	1.75	0	33	2	1	0	18	2
		NORTH_STD	1.75	3	32	0	1	2	18	0
		SOILDIV	1.75	2	33	0	1	0	20	0
	Trend	ALT_STD	1.45	1	26	2	1.1	0	20	2
		EAST_STD	1.45	0	27	2	1.1	0	22	0
		HABDIV	1.45	0	26	3	1.1	1	21	0
		NORTH_STD	1.45	2	26	1	1.1	0	22	0
		SOILDIV	1.45	0	26	3	1.1	0	22	0
Bird	Weather	HABDIV	5.8	3	109	4	1.8	1	34	1
	Trend	HABDIV	1.05	1	18	2	0.6	0	10	2

Table S13 (supplement to Table 12): Summary of tests concerning hypothesis 5b (landscape-scale area of key habitat enhances robustness) for all species. For each taxon/method of deriving events/variable, relationships are tallied according to the magnitude and direction of t-values. For butterflies, tests were combined across habitats, but only including species known to be associated with each habitat (i.e. tallied woodland butterflies relationships with woodland cover, etc). Here only results from the 5000m scale are included so as to assess landscape-scale covariates. Cells shaded in grey indicate the expected relationship according to H_{5b}. Expected is the number of relationships expected by chance (one-tailed $\alpha = 0.05$).

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	COVER(x)	3	6	51	3	2	2	36	2
	Trend	COVER(x)	2.65	2	42	9	2.2	2	37	5
Bird	Weather	COVER(W)	5.8	3	106	7	1.8	1	33	2
	Trend	COVER(W)	1.05	1	19	1	0.6	0	11	1

Table S14 (supplement to Table 13): Summary of tests concerning hypothesis 6b (landscape-scale configuration of key habitat enhances robustness) for all species. For each taxon/method of deriving events/variable, relationships are tallied according to the magnitude and direction of t-values. For butterflies, tests were combined across habitats, but only including species known to be associated with each habitat (i.e. tallied woodland butterflies relationships with woodland isolation, etc). Here only results from the 5000m scale are included so as to assess landscape-scale covariates. Cells shaded in grey indicate the expected relationship according to H_{6b}. Expected is the number of relationships expected by chance (one-tailed $\alpha = 0.05$).

Taxon	Method	Variable	Vulnerability				Recovery time			
			Expected	Neg	None	Pos	Expected	Neg	None	Pos
Butterfly	Weather	ISOLATION(x)	3	2	54	4	2	2	36	2
		PATCHES(x)	3	2	49	9	2	4	36	0
		SHAPE(x)	3	5	52	3	2	1	38	1
	Trend	ISOLATION(x)	2.65	8	45	0	2.2	4	38	2
		PATCHES(x)	2.65	2	37	14	2.2	5	37	2
		SHAPE(x)	2.65	4	46	3	2.2	2	41	1
Bird	Weather	ISOLATION(W)	5.8	5	108	3	1.8	1	34	1
		PATCHES(W)	5.8	2	101	13	1.8	2	34	0
		SHAPE(W)	5.8	3	107	6	1.8	0	36	0
	Trend	ISOLATION(W)	1.05	2	19	0	0.6	0	12	0
		PATCHES(W)	1.05	1	19	1	0.6	1	10	1
		SHAPE(W)	1.05	0	19	2	0.6	0	11	1