Supporting Information

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SI Methods

Coding IUCN Red List Threats. We used information coded according to the IUCN Red List threats classification scheme to assess threats faced by species. Only threatened species with coded threat information available were used for this portion of the analysis. To separate threats related to livestock and crops, and harvesting and logging, we split two of the top-level threats categories. Specifically, we split the agriculture and aquaculture category 2 into "cropping" (2.1, 2.2) and "livestock" (2.3, 2.4) and the biological resource use category 5 into "harvesting" (5.1, 5.4) and "logging" (5.2, 5.3). Although category 5.2 corresponds to plant gathering (rather than logging), it was uncommon in our dataset as our analysis is restricted to vertebrates. The top-level threats from the threats classification scheme (with subthreats for categories that we split) are listed below with our modifications and titles underlined.

1) Residential & commercial development (Development)
2) Agriculture & aquaculture (Agricultural cropping for 2.1/2.2, Livestock for 2.3/2.4)
   2.1) Annual & perennial nontimber crops
   2.2) Wood & pulp plantations
   2.3) Livestock farming & ranching
   2.4) Marine & freshwater aquaculture
3) Energy production & mining (Energy)
4) Transportation & service corridors (Transportation)
5) Biological resource use (Harvesting for 5.1/5.4, Logging for 5.2/5.3)
   5.1) Hunting & collecting terrestrial animals
   5.2) Gathering terrestrial plants
   5.3) Logging & wood harvesting
   5.4) Fishing & harvesting aquatic resources
6) Human intrusions & disturbance (Disturbance)
7) Natural system modifications (System modifications)
8) Invasive & other problematic species, genes & diseases (Invasives)
9) Pollution (Pollution)
10) Geological events (excluded from our analysis)
11) Climate change & severe weather (Climate)
12) Other options (excluded from our analysis)

Quantifying Research Effort. We measured research effort using the number of published articles (1965–2016) for each species in our analysis. The searches were done in Thomson Reuter's Web of Science and included taxonomic synonyms as listed on species Red List fact sheets. For each species, we searched on topic (title, author, author keywords, Web of Science keywords, and abstract) and recorded the number of results. We modeled the relationship between research effort and (log transformed) body mass using negative binomial regression for all vertebrates together and each class separately.

Quantifying Conservation Funding. For each species, we searched projects listed in AidData (aiddata.org/) using the species' common names as listed on its IUCN Red List fact sheet page. Only aid projects with sector "General Environment Protection" and purpose name "Bio-diversity" were considered in the search. Species were classified as receiving aid if one or more of their common names matched the summary text (title, short description, or long description) of at least one project. We then fit a logistic regression model to indicate any association between body mass and the likelihood of vertebrate species receiving financial aid.

Data. We obtained all of the species body size, status, threat, range, research effort, and conservation funding data used in this project from the public websites described above. The data on these websites are available to all researchers and users should realize that data posted on these websites change over time due to periodical updates.

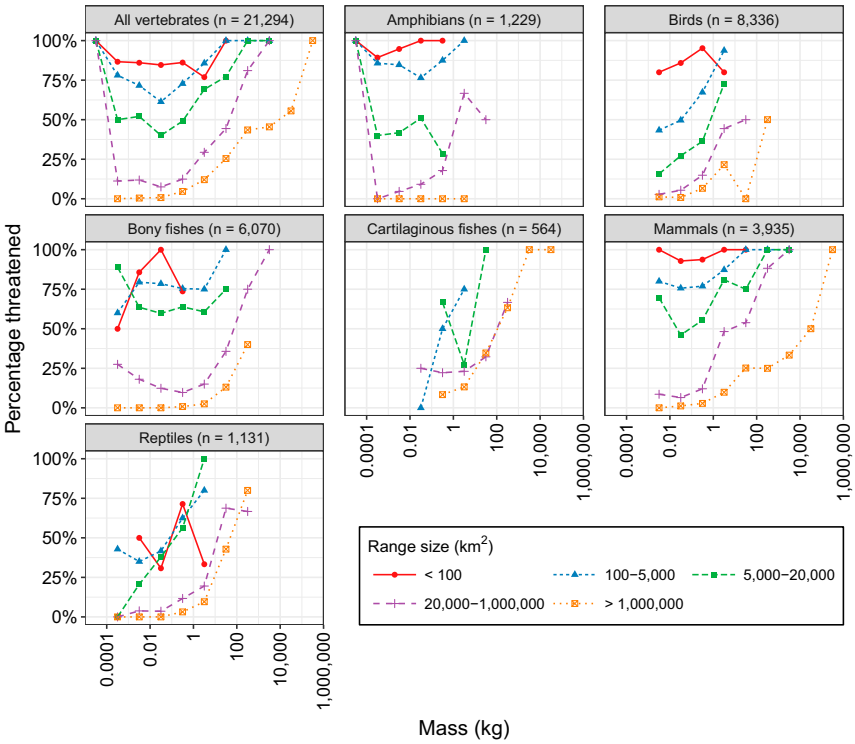

Fig. S1. For all major classes, percentage of species (*y* axis) within each range size group and mass range (log scale, e.g., 1–10 kg) that are threatened. Only species with IUCN range maps available were used in this plot (totals are shown in panel titles). The relative positions of the lines indicate that range size has a major effect on threatened status regardless of mass. Small range species are generally more threatened than those with large ranges.

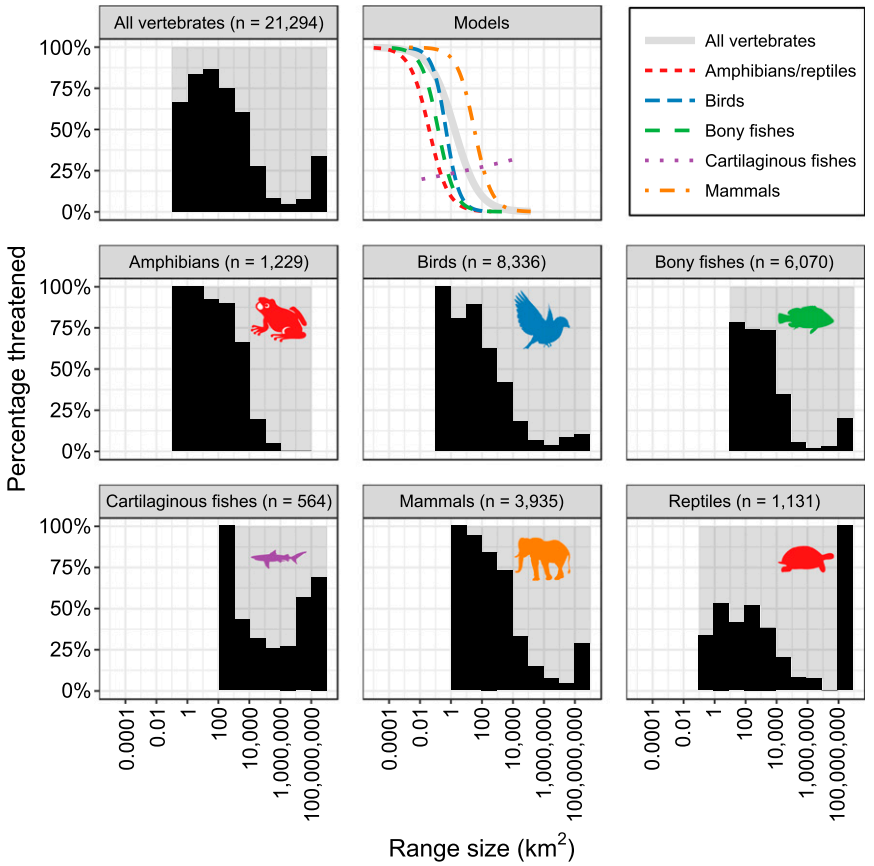

Fig. S2. For all major classes, relationships between vertebrate geographic range size and probability of being threatened. Lines in the "Models" graph indicate the predicted probabilities of being threatened as a function of range size based on logistic regression models using taxonomic random effects to account for phylogenetic dependence. These results show that there is a strong negative relationship between range size and probability of being threatened for all taxa except cartilaginous fishes.

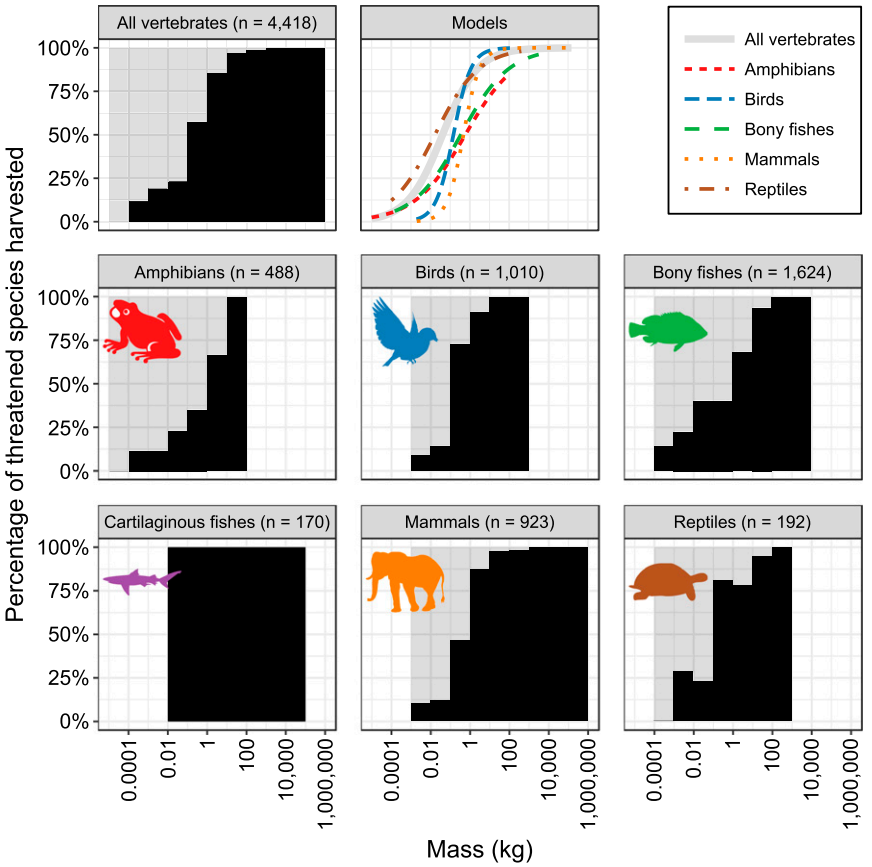

Fig. S3. Relationships between body mass and probability of being harvested for threatened species in each of the six classes and all vertebrates. Raw data are shown as black histograms. Lines in the "Models" panel indicate the predicted probabilities of threatened species being harvested (killed by humans) as a function of body mass based on logistic regression models using taxonomic random effects to account for phylogenetic dependence. No model was fit for cartilaginous fishes because all threatened species were harvested for this class; however, data for cartilaginous fishes were included in the all vertebrates model. Species totals (*n*) correspond to number of threatened species only.

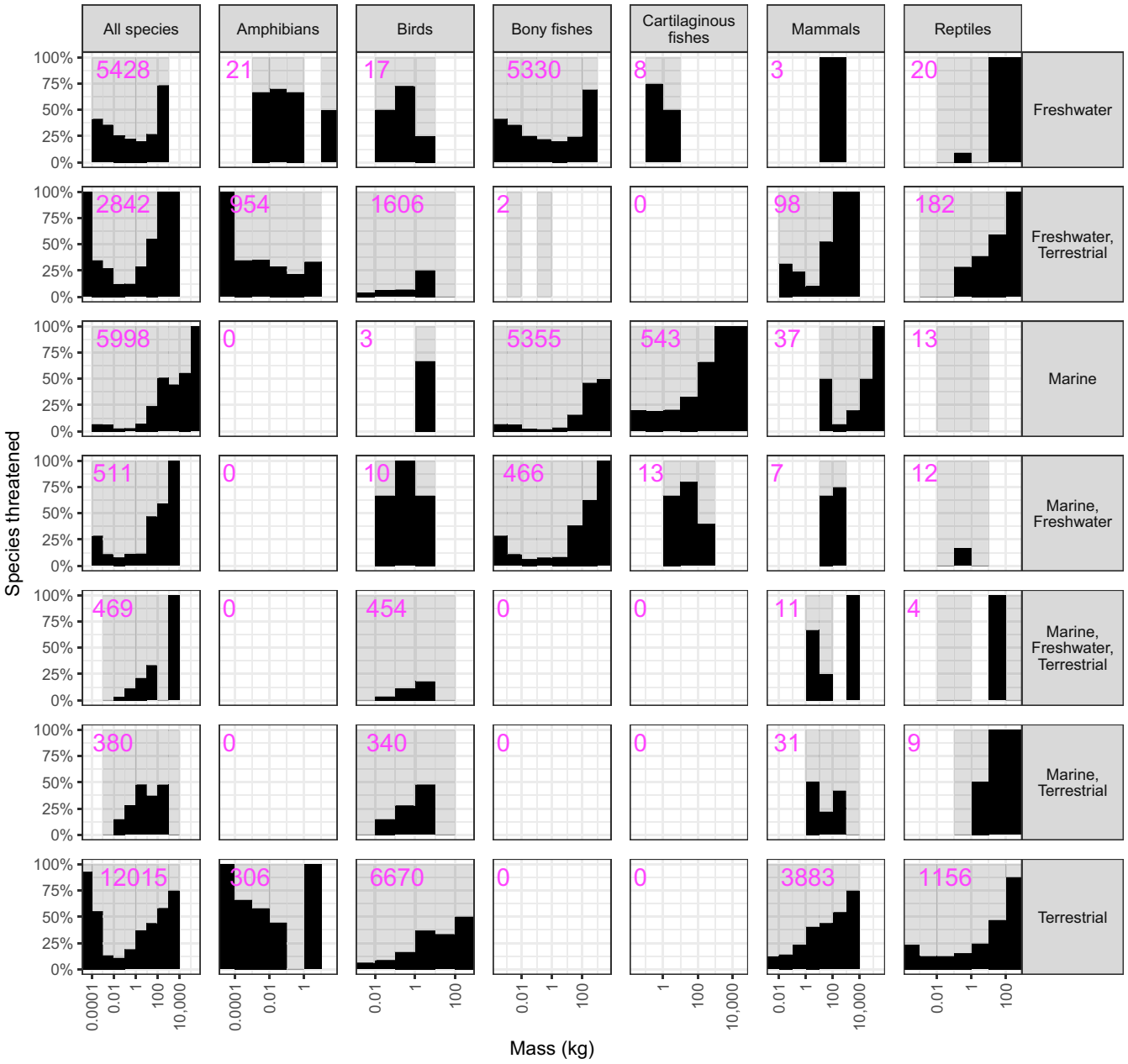

Fig. S4. Histograms showing percentages of species threatened versus body mass. Species are grouped by class (along with all vertebrates together) and types of ecosystem used. Ecosystem type data were obtained from the IUCN Red List. Note that some species may use multiple ecosystem types (e.g., terrestrial and freshwater or marine and freshwater). Numbers of species corresponding to each group and ecosystem type are shown in the panels.

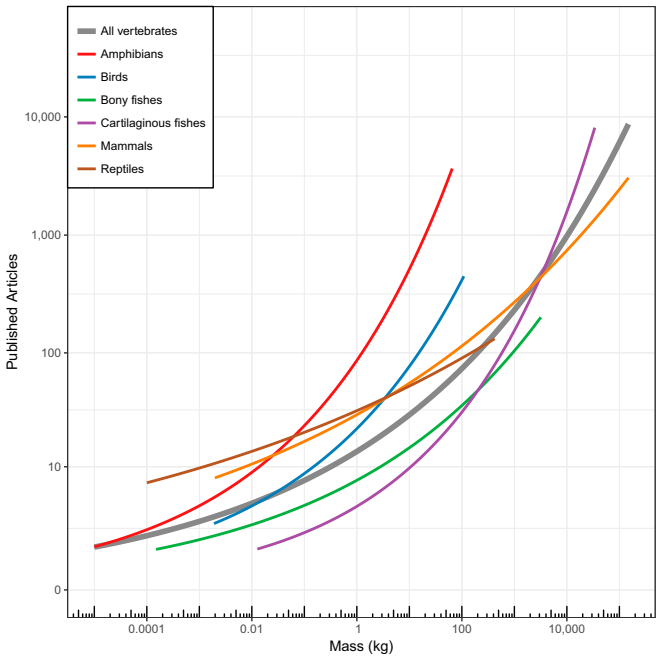

Fig. S5. Research effort versus mass for the classes in our analysis. Research effort is measured using number of published articles (1965–2016) for each of the 27,647 species in our analysis. The searches were done in Thomson Reuter's Web of Science and included taxonomic synonyms as listed on IUCN Red List fact sheets. The lines show negative binomial regression fitted models for each class separately and "all vertebrates" together.

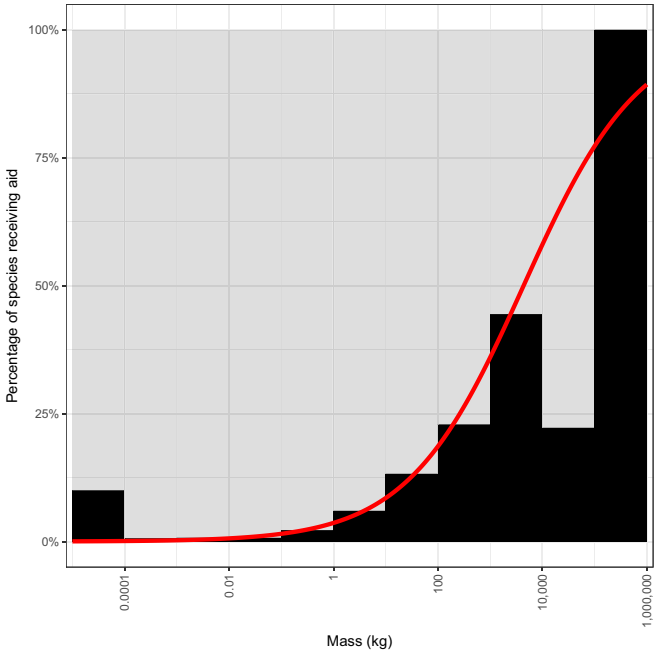

Fig. S6. Percentages of species receiving financial aid (n = 556 receiving aid). The black histogram (logistic regression fitted model shown in red) indicates a positive association between body mass and the likelihood of receiving aid. Note that the true relationship may differ slightly as some species share common names and some common names may be used in other contexts.

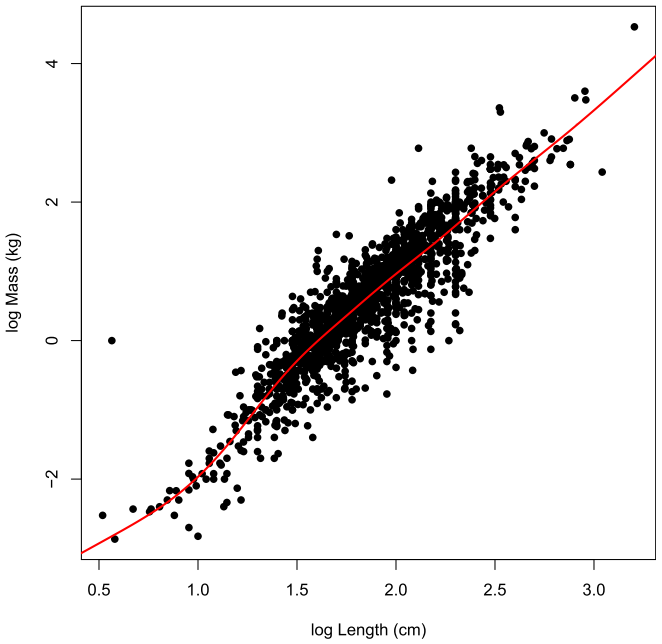

Fig. S7. Relationship between body mass and maximum length (log scale) for fish using data from FishBase. We used a generalized additive model (fitted relationship shown in red; adjusted $R^2 = 0.825$, $n = 1734$) to predict species body masses from maximum lengths for species with known lengths and unknown masses.

Table S1. Data availability summary showing the numbers of species in each group with known masses, IUCN Red List information (v2016.3), and both

Category	Amphibians	Birds	Fishes	Mammals	Reptiles	All vertebrates
Mass	1,282	9,532	29,012	4,651	2,494	46,971
IUCN	6,534	11,121	16,134	5,567	5,338	44,694
Mass + IUCN	1,282	9,180	14,402	4,594	1,456	30,914
Mass + IUCN + range size	1,229	8,364	8,195	4,391	1,168	23,347
DD	0	28	2,553	480	54	3,115
EW	0	5	6	2	2	15
EX	0	47	47	39	4	137
Nonthreatened (LC/NT)	782	8,087	9,783	3,120	1,136	22,908
Threatened (CR/EN/VU)	500	1,013	2,013	953	260	4,739
Total (excluding DD/EW/EX)	1,282	9,100	11,796	4,073	1,396	27,647
Percent threatened, %	39.0	11.1	17.1	23.4	18.6	17.1

The fourth row shows the numbers of species that have geographic range size data as well as mass and IUCN Red list information. The total number of vertebrates with mass and range size data (excluding DD/EW/EX) was 21,294. The next five rows indicate the numbers of species with both known body masses and IUCN Red List information that are DD, EW, EX, nonthreatened (LC or NT), threatened (CR or EN, or VU). The penultimate row shows the total number of species considered in this study, excluding those listed as DD, EW, or EX. The final row shows the percentages of species that are threatened. All amphibian mass data are from IUCN assessed non-DD/EW/EX species because we only looked at amphibian descriptions for these species.

Table S2. Summary of generalized linear mixed models for each taxonomic group

Group	Response	Term	Estimate	Lower	Upper	*P* value	R^2	Estimate*	Lower*	Upper*
All vertebrates	Threatened	Mass (small)	−0.573	−0.666	−0.481	<0.001	0.317†	177%	162%	195%
		Mass (large)	0.237	0.178	0.296	<0.001	0.317†	27%	20%	35%
		Breakpoint	−1.462	−1.542	−1.304		0.317†	0.035	0.029	0.05
		Range size	−1.453	−1.504	−1.403	<0.001	0.66	−77%	−78%	−75%
	Harvesting	Mass	1.115	1.011	1.22	<0.001	0.628	205%	175%	239%
Amphibians	Harvesting	Mass	0.771	0.449	1.094	<0.001	0.155	116%	57%	199%
Amphibians/reptiles	Threatened	Mass (small)	−0.428	−0.554	−0.302	<0.001	0.209†	153%	135%	174%
		Mass (large)	1.043	0.711	1.375	<0.001	0.209†	184%	104%	295%
		Breakpoint	−0.385	−1.058	−0.101		0.209†	0.412	0.087	0.792
		Range size	−1.375	−1.497	−1.253	<0.001	0.716	−75%	−78%	−71%
Birds	Threatened	Mass	0.725	0.58	0.871	<0.001	0.134	107%	79%	139%
		Range size	−1.282	−1.359	−1.205	<0.001	0.587	−72%	−74%	−70%
	Harvesting	Mass	2.242	1.825	2.658	<0.001	0.567	841%	520%	1327%
Bony fishes	Threatened	Mass (small)	−0.395	−0.454	−0.335	<0.001	0.402†	148%	140%	157%
		Mass (large)	1.37	1.106	1.635	<0.001	0.402†	294%	202%	413%
		Breakpoint	0.566	0.134	0.743		0.402†	3.679	1.363	5.532
		Range size	−1.872	−1.991	−1.753	<0.001	0.598	−85%	−86%	−83%
	Harvesting	Mass	0.813	0.697	0.93	<0.001	0.332	126%	101%	153%
Cartilaginous fishes	Threatened	Mass	0.652	0.394	0.909	<0.001	0.311	92%	48%	148%
		Range size	0.114	−0.126	0.354	0.351	0.316	12%	−12%	42%
Mammals	Threatened	mass	0.514	0.406	0.623	<0.001	0.188	67%	50%	87%
		Range size	−1.681	−1.802	−1.56	<0.001	0.724	−81%	−84%	−79%
	Harvesting	Mass	2.416	2.041	2.792	<0.001	0.793	1,021%	670%	1,532%
Reptiles	Harvesting	Mass	0.888	0.523	1.254	<0.001	0.396	143%	69%	250%

Response variables considered were threatened status and whether or not a threatened species is harvested (both binary). No model was fit for cartilaginous fishes and harvesting as insufficient information was available there (all threatened species were harvested). Segmented regression models with respect to body mass were used for species that exhibited different mass-extinction risk relationships at low vs. high masses. For each model, parameter estimates are shown with lower and upper 95% confidence interval endpoints, *P* values, and pseudo-R^2. Back-transformed estimates are shown in the columns marked with an asterisk, indicating the change in the odds of being threatened and so forth, associated with a 10-fold increase in mass (or decrease for inverse relationships when using segmented models for modeling threatened status) or range size. The body mass breakpoint estimates and confidence intervals are given in terms of kilograms. Mass and geographic range size were log-transformed for this analysis. Random intercepts were included by taxonomic order (and by class for the "All vertebrates" group) to allow for relationships varying from order to order. Model intercept and random effect estimates are omitted from the table.
†Pseudo-R^2 values for the segmented regression models are for the entire model.

Table S3. Numbers and proportions of vertebrate species facing each threat type

Threat	Species facing threat	Percent of threatened species, %
Harvesting	1,946	44.05
Agricultural cropping	1,945	44.02
Logging	1,656	37.48
Invasives	1,450	32.82
System modifications	1,370	31.01
Pollution	1,324	29.97
Development	1,188	26.89
Livestock	983	22.25
Climate	921	20.85
Energy	658	14.89
Disturbance	467	10.57
Transportation	459	10.39

The total number of threatened species here is 4,418. Note that this total excludes threatened species that lack threat type information. The numbers of species facing each threat are for threatened species only.