Targeting global conservation funding to limit immediate biodiversity declines

Anthony Waldron, Arne O. Mooers, Daniel C. Miller, Nate Nibbelink, David Redding, Tyler S. Kuhn, J. Timmons Roberts and John L. Gittleman

Supplementary Information

Full Results

Table S1 shows the complete set of underfunding rankings and results for world countries, along with comments on any uncertainties that might affect rankings for the most underfunded countries. The term “robust” in table S1 refers to a qualitative assessment of whether the country is likely to be genuinely underfunded, given knowledge of possible missing financial flows and of how large they might be in comparison to known flows (and therefore how likely it was that missing flows would alter the results). For example, uncertainty about ecotourism revenues in a major tourism destination with limited conservation funding from other sources (donor or government) would raise a significant doubt over robustness, especially if associated with a relatively small absolute dollar shortfall. Conversely, an uncertainty about trust fund allocations that are approximately ten thousand dollars annually is unlikely to affect the ranking for a country that receives several million dollars of bilateral/multilateral aid. Robustness in this context refers to whether or not a country has below-expected spending and so should be considered underfunded, not to the individual rankings. We note that small differences in rankings should not be over-interpreted owing to the nature of the data. Somalia is not included in the table because there was no evidence of government or donor spending, leading to exclusion from analysis (see below). Nevertheless, the possibility of it being one the world’s most highly underfunded countries should be considered, not least because Somalia’s threatened biodiversity ranks in the top-50 (using threatened mammal GBF, figure 1).

Poorer country (“developing world”) analysis

Developed and developing countries differ in several important ways for the purposes of the current analysis. The greater range and complexity of significant funding sources in wealthy countries increases the uncertainty for this group (particularly the European Community with its various intra-Community flows and agri-biodiversity schemes (34)). The main sources of conservation funding are different in developing and developed countries (i.e. donors vs. national governments), and so spending drivers may be weighted differently and have difference effects between wealthier and poorer nations. The domestic/donor balance also suggests that the policy implications of underfunding are different in developed and developing countries. Finally, European countries have a much stronger concentration on conservation measures outside of “wilderness” areas than many other countries e.g. agri-environmental spending is a highly important pillar of EU biodiversity strategies (35). For all these reasons, it may be useful to consider developed country underfunding separately from developing country underfunding.

Table S2 shows the results when only poorer countries (those outside the World Bank Upper Income category (36)) are analysed. The highly underfunded developing countries in the all-country analysis (table 2 in the main text) all continued to be ranked as highly underfunded when wealthy countries were excluded from analysis, with the exception that China was replaced by Brunei. Table 2 also contained seven upper-income nations, so exclusion of upper-income nations opened seven empty slots that were filled by Mexico, Turkmenistan, Liberia, The Philippines, Georgia, the Dominican Republic and Papua New Guinea.

Richer country (“developed world”) analysis

We performed a separate sub-analysis using only countries in the World Bank Upper Income bracket, plus upper-middle income countries now included in the European Community (Slovakia, Portugal, Estonia, Croatia and Hungary) (n=25). Saudi Arabia was dropped from the regression model because it was an extreme outlier in governance. For this subgroup, all governance indicators except political stability and voice/accountability were highly collinear with the cost term NPL, so we only tested models with the two non-collinear indicators political stability and "voice" (the influence of citizens on government), expecting *a priori* that cost should be important. All other candidate variables remained the same. However, we tested models both with and without voice because citizen influence may represent a political effect, rather than a hypothesized way of improving the efficiency of biodiversity conservation spending.

The best-fitting model contained voice, country size and GDP^2 (and noticeably omitted biodiversity), explaining 90% of deviance in spending. If voice was excluded *a priori*, the best-fitting model contained NPL (i.e. cost), country size and GDP^2, explaining 88% of the deviance. In other words, the models are identical except that NPL and voice are interchanged. Spending increased non-linearly as a decelerating function of either voice or NPL.

Thirteen countries had below-average spending under both NPL and Voice models, and in the same order(ranks in the original all-country analysis given in parentheses): Finland (17), Slovenia (16), Slovakia (24), Trinidad and Tobago (12), the United States (85), Iceland (26), Antigua and Barbuda (107), Norway (44), Australia (38), the Czech Republic (51), France (36), Canada (111) and Austria (40). Ten out of these thirteen were also identified as having relatively strong underfunding in the all-country analysis (relatively large negative residuals). The interesting exceptions are the United States, Canada, and Antigua and Barbuda, which have below-average levels of conservation funding when compared with their economic peer group but above-average funding when compared to all world countries (table S1). (The assessed level of underfunding for Antigua is quite sensitive to uncertainty about how far tourism revenues contribute to biodiversity conservation in this country, see table S1).

Interestingly, many developed countries that seemed highly underfunded in 2001-2008 made unusually large increases in their domestic conservation budgets around the end of that period e.g. Finland, Australia, Norway and Austria (see CBD country reports at (2)), and so the 2001-2008 annual average used for analysis is appreciably different from current funding levels. For the 2007-2013 period, Austria also allocated 2.8 billion euros of EU EAFRD funds on conservation-related threads (35) (its allocation between the Common Agricultural Policy reform in 2003 and 2008 could not be included because if inadequate reporting within the EU prior to 2008 (35). On the other hand, the potentially large extra amounts that Australia and France (due to its overseas dependencies) may need to invest to protect their extremely high biodiversity in an expensive cost context (see e.g. table 2) could be onerous for their domestic budgets. If the model's estimates are accurate (and they are likely to represent far less investment than is needed to fully meet Aichi targets (3, 4, 7)), the Australian and French shortfalls represent a novel challenge in a system where international flows tend to be directed at only poorer countries.

Table S1. Countries ranked in order of spending inadequacy (largest negative residuals from the best-fit model ranked first). The second column shows how often countries were ranked among the 40 most highly-underfunded (table 2) in 1000 perturbations of the spending data. The third column back-calculates the dollar difference between observed and expected spending, and the fourth column presents a qualitative assessment of the rankings, also commenting on data issues that may affect interpretation for individual countries. The qualitative robustness analyses is largely restricted to the 50 most highly-underfunded countries, which would be the most significant for policy, and are marked as NA thereafter unless particularly worthy of comment. Countries (plus Antarctica) from rank 125 onwards were not analysed due to either insufficient data or deliberate exclusion (see below).

Rank	Country	Data perturbation robustness	Dollar difference from expectation ($million 2005)	Comments
1	Iraq	100	-0.7	Robust
2	Djibouti	100	-0.65	Robust
3	Angola	100	-3.59	Robust
4	Kyrgyzstan	100	-2.06	Robust
5	Guyana	100	-4.74	Robust
6	Solomon Islands	99.6	-0.4	Undetected tourism revenues flowing to biodiversity conservation could affect this ranking
7	Malaysia	98.8	-53.3	Robust
8	Eritrea	99.2	-0.8	Robust
9	Chile	98.8	-55.44	Robust
10	Algeria	100	-13.34	Robust
11	Senegal	98.8	-20.98	Robust
12	Trinidad and Tobago	98.4	-4.38	Undetected tourism revenues flowing to biodiversity conservation could affect this ranking
13	Vanuatu	97.2	-0.6	Undetected tourism revenues flowing to biodiversity conservation could affect this ranking
14	Uzbekistan	96	-1.12	Robust
15	Morocco	98.4	-8.36	Robust
16	Slovenia	94.8	-6.19	Probably Robust although EU biodiversity aid is complex and some may have been missed.
17	Finland	93.6	-69.76	Spending accelerated rapidly between 2001 and 2008. Relative funding today is likely to be better.

18	Congo	91.6	-1.35	Robust: remains underfunded even if known NGO spending included
19	Yemen	95.2	-1.33	Robust
20	Comoros	92	-0.07	Small absolute shortfall, difficult to judge
21	Ivory Coast	93.2	-7.02	Robust
22	Mauritania	92.4	-1.95	Robust
23	Bhutan	86	-4.75	Robust
24	Slovakia	83.2	-9.98	Probably Robust although EU biodiversity aid is complex and some may have been missed.
25	Mongolia	90.4	-4.34	Robust
26	Iceland	70.4	-30.36	Robust
27	Colombia	85.2	-72.73	Robust
28	Venezuela	76	-25.02	Funding in 1990-7 (Castro and Locker 2000) was much better than suggested in Bovarnick et al. (2010).
29	Armenia	80.8	-2.44	Robust
30	Moldova	72.4	-0.34	Robust
31	Indonesia	66.4	-24.14	There may be significant NGO financial activity, not accounted for, but the size of the shortfall suggests overall Robustness
32	Jordan	62	-2.09	Robust
33	Azerbaijan	64.4	-1.24	Robust
34	Sudan	63.6	-2.14	Robust and indeed based on a government spending figure that appears to be an overestimate
35	Botswana	58	-11.41	Robust and the country report indeed comments that recent increase in GDP has cut the country off from former aid flows.
36	France	64.8	-355.49	Mainland France variables were used, so will be slightly better-funded than suggested here, but certainly seems worthy of attention.
37	Sri Lanka	51.6	-6.08	Robust
38	Australia	62	-275.36	There are multiple spending flows but given the size of the shortfall, conclusion seems Robust.

39	China	39.6	-75.31	Unclear. China in 2008 spent $8bn annually to support ecosystem services but the figure for earlier years is unknown and so this flow was excluded. The provinces also have large, unquantified conservation budgets.
40	Austria	46.4	-53.08	Largely has an agri-environmental-centred conservation policy, European conservation spending in general is complex
41	Brunei	35.6	-2.62	Based on a government spending figure from the 1990s, assumes spending changed in line with inflation and PA growth since then.
42	Mexico	32	-41.05	Robust
43	Turkmenistan	36.8	-0.11	Probably Robust but small absolute shortfall, difficult to judge
44	Norway	29.6	-43.24	Spending accelerated rapidly between 2001 and 2008. The urgency ranking today is likely to be lower.
45	Liberia	26	-0.17	Robust
46	Philippines	18.4	-3.07	There may be significant NGO financial activity, not accounted for
47	Brazil	10.8	-13.71	Probably much better funded than suggested here: state budgets and some substantial non-governmental funds could not be accounted for.
48	Rwanda	26.4	-0.71	Robust
49	Mali	15.6	-0.09	Robust
50	Switzerland	14.8	-6.79	Robust
51	Czech Republic	12.8	-0.34	EU funding is complex and funding may be better than assessed.
52	Swaziland	18.8	0	Probably Robust but small absolute shortfall, difficult to judge
53	Nicaragua	18.8	0.03	NA
54	Lesotho	14	0.01	Probably Robust but small absolute shortfall, difficult to judge
55	Myanmar (Burma)	12	0.01	Probably robust but in the absence of good donor relationships, government spending should be important and must be regarded as uncertain

56	Nepal	17.6	0.24	NA
57	Dominican Republic	15.6	0.78	NA
58	United Kingdom	11.2	44.02	NA
59	Laos	8.8	0.26	NA
60	Ghana	12	1.11	NA
61	Argentina	5.6	4.08	NA
62	Estonia	11.6	1.94	NA
63	Zambia	9.6	2.01	NA
64	Benin	13.2	0.91	NA
65	Sierra Leone	8.8	0.09	But funding is accelerating post-conflict
66	Georgia	6.4	0.76	NA
67	Papua New Guinea	7.2	1.09	Potentially significant NGO financial activity not accounted for
68	Cambodia	8.4	0.81	NA
69	Saudi Arabia	4	8.71	NA
70	Chad	4.4	0.71	NA
71	Denmark	13.2	76.53	NA
72	Tanzania	6.8	6.66	NA
73	Tunisia	6.8	2.1	NA
74	Togo	7.2	0.13	NA
75	Egypt	6.4	2.49	NA
76	Poland	4.4	11.32	NA
77	Mozambique	9.6	3.25	NA
78	Burkina Faso	6	1.61	NA
79	New Zealand	3.6	48.66	NA
80	Gabon	8	1.43	NA
81	Dominica	4.4	0.68	NA
82	Peru	2.8	6.55	NA
83	St. Lucia	5.6	0.45	Undetected tourism revenues flowing to biodiversity conservation could affect this ranking
84	Thailand	5.2	21.3	NA
85	United States	3.6	1895.4	Multiple other funding sources including TNC not accounted for
86	Niger	3.2	2.13	NA
87	Ecuador	3.6	7.33	However, money is very unevenly spread in favour of the Galapagos and mainland Ecuador may be much worse funded than suggested
88	South Africa	3.2	35.92	NA
89	Croatia	4.4	5.21	NA
90	Guinea	2.4	1.38	NA
91	Namibia	2.8	11.01	NA

92	Nigeria	4	7.04	NA
93	Panama	3.2	6.77	NA
94	Malawi	5.2	2.24	NA
95	Albania	2.8	1.72	NA
96	Guatemala	3.2	12.21	NA
97	Bolivia	3.2	8.58	NA
98	Belgium	4	59.33	NA
99	Guinea-Bissau	2	1	NA
100	Portugal	2.8	31.44	NA
101	India	4	53.66	NA
102	Russia	2.8	36.35	NA
103	Sweden	3.6	66.18	NA
104	DRC	1.2	3.97	NA
105	Afghanistan	0.8	1.84	NA
106	Cameroon	0.8	7.25	NA
107	Antigua and Barbuda	1.2	1.09	Undetected tourism revenues flowing to biodiversity conservation could affect this ranking
108	Fiji	0.4	4.71	NA
109	Mauritius	1.6	3.18	NA
110	Burundi	1.2	1.22	NA
111	Canada	2	626.31	NA
112	Bangladesh	0.8	4.97	NA
113	Honduras	2	9.56	NA
114	Central African Republic	0.8	3.98	NA
115	Costa Rica	0	19.77	NA
116	Uganda	1.6	16.23	NA
117	El Salvador	1.2	4.96	NA
118	Kenya	0.4	26.69	NA
119	Tajikistan	0.4	1.72	NA
120	Hungary	0.8	29.65	NA
121	Vietnam	0.8	18.2	NA
122	Madagascar	0	16.89	NA
123	Tanzania	0	30.67	NA
124	Netherlands	0	851.73	NA
125	Andorra	0	-1	0
126	Antarctica	0	-1	0
127	Bahamas, The	0	-1	0
128	Bahrain	0	-1	0
129	Barbados	0	-1	0
130	Belize	0	-1	0
131	Bosnia and Herzegovina	0	-1	0
132	Bulgaria	0	-1	0
133	Byelarus	0	-1	0
134	Cape Verde	0	-1	0

135	Cuba	0	-1	0
136	Cyprus	0	-1	0
137	East Timor	0	-1	0
138	Equatorial Guinea	0	-1	0
139	Ethiopia	0	-1	0
140	Federated States of Micronesia	0	-1	0
141	Gambia, The	0	-1	0
142	Gaza Strip	0	-1	0
143	Germany	0	-1	0
144	Greece	0	-1	0
145	Grenada	0	-1	0
146	Haiti	0	-1	0
147	Iran	0	-1	0
148	Ireland	0	-1	0
149	Israel	0	-1	0
150	Italy	0	-1	0
151	Jamaica	0	-1	0
152	Japan	0	-1	0
153	Kazakhstan	0	-1	0
154	Kiribati	0	-1	0
155	Kuwait	0	-1	0
156	Latvia	0	-1	0
157	Lebanon	0	-1	0
158	Libya	0	-1	0
159	Liechtenstein	0	-1	0
160	Lithuania	0	-1	0
161	Luxembourg	0	-1	0
162	Macedonia	0	-1	0
163	Maldives	0	-1	0
164	Malta	0	-1	0
165	Marshall Islands	0	-1	0
166	Monaco	0	-1	0
167	Montenegro	0	-1	0
168	Nauru	0	-1	0
169	North Korea	0	-1	0
170	Oman	0	-1	0
171	Pakistan	0	-1	0
172	Paraguay	0	-1	0
173	Qatar	0	-1	0
174	Romania	0	-1	0
175	San Marino	0	-1	0
176	Sao Tome and Principe	0	-1	0
177	Serbia	0	-1	0
178	Seychelles	0	-1	0
179	Singapore	0	-1	0
180	Somalia	0	-1	0

181	South Korea	0	-1	0
182	Spain	0	-1	0
183	St. Kitts and Nevis	0	-1	0
184	St. Vincent and the Grenadines	0	-1	0
185	Suriname	0	-1	0
186	Syria	0	-1	0
187	Taiwan	0	-1	0
188	Tonga	0	-1	0
189	Turkey	0	-1	0
190	Tuvalu	0	-1	0
191	United Arab Emirates	0	-1	0
192	Uruguay	0	-1	0
193	Vatican City	0	-1	0
194	West Bank	0	-1	0
195	Western Sahara	0	-1	0
196	Samoa	0	-1	0
197	Zimbabwe	0	-1	0
198	Paracel Islands	0	-1	0
199	Spratly Islands	0	-1	0

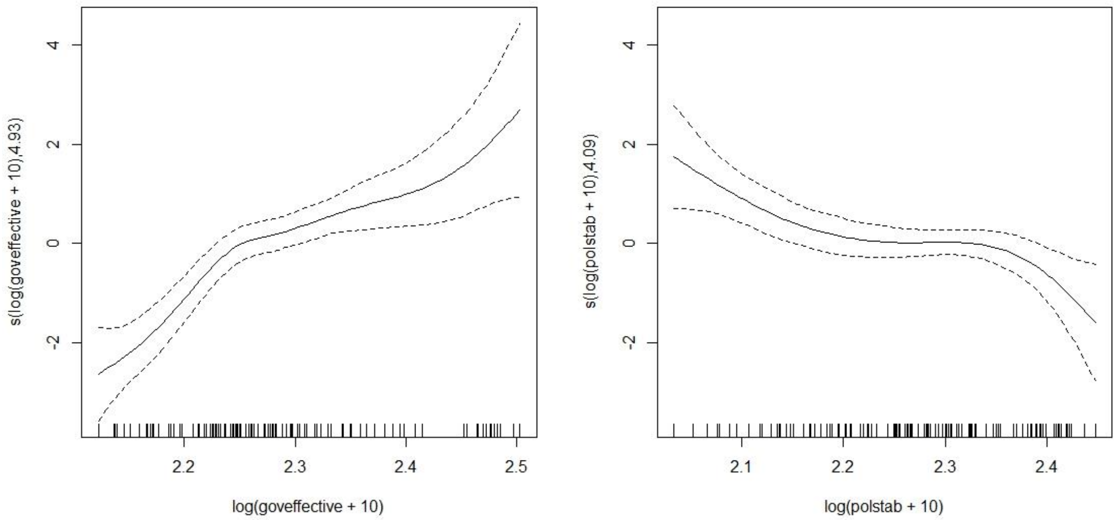
Table S2. Countries in order of underfunding when upper-income nations are excluded. To illustrate differences to the all-country analysis, (i) comparative rankings are shown, and (ii) countries that would newly appear in a worst-40 table such as table 2 (including those filling the empty slots left by the exclusion of upper-income nations) are highlighted in green.

Country	**Rank in poorer-country analysis**	**rank in all-country analysis**
Iraq	1	1
Djibouti	2	2
Angola	3	3
Kyrgyzstan	4	4
Guyana	5	5
Solomon Islands	6	6
Eritrea	7	8
Algeria	8	10
Malaysia	9	7
Morocco	10	15
Vanuatu	11	13
Congo	12	18
Uzbekistan	13	14
Senegal	14	11

Yemen	15	19
Chile	16	9
Comoros	17	20
Jordan	18	32
Bhutan	19	23
Ivory Coast	20	21
Venezuela	21	28
Armenia	22	29
Mauritania	23	22
Azerbaijan	24	33
Slovakia	25	24
Sri Lanka	26	37
Botswana	27	35
Mongolia	28	25
Brunei	29	41
Colombia	30	27
Moldova	31	30
Indonesia	32	31
Turkmenistan	33	43
Philippines	34	46
Mexico	35	42
Liberia	36	45
Sudan	37	34
Georgia	38	66
Dominican Republic	39	57
Papua New Guinea	40	67
Ghana	41	60
Nicaragua	42	53
Mali	43	49
Lesotho	44	54
Swaziland	45	52
Peru	46	82
Tanzania	47	72
Myanmar (Burma)	48	55
China	49	39
Argentina	50	61
Nepal	51	56
Cambodia	52	68
Laos	53	59
Tunisia	54	73
Togo	55	74
Zambia	56	63
Egypt	57	75
Chad	58	70
Rwanda	59	48
Benin	60	64

Brazil	61	47
Poland	62	76
Ecuador	63	87
Thailand	64	84
Sierra Leone	65	65
Croatia	66	89
Guatemala	67	96
Namibia	68	91
Saudi Arabia	69	69
Estonia	70	62
Mozambique	71	77
St. Lucia	72	83
Dominica	73	81
Gabon	74	80
Albania	75	95
Burkina Faso	76	78
Niger	77	86
Bolivia	78	97
Guinea	79	90
Russia	80	102
South Africa	81	88
Nigeria	82	92
Cameroon	83	106
Malawi	84	94
Panama	85	93
Antigua and Barbuda	86	107
Guinea-Bissau	87	99
Mauritius	88	109
Fiji	89	108
Bangladesh	90	112
India	91	101
Portugal	92	100
Costa Rica	93	115
Honduras	94	113
DRC	95	104
Uganda	96	116
Kenya	97	118
Central African Republic	98	114
El Salvador	99	117
Burundi	100	110
Afghanistan	101	105
Tajikistan	102	119
Vietnam	103	121
Hungary	104	120
Madagascar	105	122

Two of the drivers are governance indicators that had non-linear effects on spending and were statistically modelled with generalized additive models (GAMs) using cubic splines. Figure S1 shows the shape of the spline functions once other variables have been controlled for.



A B

Figure S1. Non-linear functional responses of conservation investment to governance indicators (corrected for all other regression terms). A: government effectiveness. B: political stability (absence of conflict). Both terms were ln (x+10) transformed.

MATERIALS AND METHODS.

Definitions

Our interest lay in defining the biodiversity that each country stewards and the relative spending associated with this biodiversity. The concept of stewardship is based on political responsibility, and so "country" refers here to the geopolitical units that exercise ultimate governmental control over an area. For example, the Falkland Islands or the American Virgin Islands are not countries under this definition, being territories of the UK and the USA respectively. The most important consequence of this definition for our analysis is that France is allocated stewardship of its multiple, highly biodiverse overseas dependencies such as French Polynesia and French Guyana. The total number of countries is 198, which does not include Kosovo or South Sudan, these being too new to incorporate into our study. Western Sahara has been under military occupation by Morocco for several decades and so it is unfair to expect any Western Saharan government to steward its local biodiversity. The responsibility should more fairly fall to Morocco and we allocated it thus. We could not easily calculate the biodiversity stewarded by Israel in the territories that it occupies militarily, owing to the political complexity of the Middle East situation. Taiwan and the Spratly Islands are disputed and were not included in the main analyses, not least because there were very poor data on 2001-2008 conservation spending for them. Gaza and the West Bank were treated as separate authorities, although this difference was also moot since both were excluded from analysis due to lack of data. We were unable to allocate financial responsibilities for the stewardship of Antarctica's biodiversity on account of poor budgetary information.

There is no established and consistent definition of what constitutes spending on biodiversity conservation. Lapham and Livermore (13) define biodiversity conservation spending as spending devoted to the conservation of biodiversity in the strict sense of genes, species and ecosystems and state that much of the spending categorized as being targeted towards biodiversity does not meet these criteria (see also (7)). We took a similar approach as far as possible and collated data on spending likely to have a relatively direct impact on biodiversity conservation. For example, spending on protected areas should have a relatively direct impact on the conservation of biodiversity and ecosystems, whereas spending on environmental quality measures such as clean water and waste management probably has a more diffuse impact, so we included protected area spending but excluded broad environmental spending. Additionally, spending on poverty alleviation may reduce pressure on biodiversity in some situations such as in the communities surrounding national parks (13, 30). However, the percentage improvements in biodiversity status resulting from spending on local roads, health and schools (for example) remain largely unquantified and the biodiversity effect of such spending may also be fairly indirect, so we generally excluded such flows. Further information on data selection criteria specific to each category of spending is given below.

Database assembly: identifying and calculating conservation investment

The nature of the data compilation and comparison with previous compilations

It is largely infeasible to collect data on all biodiversity conservation spending globally (13). Any financial compilation can therefore be seen as a sample from an unknown total population of spending flows, where some flows are far larger than others. All previous analyses comparing actual spending to the expectation from a model have sampled a subset of donor spending (either spending by the Global Environment Facility (GEF)(10), or summed 2002 spending by the GEF, the World Bank, the International Union for the Conservation of Nature, The Nature Conservancy and Wildlife Conservation Society (11, 37)). However, these samples represent less than 10% of global conservation spending and are not well representative of global patterns (figure S2). Even if treated as donor-specific, such underfunding assessments may still incorporate substantial bias because they fail to account for substantial variation in the ability of countries to fund their own conservation. For example, such subsamples omit very substantial tourism-based conservation funding generated for conservation by a number of African countries (38, 39).

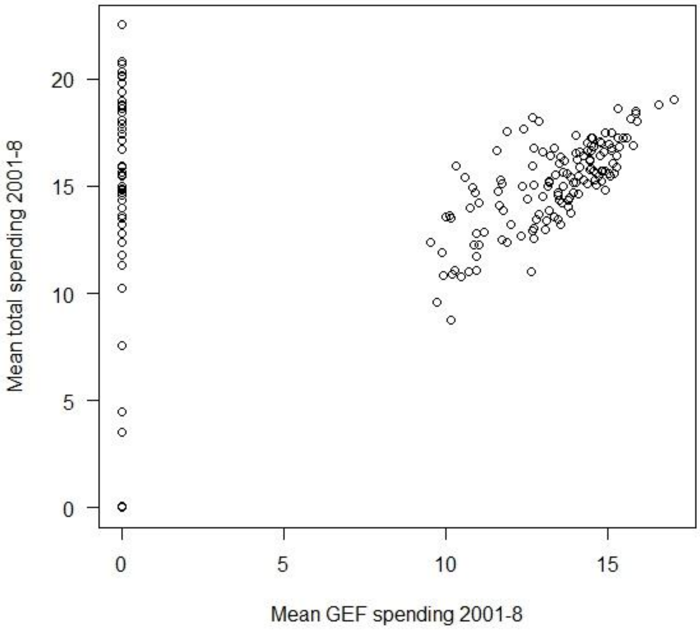


Figure S2. A comparison between total spending per country on biodiversity conservation and GEF biodiversity spending for 2001-2008. The group of points on the left indicate the large number of countries for which our analysis is able to add data for the first time. Units are ln-transformed 2005 constant US dollars.

Given the data sampling and collection constraints, our overall strategy was (i) to account for all major funding flows as far as possible, (ii), exclude any country for which information on a major flow may be missing (table S3), and (iii) use sensitivity analyses to test for the possible effects of inaccuracies in the financial totals recorded for each country on our conclusions.

Our first objective, therefore, was to assemble a much larger and more representative sample of global conservation spending, collating the data currently available on all the principal, known domestic and international flows of global conservation investment (30) (excepting grass-roots conservation spending by local communities, for which data at global level is extremely limited).

We collated spending from the early 1990s (1980 in the case of donor spending) to 2008 (the last year for which full information on many major flows is available). Our first major category of financial flows was domestic (in-country) spending, including funds from central and provincial/state governments, self-funding by conservation areas e.g. national park entrance fees and user fees, and funding from parastatal agencies or national environmental funds. This source category accounted for approximately 90% of total annual funding worldwide, though with wide variation at country level. For example, government spending for poorer countries (World Bank income groups Low Income and Low Middle Income) represents a median 13% of funding flows whereas government or state spending in the wealthiest countries (World Bank Upper Income group) represents a median

97% of all funding (with the remainder mostly flowing from philanthropy within the country e.g. The Nature Conservancy in the United States (11)).

The second major source category was international donor disbursements, principally international biodiversity aid from bilateral and multilateral donors, supplemented by any information on major disbursements by NGO donors. Additionally, we included flows from conservation trust funds (40) and debt-for-nature swaps (both two-party and three-party commercial (41, 42).

Donor spending (international biodiversity aid)

Information on donor spending (international biodiversity-conservation aid) was taken from an analysis of the Aiddata 1.0 database by D.M. and co-workers (7). AidData contains a record for nearly 1 million development projects from 1946 to 2010, making it the most comprehensive source of information on international aid currently available (20).

Biodiversity conservation aid is a subset of official development assistance (ODA) committed and disbursed by bilateral and multilateral donors. To qualify as ODA an aid project be must: 1) be "provided by official agencies, including state and local governments, or by their executive agencies," 2) have "the promotion of the economic development and welfare of developing countries as its main objective," and 3) include a grant element of at least 25 percent (43). Most, but not all biodiversity aid donors are members of the Organisation for Economic Co-operation and Development (OECD). AidData builds upon data from the OECD's Creditor Reporting System (CRS) to capture ODA from OECD donors, but also "emerging" and other non-OECD donors who provide such aid. A list of the 70 bilateral and multilateral donor agencies included in the database is found at: aiddata.org.

Using AidData, we conducted a multilingual search of 120 keywords relevant to biodiversity to identify the universe of biodiversity-related projects (see (7) for details of the keyword search). This keyword list was developed deductively and inductively, from expected terms and from those found in known biodiversity projects. In addition, we translated most of the keywords into French and Spanish. Biodiversity "means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (44). Biodiversity-related aid projects may have an immediate positive effect on biodiversity with clear, measureable goals and criteria for success (e.g. support for protected areas management). Such projects may also have less definable, longer-range positive effects (e.g. scientific research or capacity building) or may be preventative in nature (e.g. efforts to forestall the spread of invasive species, the Cartagena Protocol on Biosafety).

Our coding scheme applied these definitions to entire projects. However, many biodiversity-related projects also include components related to development objectives. If a project included any component related to biodiversity, whether it was, for example, 10% or 100%, the whole amount committed was included in our assessment of biodiversity aid. Lack of information about how funding was allocated within projects prevented finer-grained analysis within project budgets. At the same time, many project records only included short descriptions or project titles. These projects were coded based on this limited information where possible, while projects with no descriptive information received no code. This approach likely makes our method of identifying biodiversity aid conservative, since a project description must specifically indicate that a project relates to biodiversity for it to be coded it as such.

Our keyword query yielded 75,858 projects covering the period 1980-2008. These projects were sorted by year, and each was coded for inclusion or exclusion depending on its likely effect on biodiversity. Projects with clear, measureable goals and criteria for success (e.g. protected area management) and those with less defined, longer-range goals (e.g. scientific research, capacity building, or policy development) were both included, as long as a connection to biodiversity conservation could be established based on project record information. To establish inter-coder reliability two separate researchers associated with AidData coded each project. Coding in this manner yielded agreement for 79 percent of the projects. Projects without the same matching code were arbitrated by a senior researcher for a final decision before being included in the dataset. Using this method, we identified 8628 biodiversity aid projects during the period 2001-2008 (assuming five year project cycles, see below). The large number of projects not relevant to biodiversity yielded by the keyword search is due to the wide range of terms used in the search (see (7) for details). Terms such as "community," "development," or "protection" can be used in association with other words to represent biodiversity-related projects, but they can also have currency in many other contexts. Calculations of biodiversity-related aid are based on project amounts committed by donors.

Based on the biodiversity-related projects we identified, we calculated average donor financial commitment per country per year for 2001-2008. Donor disbursements for a particular year are generally used over multiple future years rather than all in the first year. Averages taken over several years mitigate this problem but could still be unrepresentative of overall patterns in any case where an unusually large disbursement is made in the last year of our study period (2008) or immediately prior to the 2001 (the former would overestimate annual flows and the latter would cause an underestimation). To minimize inaccuracies associated with large disbursements close to our cut-off dates, we assumed that the money allocated in any particular year was spent across a five-year project cycle (a common value across many GEF projects). Any years that stood out as having an unusually high donor allocation for any country after this smoothing process were checked against original project documentation as far as possible, to see whether a cycle longer than five years should be used.

The method of calculating biodiversity-related aid used here improves on current practice through independent, consistent, and more specific categorization of biodiversity-related aid projects across donors and across years. It also includes a wider range of donors than the OECD CRS funding database. We followed OECD practice and the literature on foreign aid (45) in basing calculations of biodiversity-related aid on project amounts committed rather than disbursed by donors. The OECD defines donor commitments as a "firm obligation in writing" (43). Currencies that required conversion to U.S. dollars were converted using historical exchange rates to change original amounts to 2005 dollars.

The AidData database does not include European Union LIFE program spending within the EU itself. We therefore calculated annualized LIFE spending from 1996-2006 for EU countries (the latest date for which full spending data was available) and took the mean level of spending as the annualized value for 2001-2008. However, it seems probable that many of the poorer EU members would have used newly-available LIFE central funding to reduce domestic budgetary commitments for protected areas. Including both LIFE funding and government spending reported prior to the inception of LIFE would therefore lead to double counting, so we multiplied LIFE spending by the proportion of Natura 2000 sites that were not previously national protected areas for each country. LIFE spending was taken from the EU's LIFE reports (46, 47).

Donor spending accounts for approximately $1 billion US annually of conservation investment (2012 values) in the 2001-2008 period.

Other donor flows (private philanthropy)

There is inconsistent publicly available information on the global distribution of flows to biodiversity from private philanthropy, though these have been very tentatively estimated at $1bn - $1.5bn (27). The major international conservation NGOs WWF, CI, WCS, Birdlife International and IUCN have conservation budgets estimated at over $0.70 billion (total for all organizations) and The Nature Conservancy (TNC) has a budget about $0.79 billion (varying with year). These organizations provide the great majority of philanthropic spending on biodiversity, therefore. We requested financial data several times from all these international NGO organizations (INGOs) but none were able or willing to provide country-level spending breakdowns. Available data suggests that about half ($0.75bn) of these flows are spent inside the United States alone (2002/3) (11), suggesting an equal $0.75 for the rest of the world. In addition to the US figure, data for the rest of the world is available by country for $143m spent annually in Africa (varying with year) (48) and from some individual country reports such as the 4th CBD country reports (2), summing to approximately $1bn allocable to country. However, coverage across countries and continents is not consistent. We continued with the approach of accounting for major funding flows by including documented NGO spending in any case where it represented a substantial proportion of total spending for an individual country (this occurred with Afghanistan and Fiji). Beyond this, however, we did not include the available by-country totals for NGO spending data in Africa and the USA because the uneven geographic coverage would have caused a bias against countries and continents that lack NGO spending information. To investigate how likely the omission of NGO spending was to bias our results, we calculated the correlation between NGO spending in 40 African countries for which INGO data was available (48) and our other known donor spending in the region. The correlation was high (r=0.85, see below for details), suggesting that donor flows represent reasonably accurate information on the proportional size of total donor-plus-philanthropy flows, and that bias was therefore unlikely to be strong. Even so, we excluded from analysis all countries where, on the basis of qualitative project documentation and the size of other flows, the omission of NGO spending seemed likely to introduce a serious bias into underfunding assessments (table S3 and by default North Korea, since no data were available for the latter). We further discuss below the robustness of our results to incomplete NGO data in the sensitivity section. (The AidData database does include spending by the World Bank and the GEF, which Halpern et al. (11) also refer to as NGOs).

'Domestic' (national in-country) spending

We defined domestic spending as national spending on conservation exclusive of international assistance from donors (including donor-capitalized trust funds and debt for nature swaps). This investment includes domestic government biodiversity conservation budgets, state environmental funds that take the place of government budgets in certain countries (notably eastern Europe (49)), and self-funding arrangements such as protected area entrance fees, concessions and hunting or viewing permits (39, 50).

We collated information on domestic government and parastatal spending from a wide variety of sources including both peer-reviewed and grey literature. Full sources are listed in the online version of the database [embargoed until publication] but in general, information for the 2000s was principally derived from country reports to the CBD(2), supplemented by a number of national and consultancy reports and by collations by Mansourian and Dudley (51) and Bovarnick et al. (12). Information on government spending for the 1990s was principally collated from James et al. (52–54) and Wilkie et al. (55), again supplemented by a number of country-specific reports. Where our complete set of sources gave differing investment amounts for the same country, we used the most local information in preference to compilations.

Biodiversity spending by governments in most developed nations often includes a major focus on the conservation of biodiversity in systems where agriculture dominates and has created a unique human-modified ecosystem over thousands of years (particularly in Europe) (56). We therefore included spending that supported agricultural actions specific to the conservation of this biodiversity, such as set-asides on farms or mowing of ancient meadows. We could find little data on similar government-funded economic incentives in the developing world and so domestic government spending figures for poorer countries mostly reflect information on spending on protected areas. We assumed that the error introduced by the absence of government agri-environmental spending data for developing countries would be relatively small and within the range modeled by our sensitivity testing (see below). Some governments also report broad-sense environmental spending flows as part of their biodiversity spending totals but we excluded those sums (insofar as they were made explicit). We also note that it is unclear how consistent EU countries were in reporting Pillar 2 EAFRD funds (the principal flow of EU funds to both agri-environmental schemes and Natura 2000 protected areas) in their breakdowns of domestic spending; the EU is implementing stronger and more consistent reporting schemes for the 2007-2013 period, where such funds represent approximately $5bn annually in dollar terms, spread between 27 countries (35). This potential source of error was a further motivation behind our sensitivity test that analysed developed and developing countries separately (see above).

Although most domestic spending on protected areas globally came from government coffers, these amounts are boosted by monies that protected areas generate independently of government (39, 57, 58). For example, many African park systems substantially increase their budgets by using park entry fees, tourism concessions and/or sport hunting licences to pay for conservation management (30, 39, 59). Important examples are gorilla tourism in central Africa, the ADMADE program in Zambia and the conversion of Kruger National Park's funding system (South Africa) towards a model almost exclusively sustained by tourism (30, 39, 59–61). Indeed, numerous protected area managers around the world are finding that government grants are dwindling and they are increasingly expected to fund park costs from ecotourism (mostly entry fees and user fees) (38). We reviewed scientific and grey literature for information on park funding derived from ecotourism and sport hunting. Not all park revenues are available for park managers to use (many are returned to central government), so we further used the literature to estimate the mean annualized value of the tourism or hunting fees that managers in each country are permitted to retain for conservation use. In line with our main approach, we concentrated on countries where hunting or entrance fees are likely to be a major component of conservation budgets, namely major wildlife or nature-trekking tourism destinations and countries important sport hunting infrastructures (see e.g. (38, 39, 55, 57, 59)). Countries where such flows seemed likely to be important but could not be quantified were excluded from analysis (table S3).

Government, parastatal and self-funding flows are combined into single sums by some countries so we do not attempt a breakdown but overall, domestic in-country spending flows averaged approximately $16 billion annually (2012 values).

A number of other finance flows that have likely impacts on biodiversity have been recently developed, including various market instruments such as payment for ecosystem services, biodiversity offsets, "green" commodities such as certified wood, and carbon markets (27, 30, 62). Currently, government spending is also the main source of funding for this broad category(27, 62). However, such flows are still largely limited to developed countries and China (27). In addition, only limited data are available at a country level during the 2001-2008 study period, which represented a time of ground-breaking development for many such options (30, 62). Finally, some market schemes have potentially diffuse impacts on biodiversity conservation and are conceptually more similar to broad-sense environmental spending, which we always excluded under our overall data selection criteria. We therefore chose to exclude these market flows. In general, this exclusion should lead to underestimates of the level of underfunding in poorer countries, including most of the highly underfunded countries identified in table 2 (but see comment for China in table S1).

Conservation Trust Funds and debt swaps

Further funds for conservation have been derived from conservation trust funds (CTFs) (40) and debt-for-nature swaps such as the EAI and TFCA programs (41, 42). We collated information on both types of flow from grey literature including the annual or periodic reports of the CTFs themselves. For CTFs, we then used Fund reports and other literature to estimate the amount of money disbursed annually for the conservation of biodiversity by each fund. In all, we collated information on 84 CTFs (taking CTF in a broad sense to include any fund that makes disbursements for biodiversity conservation within a specific country or group of countries, including investment funds, revolving funds and sinking funds (40)). The distinction between national environmental funds and conservation trust funds is not always clear but underfunding analysis simply sums all flows, making this difficulty moot. For the small number of cases where a CTF covered more than one country and there was no information on by-country allocations, we assumed equal allocations (the sums involved in this estimation are very small within the context of total flows per country). CTFs accounted for approximately $75 million (2012 values) spent annually on biodiversity conservation.

Debt-for-nature swaps represent another significant source of funding, with $117 million having been generated since 1987 by three-party swaps, $314 million from bilateral swaps with the USA, and $417 million from bilateral swaps with countries other than the USA (although some funding went to non-conservation projects, see below) (42). Many swaps are used to capitalize trust funds (40) and these were excluded to avoid double counting. For the remaining swaps, annualized disbursements were not usually listed so we divided the amount swapped by the number of years the funds were intended to cover (data taken from (41, 42)). When information on fund duration was not available, we set it to the average of all swaps for the half-decade in which the debt swap occurred. Debt swaps declined significantly in terms of their importance as a conservation funding source between the 1980/90s and the early 2000s and for the 2001-2008 period, represent approximately $20 million US in annualized funding.

Some debt swaps and trust funds were designed to fund broad-sense environmental projects including biodiversity conservation, whereas others were for more strict-sense biodiversity conservation. In the case of mixed-purpose swaps and trust funds, we used fund documentation to determine the proportion allocated to biodiversity conservation. Proportions ranged from 11% to 20% and so wherever a mixed purpose was apparent from mission statements but allocations were not directly documented, we assumed 15% to biodiversity. We confirmed that the error implied by such assumptions was well within the range of our sensitivity testing. None of the highly underfunded countries were subject to this estimation.

Deflation

All values were standardized to the value of the dollar in 2005 by converting original values to dollars at historical exchange rates, then applying a dollar deflator based on US inflation. 2005 was chosen arbitrarily to standardize all spending to a common baseline.

Dependent variable for analysis of current underfunding patterns

Our underfunding analysis was based on spending patterns from 2001-2008 (the last year for which relatively complete data is available in both the donor compilation and in countries' domestic spending reports). To minimise bias and inaccuracy, we chose to analyse only those countries for which we could either quantify both major and minor financial flows, or could quantify major flows and make reasonable estimates of minor flows (such that inaccuracies in the estimates of minor flows would be small enough to be covered by the range of our sensitivity testing (see below)). Major funding flows are defined here as flows likely to represent a major proportion of total spending in any particular country.

In general, the major flows in developed countries come from domestic government and state spending and the major flows in developing countries come from international donors. In developing countries that have poor relationships with the international donor community, such as Zimbabwe or North Korea, domestic funding can (unusually) also represent a major funding flow. Economies in transition (defined here as countries in the World Bank upper-middle income bracket) have a mixed picture of domestic government spending and international donor assistance. In a few countries, tourism or hunting concessions (e.g. Kenya, Rwanda and Zambia(30, 38, 39, 59)) or NGO spending (e.g. Afghanistan) also represent a major funding flow.

In sum, there were 164 countries for which we were able to collate flows of both domestic spending and donor spending, consisting of 36 upper-income countries with data on government spending, 30 upper-middle income countries with data on both government and donor spending, and 98 developing countries with data on donor funding. Of these 164, 140 countries were qualitatively considered sufficiently data-complete with respect to major flows to be analysed for the 2001 to 2008 period. The remaining 24/164 countries were considered cases where other potentially major but unquantified flows to conservation could have been present (such as tourism), or where data seemed very poor-quality for other reasons, and were excluded from analysis (table S3). A further 16 countries were excluded for other reasons - 13 countries with missing data on predictor variables, plus the disputed or invaded countries Taiwan, the Spratly Islands and Western Sahara (see above), resulting in a final sample size of 124 countries for the analysis of relative underfunding.

Table S3. Countries excluded from analysis with justifications.

Bahamas	1990s spending data only and a major tourism destination with no information on ecotourism funding flows.
Barbados	1990s spending data only and a major tourism destination with no information on ecotourism funding flows.
Belize	A major tourism destination with no information on ecotourism funding flows and a major role for NGOs but with no quantification.
Byelarus	Extensive funding derived from industry and not quantified
Cyprus	1990s European spending data only and an important tourism destination with no data on tourism flows to conservation
Ethiopia	Protected areas were financial responsibility of local governments (no data) up to 2008 and the aid budget is so small that this omission could make a big difference
Germany	1990s European spending data only
Greece	1990s European spending data only and major but unquantified NGO and tourism flows
Haiti	No information on the main trust fund
Iran	Future government budget suggests past government spending must have represented an important component of the total, but no figures
Israel	Mansourian and Dudley figure the best available but clearly refers to environmental spending rather than biodiversity spending
Jamaica	The main national park is run by a local NGO, including the right to use tourist entrance fees. No information on this NGO.
Latvia	Incomplete budget with clear suggestion of the importance of EU structural and accession funds, which were not quantified

Lithuania	Incomplete budget with clear suggestion of the importance of EU structural and accession funds, which were not quantified
Macedonia	1990s European spending data only
Malta	1990s European spending data only and a major tourism destination with no information on ecotourism funding flows.
Pakistan	A major tourism destination with no information on ecotourism funding flows.
Paraguay	A very small budget and Bovarnick et al (2008) state that this information is incomplete.
Qatar	Only a 1990s report exists documenting the very small budget for the protection of a very small (139 square kilometres) national protected area. If total national biodiversity spending is genuinely represented by this tiny protected area disbursement and has not changed in the past15 years, Qatar is highly underfunded.
Seychelles	A major tourism destination with no information on ecotourism funding flows.
St. Kitts and Nevis	A major tourism destination with no information on ecotourism funding flows.
Turkey	A major tourism destination with no information on ecotourism funding flows. There is also a ~50% difference between the amounts reported by Mansourian and Dudley (51) and James et al. (53) and no information in the CBD country report.
Uruguay	A very small budget and Bovarnick et al (2008) state that this information is incomplete.
Zimbabwe	Links with donors have been severely disrupted under the Mugabwe regime, implying that government subsidies and tourism should play a major role, but inadequate current information on these two last flows.

Cases where a country had explicitly listed its government conservation spending as zero were set to one dollar annually, to distinguish them from countries with no information.

Using data imputation to reduce bias and increase coverage

Some countries reported government spending in the 1990s but not in the 2000s (the period of our analysis). Spending may have changed in the interim so the older figures should not be used raw. Instead, we tested a model of temporal change in conservation spending across different income categories, to see if it were possible to make a reasonable estimate of government spending figures from older data and then use this for imputation.

We analysed how spending changes over time for the 42 countries for which multi-year data spanning the 1990s and 2000s existed (including both wealthier and poorer countries). Multi-year data were derived from comparing the figures for government spending on protected areas from James et al. (53)for the 1990s, and Hanks and Atwell (63), Mansourian and Dudley (51), Bovarnick et al. (12) and the CBD country reports (2) for the 2000s. Our literature search suggested large differences would exist between rates of spending growth in OECD/European Union countries and non-OECD/EU countries, so we analyzed these two groups separately. Two countries were not suitable for modelling and were excluded: James et al. (53) used spending data for only a subset of national government conservation agencies in Guatemala whereas Mansourian and Dudley (51) use the whole system; and the figure for Israel in Mansourian and Dudley (51) clearly refers to overall environmental spending whereas the figure in James et al. (53) refers to biodiversity (protected area) spending.

We tested a model whereby protected area spending rises year-on-year in line with both inflation and the annual percentage increase in protected area extent, but with some economy of scale as protected area extent increases. With the addition of a fitted empirical parameter for the economy of scale associated with increased protected area extent, we produced a model based on 1990's spending, inflation and change in PA extent that did very well at predicting actual spending in the 2000s for non-OECD/EU countries (scale=0.875, adjusted r-squared value=0.95, t=18.53, p =3.58e-13, figure S3). OECD/EU countries proved much more difficult to model, perhaps due to a combination of very large real increases, spending changes associated with political change and accession to the EU in central-eastern Europe, and differences between the two periods in the way biodiversity spending was categorized. Peru's lack of fit is consistent with the known atypical and very large change in conservation spending (64) over this time (figure S3). The deviation for Honduras represents a difference of $100,000 between the model prediction and the reported figure.

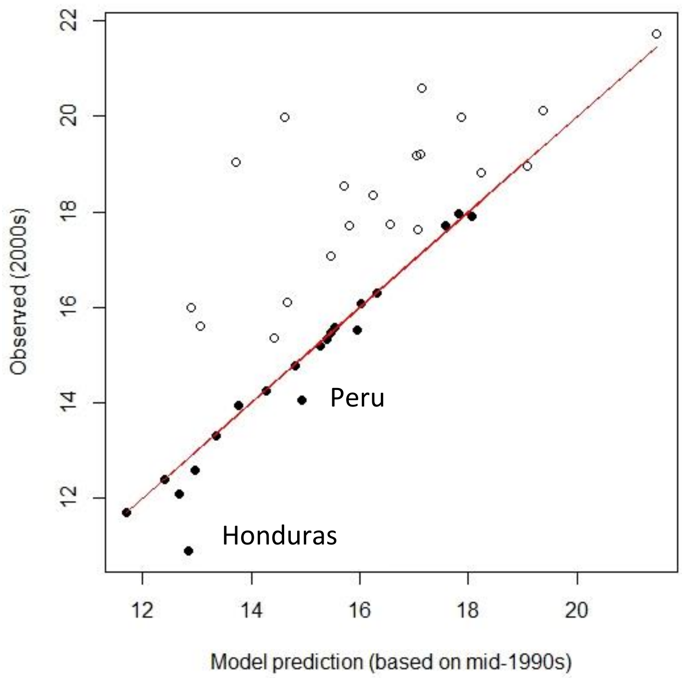


Figure S3: predicted domestic spending in the 2000s (based on a model that uses data from the 1990s) compared to actual spending. The line shows a hypothetical one-to-one relationship once inflation is corrected for. Data are ln-transformed. Filled circles = non-OECD/EU countries, open circles = OECD/EU countries.

Given these patterns, we excluded any OECD/EU countries for which we had no data from the 2001-2008 period and used the model to extrapolate 2001-2008 values for the 32 non-OECD/EU countries that only had mid-1990s spending data: Afghanistan, Angola, Antigua, Bahamas*, Barbados*, Bahrain, Bangladesh, Brunei, Burkina Faso, Cambodia, Cameroon, Central African Republic, Chad, Dominica, The Gambia, Jamaica*, Mali, Myanmar, Niger, Nigeria, Pakistan*, Papua New Guinea, Qatar*, Rwanda, St. Kitts and Nevis*, Samoa, Saudi Arabia, Senegal, Sudan, Taiwan*, Tanzania and Zimbabwe*. Eight of these countries were subsequently removed from analysis for other reasons (starred in the list, table 3). Otherwise, qualitative reports from the 2000s do not suggest any large, unusual changes in government spending policy that might make the model prediction inaccurate. All but three of the non-OECD/EU countries for which modelled government spending was used are low-income or low-middle income, with biodiversity budgets dominated by donor funding, so the errors introduced into underfunding analysis by the data imputation should be minimal and certainly much smaller than the error size tested in our sensitivity analysis (below). The three higher-income exceptions are Saudi Arabia, Brunei and Bahrain but of these three, only Brunei was important as a potentially underfunded country (Table S1).

Where data were available for some but not all years in the 2001-2008 period, we also used the model to help impute values for the missing years for non-OECD/EU countries, cross-checking with non-quantitative comments in CBD reports and other country reports to see whether these figures were likely to be reasonable. If observed spending in a later year was greater than predicted by the model, we applied a multiplier to the model that assumed a smooth annual percentage increase. Missing years for OECD/EU countries were similarly modelled as a smooth increase between the years for which data was available. Smoothing spending changes will have very little effect on calculations of average spending over longer periods, and so is appropriate for questions asked at our decadal scale, but individual year–to-year variation cannot be analysed.

Some countries had never reported government expenditures in any period. We excluded any such countries where government spending was likely to represent a major flow i.e. relatively wealthy or developed countries (Andorra, Ireland, Italy, Japan, Kuwait, Libya, Liechtenstein, Monaco, Montenegro, Nauru, San Marino, Sao Tome and Principe, Spain, Tuvalu, the United Arab Emirates, and the Holy See – the Spratly Islands and the Paracel Islands were also excluded due to lack of other data). In the case of many developing countries, however, government spending represents a minor flow and so data can be considered relatively complete if major flows are accounted for. Even so, variation in the coverage of minor funding flows may still introduce bias into the results, for example if government spending is included for some developing countries and set to zero for others. Reasonable imputations of government spending for such countries seems likely to reduce error compared to simply setting these minor flows to zero.

A standard measure of government spending on conservation is as a percentage of GDP, a measure that shows reasonably limited variation for developing countries (12, 51, 53, 65). To ensure that estimation-associated errors were very small compared to per-country spending totals, we only estimated domestic government spending from GDP for countries where known donor disbursements represent the large majority of spending. We defined such “donor-dependent” countries as countries found in the bottom two income brackets that have no known domestic self-funding capacity (such as large wildlife tourism infrastructures) beyond domestic government subsidies, where government subsidies are described as minimal in comparison to donor funding in qualitative reports.

The level of dependence on donors may vary with GDP, so we first created bivariate plots to investigate whether the percentage of biodiversity conservation spending contributed by donor-dependent governments increases with GDP, using the 41 donor-dependent countries for which we had government spending data and 2005 as our comparison year. There was no pattern of increasing contribution with increasing GDP, so we calculated the mean percent GDP (0.004%) dedicated to conservation spending across the entire donor-dependent group and used it to impute government spending in 25 further donor-dependent countries for which no government spending data were available (table S4). Three of the lowest absolute funding totals in the world belong to three donor-dependent countries, namely Iraq, Djibouti and Angola. Those very low totals include very limited donor assistance, but we still chose to impute their government spending on the grounds that it was likely to be very low. These countries are so highly underfunded that the decision seems unlikely to have altered the large patterns in global underfunding.

Kazakhstan, an important country in biodiversity conservation terms, lies at the bottom of the upper-middle income bracket and so was not included in the main analysis. However, Kazakstan's GDP is similar to that of many countries in lower income brackets and so we tried re-running the analysis including an extrapolated government spending figure for this country ($2.2m). If the extrapolation is justified, Kazakstan should also be considered quite poorly funded (figure 1B).

Table S4. Developing countries for which government spending was imputed from GDP.

Country	Estimated domestic spend ($2005)
Albania	329,741
Angola	1,287,561
Armenia	192,349
Azerbaijan	494,612
Benin	168,796
Congo	200,200
Djibouti	27,478
Eritrea	39,255
Georgia	251,231
Guinea	129,541
Guinea-Bissau	11,776
Guyana	31,404
Iraq	219,827
Jordan	498,537
Kyrgyzstan	94,212
Liberia	34,458
Mauritania	74,584
Moldova	113,839
Swaziland	51,031
Tajikistan	90,286
Turkmenistan	317,965
Uzbekistan	549,569
Comoros	15,702
Philippines	3,116,839
Solomon Islands	1,350,368

Estimates of total global conservation spending 2001-8

The uncertainties involved in collating biodiversity finance data make it difficult to create robust estimates of total spending from the sample of spending detected. Nevertheless, extrapolations of both actual spending and necessary spending have been published (3, 27) in order to fulfil policy needs for financial estimates. We therefore attempted a similar extrapolation with the extended database for 2001-2008 collated in this study. For domestic spending data, we broke down countries into the four World Bank income categories (upper, upper middle, lower middle and lower). Within each income class, we took the countries with known spending and calculated the median proportion of GDP (2005) spent on biodiversity conservation (as defined in this study). We then multiplied the GDP of all countries without data in each income class to estimate the domestic spending that we had not been able to account for. The figures for the four income classes were summed and added to known domestic spending, generating an estimate of total global domestic spending. Based on these data imputation procedures, our estimate of total domestic spending was $16.5bn (2005 US dollars), of which $15.6bn was spent by countries in the upper income bracket and $0.9bn by countries in the lower three income brackets ($0.37bn in the two bottom income brackets). This suggests that the domestic data collated in the database represents approximately 88% of global domestic flows.

We note that our estimates differ from previous extrapolations of domestic spending e.g. (27). The difference is largely due to differences in the extrapolation method, plus differences in the age of the data. Parker et al. (27) used the incomplete data from the 1990s from James et al. (53). To make their extrapolation, they took the average spending per area on protected areas from the James et al. data and multiplied it by the total areal extent of current protected areas. Their estimates of domestic spending may be considerably higher than ours because wealthier countries had a higher tendency to report figures to James et al., strongly biasing the average spending per area upwards within a global context. In addition, spending patterns have changed between the 1990s and the 2000s.

To make an estimate of total global biodiversity spending 2001-2008, we assumed that information from aid reporting systems for the period was relatively complete and that the main sources of missing data were domestic spending, INGO spending and local community spending. The estimated missing domestic flow was $2.05bn dollars, which we rounded upward to $2.1bn to account for the possibility of some missed park entrance fee flows. INGO flows are likely to be about $1.5bn (11) and community conservation spending an estimated $2bn (32) (note that this figure refers to developing world communities and it is unclear to what degree local communities in the developed world might add to biodiversity funding flows). The total estimated non-market flows for the period are therefore $16bn (known) + $2.1bn (unknown domestic) + $1.5bn (INGO) + $2bn (community) = $21.5bn. However, there is some uncertainty around the community figure (32) and the budgets of both INGOs and probably of community initiatives seem likely to be part funded by the donor flows already accounted for. The total global spending on biodiversity (as defined here, see above) may therefore be closer to $20bn. On the other hand, it may be greater than $21.5bn if undocumented spending by private individuals and corporations in developed countries represents an important flow. The current database may therefore collate approximately 70-80% of all non-market global spending for the period (defined as government subsidies plus park self-funding plus debt swaps and trust funds plus donor and philanthropy flows plus local community contributions). Market-based funding schemes were in a stage of very early development during most of the period (30, 62) so a similar completeness statistic is likely when comparing the database to all global conservation spending, unless unknown investment actions by private individuals and firms are very large.

Predictor variables for analysis of 2001-2008 spending patterns

The main underfunding analysis was guided by the principle that most drivers of conservation spending should have a rational link with the conservation of biodiversity. The overall categories of rational driver are described in the main text. We constructed a set of candidate regression models using subsets of the terms threatened biodiversity (mammal GBF), the area to be conserved (both country area and the percentage of land area protected under IUCN categories I to IV), GDP, the cost terms NPL and CAU, a variable describing whether or not a country was primarily continental or insular, and various possible governance indicators (see below). The island term was included because the covariance between the biodiversity and area terms in the regression could have been different for islands and mainland areas (66). We then tested the goodness of fit of each model to the data using information theoretic approaches (67).

Measures of biodiversity

We used global Mammalia as our biodiversity surrogate. All measures of biodiversity were calculated on the basis of species fractions (22, 68), which we defined here as the proportion of each species' range contained inside the political borders of each country in the world. Each country's Mammalian Global Biodiversity Fraction (mammal GBF) was then calculated as the sum of all mammalian species fractions stewarded by that country.

Mammal GBF scores for world countries were calculated by intersecting the range maps for the 5487 mammals in the world under the recent IUCN assessment (69) with shapefiles for each world country. The portion of each range that intersected with each country was divided by the total species range to derive the species fraction. We used the country shapefiles from ArcGIS version 9.3 (70). and geographic range shapefiles from the IUCN GIS database (71). All shapefiles were first converted to an equal area projection (Lambert World Cylindrical Equal Area) to ensure the accuracy of the area of overlap derived before calculating the approximately 26,000 areas of overlap. For approximately 200 species, the IUCN does not provide range maps. We researched how many countries each of those missing species occurs in (after first removing extinct species), using the IUCN's own database as the main source (71), supplemented by Walker's mammals of the world (72) where the IUCN provided no data. The majority of those species (118/157) were endemic to one country, in which case the mammal GBF total of the country was increased by one. For the remaining 39 species that occur in two (or rarely, more than two) countries, we took the simplifying assumption that the range was divided equally between all countries of occurrence, and increased the mammal GBF totals accordingly.

The ESRI shapefiles for country give the land area (including rivers) of each country only. A small number of mammals have all or part of their range in the sea, being either coastal or open-ocean marine mammals. For coastal mammals, we took the viewpoint that countries should be made responsible for the stewardship of mammalian biodiversity in their coastal waters as much as on their land. There is no universally-accepted definition of where the territorial waters of countries lie under the United Nations Law of the Sea (73). We therefore used the most conservative measure, namely the twelve nautical mile limit off the coastline of each country. Country shapefiles were extended by 12 nautical miles (using the ArcMap 'buffer' utility), and the overlap of coastal mammals calculated with those extended shapefiles. It was not possible to correct for overlaps in territorial waters (again, these are contested), but overlaps are minimal with the 12-mile limit. Coastal marine mammals represent only a small percentage of mammalian biodiversity, and so any small overlaps between territorial waters represent an exceedingly small source of error in calculations of a country's mammal GBF. Open ocean marine mammals were omitted because their range sizes are poorly known. The range fraction of open ocean mammals occurring in the stewarded area of each country's coastline will be very small, so the omission of these species is highly unlikely to alter the results of our analyses.

Threatened mammal GBF per country was calculated by multiplying each species fraction by its probability of that species going extinct in the next 100 years (24), then summing the species scores for each country as before. The probability score is based on the IUCN Red List categories, as follows:

CR = 0.75, EN=0.2, VU=0.1, NT=0.05, and LC=0.01 (24). We used the 2008 Red List assessment, the most current threat estimate available globally for mammals (69).

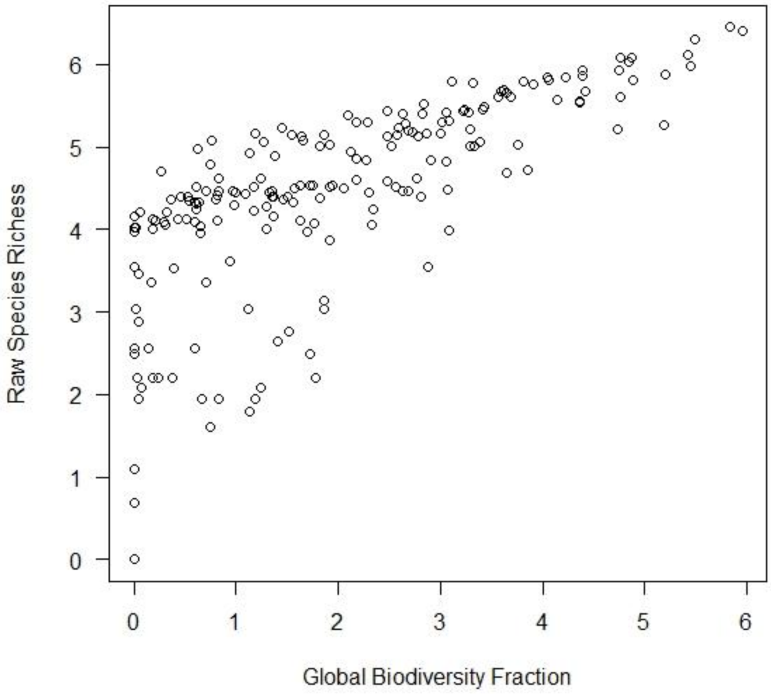


Figure S4: Threatened species richness compared to threatened GBF (for mammals, both axes log-transformed).

The mammal Global Biodiversity Fraction is strongly correlated with raw species richness (Spearman's product moment correlation between mammal species richness and mammal GBF = 0.72) and threatened mammal GBF is even more strongly correlated with threatened mammal species richness (Spearman's product moment correlation = 0.91 when species and species fractions are both multiplied by threat level) (figure S4). Even so, the biodiversity importance of a small number of countries varies quite significantly depending on whether range-fraction or raw species richness metrics are used. GBF reduces the importance of countries that contain mostly range edges of species found elsewhere. For example, Singapore has 17 threatened mammal species, which would place it at number 82nd (out of 197) on raw threatened species richness. However, Singapore's threatened mammals have most of their ranges in other countries, so Singapore's threatened Global Biodiversity Fraction (Mammal) is only 0.01, placing it 172nd in the threatened mammal GBF rankings. Brunei, Bangladesh, Burkina Faso, Benin, Jordan, Togo and the UK are similar cases. Conversely, countries that have high levels of threatened endemism are ranked as more important under GBF approaches than they would be under simple species richness metrics – examples are mostly tropical islands such as Sao Tome and Principe, which ranks only 171st in the world on threatened species richness but 60th on threatened GBF. Other islands showing large increases in importance are the Dominican Republic, Jamaica, Vanuatu, New Zealand, Mauritius, Fiji, Comoros and Federated States of Micronesia.

GBF can also identify the potential importance of countries that would not normally be regarded as endemic-rich, and yet have large numbers of species that are nearly endemic (i.e. that have the vast majority of their range in a single country). Near-endemics must depend for their survival on actions inside a single country as much as endemics do. For example, none of Sao Tome and Principe's mammal species are endemic and yet on average, the island stewards 62% of the total range of its mammal species, thereby exerting a powerful influence on their survival.

Area

All else being equal, larger areas will need larger conservation budgets. When dealing with the allocation of conservation funding to political units (countries), this principle applies to both the area of the entire country and the area of land that is under conservation within the country. We calculated the area of all countries using ArcGIS utilities (70) and additionally, the percentage of land area under strong conservation protection (IUCN categories I to IV) within each country. The latter information was derived from the World Database of Protected Areas (74).

Governance indicators

When conservation investment is being committed, it seems likely that donors will take into account the level of governance of a country in deciding how much funding to allocate (7). Countries with poor governance may have weak rule of law, high levels of corruption, less effective management of protected areas, and an increased tendency for conservation projects to fail, all of which could reduce the effectiveness of any conservation dollars spent (16, 18). Poor governance may also significantly increase the cost base (18), so its inclusion as a predictor of spending may also be seen as an additional measure of cost.

Six governance indicators have been historically measured for the countries of the world (28): (1) "voice and accountability", being freedom of expression and freedom to choose governments; (2) "government effectiveness", being the quality of policy formulation and the effectiveness of implementing policy without yielding to political pressures; (3) "control of corruption"; (4) "rule of law", measuring confidence that agents will abide by rules, including law enforcement effectiveness; (5) "political stability and absence of violence"; (6) "regulatory quality", being the ability of governments to formulate policies and regulations promoting private industry. The first five of these indicators have a strong hypothetical linkage to the spending policy of donors and the cost-effectiveness of conservation investment. The sixth, regulatory quality, has a less clear relevance to the conservation spending decision process. We therefore tested the predictive power of the first five indicators, including a number of possible interactions (e.g. government effectiveness and control of corruption may interact, if governments create sound policies but local agents are corrupt and sabotage their implementation).

Governance indicators change across time and are available for multiple years. We used the mean of each indicator for 2001-2008.

Cost

Countries differ in the national cost of goods and services, and so the US dollar amount spent on conservation is potentially a poor indicator of the conservation achieved by the spending: a thousand dollars can go a long way in an underdeveloped country but achieve very little in the United States (36). With regard to cost factors, previous authors have suggested that countries with larger GDPs (corrected for area) should be more expensive to work in and/or should require more investment (7, 10, 11). Differences between in-country costs are more precisely expressed as the National Price Level (NPL), being the proportional dollar cost of a fixed basket of goods and services in each country (75). However, GDP may have other hypothetical influences on spending other than simple operational cost(7) so we tested both NPL and GDP. We took GDP for 2005 (the middle year of the time series) from the World Development Indicators (36) and NPL from the ICP 2005 round (75). Some countries did not participate in the 2005 PPP round from which NPL values were calculated. However, the ICP provides estimates of PPP for these countries (75), so we converted these estimates to NPL for completeness by using mean 2005 bank exchange rates with the US dollar (76).

Furthermore, the cost of conservation may have only a weak relationship with goods and services costs or GDP. The main conservation expenditure at country level is on protected areas (PAs) and PA costs are far more strongly predicted by PA area than by GDP or PPP (Purchasing Power Parity, a measure similar to NPL) (51, 77)). We therefore calculated a measure of the per-country cost of PA conservation, the Conservation Action Unit (CAU). CAU was defined operationally as the recurrent cost of maintaining 100km^2 of protected area for one year. We calculated this value by applying Bruner et al.'s (77) algorithm, which explains 82% of the variance in the recurrent costs of protected areas, to countries' mean PA size (IUCN I-IV-grade). The algorithm uses as its parameters the size of the protected area, GDP, PPP and Human Development Index rank (HDI rank, an index of poverty) for each country. We calculated the average protected area size existing in each country (IUCN categories I to IV protected areas only) using information from the World Database on Protected Areas (74). Marine protected areas (MPAs) were not included in Bruner et al.'s study and have a different cost structure (78, 79), whereas mammals are mostly terrestrial, so we excluded MPAs. HDI and GDP per km2 for 2005 were taken from the World Development Indicators database (36) for the year 2005, the midpoint of our time series. Country area was calculated using ArcGIS utilities (70) in order to generate GDP/km^2. PPP values were taken from the ICP 2005 round (75). A small number of countries have no protected areas in IUCN categories I to IV. Laos and Jamaica have well-defined national protected areas, even though these have not been categorized by the IUCN, and harbour important biodiversity, so we used the mean size of those unclassified areas. For other countries with no category I to IV PAs, we were unable to calculate CAU. No country with either high levels of biodiversity or high levels of underfunding lacked CAU.

Underfunding analysis procedure

To establish which countries had above- and below-average conservation investment for that period (10, 11) we entered the terms threatened mammal GBF, country area, percent land area protected (IUCN categories I to IV), GDP, NPL, CAU, island, and several hypothesis-motivated governance indicators or indicator combinations into a sequence of regression models (see below), then used information theory (67) to define the best-fitting model to explain spending. Diagnostic plots suggested non-linearities (especially in governance and GDP responses) and violations of normality, so all variables except NPL and Islam were ln (x+constant)-transformed (arcsine square root-transformed for percent area protected) and generalized additive mixed models with cubic splines and/or quadratic terms for governance indicators and GDP were included alongside linear models in the candidate model set. We preferred a GAM using a ln-tranformed spending variable with Gaussian errors to one using an untransformed spending variable, Poisson errors and a log link (and where, due to overdispersion, the standard errors were corrected using a quasi-GAM model with variance of (mean x dispersion parameter)) because the residuals showed strong heteroscedasticity for the Poisson model and no clear pattern for the Gaussian model. Three countries (Iraq, Djibouti and Angola) exerted very strong influences on model fit so these were removed from the model selection process; their residuals were calculated post-selection using the regression equation from the best-fitting linear model.

Our initial analysis included CAU and so necessitated the omission of all countries for which CAU could not be calculated. Results are shown in table S5a. However, the best-fitting model from this analysis excluded the term for CAU, so we re-instated countries for which CAU could not be calculated and ran a second set of models without CAU (table S5b).

There is a potential danger of collinearity, especially among the socioeconomic factors used. Simple correlation analysis suggests (surprisingly) that in the subset of data analyzed, the cost factors GDP, CAU and NPL are largely independent measures, as were the governance indicators government effectiveness and political stability (table S6). We also applied a collinearity tolerance test by regressing political stability on all other explanatory variables; the adjusted r2 was 0.288, suggesting that the collinearity is within commonly-accepted tolerance levels (80).

Residuals were tested for spatial autocorrelation by semivariogram plots. We also converted the best-fitting model (the GAM #3 in table S5b) into a generalized additive mixed model and tested whether the coordinates of the country centroids were generating spatial structure in the residuals, using in turn linear, exponential, Gaussian, spherical and rational quadratic correlation structures. There was no indication of spatial autocorrelation in the residuals (AIC values for all models with spatial correlation structures was at least 25 points greater than for the base model).

Table S5a: AIC values for a series of candidate models that included CAU, (n=118 countries). Codes: bd = threatened mammal GBF, area = country area in square kilometres, goveffective = government effectiveness, polstab = political stability, corruption = corruption, %pa = percent of land area under IUCN protected area categories I to IV, Isle = binomial variable indicating an island nation or not. Dummy indicates where a dummy variable drawn at random from a standard normal distribution was included to perturb other coefficients and so provide an additional robustness test. Italics indicate linear models, normal type indicates generalized additive models, * indicates a cubic spline.

Model #	**AIC**	**Model Terms**
13	305.6717	bd,area,goveffective*,polstab*,%pa,NPL,GDP^2
17	306.1889	bd,area,goveffective*,polstab*,%pa,NPL,GDP^2,Isle
4	307.4851	bd,area,goveffective*,polstab*,%pa,NPL,CAU,GDP^2,Isle
3	308.4778	bd,area,goveffective*,polstab*,%pa,NPLxCAU,GDP^2
1	309.1333	bd,area,goveffective*,polstab*,%pa,NPLxCAU,GDP^2,Isle
7	309.1549	bdxarea,goveffective*,polstab*,%pa,NPLxCAU,GDP^2
8	310.0410	bdxarea,goveffective*,polstab*,%pa,NPLxCAU,GDP
2	310.2389	bdxIsle,area,goveffective*,polstab*,%pa,NPLxCAU,GDP^2
12	310.4861	bd,area,goveffective*,polstab*,%pa,NPLxCAU,GDP^2,dummy
11	311.2656	bd,areaxIsle,goveffective*,polstab*,%pa,NPLxCAU,GDP^2
9	311.5738	area,goveffective*,polstab*,%pa,NPLxCAU,GDP^2
14	312.2308	bd,area,goveffective*,polstab*,%pa,GDP^2
16	*314.1843*	*bd,area,goveffective^2,polstab,%pa,NPLxCAU,GDP^2*
5	314.5125	bd,area,goveffective*,corruption*,%pa,NPL,GDP^2
15	316.1833	*bd,area,goveffective^2,polstab^2,%pa,NPLxCAU,GDP^2*
10	317.4827`	bd,goveffective*,polstab*,%pa,NPL,GDP^2
6	321.5031	bd,area,goveffective*,%pa,NPLxCAU,GDP,GDP^2,Isle

Table S5b. AIC values for a further series of candidate models that excluded CAU (n=121 countries). Codes: bd = threatened mammal GBF, area = country area in square kilometres, goveffective = government effectiveness, polstab = political stability, corruption = corruption, %pa = percent of land area under IUCN protected area categories I to IV, Isle = binomial variable indicating an island nation or not. Numbers in parentheses indicate where a model duplicates a model from Table S5a. Italics indicate linear models, normal type indicates generalized additive models, * indicates a cubic spline. Dummy indicates where a dummy variable drawn at random from a standard normal distribution was included to perturb other coefficients and so provide an additional robustness test.

Model	**AIC**	**Model Terms**
3 (13)	311.3844	bd, area, goveffective*, polstab*, %pa, NPL, GDP^2
1 (17)	311.7723	bd, area, goveffective*, polstab*, %pa, NPL, GDP^2, Isle
2	313.2122	bd*Isle, area, goveffective*, polstab*, %pa, NPL, GDP^2
4	313.4695	bd, area, goveffective*, polstab*, %pa, NPL, GDP
19	316.1425	Model 4 plus dummy variables for perturbation
13	317.0714	area, goveffective*, polstab*, %pa, NPL, GDP^2
16	317.8828	*bd, area, goveffective^2, polstab, %pa, NPL, GDP^2*
17	318.3833	*bd, area, goveffective^2, polstab^2, %pa, NPL, GDP^2*
15	319.8404	*bd, area, goveffective^2, polstab^2, %pa, GDP^2*
21	320.3388	bd, area, goveffective*, corruption*, %pa, NPL, GDP^2
5	320.4482	bd, area, goveffective*, polstab*, %pa, NPL
14	322.4754	bd, goveffective*, polstab*, %pa, NPL, GDP^2
6	324.3515	bd, area, goveffective*, %pa, NPL, GDP^2
8	341.2107	bd, area, voice*, %pa, NPL, GDP^2
7	341.9364	bd, area, rule of law*, %pa, NPL, GDP^2
11	342.3472	bd, area, goveffective*, polstab*, NPL, GDP
12	347.1457	bd, area, goveffective*, polstab*, NPL, GDP^2
9	348.3889	bd, area, corruption*, %pa, NPL, GDP^2
10	357.7881	bd, area, polstab*, %pa, NPL, GDP^2
20	359.6076	bd, area, %pa, NPL, GDP^2

Table S6. Correlations between variables used in the underfunding models. See Methods in main text for data transformations used. Thrt. GBF = Threatened Global Biodiversity Fraction for mammals.

	Thrt. GBF	Area	NPL	Government effectiveness	Political stability	GDP	CAU
Thrt. GBF	1						
Area	0.41	1					
NPL	0.20	-0.26	1				
Government effectiveness	-0.16	-0.14	-0.07	1			
Political stability	-0.28	-0.36	-0.01	0.047	1		
GDP	0.32	0.47	0.006	0.51	0.16	1	
CAU	-0.14	-0.39	-0.24	-0.02	0.03	-0.10	1
%PA	0.22	0.12	0.43	-0.008	-0.04	0.16	-

Variables for the extended model

We extended the underfunding model to explore possible political influences, unrelated to the direct goal of biodiversity conservation, that might be driving spending patterns. In particular, we tested for the effects of region, and for whether Muslim-majority countries (and in particular Muslim-majority countries found in the Arab world and Central Asia e.g. Afghanistan and its neighbours) are receiving lower investment. For example, former colonial powers tend to donate disproportionate amounts of aid to their former colonies and the United States focuses much of its aid budget towards Latin America (26, 65). Hypothetically, the regional biases and potentially biases against Muslim majority countries may be largely associated with donor preferences, so we excluded the mostly government-funded countries in the World Bank upper income group from this analysis.

We divided the world up into politico-economic groupings ("regions"), namely subSaharan Africa, North Africa, the Middle East, Europe, North America (excluding Mexico), wealthy non-OECD nations (mostly oil-rich Gulf states), IndoMalaysia (South East Asia plus Papua New Guinea), South Asia, Central Asia (mostly former Soviet satellites), Oceania (including Pacific Islands), East Asia, South America, and "Camcar" (Central America plus the Caribbean and Mexico). We tried grouping the Philippines into either East Asia or IndoMalaysia and we also tested for the effects of categorizing Madagascar as Sub-Saharan Africa, South Asia or as a category in its own right. Results were consistent irrespective of which of these alternatives was used.

We took the percentage of Muslim population in each country from the Pew database on world religions (81). Within North Africa, the Middle East and Central Asia (excluding Mongolia and the Russian Federation), Muslim population percentage is generally close to 100%. We did not feel it useful to attempt to model differences in spending between e.g. 96% and 98% Muslim population in this group, so to test the hypothesis of potential funding bias against Muslim countries in this geographic area, we simply coded all Muslim-majority countries in the area as 1 and the rest of the word as 0. However, there is some variation in the definition of countries that belong to the North African region (82), with Chad and Burkina Faso considered partly inside and partly outside the region. Both of these countries also have lower percentages of Muslim population (55.7 and 58.9), so we exceptionally coded them as 0.5.

We carried out a post-hoc test of both potential biases by adding percentage Muslim population, Region, and both terms simultaneously to the base model. We tested for a particular bias against Muslim-majority countries in Arabia and Central Asia using the same procedure, but replacing percentage Muslim population with the 1/0.5/0 coding variable. Percent Muslim population and the coding variable are both percentage scales and so were asin-square root transformed.

When Region alone was added to the base model, there was an improvement in model fit (delta AIC 1.722) and boxplots by Region suggested that the Middle East, North Africa and Oceania (excluding upper income countries such as Australia and Saudi Arabia) had lower funding relative to their biodiversity importance and investment conditions than other regions. Adding percent Muslim population on its own to the base model produced a stronger improvement in model fit than adding Region on its own (delta AIC = 6.21), but replacing percentage Muslim population with the coding variable for Muslim-majority countries in the Arab World and Central Asia gave an even stronger fit (delta AIC from the base model = 9.75). Either term for predominance of Islam gave a better fit when added on its own than when added in combination with Region (e.g. delta AIC = 1.88 for the coding variable). Parametric coefficients for the best-fitting post-hoc model (i.e. the base model plus the coding variable) were slope = -0.76 (change in ln (spending) over a 100% change in the coding variable), t=-3.31, p=0.001. This is equivalent to predominantly Muslim countries in the Arab world and Central Asia receiving 49% of the funding allocated to any other country with similar biodiversity importance, size, governance, GDP and cost. For comparison, the parametric slope, t and p coefficients for base-model-plus percentage Muslim population globally were -0.58, -2.88 and 0.005.

Robustness and sensitivity testing

Our underfunding conclusions were remarkably insensitive to fairly large possible errors in financial data and also to variation in the model used (main text). Nevertheless, it is difficult to estimate the effect of missing INGO information (see above) on underfunding conclusions. Halpern et al. (11) encountered similar problems and mention that INGOs are working towards by-country accounting, not least to comply with the imperative of transparent accounting procedures. We encourage this process because the inclusion of such data would clear up uncertainties about the true levels of funding globally.

In general, we have made the assumption is that INGOs follow a prioritization scheme similar to that of the rest of the conservation investment community, such that their inclusion would have only small effects on underfunding conclusions. We were able to test for congruence between NGO spending and our existing donor spending data in the case of sub-Saharan Africa, for which NGO information does exist (48). The correlation is 85% between our existing donor spending data and NGO spending for those 40 countries, suggesting our assumption is reasonable. Our sensitivity analyses (perturbing total spending) are designed to account for discrepancies such as the missing data from INGOS.

The median annual spending per country in Africa by NGOs is $720,000, with most countries receiving small amounts and a few receiving sums of ~ $10-14 million e.g. Tanzania, South Africa, Kenya and Madagascar (48). Comparison with the estimated shortfalls in table 2 suggests that NGOs would need to spend most of their budget in countries not supported by bilateral/multilateral aid in order to invalidate the underfunding conclusions. The 85% correlation suggests that this is unlikely. Nevertheless, we indicate in table S1 where the absence of INGO spending information may have generated an inaccuracy large enough to alter the overall conclusions of underfunding analysis. This judgment is informed by CBD reports, which generally indicate where an INGO is an important partner. In general, underfunding conclusions are most likely to be affected when INGO money is spent in countries with very limited financial flows from other sources.

Testing the effects of excluding governance indicators

Governance was included in the spending model because it is hypothesized that poor governance implies lower cost-efficiency and a lower probability of success in conservation projects, and so investors are likely to weigh this factor when making decisions (16, 18). However, the precise functional effect of governance on investment efficiency has not been defined and current prioritizations may reflect a mixture of political and conservation-related considerations (25). To investigate pragmatic consequences associated with this uncertainty, we repeated the analysis with the governance factors removed.

With governance terms removed, the best-fitting model (76.5% of deviance explained) had the additional changes of a linear rather than a quadratic GDP term, and also a non-linear rather than a linear NPL term (spending increased as an S-shaped function of NPL). Underfunding assessments by country were still fairly similar between the two analyses - for example, 30 out of the original group of 40 most-underfunded countries were still retained under the new model (table S7). Some countries with relatively good governance (notably Bhutan, Colombia and Armenia) appeared relatively better-funded than before, and several countries with poor governance (notably Myanmar, Turkmenistan, Liberia and Laos) ranked as relatively worse-funded (table S7). The linearization of the previously decelerating (convex) GDP function also created a higher spending expectation for countries with very high area-corrected GDP, counter-intuitively causing a few of the underfunded developed nations (such as Norway and Australia) to appear slightly worse-funded than before.

Given the uncertainty over how the cost-effectiveness of conservation spending is functionally related to poor governance, we suggest that decision makers also consider whether current levels of aversion to investing in poor-governance countries are consistent with maximally efficient global conservation.

Table S7. Underfunding assessments by country when governance is not included as a predictor of spending. To illustrate differences to the main analysis,(i) rankings and rank differences between the full analysis and the no-governance analysis are shown, and (ii) countries that would make large upward moves resulting in promotion to the 40 most highly-underfunded countries are highlighted in red (note Mexico also moves from 42 to 39).

Country	**Rank in full analysis**	**Rank when governance excluded**	**Rank difference**
Iraq	1	1	0
Djibouti	2	2	0
Angola	3	3	0
Kyrgyzstan	4	10	-6
Guyana	5	24	-19
Solomon Islands	6	4	2
Malaysia	7	20	-13
Eritrea	8	8	0
Chile	9	21	-12
Algeria	10	16	-6
Senegal	11	12	-1
Trinidad and Tobago	12	23	-11
Vanuatu	13	18	-5
Uzbekistan	14	11	3
Morocco	15	22	-7
Slovenia	16	14	2
Finland	17	13	4
Congo	18	7	11
Yemen	19	19	0
Comoros	20	5	15
Ivory Coast	21	17	4
Mauritania	22	47	-25
Bhutan	23	66	-43
Slovakia	24	29	-5
Mongolia	25	40	-15
Iceland	26	35	-9
Colombia	27	80	-53
Venezuela	28	9	19
Armenia	29	58	-29
Moldova	30	31	-1
Indonesia	31	49	-18

Jordan	32	62	-30
Azerbaijan	33	28	5
Sudan	34	60	-26
Botswana	35	59	-24
France	36	34	2
Sri Lanka	37	64	-27
Australia	38	32	6
China	39	55	-16
Austria	40	26	14
Brunei	41	54	-13
Mexico	42	39	3
Turkmenistan	43	6	37
Norway	44	33	11
Liberia	45	25	20
Philippines	46	89	-43
Brazil	47	57	-10
Rwanda	48	41	7
Mali	49	53	-4
Switzerland	50	48	2
Czech Republic	51	63	-12
Swaziland	52	50	2
Nicaragua	53	46	7
Lesotho	54	88	-34
Myanmar (Burma)	55	27	28
Nepal	56	101	-45
Dominican Republic	57	43	14
United Kingdom	58	67	-9
Laos	59	38	21
Ghana	60	87	-27
Argentina	61	77	-16
Estonia	62	91	-29
Zambia	63	37	26
Benin	64	75	-11
Sierra Leone	65	30	35
Georgia	66	102	-36
Papua New Guinea	67	68	-1
Cambodia	68	44	24
Saudi Arabia	69	109	-40
Chad	70	36	34
Denmark	71	85	-14
Tanzania	72	83	-11
Tunisia	73	106	-33
Togo	74	15	59
Egypt	75	70	5
Poland	76	78	-2
Mozambique	77	81	-4

Burkina Faso	78	79	-1
New Zealand	79	52	27
Gabon	80	65	15
Dominica	81	115	-34
Peru	82	105	-23
St. Lucia	83	110	-27
Thailand	84	104	-20
United States	85	103	-18
Niger	86	76	10
Ecuador	87	42	45
South Africa	88	97	-9
Croatia	89	82	7
Guinea	90	73	17
Namibia	91	84	7
Nigeria	92	69	23
Panama	93	124	-31
Malawi	94	95	-1
Albania	95	90	5
Guatemala	96	74	22
Bolivia	97	96	1
Belgium	98	71	27
Guinea-Bissau	99	51	48
Portugal	100	56	44
India	101	107	-6
Russia	102	98	4
Sweden	103	112	-9
DRC	104	45	59
Afghanistan	105	94	11
Cameroon	106	72	34
Antigua and Barbuda	107	118	-11
Fiji	108	86	22
Mauritius	109	120	-11
Burundi	110	99	11
Canada	111	100	11
Bangladesh	112	92	20
Honduras	113	108	5
Central African Republic	114	61	53
Costa Rica	115	113	2
Uganda	116	121	-5
El Salvador	117	117	0
Kenya	118	116	2
Tajikistan	119	93	26
Hungary	120	111	9
Vietnam	121	114	7
Madagascar	122	123	-1
Tanzania	123	83	40

Netherlands	124	122	2

References

1. Butchart SHM et al. (2010) Global Biodiversity : Indicators of Recent Declines. *Science* 328:1164–1168.

2. CBD CBD Country Reports. Available at: www.cbd.int/countries. Accessed Apr-Sep 2012

3. McCarthy DP et al. (2012) Financial costs of meeting global biodiversity conservation targets: current spending and unmet needs. *Science* 338: 946-949.

4. Balmford A, Gaston KJ, Blyth S, James A, Kapos V (2003) Global variation in terrestrial conservation costs , conservation benefits , and unmet conservation needs. *PNAS* 100:1046–1050.

5. McKinney ML (2002) Effects of National Conservation Spending and Amount of Protected Area on Species Threat Rates. *Conservation Biology* 16:539–543.

6. Leader-Williams N, Albon SD (1988) Allocation of Resources for Conservation. *Nature* 336:533–535.

7. Miller DC, Agrawal A, Timmons Roberts J (2013) Biodiversity , Governance , and the Allocation of International Aid for Conservation. *Conservation Letters* 6:12–20.

8. CBD COP Decision X/2. Strategic plan for biodiversity 2011-2020. Available at: www.cbd.int/decision/cop?id=12268. Accessed 10/10/2012

9. James A, Gaston KJ, Balmford A (2001) Can We Afford to Conserve Biodiversity ? *BioScience* 51:43–52.

10. Balmford A, Long A (1995) Across-Country Analyses of Biodiversity Congruence and Current Conservation Effort in the Tropics. *Conservation Biology* 9:1539–1547.

11. Halpern BS et al. (2005) Gaps and Mismatches between Global Conservation Priorities and Spending. *Conservation Biology* 20:56–64.

12. Bovarnick A, Fernandez-Baca J, Galindo J, Negret H (2010) *Financial Sustainability of Protected Areas in Latin America and the Caribbean : Investment Policy Guidance*. United Nations Development Program, New York.

13. Lapham NP, Livermore RJ (2003) *Striking a Balance. Ensuring Conservation's Place on the International Biodiversity Assistance Agenda*. Conservation International, Washington DC.

14. Martin TG et al. (2012) Acting fast helps avoid extinction. *Conservation Letters* 5:274–280.

15. Bottrill M et al. (2009) Finite funds means triage is unavoidable. *Trends in Ecology and Evolution* 24:183–184.

16. Wilson KA et al. (2011) Prioritizing conservation investments for mammal species globally. *Philosophical Transactions of the Royal Society* 366:2670–2680.

17. Ceballos G, Salazar I, Fay JP (2009) Global Mammal Conservation : What Must We Global Mammal Conservation : What Must We Manage? *Science* 603:603–607.

18. Eklund J, Arponen A, Visconti P, Cabeza M (2011) Governance factors in the identification of global conservation priorities for mammals. *Philosophical Transactions of the Royal Society* 366:2661–2669.

19. Redford KH et al. (2003) Mapping the conservation landscape. *Conservation Biology* 17:116-131.

20. Tierney MJ et al. (2011) More Dollars than Sense : Refining Our Knowledge of Development Finance Using AidData. *World Development* 39:1891–1906.

21. Hickey V, Pimm SL (2011) How the World Bank funds protected areas. *Conservation Letters* 4:269–277.

22. Kier G et al. (2009) A global assessment of endemism and species richness across island and mainland regions. *PNAS* 106:9322–9327.

23. Metrick A, Weitzmann ML (1998) Conflicts and choices in biodiversity preservation. *Journal of Economic Perspectives* 12:21–34.

24. Redding DW, Mooers AØ (2006) Incorporating Evolutionary Measures into Conservation Prioritization. *Conservation Biology* 20:1670–1678.

25. Lewis TL (2003) Environmental Aid : Driven by Recipient Need or Donor Interests ? *Social Science Quarterly* 84:144–161.

26. Hicks RL, Parks BC, Roberts JT, Tierney MJ (2008) *Greening Aid? Understanding environmental assistance to developing countries* (Oxford University Press, Oxford).

27. Parker C, Cranford M, Oates N, Leggett M (2012) *The little biodiversity finance book - 3rd edition* (Global Canopy Programme, Oxford, UK).

28. Kaufmann D, Kraay A, Mastruzzi M (2010) The Worldwide Governance Indicators Methodology and Analytical Issues.World Bank Policy Research Working Paper No. 5430.

29. Hanson T et al. (2009) Warfare in Biodiversity Hotspots. *Conservation Biology* 23:578–587.

30. Emerton L, Bishop J, Thomas L (2006) *Sustainable Financing of Protected Areas. A global review of challenges and options* (IUCN, Gland, Switzerland and Cambridge, UK).

31. Cleary D (2006) The Questionable Effectiveness of Science Spending by International Conservation Organizations in the Tropics. *Conservation Biology* 20:733–738.

32. Molnar A, Scherr S, Khare A (2004) *Who conserves the world's forests? A new assessment of conservation and investment trends* (Forest Trends, Washington DC) Available at: www.forest-trends.org. Accessed 10 Apr 2010.

33. Mace GM et al. (2000) It's time to work together and stop duplicating conservation efforts. *Nature* 405:393–393.

34. Cooper T, Baldock D (2009) *The provision of public goods through agriculture in the European Union, report prepared for DG Agricultural and Rural Development, Contract No 30-CE-0233091/00-28* (London).

35. Commission of the European Communities (2008) Accompanying document to the Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. A mid-term assessment of implementing the EC biodiversity action plan.

36. World Bank World Development Report. Available at: data.worldbank.org. Accessed 8 Jun 2011.

37. Carwardine J et al. (2008) Cost-effective priorities for global mammal conservation. *PNAS* 105:11446–11450.

38. Font X, Cochrane J, Tapper R (2004) *Tourism for Protected Area Financing. Understanding tourism revenues for effective management plans* (Leeds Metropolitan University, Leeds, UK).

39. Lindberg K (1991) *Policies for maximimzing nature tourism's ecological and economic benefits* (World Resources Institute, Washington DC).

40. Conservation Finance Alliance (2008) *Rapid Review of Conservation Trust Funds. Prepared for the CFA Working Group on Environmental Funds by Barry Spergel and Philippe Taieb*.

41. Moye M (2003) *Bilateral debt-for-environment swaps by creditor* (WWF, Washington DC).

42. Sheikh PA (2006) *Debt-for-Nature Initiatives and the Tropical Forest Conservation Act : Status and Implementation* (Congressional Research Service, Washington DC).

43. Organization for Economic Cooperation and Development Is it ODA? Available at: www.oecd.org/dac/stats/methodology. Accessed 11 Jul 2012

44. Convention on Biological Diversity CBD. Available at: www.cbd.int/convention/convention.shtml. Accessed 5 May 2011.

45. Neumayer E (1993) *The pattern of aid giving: the impact of good governance on aid assistance* (Routledge, London).

46. Directorate General Environment Unit E.4 LIFE (2009) Ex-post evaluation of projects and activities financed under the LIFE programme. Available at: http://ec.europa.eu/environment/life/publications/lifepublications/evaluation/documents/lifeval_nature.pdf.

47. LIFE Country reports. Available at: http://ec.europa.eu/environment/life/publications/lifepublications/evaluation/index.htm. Accessed May-Oct 2009

48. Brockington D, Scholfield K (2010) Expenditure by conservation nongovernmental organizations in sub-Saharan Africa. *Conservation Letters* 3:106–113.

49. Francis P, Klarer J, Petkova N *Sourcebook on environmental funds in economies in transition* Available at: http://www.oecd.org/environment/environmentinemergingandtransitioneconomies/35157969.pdf.

50. Gossling S (1999) Ecotourism : a means to safeguard biodiversity and ecosystem functions ? *Ecological Economics* 29:303–320.

51. Mansourian S, Dudley N (2008) *Public Funds to Protected Areas* (WWF International, Washington DC).

52. James AN (1999) Institutional constraints to protected area funding. *Parks* 9:16–26.

53. James AN, Green MJB, Paine JR (1999) *A Global Review of Protected Area Budgets and Staffing* (World Conservation Press, Cambridge, UK).

54. James AN, Green MJB, Paine JR (1996) Financial Indicators for Biodiversity Assessment : In Situ Conservation Investments. *Investing in Biodiversity, Buenos Aires, Argentina*. Available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.195.3689&rep=rep1&type=pdf.

55. Wilkie DS, Carpenter JF, Zhang Q (2001) The under-financing of protected areas in the Congo Basin : so many parks and so little willingness-to-pay. *Biodiversity and Conservation*:691–709.

56. Benton TG, Vickery JA, Wilson JD (2003) Farmland biodiversity : is habitat heterogeneity the key ? *Trends in Ecology and Evolution* 18:182–188.

57. Wilkie DS, Carpenter JF (1999) Can nature tourism help finance protected areas in the Congo Basin? *Oryx* 33:332–338.

58. Fennell D, Weaver D (2005) The Ecotourium Concept and Tourism-Conservation Symbiosis. *Journal of Sustainable Tourism* 13:373–390.

59. Wilkie DS, Carpenter JF (1999) The potential role of safari hunting as a source of revenue for protected areas in the Congo Basin. *Oryx* 33:339–345.

60. Dixey L (2005) *Inventory and analysis of community based tourism in Zambia* (PROFIT/USAID, Lusaka, Zambia).

61. SANParks *SANParks annual reports 2004-2008*. Available at www.sanparks.org

62. Stanton T, Echavarria M, Hamilton K, Ott C (2010) *State of Watershed Payments: An Emerging Marketplace* (Ecosystem Marketplace).

63. Hanks J, Attwell CAM (2003) Financing Africa's protected areas, in *Vth World Parks Congress: Sustainable Finance Stream*, pp 1–21.

64. De la Maza Elvira J, Cadena Gonzalez R, Pigueron Wirz C (2003) *Estado Actual de las Áreas Naturales Protegidas de América Latina y el Caribe* (PNUMA. Programa de las Naciones Unidas para el Medio, available at www.pnuma.org).

65. Castro BG, Locker I *Mapping Conservation Investments: An Assessment of Biodiversity Funding in Latin America and the Caribbean* (Biodiversity Support Program, Washington DC).

66. MacArthur R, Wilson EO (1967) *The theory of island biogeography.* (Princeton University Press, Princeton, NJ).

67. Burnham KP, Anderson DR (2002) *Model selection and multimodel inference: a practical information-theoretic approach* (Springer-Verlag, New York).

68. Soutullo A, Dodsworth S, Heard S, Mooers A (2005) Distribution and correlates of carnivore phylogenetic diversity across the Americas. *Animal Conservation* 8:249–258.

69. Schipper J et al. (2008) The status of the world's land and marine mammals: diversity, threat, and knowledge. *Science* 322:225–30.

70. ESRI (2005) *ArcGIS 9.2* (Institute, Environmental Systems Research, Redlands, California).

71. IUCN (2009) *The IUCN Red List of threatened species* Available at: www.iucnredlist.org. Accessed 31 Aug 2009.

72. Nowak RH, Paradiso JL (1999) *Walker's Mammals of the World* (Johns Hopkins University Press, Baltimore).

73. United Nations United Nations Convention on the Law of the Sea. Available at: http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm.

74. World Database of Protected Areas Available at: www.protectedplanet.net. Accessed Oct-Dec 2012

75. World Bank International Comparison Program (2008) *Global purchasing power parities and real expenditures* Available at: siteresources.worldbank.org/ICPEXT/Resources/ICP_2011.html. Accessed 01 Sep 2009.

76. Historical Exchange Rates Available at: www.tradingeconomics.com. Accessed May 2009-Oct 2012

77. Bruner AG, Gullison RE, Balmford A (2004) Financial Costs and Shortfalls of Managing and Expanding Protected-Area Systems in Developing Countries. *BioScience* 54:1119–1126.

78. Balmford A, Gravestock P, Hockley N, McClean CJ, Roberts CM (2004) The worldwide costs of marine protected areas. *Proceedings of the National Academy of Sciences of the United States of America* 101:9694–7.

79. Mccrea-Strub A et al. (2011) Understanding the cost of establishing marine protected areas. *Marine Policy* 35:1–9.

80. Lewis-Beck M (1980) *Applied Regression: an introduction* (Sage Publications, Newbury Park).

81. Pew Charitable Trust Pew database on world religions. Available at: http://features.pewforum.org/muslim-population. Accessed 05 Jan 2013

82. International Bank for Reconstruction and Development and World Bank (2008) *Global Purchasing Power Parities and Real Expenditures. 2005 International Comparison Programme*.

Appendix: Data for the 2001-2008 financial period analysis

Table S8. Data used in the analysis.

Spending data shows the average annualized total of all flows across the years 2001-2008 in 2005 US dollars. Abbreviations as follows:

GBF = mammal Global Biodiversity Fraction (uncorrected for the probability of extinction ,see text).

Threatened GBF = threatened mammal GBF (i.e. weighted by the probability of extinction for each species, see text).

CAU = Conservation Action Unit (see text).

NPL = National Price Level.

Arab-C.Asia + Islam indicates coding variable distinguishing predominantly-Muslim countries in the Arab world and central Asia from the rest of the world (see text).

%pa = percentage of a country's land area with IUCN protected area status I to IV (see text for exceptions).

Gov effective = government effectiveness.

Region, camcar = Caribbean and Central America, sam = South America, nam = North America developed, sasia = South Asia, seasia = South East Asia, casia = Central Asia, asia = East Asia, Mid East = Middle East, nafrica = North Africa, other regions not abbreviated. NB only developing countries were analysed by region.

Income group = World Bank income group 2009, 1=lower income, 2= lower middle income, 3 = upper middle income, 4 = upper income, 0 = unknown.

Lack of data coded as -999. Total average spending amounts do not include modelled government figures and should also be cross-referenced with tables S3 and S4, which shows where they are unlikely to be complete, and with comments in table S1. Also, see text for meaning of zeroes in spending data.

COUNTRY	Total average annual spending $USmill	GBF	Threatened GBF	country area sq. km. x 1000	CAU	NPL	GDP $bn	% pa	Gov effective	Political stability	% Muslim pop.	Arab-C. Asia + Islam	Region	Income group
Afghanistan	3.575	8.71	0.14	641.91	19754.32	0.3	5.6963	0.37	-1.33	-2.36	99.8	1	casia	1

Albania	4.398	0.82	0.025	28.65	69091.88	0.49	8.4	6.05	-0.50	-0.34	82.1	0	europe	2
Algeria	4.220	13.73	0.6	2317.51	1531.76	0.43	102.3	6.24	-0.58	-1.32	98.2	1	nafrica	3
Andorra	0.000	0.06	0.012	0.51	-999.00	-999	-999	5.56	1.41	1.38	1.1	0	europe	4
Angola	0.061	37.62	0.502	1247.36	4174.88	0.51	32.8	12.06	-1.24	-0.88	1	0	subsahara	2
Antarctica	0.000	0.05	0	12403.18	-999.00	-999	-999	-999.00	-999.00	-999.00	0	0	antarctica	0
Antigua and Barbuda	2.083	0.20	0.002	0.54	21536.20	0.66	0.9	0.79	0.48	0.86	0.6	0	camcar	4
Argentina	38.688	132.15	7.793	2780.99	1442.91	0.44	183.2	5.25	-0.06	-0.21	2.5	0	sam	3
Armenia	2.384	2.95	1.067	29.67	29376.93	0.39	4.9	6.93	-0.19	-0.09	0	0	asia	2
Australia	526.113	179.95	19.583	7687.53	4396.72	1.06	732.5	9.33	1.82	0.95	1.9	0	oceania	4
Austria	104.496	1.70	0.021	83.95	9291.10	1.09	306.1	22.90	1.85	1.14	5.7	0	europe	4
Azerbaijan	1.746	4.09	0.17	164.32	5823.54	0.35	12.6	6.75	-0.76	-0.91	98.4	1	casia	2
Bahamas, The	1.189	0.94	0.023	12.14	3817.99	0.89	5.5	0.54	-999.00	-999.00	0.1	0	camcar	4
Bahrain	5.587	0.00	0	0.64	9206.86	0.65	12.9	0.16	0.44	0.01	81.2	1	wealthy non-oecd	4
Bangladesh	8.456	2.56	0.236	137.88	26546.48	0.36	60	1.59	-0.76	-1.40	90.4	0	sasia	1
Barbados	0.218	0.46	0.028	0.45	61758.25	0.62	3.1	0.07	1.33	1.04	0.9	0	camcar	4
Belgium	143.167	0.24	0.003	30.65	18780.34	1.12	370.8	10.84	1.75	0.82	6	0	europe	4
Belize	3.543	2.13	0.08	22.03	9303.04	0.61	1.1	19.01	-0.29	0.24	0.1	0	camcar	2
Benin	7.098	3.71	0.07	116.18	11439.50	0.42	4.3	23.27	-0.46	0.45	24.5	0	subsahara	1
Bhutan	4.005	4.14	0.507	39.84	3802.30	0.36	0.8	28.35	0.28	0.96	1	0	sasia	2
Bolivia	20.843	79.75	2.792	1086.52	653.81	0.28	9.3	18.16	-0.53	-0.75	0	0	sam	2
Bosnia and Herzegovina	1.671	1.03	0.046	51.53	62265.49	0.46	9.9	0.54	-999.00	-999.00	41.6	0	europe	3
Botswana	16.598	12.20	0.331	578.34	157.93	0.47	10.3	30.93	0.58	0.91	0.4	0	subsahara	3
Brazil	180.884	384.71	20.09	8472.27	2335.03	0.56	796.1	17.71	-0.01	-0.19	0.1	0	sam	3
Brunei	5.163	1.13	0.06	5.75	2835.21	0.54	6.4	29.58	0.71	1.18	51.9	0	seasia	3
Bulgaria	4.958	1.98	0.074	111.02	31313.26	0.38	26.6	4.35	0.08	0.26	13.4	0	europe	3
Burkina Faso	5.989	5.21	0.083	272.34	15198.94	0.38	5.2	13.85	-0.64	0.03	58.9	0.5	subsahara	1

Burundi	2.127	3.27	0.134	27.19	136754.74	0.32	0.8	4.85	-1.27	-1.87	2.2	0	subsahara	1
Byelarus	0.440	1.67	0.055	207.72	203057.55	0.36	29.6	7.22	-999.00	-999.00	0.2	0	casia	3
Cambodia	4.875	10.88	1.253	181.74	43007.35	0.31	6.2	20.74	-0.91	-0.51	1.6	0	seasia	1
Cameroon	13.980	49.09	5.108	464.76	18038.51	0.48	16.9	9.00	-0.81	-0.47	18	0	subsahara	2
Canada	1083.101	41.85	0.451	9953.02	929.79	1	1113.8	5.17	1.90	1.01	2.8	0	nam	4
Cape Verde	1.056	0.00	0	4.03	-999.00	0.78	1	0.16	0.12	0.88	0.1	0	subsahara	2
Central African Republic	6.316	16.09	0.258	618.61	9648.77	0.5	1.4	17.74	-1.51	-1.68	8.9	0	subsahara	1
Chad	3.687	7.31	0.455	1271.84	5111.68	0.39	5.5	9.39	-1.28	-1.67	55.7	0.5	subsahara	1
Chile	16.936	37.29	2.121	744.35	5189.44	0.6	115.2	13.21	1.19	0.67	0	0	sam	3
China	145.644	240.85	13.063	9369.13	4338.09	0.42	2234.3	15.71	0.02	-0.51	1.8	0	asia	2
Colombia	67.960	115.40	7.582	1135.10	15595.89	0.51	122.3	18.44	-0.11	-2.01	0	0	sam	3
Comoros	0.049	4.63	0.455	1.72	50675.88	0.58	0.4	0.00	-1.53	-0.41	98.3	1	asia	1
Congo	0.761	24.52	1.131	344.02	9787.08	0.51	5.1	9.60	-1.27	-1.08	1.4	0	subsahara	2
Costa Rica	31.109	20.83	0.412	51.05	41118.59	0.51	20	17.55	0.21	0.70	0	0	camcar	3
Croatia	15.788	0.84	0.027	55.89	16485.45	0.66	38.5	7.09	0.50	0.53	1.3	0	europe	4
Cuba	4.356	16.82	2.606	109.19	3090.03	-999	53.069	4.34	-0.36	0.32	0.1	0	camcar	3
Cyprus	2.803	1.02	0.011	9.14	6095.19	0.91	15.4	4.53	1.30	0.43	22.7	0	europe	4
Czech Republic	19.350	0.85	0.017	78.75	69099.26	0.6	124.4	15.05	0.96	0.91	0	0	europe	4
DRC	7.981	125.74	4.688	2326.66	6363.11	0.45	7.1	9.99	-1.65	-2.22	1.4	0	subsahara	1
Denmark	392.402	0.81	0.013	2204.05	12043.87	1.42	258.7	3.77	2.22	1.13	4.1	0	europe	4
Djibouti	0.002	0.84	0.018	21.44	-999.00	0.48	0.7	0.05	-0.82	-0.34	97	1	subsahara	2
Dominica	2.429	0.81	0.037	0.76	18388.06	0.58	0.3	3.70	0.41	0.81	0.2	0	camcar	3
Dominican Republic	13.267	5.41	0.703	48.37	14081.79	0.57	29.5	24.06	-0.53	-0.17	0	0	camcar	3
East Timor	0.128	4.46	0.093	15.04	-999.00	0.47	0.3	3.11	-999.00	-999.00	0.1	0	seasia	2
Ecuador	22.740	57.23	2.485	255.31	956.04	0.42	36.5	37.85	-0.86	-0.83	0	0	sam	2
Egypt	9.083	12.05	0.282	998.39	467.15	0.27	89.4	4.38	-0.42	-0.67	94.7	1	nafrica	2
El Salvador	6.829	2.97	0.043	20.57	38684.53	0.5	17	1.09	-0.26	-0.02	0	0	camcar	2

Equatorial Guinea	0.081	4.24	0.989	26.92	10415.40	0.54	3.2	14.02	-1.50	-0.11	4.1	0	subsahara	4
Eritrea	0.209	2.47	0.206	120.90	5050.01	0.41	1	3.69	-1.10	-0.75	36.5	0	subsahara	1
Estonia	17.162	0.21	0.004	45.93	71913.00	0.62	13.1	21.79	1.01	0.70	0.1	0	europe	4
Ethiopia	6.639	62.31	6.329	1127.55	2684.59	0.26	11.2	17.71	-0.69	-1.57	33.8	0	subsahara	1
Federated States of Micronesia	3.044	2.11	0.246	0.52	268408.08	0.75	0.2	0.09	-999.00	-999.00	0	0	oceania	2
Fiji	8.438	2.49	0.279	18.03	65297.08	0.85	2.7	0.18	-0.30	0.23	6.3	0	oceania	3
Finland	37.364	0.92	0.011	335.28	8398.50	1.22	193.2	8.32	2.15	1.56	0.8	0	europe	4
France	577.085	26.70	2.398	666.33	24776.91	1.15	2126.6	12.68	1.64	0.49	7.5	0	europe	4
Gabon	5.285	19.18	0.742	260.69	4797.96	0.49	8.1	5.33	-0.71	0.24	9.7	0	subsahara	3
Gambia, The	0.062	0.31	0.009	10.72	162835.32	0.03	0.5	1.27	-999.00	-999.00	95.3	0	subsahara	1
Gaza Strip	see West Bank			0.37		4.39	0	0.00	-999.00	-999.00	97.5	1	Mid East	1
Georgia	5.270	4.80	0.323	69.96	8951.25	0.41	6.4	3.39	-0.30	-0.96	10.5	0	europe	2
Germany	102.923	3.33	0.038	357.22	29314.85	1.11	2794.9	39.84	1.60	0.86	5	0	europe	4
Ghana	11.485	15.74	0.288	239.03	83815.40	0.41	10.7	13.96	-0.14	-0.02	16.1	0	subsahara	1
Greece	2.818	4.63	0.193	130.01	9840.46	0.87	225.2	6.05	0.73	0.52	4.7	0	europe	4
Grenada	1.047	0.05	0	0.35	-999.00	0.68	0.5	0.15	0.23	0.65	0.3	0	camcar	3
Guatemala	31.708	19.37	1.591	109.00	11956.91	0.53	31.7	27.28	-0.54	-0.80	0	0	camcar	2
Guinea	4.069	12.88	1.705	245.03	133127.96	0.33	3.3	6.42	-1.06	-1.53	84.2	1	subsahara	1
Guinea-Bissau	2.273	1.13	0.057	33.16	26976.44	0.41	0.3	26.93	-1.23	-0.50	42.8	0	subsahara	1
Guyana	0.755	10.90	0.148	210.59	13821.66	0.44	0.8	4.75	-0.23	-0.57	7.2	0	sam	2
Haiti	0.811	2.07	0.1	27.15	111558.18	0.43	4.3	0.11	-1.43	-1.52	0	0	camcar	1
Honduras	14.528	12.32	0.486	112.20	28057.98	0.43	8.3	13.54	-0.59	-0.52	0.1	0	camcar	2
Hungary	42.740	1.23	0.03	93.00	49182.96	0.64	109.2	5.11	0.90	0.92	0.3	0	europe	4
Iceland	28.007	0.04	0.001	102.95	8648.88	1.54	15.8	7.50	1.95	1.44	0.1	0	europe	4
India	119.860	115.08	13.768	3152.12	21781.36	0.33	805.7	4.82	-0.05	-1.17	14.6	0	sasia	2
Indonesia	30.364	340.27	40.72	1878.87	87891.01	0.41	287.2	5.68	-0.36	-1.52	88.1	1	seasia	2
Iran	13.858	26.96	0.732	1678.34	38640.89	0.3	189.8	6.67	-0.55	-0.93	99.6	1	casia	2

Iraq	0.0001	3.75	0.368	436.28	-999.00	0.38	5.6	0.05	-1.65	-2.59	98.9	1	casia	2
Ireland	1.158	0.19	0.002	69.64	16263.56	1.27	201.8	0.66	1.63	1.26	0.9	0	europe	4
Israel	17.803	1.63	0.047	20.71	14100.90	0.83	123.4	15.08	1.22	-1.43	17.7	0	Mid East	4
Italy	5.440	10.91	0.294	299.99	13499.48	1.09	1762.5	11.94	0.60	0.51	2.6	0	europe	4
Ivory Coast	5.050	25.36	1.713	321.33	18582.34	0.55	16.3	21.82	-1.18	-2.02	36.9	0	subsahara	2
Jamaica	2.638	5.40	0.936	11.03	27441.25	0.6	9.6	7.34	0.16	-0.32	0	0	camcar	3
Japan	0.000	46.20	6.023	371.21	18528.47	1.18	4534	10.44	1.38	0.99	0.1	0	asia	4
Jordan	2.770	0.71	0.012	89.21	-999.00	0.54	12.7	1.91	0.15	-0.36	98.8	1	Mid East	2
Kazakhstan	4.220	28.72	1.082	2842.23	7295.98	0.43	57.1	2.52	-0.60	0.30	56.4	0.5	casia	3
Kenya	39.036	56.16	4.062	581.86	13771.36	0.39	18.7	11.73	-0.63	-1.23	7	0	subsahara	1
Kiribati	0.053	0.00	0	0.42	-999.00	0.51	0.1	1.01	-0.59	-999.00	0	0	oceania	2
Kuwait	0.000	0.05	0.001	16.74	13408.11	0.73	80.8	1.11	0.10	0.25	86.4	1	wealthy non-oecd	4
Kyrgyzstan	0.328	5.15	0.072	199.56	24125.85	0.28	2.4	6.94	-0.74	-1.01	88.8	1	casia	1
Laos	3.174	29.20	2.638	229.89	-999.00	0.28	2.9	16.62	-0.99	-0.39	0	0	seasia	1
Latvia	3.214	0.34	0.004	64.64	8844.53	0.53	15.8	14.07	0.59	0.71	0.1	0	europe	3
Lebanon	0.447	0.20	0.003	10.21	190185.64	0.56	21.9	0.36	-0.33	-1.26	59.7	0.5	Mid East	3
Lesotho	1.950	2.22	0.042	30.52	33076.08	0.55	1.5	0.49	-0.39	-0.05	0	0	subsahara	2
Liberia	0.686	14.37	1.032	96.00	3130.39	0.49	0.8778	1.44	-1.40	-1.59	12.8	0	subsahara	1
Libya	0.027	9.25	0.218	1617.58	1624.61	0.56	38.8	0.11	-1.04	0.33	96.6	1	nafrica	3
Liechtenstein	0.000	0.00	0	0.18	-999.00	-999	5.2427	42.45	1.67	1.40	4.8	0	europe	4
Lithuania	4.000	0.37	0.004	65.01	15848.01	0.53	25.6	11.40	0.69	0.83	0.1	0	europe	3
Luxembourg	2.119	0.03	0	2.58	4634.68	1.15	36.5	20.00	1.79	1.44	2.3	0	europe	4
Macedonia	1.302	0.89	0.023	25.46	-999.00	0.39	5.8	4.84	-0.20	-0.79	34.9	0	europe	4
Madagascar	22.466	178.98	16.04	592.98	91831.59	0.32	5	2.54	-0.50	0.04	1.1	0	subsahara	1
Malawi	5.520	8.86	0.12	118.49	12670.19	0.33	2.1	15.02	-0.63	0.01	12.8	0	subsahara	1
Malaysia	9.268	81.85	4.915	328.50	4845.69	0.46	130.3	13.67	1.12	0.29	61.4	0	seasia	3
Maldives	0.867	0.00	0	0.03	-999.00	0.64	0.8	0.00	0.02	0.58	98.4	0	asia	2
Mali	3.367	11.42	0.339	1252.29	13703.89	0.46	5.3	2.34	-0.72	0.27	92.4	1	subsahara	1
Malta	0.835	0.01	0	0.29	56031.18	0.71	5.6	1.50	1.03	1.34	0.3	0	europe	4

Marshall Islands	0.124	0.00	0	0.03	-999.00	-999	0.1	0.62	-1.11	-999.00	0	0	oceania	2
Mauritania	1.531	6.82	0.243	1038.48	6176.64	0.37	1.9	1.13	-0.51	-0.12	99.2	1	subsahara	1
Mauritius	5.552	2.27	1.019	2.15	39294.48	0.51	6.3	0.72	0.64	0.92	16.6	0	sasia	3
Mexico	94.044	225.82	29.156	1956.87	5395.29	0.65	768.4	8.29	0.17	-0.41	0.1	0	camcar	3
Moldova	0.406	0.38	0.006	33.69	165201.92	0.35	2.9	1.35	-0.74	-0.28	0.4	0	subsahara	2
Monaco	0.000	0.00	0	0.01	-999.00	-999	-999	0.67	-999.00	-999.00	0.5	0	europe	4
Mongolia	3.826	20.39	1.467	1562.94	14054.02	0.35	1.9	13.39	-0.39	0.76	4.4	0	casia	2
Montenegro	0.002	0.43	0.02	13.80	-999.00	0.46	5.0631	11.43	-999.00	-999.00	18.5	0	europe	3
Morocco	4.333	12.84	1.051	672.22	5487.71	0.55	51.6	1.53	-0.14	-0.46	99.9	1	nafrica	2
Mozambique	13.287	23.94	0.747	786.30	3705.97	0.47	6.6	13.76	-0.51	0.21	22.8	0	subsahara	1
Myanmar (Burma)	0.777	44.00	2.528	667.06	5084.17	0.25	0	4.38	-1.45	-1.12	3.8	0	seasia	1
Namibia	31.367	26.00	0.507	824.75	717.81	0.67	6.1	13.92	0.08	0.67	0.4	0	subsahara	3
Nauru	0.014	0.00	0	0.03	-999.00	-999	-999	0.00	-999.00	-999.00	0	0	oceania	0
Nepal	12.940	13.27	0.987	147.16	12868.80	0.32	7.4	17.00	-0.69	-1.93	4.2	0	sasia	1
Netherlands	999.776	2.24	0.014	36.53	16557.97	1.12	624.2	14.00	1.91	0.99	5.5	0	europe	4
New Zealand	179.829	3.54	0.221	269.14	12794.96	1.08	109.3	17.28	1.77	1.25	0.9	0	oceania	4
Nicaragua	5.447	13.73	0.242	128.11	34428.44	0.38	4.9	31.73	-0.80	-0.23	0	0	camcar	2
Niger	6.767	7.78	0.928	1182.01	4974.39	0.43	3.4	7.07	-0.82	-0.36	98.3	1	subsahara	1
Nigeria	19.120	34.43	1.417	908.53	13237.17	0.274	99	12.59	-0.90	-1.78	47.9	0	subsahara	2
North Korea	0.232	2.68	0.066	122.21	-999.00	-999	-999	2.86	-999.00	-999.00	0	0	asia	1
Norway	124.668	0.68	0.01	383.83	12301.10	1.37	295.5	7.12	1.95	1.26	3	0	europe	4
Oman	0.051	5.84	0.54	308.64	135.36	0.6	24.3	9.31	0.38	0.92	87.7	1	Mid East	4
Pakistan	5.930	16.60	0.604	876.53	16968.05	0.32	110.7	9.81	-0.46	-1.94	96.4	0	sasia	2
Panama	17.562	20.14	0.938	74.07	2506.83	0.52	0.1	11.49	0.06	0.03	0.7	0	camcar	3
Papua New Guinea	6.785	116.00	20.001	461.86	-999.00	0.43	15.5	1.37	-0.68	-0.72	0	0	seasia	2
Paraguay	3.343	15.08	0.604	398.81	39671.44	0.32	0	4.45	-0.87	-0.75	0	0	sam	2
Peru	22.222	129.95	5.514	1290.85	994.72	0.45	7.3	9.11	-0.44	-0.95	0	0	sam	3
Philippines	21.137	113.22	7.522	292.41	12400.36	0.39	79.4	5.00	-0.06	-1.47	5.1	0	seasia	2

Poland	40.369	2.87	0.085	311.67	40637.59	0.59	99	21.81	0.48	0.51	0.1	0	europe	3
Portugal	71.490	2.92	0.461	91.91	12242.23	0.88	303.2	5.55	1.01	1.01	0.6	0	europe	4
Qatar	0.352	0.03	0.001	11.10	-999.00	0.75	183.3	1.29	0.41	0.99	77.5	1	wealthy non-oecd	4
Romania	1.823	3.83	0.078	237.38	39138.88	0.49	42.5	5.41	-0.18	0.19	0.3	0	europe	3
Russia	76.827	77.58	2.205	17005.25	7462.83	0.45	98.6	9.11	-0.41	-1.02	11.7	0	casia	3
Rwanda	11.486	7.18	1.081	25.14	46197.65	0.33	763.7	9.89	-0.53	-0.90	1.8	0	subsahara	1
San Marino	0.000	0.00	0	0.06	-999.00	-999	2.2	0.00	-999.00	-999.00	0	0	europe	4
Sao Tome and Principe	0.000	4.93	0.992	1.14	-999.00	0.53	0.9	0.00	-0.69	0.44	0	0	subsahara	4
Saudi Arabia	47.879	9.42	0.343	1954.57	455.01	0.64	0.1	29.95	-0.25	-0.38	97.1	1	wealthy non-oecd	4
Senegal	7.813	5.79	0.113	196.01	19286.22	0.48	309.8	23.10	-0.23	-0.20	95.9	1	subsahara	1
Serbia	19.873	1.31	0.028	88.14	54445.04	0.41	8.2	5.53	-0.31	-0.60	3.7	0	europe	3
Seychelles	1.228	1.28	0.482	0.38	15868.84	0.61	0.8757	0.92	0.05	0.80	1.1	0	sasia	3
Sierra Leone	0.684	5.47	0.238	72.49	116859.26	0.37	0.7	4.30	-1.25	-0.49	71.5	0	subsahara	1
Singapore	0.000	0.93	0.01	0.55	12129.35	0.65	1.2	3.28	2.09	1.12	14.9	0	seasia	4
Slovakia	8.631	0.69	0.015	48.93	67147.31	0.55	116.8	21.15	0.81	0.85	0.1	0	europe	4
Slovenia	3.224	0.58	0.007	20.42	188065.96	0.76	46.4	9.00	1.00	1.11	2.4	0	europe	4
Solomon Islands	0.065	20.77	5.185	26.98	102611.79	0.43	34.4	0.12	-1.34	0.09	0	0	oceania	2
Somalia	0.000	25.86	0.763	636.27	-999.00	-999	0.3	0.53	-2.15	-2.74	98.6	1	subsahara	1
South Africa	111.036	77.39	4.053	1220.23	8357.17	0.61	277.2	6.70	0.64	-0.09	1.5	0	subsahara	3
South Korea	82.402	2.64	0.049	97.23	57510.78	0.77	787.6	2.84	-999.00	-999.00	0.2	0	asia	4
Spain	8.098	14.99	2.088	506.15	1440.37	0.95	239.5	7.58	1.33	0.10	2.3	0	europe	4
Sri Lanka	10.662	20.61	4.098	66.04	26332.46	0.35	41.58	14.95	-0.20	-1.26	8.5	0	sasia	2
St. Kitts and Nevis	0.150	0.08	0.001	0.20	85230.65	0.69	23.5	0.77	0.33	1.18	0.3	0	camcar	3
St. Lucia	1.537	0.28	0.003	0.64	126071.76	0.6	0.5	2.04	0.42	0.86	0.1	0	camcar	3
St. Vincent and the Grenadines	0.063	0.15	0.002	0.34	48702.10	0.57	0.8	1.23	0.38	0.91	1.7	0	camcar	3

Sudan	3.014	35.47	0.822	2486.95	5049.59	0.44	0.4	4.18	-1.22	-2.10	71.4	1	subsahara	2
Suriname	2.470	7.87	0.098	144.99	1524.88	0.69	27.5	12.05	-0.15	0.23	15.9	0	sam	3
Swaziland	0.947	0.88	0.025	17.11	8142.40	0.52	1.3	3.02	-0.86	-0.09	0.2	0	subsahara	2
Sweden	136.387	1.25	0.014	446.01	12249.01	1.24	2.7	9.45	1.98	1.29	4.9	0	europe	4
Switzerland	258.812	1.25	0.014	41.49	22886.21	1.4	357.7	23.06	2.01	1.24	5.7	0	europe	4
Syria	0.662	2.76	0.036	187.98	-999.00	0.37	367	0.33	-0.93	-0.25	92.8	1	Mid East	2
Taiwan	59.208	15.60	0.21	36.17	-999.00	0.6	26.3	4.90	-999.00	-999.00	0.1	0	asia	0
Tajikistan	2.495	3.49	0.047	142.43	3314.71	0.24	2.3	4.14	-1.09	-1.09	99	1	casia	1
Tanzania	30.641	67.33	8.278	941.39	1230.86	0.35	12.1	26.36	-0.42	-0.47	29.9	0	subsahara	1
Thailand	68.829	36.21	1.865	512.24	6891.40	0.4	176.6	17.34	0.31	-0.68	5.8	0	seasia	2
Togo	0.558	2.26	0.037	57.12	46608.65	0.46	2.2	11.04	-1.51	-0.47	12.2	0	subsahara	1
Tonga	0.388	0.01	0	0.46	41111.32	0.62	0.2	9.42	-0.60	-999.00	0	0	oceania	2
Trinidad and Tobago	1.724	2.88	0.03	5.01	17695.17	0.61	14.4	9.60	0.27	-0.16	5.8	0	camcar	4
Tunisia	9.295	4.12	0.108	155.37	12698.77	0.45	28.7	1.27	0.50	0.14	99.8	1	nafrica	2
Turkey	16.487	17.39	0.287	779.94	2532.27	0.65	362.5	1.94	0.14	-0.78	98.6	1	Mid East	3
Turkmenistan	0.282	5.84	0.139	554.53	1378.27	0.36	8.1	2.99	-1.53	0.03	93.3	1	casia	2
Tuvalu	0.006	0.00	0	0.03	-999.00	-999	0.0149	0.19	-0.50	-999.00	0.1	0	oceania	0
Uganda	24.477	21.40	1.541	242.07	43860.16	0.36	8.7	8.51	-0.54	-1.32	12	0	subsahara	1
Ukraine	36.043	7.77	0.499	597.50	77418.24	0.33	82.9	3.59	-0.63	-0.20	0.9	0	casia	2
United Arab Emirates	0.000	0.48	0.054	70.32	1260.69	0.66	129.7	4.50	0.79	0.82	76	1	wealthy non-oecd	4
United Kingdom	701.211	1.30	0.025	261.49	13343.30	1.18	2198.8	16.89	1.75	0.38	4.6	0	europe	4
United States	7483.807	230.02	8.208	9476.53	17868.47	1	12417	13.55	1.62	0.11	0.8	0	nam	4
Uruguay	6.749	9.06	0.787	177.86	18649.58	0.54	16.8	0.24	0.47	0.79	0	0	sam	3
Uzbekistan	0.565	6.00	0.118	446.59	26834.51	0.27	14	2.26	-1.01	-1.43	96.5	1	casia	1
Vanuatu	0.264	3.10	0.697	12.26	937770.14	0.53	0.6017	0.47	-0.56	1.16	0	0	oceania	2
Vatican City	0.000	0.00	0	0.00	-999.00	-999	-999	0.00	-999.00	-999.00	0	0	europe	0
Venezuela	24.271	80.00	3.92	910.86	1119.45	0.55	140.2	50.18	-0.99	-1.27	0.3	0	sam	2
Vietnam	25.525	39.00	5.151	324.23	230211.98	0.3	52.4	4.00	-0.30	0.22	0.2	0	seasia	1

West Bank	0.245	0.54	0.008	5.88	-999.00	-999	4	0.00	-999.00	-999.00	97.5	1	Mid East	2
Western Sahara	0.000	1.57	0.062	268.98	-999.00	-999	-999	6.49	-999.00	-999.00	99.6	1	nafrica	4
Western Samoa	0.353	1.10	0.012	2.94	28397.42	0.6	0.4	0.98	-999.00	-999.00	0	0	oceania	2
Yemen	0.801	4.82	0.062	423.68	-999.00	0.36	15.1	0.69	-0.90	-1.54	99	1	Mid East	2
Zambia	17.146	29.62	0.9141612	751.92	49790.31	0.54	7.3	36.04	-0.81	0.14	0.4	0	subsahara	1
Zimbabwe	unclear	17.43	0.337	0.00	14851.11	1.48	2E+06	7.01	-1.67	-2.06	0.9	0	subsahara	1
Spratly Islands	-999.000	0.00	-999.00	0.00	-999.00	-999.00	-999.00	-999.00	-999.00	-999.00	-999.00	-999.00	not analyzed	not analyzed
Paracel Islands	-999.000	0.00	-999.00	0.00	-999.00	-999.00	-999.00	-999.00	-999.00	-999.00	-999.00	-999.00	not analyzed	not analyzed