

Table S1: Community-level results

“Observed S” is the number of species provided in the raw data. Species included in a community matrix with no or few non-zero abundances, for which estimation of population parameters was obviously not possible, were removed from the dataset before analysis and are not included in the “Observed S”. “Persistent S” is the number of species determined persistent by the methods described in the text. “Effect Size” is the proportional difference in the empirical pattern from random, or “Covariance”/“Randomized Cov”. “Covariance” is the estimated covariance between equilibrium frequency and strength of negative frequency dependence for the community. “Randomized Cov” is the mean covariance between equilibrium frequency and strength of negative frequency dependence found in the randomized data. “P-val” is the proportion of randomized pattern values that are less than or equal to the observed pattern.

Group	Site	Community	Observed S	Persistent S	Time Series Length	Effect Size	Covariance	Randomized Cov	p-val
Birds	Hubbard Brook LTER	Songbirds	25	24	42	1.460848	-0.97769	-0.66926	0.0042
Birds	White Mountain	Songbirds	23	20	15	1.30022	-1.07175	-0.82428	0.0134
Birds	Redvers	Waterfowl	13	13	26	1.754084	-1.38287	-0.78837	0.0028
Birds	Skokholm	Songbirds	16	9	52	2.051292	-2.36048	-1.15073	0.0098
Birds	Konza LTER	Waterfowl	7	3	29	1.598203	-2.24369	-1.40388	0.1542
Birds	Konza LTER	Songbirds	68	64	29	1.003672	-1.21535	-1.2109	0.4558
Birds	Texas	Songbirds	14	12	16	1.95649	-1.01528	-0.51893	0.0234

Birds	Eastern Wood	Songbirds	45	29	31	1.190 082	-0.82631	-0.69433	0.0352
Birds	Pawnee	Songbirds	25	21	9	1.070 494	-3.86922	-3.61442	0.2178
Birds	Pawnee	Raptors	5	3	9	1.056 599	-0.84098	-0.79593	0.441
Birds	Maine	Songbirds	28	21	11	1.193 978	-1.9022	-1.59316	0.1968
Birds	NewYork	Songbirds	36	25	11	0.779 865	-1.45436	-1.86489	0.9026
Birds	Green Mountains	Songbirds	38	35	11	1.762 618	-2.89354	-1.64161	0.0022
Birds	Luquillo LTER	Songbirds	19	16	20	1.177 439	-1.49932	-1.27337	0.183
Fish	HinkleyPoint	Flatfish	9	5	17	1.971 988	-4.90158	-2.4856	0.0444
Fish	HinkleyPoint	Gadoid Fish	14	7	17	1.289 406	-3.86638	-2.99858	0.0306
Fish	North Sea	Demersal Fish	7	7	24	1.805 48	-2.68337	-1.48624	0.0148
Fish	North Sea	Flatfish	11	11	24	1.084 985	-3.40122	-3.13481	0.3148
Fish	North Sea	Gadoid Fish	9	9	24	1.047 29	-12.4746	-11.9113	0.2088
Fish	North Sea	Pelagic Fish	3	3	24	1.192 582	-26.7981	-22.4707	0.1532
Herpet ofauna	Luquillo LTER	Anoles	3	3	4	- 1.418 81	0.11549 6	-0.0814	0.688
Herpet ofauna	Bold Park	Snakes	7	3	7	0.253 278	-0.06154	-0.24299	0.6614
Herpet ofauna	Bold Park	Lizards	19	14	7	0.713 338	-0.69902	-0.97993	0.8236

Herpet ofauna	Cowley County	Snakes	16	6	15	1.137 56	-1.26049	-1.10806	0.3062
Herpet ofauna	Cowley County	Lizards	6	4	15	0.713 052	-0.16254	-0.22795	0.5572
Herpet ofauna	Ora Banda	Snakes	9	5	4	- 1.427 15	0.96980 2	-0.67954	0.997
Herpet ofauna	Ora Banda	Lizards	42	23	4	0.907 332	-0.90224	-0.99439	0.6786
Herpet ofauna	Fitch Nature Preserve	Snakes	3	3	58	0.240 474	-0.02043	-0.08497	0.745
Herpet ofauna	CoweetaHydrologic Laboratory	Salamanders	4	4	15	0.640 901	-0.27563	-0.43006	0.8494
Herpet ofauna	E.S.George Reserve	Turtles	3	2	18	- 0.008 06	0.00580 5	-0.71996	0.9174
Herpet ofauna	Rainbow Bay	Frogs	13	10	16	1.252 58	-2.2254	-1.77665	0.0292
Inverte brates	CA Coastline	Molluscs	8	6	66	0.072 698	-0.30341	-4.17352	0.8624
Inverte brates	Hubbard Brook LTER	Lepidoptera	5	4	12	3.227 056	-2.28068	-0.70674	0.0012
Inverte brates	Jornada – Creosote	Creosote Insects	113	12	6	2.102 38	-0.72949	-0.34699	0.0966
Inverte brates	Jornada – Grassland	Grassland Insects	132	11	6	0.234 273	-0.15984	-0.68227	0.9356
Inverte brates	Jornada – Mesquite	Mesquite Insects	62	7	6	1.604 363	-0.30768	-0.19178	0.2702
Inverte brates	Jornada – Tarbush	Tarbush Insects	122	13	6	3.238 105	-1.16151	-0.3587	0.0254
Inverte brates	Luquillo LTER	Snails	18	16	17	1.276 793	-2.49301	-1.95256	0.016
Inverte brates	Oneida Lake	Zooplankton	33	24	32	1.019 407	-3.2288	-3.16733	0.4368

Invertebrates	Pacific Coast – CAY	Arthropods	12	3	11	1.222 685	-0.2015	-0.1648	0.3456
Invertebrates	Pacific Coast	Echinoderms	8	3	11	1.129 088	-5.40333	-4.78557	0.453
Invertebrates	Pacific Coast – BOA	Molluscs	40	5	11	1.772 185	-8.39826	-4.73893	0.0734
Invertebrates	Pacific Coast – CAY	Molluscs	40	9	11	1.029 13	-4.17786	-4.0596	0.4412
Invertebrates	Pacific Coast – GPT	Molluscs	40	5	11	2.192 757	-8.4164	-3.83827	0.1026
Invertebrates	Pacific Coast – HAZ	Molluscs	40	5	11	1.641 517	-10.2168	-6.22397	0.1292
Invertebrates	Pacific Coast – MCR	Molluscs	40	3	11	0.611 269	-4.00016	-6.54403	0.566
Invertebrates	Pacific Coast – OCC	Molluscs	40	6	11	1.606 698	-8.2474	-5.13313	0.2372
Invertebrates	Pacific Coast – PSN	Molluscs	40	5	11	0.987 478	-6.40249	-6.48368	0.4912
Invertebrates	Pacific Coast – SAD	Molluscs	40	6	11	2.212 749	-9.84846	-4.45078	0.1482
Invertebrates	Pacific Coast – SHB	Molluscs	40	6	11	0.967 965	-5.81198	-6.00433	0.5108
Invertebrates	UK Nature Reserves - Agricultural	Butterflies	23	18	10	1.685 584	-1.64595	-0.97649	0.0288
Invertebrates	UK Nature Reserves - Coastal	Butterflies	28	26	10	2.027 888	-2.39817	-1.1826	8.00E-04
Invertebrates	UK Nature Reserves - Forest	Butterflies	33	31	10	2.312 155	-3.46482	-1.49853	6.00E-04
Invertebrates	UK Nature Reserves - Grassland	Butterflies	36	32	10	1.337 837	-2.15996	-1.61452	0.0058
Invertebrates	UK Nature Reserves - Mixed	Butterflies	32	25	10	1.602 531	-1.9129	-1.19367	0.012
Invertebrates	UK Nature Reserves - Wetlands	Butterflies	25	24	10	5.098 465	-3.22524	-0.63259	0

Mammals	Portal	Rodents	9	8	22	2.536 646	-1.16792	-0.46042	0.0032
Mammals	Sevilleta LTER - 5pgrass	Rodents	11	4	17	3.003 411	-2.3577	-0.78501	0.0144
Mammals	Sevilleta LTER - 5plarrea	Rodents	12	5	17	1.643 514	-1.97727	-1.20307	0.0436
Mammals	Sevilleta LTER –rslarrea	Rodents	15	9	17	1.421 208	-0.96006	-0.67553	0.0978
Mammals	Konza LTER	Rodents	7	4	17	7.500 262	-1.3129	-0.17505	0.0026
Mammals	Curlew Valley	Rodents	5	4	14	1.094 734	-1.27326	-1.16308	0.3624
Mammals	INEEL	Rodents	3	3	12	1.078 366	-1.34627	-1.24844	0.402
Mammals	Jornada LTER – Grass	Rodents	6	2	13	3.207 793	-0.60941	-0.18998	0.144
Mammals	Jornada LTER – Shrub	Rodents	11	4	13	0.133 943	-0.14818	-1.10627	0.996
Mammals	Powdermill	Squirrels	2	2	21	11.58 153	-1.61936	-0.13982	0.012
Mammals	Powdermill	Rodents	3	3	21	0.907 739	-1.04013	-1.14584	0.6314
Mammals	Shortgrass	Rodents	5	4	7	1.766 757	-3.04956	-1.72608	0.1358
Mammals	Ontario	Rodents	6	6	44	1.144 043	-2.75561	-2.40866	0.1708
Mammals	Mont St. Hilaire	Rodents	4	3	11	3.306 308	-2.27832	-0.68908	0.0152
Mammals	Karoo National Park	Ungulates	14	10	16	1.041 391	-2.18062	-2.09395	0.408
Mammals	Kruger National Park	Ungulates	11	3	17	1.315 874	-3.36299	-2.55571	0
Mammals	Golden Gate National Park	Ungulates	9	5	11	2.334 599	-1.43055	-0.61276	0.0458

Plants	Desert Laboratory – Open	Annuals	55	27	29	1.532 751	-3.12688	-2.04005	0.023
Plants	Desert Laboratory – Shrub	Annuals	54	29	21	1.525 841	-2.4453	-1.60259	0.0392
Plants	Jornada LTER – Creosote	Summer Annuals	111	19	20	1.652 307	-3.61594	-2.18842	0.0938
Plants	Jornada LTER – Creosote	Winter Annuals	83	15	19	1.048 527	-3.0505	-2.90932	0.4038
Plants	Jornada LTER – Grassland	Summer Annuals	167	54	20	0.774 157	-2.79655	-3.61238	0.881
Plants	Jornada LTER – Grassland	Winter Annuals	119	35	19	1.339 55	-6.70174	-5.00298	0.0326
Plants	Jornada LTER – Mesquite	Summer Annuals	79	16	20	1.573 698	-2.91863	-1.85463	0.1952
Plants	Jornada LTER – Mesquite	Winter Annuals	61	9	18	2.134 996	-7.58835	-3.55427	0.077
Plants	Jornada LTER – Playa	Summer Annuals	84	10	20	3.331 231	-7.82586	-2.34924	0.006
Plants	Jornada LTER – Playa	Winter Annuals	53	6	19	0.199 546	-0.37637	-1.88611	0.6464
Plants	Jornada LTER – Tarbush	Summer Annuals	99	27	20	1.820 415	-7.28044	-3.99933	0.0132
Plants	Jornada LTER – Tarbush	Winter Annuals	81	21	19	1.319 28	-5.73949	-4.35048	0.2482
Plants	Kansas mixed-grass prairie	Annuals	34	4	39	2.674 102	0.10142 1	0.03792 7	0.524
Plants	Kansas mixed-grass prairie	Perennials	102	39	41	0.426 919	-1.12883	-2.64414	1
Plants	Portal	Summer Annuals	68	33	32	1.101 736	-3.36264	-3.05212	0.304
Plants	Portal	Winter Annuals	71	34	32	1.349 654	-3.89468	-2.88569	0.0748
Plants	Sagebrush Steppe	Annuals	73	6	27	3.993 184	-1.78516	-0.44705	0.0094