Supporting Information - Global changes threaten functional and taxonomic diversity of insular species worldwide

Supplementary Information contains:

- Ten Supporting Information Tables:

- Four Supporting Information Figures:

Table S1| The 11 classes of major threats from the IUCN Red List, with associated definition. In brackets, the original threat names from Salafsky *et al.* (2008).

IUCN - CMP Unified Classification of Direct Threats	
Cultivation (*agriculture & aquaculture*)	Threats from farming and ranching as a result of agricultural expansion and intensification, including silviculture, mariculture and aquaculture (includes the impacts of any fencing around farmed areas).
Wildlife exploitation (*biological resource use*)	Threats from consumptive use of "wild" biological resources including both deliberate and unintentional harvesting effects; also persecution or control of specific species.
Climate change (*climate change & severe weather*)	Threats from long-term climatic changes, which may be linked to global warming and other severe climatic/weather events that are outside of the natural range of variation, or potentially can wipe out a vulnerable species or habitat.
Energy production/mining	Threats from production of non-biological resources.
Geological events	Threats from catastrophic geological events.
Human intrusions/disturbance	Threats from human activities that alter, destroy and disturb habitats and species associated with non-consumptive uses of biological resources.
Biological invasions (*invasive & other problematic species, genes & diseases*)	Threats from non-native and native plants, animals, pathogens/microbes, or genetic materials that have or are predicted to have harmful effects on biodiversity following their introduction, spread and/or increase in abundance.
Habitat modifications (*natural system modifications*)	Threats from actions that convert or degrade habitat in service of “managing” natural or semi-natural systems, often to improve human welfare.
Pollution	Threats from introduction of exotic and/or excess materials or energy from point and nonpoint sources.
Urbanization (*residential & commercial development*)	Threats from human settlements or other non-agricultural land uses with a substantial footprint.
Transport corridors (*transportation & service corridors*)	Threats from long narrow transport corridors and the vehicles that use them including associated wildlife mortality.

Salafsky, N. *et al.* (2008). A standard lexicon for biodiversity conservation: Unified classifications of threats and actions. *Conservation Biology*, *22*, 897–911.

Table S2 | Description of the functional traits used to measure the functional diversity of birds and mammals endemic to islands.

Trait type	Trait	Modality/Unit	Taxa concerned	Nature	Relevance	Source / Initial nature
Feeding	Main diet [Δ]	Plant material and seeds	B ; M	Nominal	Regulating services (*e.g.* pest control, carcass removal) ; Supporting services (*e.g.* nutrient cycling, pollination, seed dispersal, soil fertility)	Wilman *et al.* 2014 / qualitative for birds ; quantitative for mammals
		Fleshy fruits and nectar	B ; M			
		Invertebrates	B ; M			
		Vertebrate prey and carrion	B ; M			
		Omnivore	B ; M			
		Mixed herbivore	B ; M			
		Mixed carnivore	B ; M			
	Foraging niche [∂]	Water	B	Nominal	Supporting services (*e.g.* nutrient cycling, soil fertility, mobile link)	Wilman *et al.* 2014 / quantitative for birds ; qualitatives for mammals
		Ground-level	B ; M			
		Understory	B			
		Mid-canopy	B			
		Upper canopy	B			
		Scansorial	M			
		Arboreal	M			
		Aerial	B ; M			
		Multiple niches	B			
	Foraging period	Crespuscular	M	Nominal	Supporting services (*e.g.* mobile link)	Wilman *et al.* 2014 / qualitative for birds and mammals
		Diurnal	B ; M			
		Nocturnal	B ; M			
		Crepuscular / Diurnal	M			
		Crepuscular / Nocturnal	M			
		Crepuscular / Diurnal / Nocturnal	M			
Habitat [*]	Habitat breadth	Number of habitat used	B ; M	Ordinal	Supporting services (*e.g.* seed dispersal, nutrient cycling, soil fertility, mobile link)	IUCN 2015 / quantitative for birds and mammals
Morphology [†]	Body mass	Very small	B ; M	Ordinal	Regulating services (*e.g.* trophic control) ; Supporting services (*e.g.* nutrient cycling, pollination, soil fertility)	Wilman *et al.* 2014 / quantitative for birds and mammals
		Small	B ; M			
		Medium	B ; M			
		Large	B ; M			
		Very large	B ; M			

[*] The habitat types were based on the IUCN Habitats Classification Scheme (version 3.1) which use standard terms to describe the major habitat/s in which taxa occur.
For birds, 12 habitats were considered: Artificial (terrestrial and aquatic), Caves and subterranean habitats, Coastal marine areas (marine neritic, marine oceanic, marine intertidal, marine coastal), Desert, Forest, Grassland, Introduced vegetation, Other, Rocky areas, Savanna, Shrubland, Wetlands. Based on our database, bird species have two habitats in average (s.d. ± 1; max = 7; min = 1).
For mammals, 11 habitats were considered: Artificial (terrestrial), Caves and subterranean habitats, Coastal areas (marine intertidal, marine coastal), Desert, Forest, Grassland, Introduced vegetation, Rocky areas, Savanna, Shrubland, Wetlands. Based on our database, mammal species have two habitats in average (s.d. ± 1; max = 6; min =1).

[†] Body mass category for birds and mammals have been based on their respective quantiles.
For birds, very small: <13.6 g, small: 13.6-31.3 g, medium: 31.3-79.0 g, large: 79.0-200.4 g, and very large: >200.4 g.
For mammals, very small: <16.6 g, small: 16.6-71.3 g, medium: 71.3-180.2 g, large: 180.2-855.4 g, and very large: >855.4 g.

[Δ] Main diet category for mammals have been based on the relative importance of different items consumed by each species, with a 50% threshold, as done by Wilman *et al.* (2014) for birds. If the diet is constituted by several categories, the main diet is the one representing more than 50% of the whole diet. The category mixed herbivores represents all species whose diet consists of more than 50% plant material, seeds, fleshy fruits and nectar. The category mixed carnivores represents species whose diet consists of more than 50% invertebrates and vertebrates.

[∂] Foraging niche category for birds have been based on the relative importance of different items consumed by each species, with a 50% threshold, as done by Wilman *et al.* (2014) for mammals. If the foraging niche is constituted by several categories, the foraging niche is the one representing more than 50% of the whole foraging niche; and if none foraging niche is representing by more 50%, "multiple" is designated to the foraging niche.

Some species traits from Wilman *et al.* (2014) can be available both quantitatively and qualitatively. In order to compare the results between the two taxonomic groups (birds and mammals), some variables had to be transformed to categorical variables (ordinal or nominal). For example, percent use of foraging niche is available for birds but this is not the case for mammals (categorical variable only). We thus used categorical variables for both taxonomic groups. Moreover, quality and accuracy of the information vary between species, and considering categorical variables (through range of values) reduces the uncertainty of the quantitative data. For example, a single value of body mass is associated with each species, and it may be based on species-level data but may also be inferred or imputed from data of a specific congeneric species, or from data at the genus / family level. We thus chose to transform all data into qualitative data to perform analyses as a modality category allows to encompass a diversity of value having different level of sources and so lift part of the uncertainties.

Table S3 | Number of species and functional entities (in brackets) for birds and mammals according to each threat.

	BIRDS			MAMMALS		
	DD, LC, NT	*VU, EN, CR*	*All*	*DD, LC, NT*	*VU, EN, CR*	*All*
Biological invasions	75 (60)	242 (155)	317 (187)	46 (38)	92 (61)	138 (90)
Climate change	126 (87)	180 (124)	306 (177)	15 (10)	43 (25)	58 (29)
Cultivation	227 (127)	301 (172)	528 (238)	185 (98)	256 (110)	441 (164)
Energy production & Mining	36 (30)	77 (59)	113 (81)	36 (20)	50 (31)	86 (47)
Geological events	4 (4)	13 (13)	17 (17)	1 (1)	13 (11)	14 (12)
Habitat modifications	73 (55)	77 (68)	150 (102)	45 (30)	69 (48)	114 (65)
Human intrusions & disturbance	12 (11)	36 (32)	48 (40)	29 (14)	33 (18)	62 (28)
Pollution	7 (7)	33 (31)	40 (37)	2 (2)	11 (8)	13 (10)
Transport corridors	27 (26)	41 (37)	68 (58)	10 (10)	15 (14)	25 (21)
Urbanization	50 (43)	96 (77)	146 (107)	76 (45)	98 (59)	174 (88)
Wildlife exploitation	285 (143)	334 (170)	619 (241)	205 (103)	304 (126)	509 (179)

Abbreviation of IUCN Red List Categories | *DD*: Data Deficient; *LC*: Least Concern; *NT*: Near Threatened ; *VU*: Vulnerable; *EN*: Endangered; *CR*: Critically Endangered

Table S4 | Comparison of functional diversity observed and expected under a null model based on the global FE pool (9,999 iterations). Standardized Effect Size (SES) and associated p-value metrics were obtained by comparing observed and expected values under a null model for birds and mammals.

		FRic			FSpe			FOri		
		SES	*p-value*		*SES*	*p-value*		*SES*	*p-value*	
Birds	*Biological invasions*	**-2.724**	**0.996**	**	**-2.214**	**0.989**	*	-0.451	0.669	
	Climate change	-1.464	0.928		-0.187	0.567		0.598	0.260	
	Cultivation	-1.500	0.932		0.397	0.344		1.276	0.101	
	Energy production & Mining	-0.569	0.708		1.118	0.132		0.985	0.152	
	Geological events	-0.987	0.875		0.503	0.296		0.044	0.455	
	Habitat modifications	-1.081	0.865		-0.557	0.711		-0.484	0.687	
	Human intrusions & disturbance	**-2.009**	**0.994**	**	-0.775	0.777		-1.508	0.945	
	Pollution	**-2.063**	**0.997**	**	-1.174	0.885		**-2.823**	**0.999**	***
	Transport corridors	0.916	0.173		0.788	0.210		0.118	0.433	
	Urbanization	0.386	0.336		0.950	0.167		1.334	0.091	
	Wildlife exploitation	-1.486	0.929		0.241	0.397		0.423	0.328	
Mammals	*Biological invasions*	**-2.619**	**0.996**	**	**-2.669**	**0.996**	**	**-2.798**	**0.999**	***
	Climate change	-1.382	0.930		-0.080	0.533		-1.676	0.970	
	Cultivation	**-2.357**	**0.991**	**	1.314	0.092		**-2.289**	**0.992**	**
	Energy production & Mining	-0.780	0.774		1.815	0.033		-1.093	0.868	
	Geological events	-1.219	0.970		-0.418	0.660		-0.936	0.830	
	Habitat modifications	-1.137	0.872		1.434	0.076		-0.485	0.669	
	Human intrusions & disturbance	**-1.970**	**0.998**	**	**2.249**	**0.011**	*	-0.952	0.832	
	Pollution	-0.846	0.951		0.859	0.197		-0.121	0.492	
	Transport corridors	-0.977	0.844		0.042	0.489		0.059	0.443	
	Urbanization	**-3.257**	**0.999**	***	0.796	0.216		**-2.361**	**0.995**	**
	Wildlife exploitation	**-2.379**	**0.991**	**	1.287	0.099		**-2.942**	**0.999**	***

* *p-value* < 0.025 or *p-value* > 0.975 ; ** *p-value* < 0.010 or *p-value* > 0.990; *** *p-value* < 0.001 or *p-value* > 0.999

The functional diversity values significantly different from the null expectation are in bold font.

Table S5 | Comparison of functional diversity observed and expected under a null model accounted for occurrence of FEs in biogeographic realms (9,999 iterations). Standardized Effect Size (SES) and associated p-value metrics were obtained by comparing observed and expected values under a null model for birds and mammals.

		FRic			FSpe			FOri		
		SES	*p-value*		*SES*	*p-value*		*SES*	*p-value*	
Birds	*Biological invasions*	-0.921	0.821		**-2.258**	**0.989**	*	0.240	0.400	
	Climate change	-0.455	0.685		0.055	0.474		-0.149	0.560	
	Cultivation	-0.794	0.792		-0.108	0.540		0.102	0.454	
	Energy production & Mining	-0.142	0.568		0.227	0.398		0.615	0.265	
	Geological events	-0.588	0.672		0.416	0.412		0.075	0.464	
	Habitat modifications	-0.519	0.690		-0.982	0.833		**-2.016**	**0.976**	*
	Human intrusions & disturbance	-0.786	0.763		-0.337	0.630		-1.479	0.928	
	Pollution	**-2.473**	**0.990**	**	-1.462	0.925		-1.902	0.972	
	Transport corridors	0.784	0.229		-0.201	0.570		-0.733	0.766	
	Urbanization	0.617	0.282		0.289	0.379		0.218	0.409	
	Wildlife exploitation	-0.628	0.746		-0.014	0.496		-0.034	0.508	
Mammals	*Biological invasions*	-2.076	0.973		-1.635	0.949		**-2.911**	**0.999**	***
	Climate change	1.530	0.034		0.094	0.460		-0.812	0.780	
	Cultivation	**-2.240**	**0.981**	*	1.561	0.060		**-3.218**	**0.999**	***
	Energy production & Mining	**1.867**	**0.024**	*	1.758	0.038		0.510	0.298	
	Geological events	-0.207	0.666		-1.005	0.833		-0.277	0.665	
	Habitat modifications	-1.689	0.942		1.373	0.082		-0.299	0.601	
	Human intrusions & disturbance	0.668	0.257		1.129	0.134		-0.365	0.630	
	Pollution	0.516	0.356		1.068	0.151		0.001	0.415	
	Transport corridors	0.275	0.390		0.023	0.489		0.871	0.198	
	Urbanization	-1.614	0.941		**2.513**	**0.004**	**	-1.237	0.893	
	Wildlife exploitation	**-2.170**	**0.979**	*	1.367	0.086		**-4.618**	**0.999**	***

* *p-value* < 0.025 or *p-value* > 0.975 ; ** *p-value* < 0.010 or *p-value* > 0.990; *** *p-value* < 0.001 or *p-value* > 0.999

The functional diversity values significantly different from the null expectation are in bold font.

Comparison of the results about functional diversity under null model based on the global FEs pool (Table S4) and null model accounted for occurrence of FEs in biogeographic realms (Table S5).

Functional richness (FRic). Six threats are associated with a FRic significantly lower than expected under null model based on the global FEs pool (Table S4): *biological invasions* (birds and mammals), *cultivation* (mammals), *human intrusions & disturbance* (birds and mammals), *pollution* (birds), *urbanization* (mammals), wildlife exploitation (mammals). Based on the second null model accounted for occurrence of FEs in biogeographic realms, only *cultivation* (mammals), *energy production & mining* (mammals), *pollution* (birds) and *wildlife exploitation* (mammals) are associated with a FRic significantly lower than expected by chance (Table S5).

Functional specialization. Two threat are associated with a FSpe significantly lower than expected under null model based on the global FEs pool (Table S4): *biological invasions* (birds and mammals) and *human intrusions & disturbance* (mammals). Based on the second null model accounted for occurrence of FEs in biogeographic realms, *biological invasions* (birds) and *urbanization* (mammals) are associated with a FSpe significantly lower than expected by chance (Table S5).

Functional originality. Five threats are associated with a FOri significantly lower than expected under null model based on the global FEs pool (Table S4): *biological invasions* (mammals), *cultivation* (mammals), *pollution* (birds), *urbanization* (mammals), wildlife exploitation (mammals). Based on the second null model accounted for occurrence of FEs in biogeographic realms, *biological invasions* (mammals), *cultivation* (mammals), *habitat modifications* (birds), and *wildlife exploitation* (mammals) are associated with a FOri significantly lower than expected by chance (Table S5).

Table S6 | Comparison of trait modalities distribution observed and expected (under a null model based on the global FE pool) associated with each threat, for birds. Standardized Effect Size (SES) and associated p-value metrics were obtained by comparing observed and expected values under a null model (9,999 iterations).

		Biological invasions			**Human intrusions & disturbance**			**Pollution**		
Trait	**Modalities**	*SES*	*p-value*		*SES*	*p-value*		*SES*	*p-value*	
Main diet	*Plant material and seeds*	-0.605	0.750		1.607	0.098		0.837	0.267	
	Fleshy fruits and nectar	-0.621	0.748		**-1.643**	**0.982**	*	-0.676	0.816	
	Invertebrates	**3.695**	**2.00e-04**	***	0.663	0.299		-1.500	0.960	
	Vertebrate prey and carrion	0.181	0.455		**4.236**	**0.001**	**	**6.180**	**<0.001**	***
	Omnivore	**-2.682**	**0.998**	**	**-2.256**	**0.999**	***	-1.342	0.958	
	Mixed herbivore	-0.613	0.747		-1.235	0.944		**-1.669**	**0.988**	*
	Mixed carnivore	-0.745	0.795		-0.351	0.714		0.390	0.425	
Foraging niche	*Water*	**4.736**	**<0.001**	***	**5.863**	**<0.001**	***	**6.502**	**<0.001**	***
	Ground-level	**2.650**	**0.005**	**	1.675	0.075		-0.293	0.678	
	Understory	**-3.279**	**0.999**	***	**-1.934**	**0.999**	***	**-1.964**	**0.999**	***
	Mid-canopy	**-2.572**	**0.997**	**	**-1.624**	**0.983**	*	**-1.551**	**0.976**	*
	Upper canopy	**-2.308**	**0.994**	**	**-1.599**	**0.986**	*	**-1.557**	**0.983**	*
	Aerial	-1.422	0.972		0.364	0.466		0.449	0.467	
	Multiple niches	1.418	0.088		-1.090	0.901		0.248	0.463	
Foraging period	*Diurnal*	1.482	0.079		0.420	0.498		1.594	0.080	
	Nocturnal	-1.482	0.950		-0.420	0.739		**-1.594**	**0.999**	***
Habitat breadth	*1*	**2.282**	**0.015**	*	-1.120	0.905		-0.896	0.862	
	2	1.820	0.040		0.918	0.224		0.215	0.473	
	3	-1.777	0.967		0.037	0.537		-0.50	0.584	
	4	-1.486	0.946		0.637	0.318		1.894	0.058	
	5	**-2.237**	**0.998**	**	-0.386	0.756		**-1.175**	**0.999**	***
	6	**-1.295**	**0.999**	***	**-0.536**	**0.999**	***	**-0.550**	**0.999**	***
	7	**-0.643**	**0.999**	***	**-0.263**	**0.999**	***	**-0.274**	**0.999**	***
Body mass	*Very small*	**-2.903**	**0.999**	***	**-2.054**	**0.997**	**	**-1.618**	**0.981**	*
	Small	0.076	0.490		**-1.793**	**0.989**	*	**-2.154**	**0.998**	**
	Medium	-0.865	0.821		-0.648	0.792		**-1.665**	**0.981**	*
	Large	0.233	0.424		-0.569	0.769		0.472	0.373	
	Very large	**3.151**	**9.00e-04**	***	**4.702**	**<0.001**	***	**4.548**	**<0.001**	**

* *p-value* < 0.025 or *p-value* > 0.975 ; ** *p-value* < 0.010 or *p-value* > 0.990; *** *p-value* < 0.001 or *p-value* > 0.999

Observed values significantly different from the null expectation are in bold font.

Table S7 | Comparison of trait modalities distribution observed and expected (under a null model based on the global FE pool) associated with each threat, for mammals. Standardized Effect Size (SES) and associated p-value metrics were obtained by comparing observed and expected values under a null model (9,999 iterations).

		Biological invasions			Cultivation			Human intrusions & disturbance			Urbanization			Wildlife exploitation		
Trait	**Modalities**	*SES*	*p-value*		*SES*	*p-value*		*SES*	*p-value*		*SES*	*p-value*		*SES*	*p-value*	
Main diet	*Plant material and seeds*	1.541	0.077		**2.082**	**0.021**	*	-1.122	0.896		1.823	0.042		**2.364**	**0.011**	*
	Fleshy fruits and nectar	0.995	0.188		**3.110**	**0.002**	**	2.224	0.032		0.473	0.346		**5.168**	**<0.001**	***
	Invertebrates	-1.627	0.960		-1.828	0.968		**2.205**	**0.024**	*	-0.886	0.834		**-2.411**	**0.992**	**
	Vertebrate prey and carrion	0.027	0.528		-1.396	0.945		**-0.833**	**0.999**	***	-0.832	0.844		-1.578	0.960	
	Omnivore	-0.648	0.810		-0.936	0.863		**-0.619**	**0.999**	***	-0.159	0.599		-0.919	0.852	
	Mixed herbivore	**-2.076**	**0.993**	**	-0.639	0.758		**-1.734**	**0.999**	***	-0.861	0.834		-1.799	0.971	
	Mixed carnivore	1.997	0.045		**-2.042**	**0.987**	*	**-1.187**	**0.999**	***	-0.288	0.643		**-2.443**	**0.996**	**
Foraging niche	*Ground-level*	**2.242**	**0.015**	*	**-4.773**	**0.999**	***	**-2.844**	**0.999**	***	**-2.223**	**0.990**	**	**-5.217**	**0.999**	***
	Scansorial	-1.001	0.874		-1.479	0.943		-0.696	0.794		-1.338	0.938		-1.735	0.967	
	Arboreal	-1.635	0.963		**6.824**	**<0.001**	***	0.494	0.346		**2.229**	**0.018**	*	**7.163**	**<0.001**	***
	Aerial	-0.260	0.638		-0.795	0.806		**5.891**	**<0.001**	***	2.210	0.033		-0.182	0.601	
Foraging period	*Crepuscular*	**-0.850**	**0.999**	***	0.001	0.553		**-0.428**	**0.999**	***	**-0.832**	**0.999**	***	-0.229	0.642	
	Diurnal	**-2.180**	**0.993**	**	**2.439**	**0.009**	**	-1.243	0.935		-0.206	0.604		**2.114**	**0.021**	*
	Nocturnal	**3.093**	**0.001**	**	1.130	0.137		**2.663**	**0.004**	**	**2.046**	**0.024**	*	1.652	0.052	
	Crepuscular / Diurnal	-1.025	0.916		**-1.817**	**0.987**	*	-0.099	0.482		**-1.459**	**0.999**	***	**-2.101**	**0.995**	**
	Crespuscular / Nocturnal	0.606	0.300		-1.789	0.974		-0.894	0.859		-0.998	0.872		-1.658	0.961	
	Crepuscular / Diurnal / Nocturnal	**-1.927**	**0.990**	**	-1.707	0.966		**-1.486**	**0.999**	***	-0.760	0.805		**-2.008**	**0.982**	*
Habitat breadth	*1*	1.118	0.154		**5.560**	**<0.001**	***	-0.825	0.822		**2.738**	**0.004**	**	**5.856**	**<0.001**	***
	2	-0.321	0.651		-1.007	0.856		-1.024	0.873		-0.489	0.709		-1.356	0.919	
	3	0.037	0.511		**-2.769**	**0.998**	**	**2.914**	**0.007**	**	-0.994	0.863		**-2.406**	**0.994**	**
	4	-0.965	0.870		**-2.987**	**0.999**	***	-0.412	0.691		**-1.838**	**0.991**	**	**-3.328**	**0.999**	***
	5	**-1.104**	**0.999**	***	**-1.728**	**0.999**	***	**-0.560**	**0.999**	***	**-1.082**	**0.999**	***	**-1.944**	**0.999**	***
	6	0.284	0.417		**-1.075**	**0.999**	***	**-0.341**	**0.999**	***	**-0.679**	**0.999**	***	-0.710	0.749	
Body mass	*Very small*	0.743	0.259		0.008	0.521		**5.387**	**<0.001**	***	**2.602**	**0.012**	*	-0.417	0.681	
	Small	-0.571	0.740		**-2.922**	**0.999**	***	-0.795	0.820		**-1.909**	**0.983**	*	**-3.102**	**0.999**	***
	Medium	-0.704	0.788		**-2.289**	**0.992**	**	**-1.656**	**0.984**	*	**-2.037**	**0.989**	*	**-2.313**	**0.992**	**
	Large	0.128	0.476		0.698	0.260		0.019	0.516		0.043	0.506		1.199	0.128	
	Very large	0.513	0.333		**3.989**	**$1.00e^{-04}$**	***	-1.434	0.950		1.729	0.055		**4.004**	**<0.001**	***

* *p-value* < 0.025 or *p-value* > 0.975 ; ** *p-value* < 0.010 or *p-value* > 0.990; *** *p-value* < 0.001 or *p-value* > 0.999

Observed values significantly different from the null expectation are in bold font.

Table S8 | Comparison of trait modalities distribution observed and expected (under a null model accounted for occurrence of FEs in biogeographic realms) associated with each threat, for birds and mammals. Standardized Effect Size (SES) and associated p-value metrics were obtained by comparing observed and expected values under a null model (9,999 iterations).

		Birds - Pollution			**Mammals - Cultivation**			**Mammals - Energy production and mining**			**Mammals - Wildlife exploitation**		
Trait	**Modalities**	*SES*	*p-value*		*SES*	*p-value*		*SES*	*p-value*		*SES*	*p-value*	
Main diet	*Plant material and seeds*	-0.311	0.791		1.926	0.030		1.390	0.112		2.018	0.026	
	Fleshy fruits and nectar	0.492	0.549		**2.874**	**0.003**	**	1.252	0.138		**4.973**	**<0.001**	***
	Invertebrates	-0.970	0.923		**-2.276**	**0.991**	**	-1.248	0.922		-1.823	0.970	
	Vertebrate prey and carrion	**2.447**	**0.016**	*	-1.667	0.968		--	--		**-2.009**	**0.988**	*
	Omnivore	-0.865	0.939		-0.733	0.822		--	--		-1.015	0.878	
	Mixed herbivore	-1.222	0.978		-0.776	0.801		-1.029	0.896		**-2.326**	**0.992**	**
	Mixed carnivore	-0.669	0.903		-0.930	0.855		**-1.520**	**0.999**	***	**-2.265**	**0.992**	**
Foraging niche	*Water*	1.679	0.094		--	--		--	--		--	--	
	Ground-level	-0.105	0.708		**-4.233**	**0.999**	***	**-1.838**	**0.979**	*	**-4.756**	**0.999**	***
	Understory	--	--		--	--		--	--		--	--	
	Scansorial	--	--		-1.479	0.944		1.335	0.167		**-2.342**	**0.992**	**
	Arboreal	--	--		**5.662**	**<0.001**	***	1.602	0.075		**6.084**	**<0.001**	***
	Mid-canopy	-0.882	0.944		--	--		--	--		--	--	
	Upper canopy	**-1.236**	**0.979**	*	--	--		--	--		--	--	
	Aerial	0.239	0.835		-0.517	0.736		-0.615	0.792		1.142	0.158	
	Multiple niches	-0.523	0.813		--	--		--	--		--	--	
Foraging period	*Crepuscular*	--	--		-0.078	0.612		-0.051	0.655		-0.209	0.670	
	Diurnal	**2.787**	**0.021**	*	1.262	0.117		**3.279**	**0.002**	**	0.794	0.232	
	Nocturnal	**-2.787**	**0.999**	***	1.595	0.061		0.787	0.821		**2.351**	**0.009**	**
	Crepuscular / Diurnal	--	--		**-2.232**	**0.994**	**	**-1.060**	**0.999**	***	**-2.477**	**0.997**	**
	Crespuscular / Nocturnal	--	--		**-1.854**	**0.975**	*	-0.995	0.888		-1.371	0.928	
	Crepuscular / Diurnal / Nocturnal	--	--		-0.969	0.857		-0.620	0.800		**-1.882**	**0.976**	*
Habitat breadth	*1*	0.688	0.398		**3.920**	**$1.00e^{-04}$**	***	**2.206**	**0.019**	*	4.277	<0.001	
	2	-1.178	0.940		-1.187	0.891		-1.237	0.919		-1.596	0.950	
	3	-0.023	0.671		**-1.845**	**0.975**	*	-1.407	0.956		**-2.074**	**0.985**	*
	4	0.732	0.375		**-2.292**	**0.994**	**	-0.059	0.658		-1.624	0.961	
	5	--	--		**-1.642**	**0.999**	***	--	--		**-1.762**	**0.999**	***
	6	--	--		**-1.157**	**0.999**	***	--	--		-1.239	0.918	
	7	--	--		--	--		--	--		--	--	
Body mass	*Very small*	0.339	0.709		-0.099	0.572		-0.989	0.885		0.479	0.352	
	Small	**-1.223**	**0.977**	*	**-1.905**	**0.977**	*	**-1.886**	**0.983**	*	**-2.002**	**0.982**	*
	Medium	-0.656	0.901		**-3.714**	**0.999**	***	-1.076	0.915		**-3.470**	**0.999**	***
	Large	-0.030	0.669		1.949	0.031		0.873	0.244		**2.111**	**0.020**	*
	Very large	0.835	0.322		**3.225**	**$4.00e^{-04}$**	***	**2.673**	**0.006**	**	**2.469**	**0.008**	**

* *p-value* < 0.025 or *p-value* > 0.975 ; ** *p-value* < 0.010 or *p-value* > 0.990; *** *p-value* < 0.001 or *p-value* > 0.999
Observed values significantly different from the null expectation are in bold font.

Comparison of the results about trait modalities distribution under null model based on the global FEs pool (Table S6-7) and null model accounted for occurrence of FEs in biogeographic realms (Table S8).

Cultivation - mammals. Under null model based on the global FEs pool (Table S7), six trait modalities were more often associated than expected by chance: *plant material and seeds main diet*, *fleshy fruits and nectar main diet*, *arboreal foraging niche*, *diurnal foraging period*, *habitat specialization* and *very large body mass*, while nine trait modalities were less often associated than expected by chance: *mixed carnivore main diet*, *ground-level foraging niche*, *crepuscular/diurnal foraging period*, *large habitat breadth (three to six)*, and *small and medium body mass*. Based on the second null model accounted for occurrence of FEs in biogeographic realms (Table S8), four trait modalities were more often associated than expected by chance: *fleshy fruits and nectar main diet*, *arboreal foraging niche*, *habitat specialization* and *very large body mass* while ten trait modalities were less often associated than expected by chance: *invertebrates main diet*, *ground-level foraging niche*, *crepuscular/diurnal and crepuscular nocturnal foraging period*, *large habitat breadth (three to six)*, and *small and medium body mass*.

Wildlife exploitation - mammals. Under null model based on the global FEs pool (Table S7), six trait modalities were more often associated than expected by chance: *plant material and seeds main diet*, *fleshy fruits and nectar main diet*, *arboreal foraging niche*, *diurnal foraging period*, *habitat specialization*, and *very large body mass*, while ten trait modalities were less often associated than expected by chance: *mixed carnivore and invertebrates main diet*, *ground-level foraging niche*, *crepuscular/diurnal and crepuscular/dirunal/nocturnal foraging period*, *large habitat breadth (three to five)*, and *small and medium body mass*. Based on the second null model accounted for occurrence of FEs in biogeographic realms (Table S8), five trait modalities were more often associated than expected by chance: *fleshy fruits and nectar main diet*, *arboreal foraging niche*, *nocturnal foraging period*, and *large and very large body mass*, while eleven trait modalities were less often associated than expected by chance: v*ertebrate prey and carrion*, *mixed carnivore and mixed carnivore main diet*, *ground-level and scansorial foraging niche*, *crepuscular/diurnal and crepuscular/dirunal/nocturnal foraging period*, *large habitat breadth (three and five)*, and *small and medium body mass.*

Pollution - birds. Under null model based on the global FEs pool (Table S6), three trait modalities were more often associated than expected by chance: *vertebrate prey and carrion main diet*, *foraging niche below the water surface*, and *very large body mass*, while eleven trait modalities were less often associated than expected by chance: *mixed herbivore main diet*, *understory, mid-canopy and upper canopy foraging niche, nocturnal foraging period*, a *habitat breadth* from five to seven, and *very small, small, and medium body mass*. Based on the second null model controlling for biogeographic realms (Table S8), two trait modalities were more often associated than expected by chance: *vertebrate prey and carrion main diet*, and *diurnal foraging period*, while two three modalities were less often associated than expected by chance: *upper canopy foraging niche, nocturnal foraging period*, and *small body mass*.

Table S9│Comparison of functional vulnerability observed and expected associated with each threat. Standardized Effect Size (SES) and associated p-value metrics were obtained by comparing observed and expected values under a null model (9,999 iterations). Null model simulated random assignment of non-threatened species on the global FE pool of each threat, where the number of species and the number of functional entities were kept constant.

	Birds			**Mammals**	
	SES	*p-value*		*SES*	*p-value*
Biological invasions	0.691	0.212		0.035	0.402
Climate change	-0.568	0.629		-0.729	0.766
Cultivation	**2.329**	**0.021**	*	2.005	0.036
Energy production & Mining	0.570	0.113		-0.215	0.481
Geological events	0.000	--		1.186	0.076
Habitat modifications	-0.591	0.694		0.851	0.152
Human intrusions & disturbance	0.682	0.146		1.616	0.051
Pollution	-0.428	0.556		-0.279	0.380
Transport corridors	-0.176	0.330		0.176	0.285
Urbanization	0.061	0.275		-0.542	0.659
Wildlife exploitation	2.260	0.035		2.045	0.033

* *p-value* < 0.025 or *p-value* > 0.975 ; ** *p-value* < 0.010 or *p-value* > 0.990; *** *p-value* < 0.001 or *p-value* > 0.999
The functional vulnerability values significantly different from the null expectation are in bold font.

Table S10 │ Overlap in terms of functional entities between threats with a specific focus on *cultivation* and *wildlife exploitation*.

		Number of species	***Number of functional entities***	
Birds	*Cultivation* and *Wildlife exploitation* acting together and combined with other threats	264	150	
	Cultivation acting alone and combined with other threats	301	172	87.2% of FEs associated with *cultivation* are also associated with *wildlife exploitation*
	Wildlife exploitation acting alone and combined with other threats	334	170	88.2% of FEs associated with *wildlife exploitation* are also associated with *cultivation*
	Other threats acting alone and combined together	319	173	86.7% of FEs associated with *other threats* are also associated with *cultivation* and/or *wildlife exploitation*
Mammals	*Cultivation* and *Wildlife exploitation* acting together and combined with other threats	228	101	
	Cultivation acting alone and combined with other threats	270	112	90.1% of FEs associated with *cultivation* are also associated with *wildlife exploitation*
	Wildlife exploitation acting alone and combined with other threats	317	128	78.9% of FEs associated with *wildlife exploitation* are also associated with *cultivation*
	Other threats acting alone and combined together	283	117	86.3% of FEs associated with *other threats* with are also associated with *cultivation* and/or *wildlife exploitation*

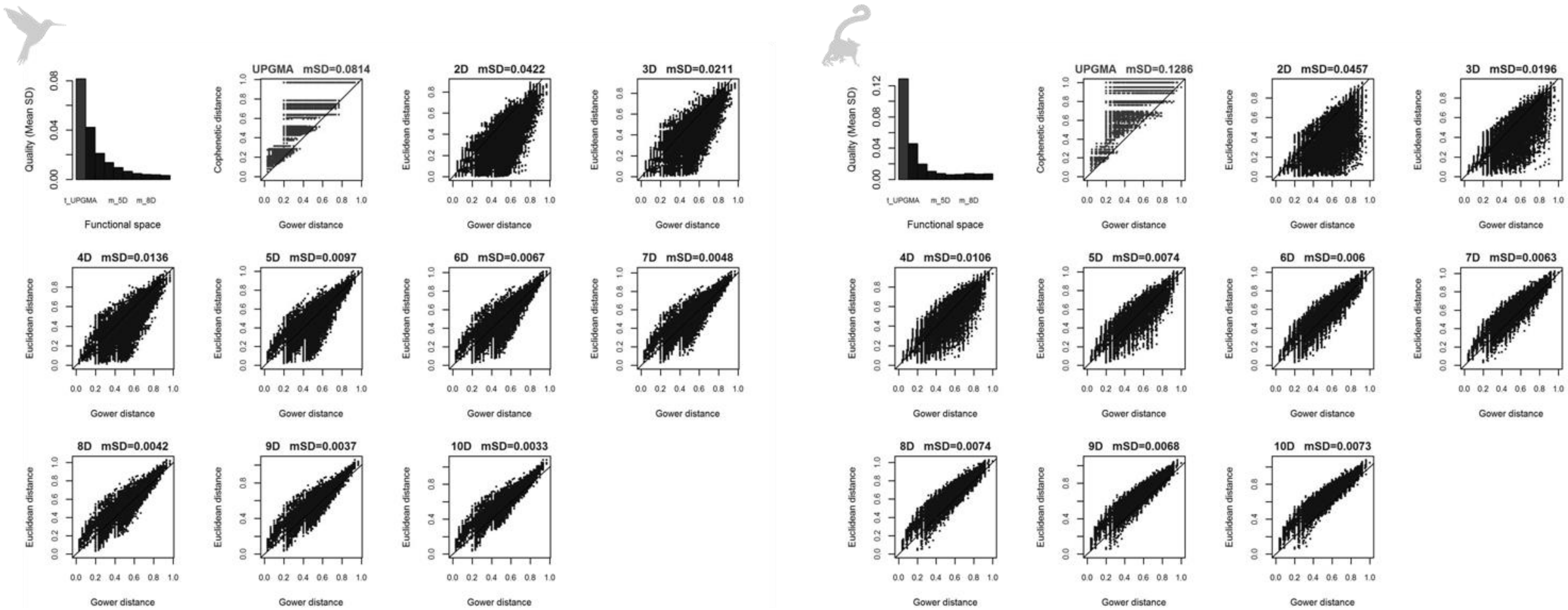

Figure S1 | Quality (mean Squared-Deviation (mSD)) of the functional spaces computing based on UPGMA-dendrogram and on PCoA (up to 10 axes) for birds and mammals.

The quality of functional space is highest when the mSD value is lowest (especially < 0.01).

For birds, the functional space based on 10 axes has the lowest mSD (=0.0033) while the one with 6 dimensions has a mSD <0.01.

For mammals, the functional space based on 6 axes has the lowest mSD (=0.0060).

To limit computing time, we chose functional space based on 6 axes for both taxa (mSD≈0.006). That means that average deviation between Euclidean distance and Gower's distance is of $(0.006)^{0.5}$=0.077, so it can be seen like an average error of 7.7%. For details about methods, see Maire *et al.*, 2015.

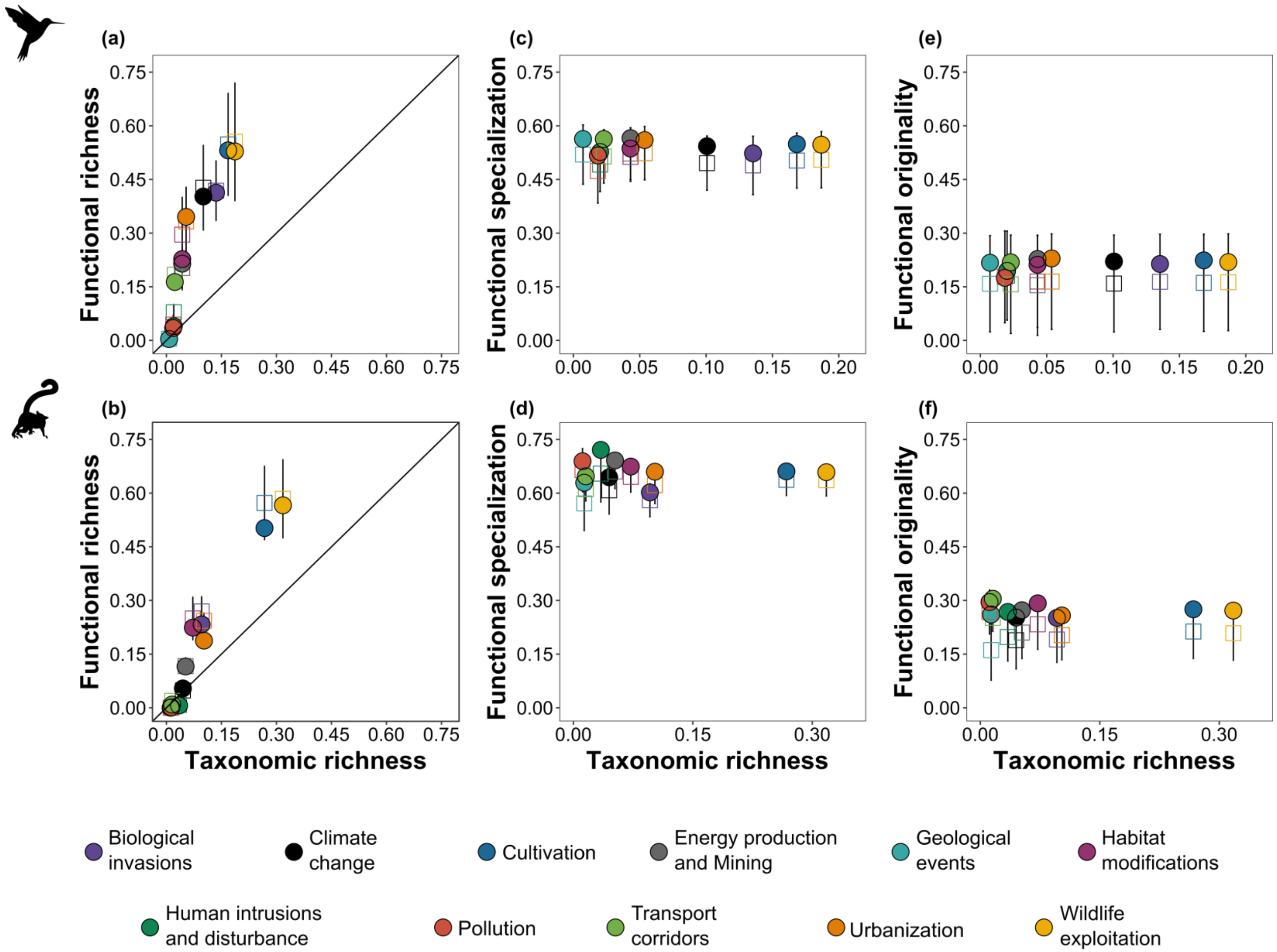

Figure S2 | Sensitivity analyses for relationships between taxonomic and functional facets of insular threatened birds and mammals (VU, EN, and CR species) associated with each threat. Full colored points represent the observed values obtained with the five traits. The mean value obtained with four traits (± s.d.) is symbolized by the empty colored squares.

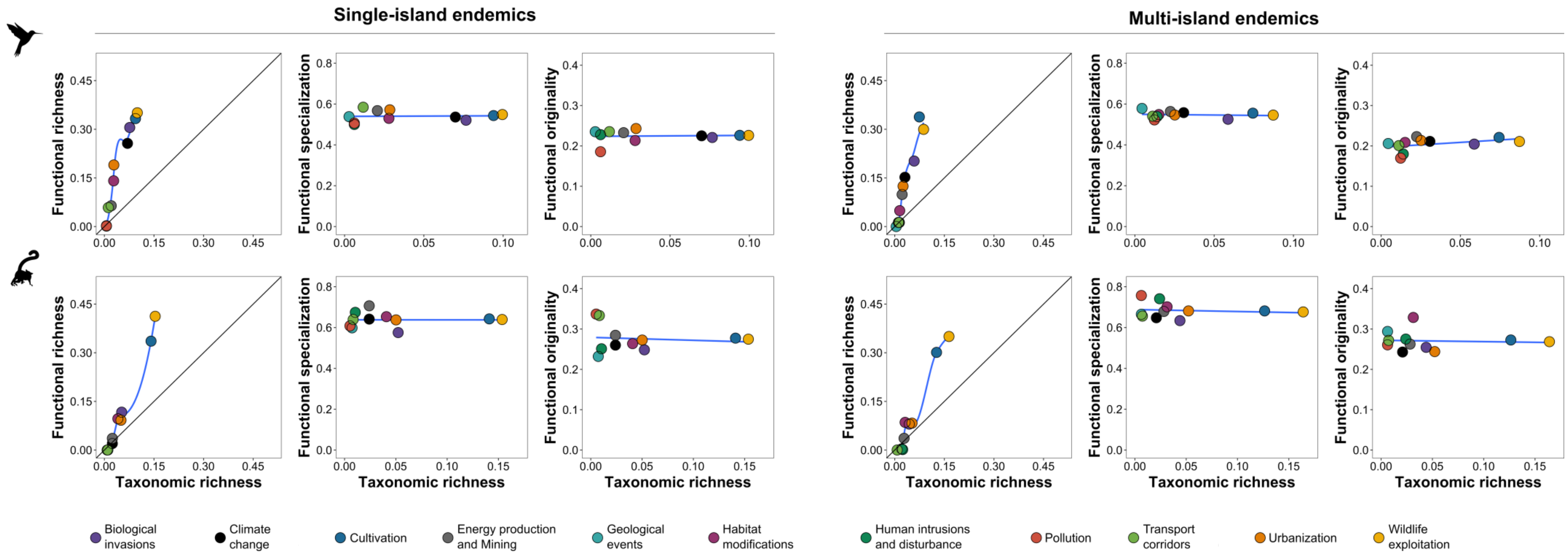

Figure S3 | Relationships between taxonomic and functional diversity of threatened species (VU, EN, and CR species), endemic to one or many islands, associated with each threat. The blue line is a smooth curve computed using the loess method or linear method. The black solid line represents the identity line functional richness = taxonomic richness.

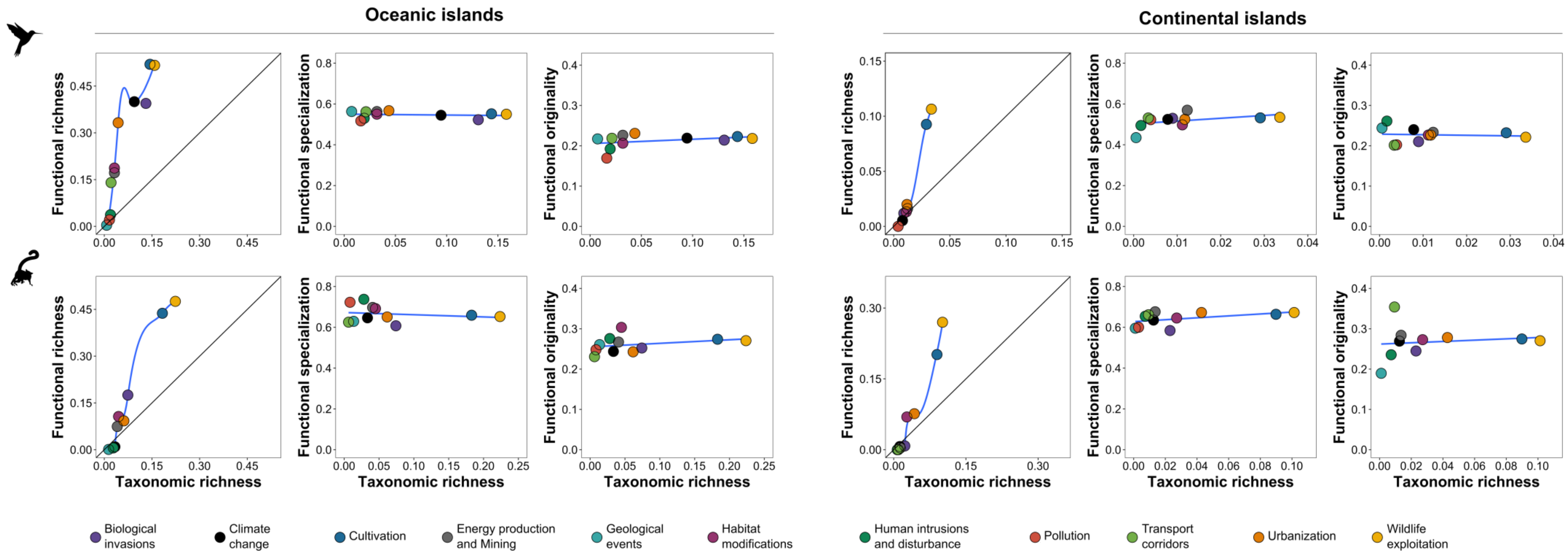

Figure S4 | Relationships between taxonomic and functional diversity of threatened species (VU, EN, and CR species), endemic to oceanic or continental islands, associated with each threat. The blue line is a smooth curve computed using the loess method or linear method. The black solid line represents the identity line functional richness = taxonomic richness.