

3.4 Deforestation and biodiversity

	Forest area		Average annual deforestation ^a		Mammals		Birds		Higher plants ^b		Nationally protected areas	
	thousand sq. km 2000	% of total land area 2000	sq. km 1990–2000	% 1990–2000	Species 2002	Threatened species 2002	Species 2002	Threatened species 2002	Species 2002	Threatened species 2002	thousand sq. km 2003 ^c	% of total land area 2003 ^c
Afghanistan	14	2.1	..	..	119	13	181	11	4,000	1	2.0	0.3
Albania	10	36.2	78	0.8	68	3	193	3	3,031	0	1.0	3.8
Algeria	21	0.9	-266	-1.3	92	13	183	6	3,164	2	119.1	5.0
Angola	698	56.0	1,242	0.2	276	19	265	15	5,185	19	82.3	6.6
Argentina	346	12.7	2,851	0.8	320	34	362	39	9,372	42	180.6	6.6
Armenia	4	12.4	-42	-1.3	84	11	236	4	3,553	1	2.1	7.6
Australia	1,545	20.1	2,820	0.2	252	63	497	37	15,638	38	1,029.4	13.4
Austria	39	47.0	-77	-0.2	83	7	230	3	3,100	3	27.3	33.0
Azerbaijan	11	13.2	-130	-1.3	99	13	229	8	4,300	0	5.3	6.1
Bangladesh	13	10.2	-165	-1.3	125	23	166	23	5,000	12	1.0	0.8
Belarus	94	45.3	-2,562	-3.2	74	7	194	3	2,100	0	13.1	6.3
Belgium ^d	7	22.2	13	0.2	58	11	191	2	1,550	0	0.9	2.6
Benin	27	24.0	699	2.3	188	8	112	2	2,500	11	12.6	11.4
Bolivia	531	48.9	1,611	0.3	316	24	504	28	17,367	70	145.3	13.4
Bosnia and Herzegovina	23	44.4	0	0.0	72	10	205	3	..	1	0.3	0.5
Botswana	124	21.9	1,184	0.9	164	6	184	7	2,151	0	104.8	18.5
Brazil	5,439	64.3	23,093	0.4	394	81	686	114	56,215	..	566.6	6.7
Bulgaria	37	33.4	-204	-0.6	81	14	248	10	3,572	0	5.0	4.5
Burkina Faso	71	25.9	152	0.2	147	7	138	2	1,100	2	31.5	11.5
Burundi	1	3.7	147	9.0	107	6	145	7	2,500	2	1.5	5.7
Cambodia	93	52.9	561	0.6	123	24	183	19	..	29	32.7	18.5
Cameroon	239	51.3	2,218	0.9	409	40	165	15	8,260	155	20.9	4.5
Canada	2,446	26.5	0	0.0	193	14	310	8	3,270	1	1,023.5	11.1
Central African Republic	229	36.8	300	0.1	209	14	168	3	3,602	10	54.2	8.7
Chad	127	10.1	817	0.6	134	17	141	5	1,600	2	114.6	9.1
Chile	155	20.7	203	0.1	91	21	157	22	5,284	40	141.5	18.9
China	1,635	17.5	-18,063	-1.2	394	79	618	74	32,200	168	727.5	7.8
Hong Kong, China	..	..	..	..	..	1	..	11	..	..	0.5	..
Colombia	496	47.8	1,905	0.4	359	41	708	78	51,220	213	105.9	10.2
Congo, Dem. Rep.	1,352	59.6	5,324	0.4	200	15	130	3	6,000	33	113.4	5.0
Congo, Rep.	221	64.6	175	0.1	450	40	345	28	11,007	55	22.2	6.5
Costa Rica	20	38.5	158	0.8	205	14	279	13	12,119	109	11.7	23.0
Côte d'Ivoire	71	22.4	2,649	3.1	230	19	252	12	3,660	101	19.1	6.0
Croatia	18	31.9	-20	-0.1	76	9	224	4	4,288	0	4.2	7.5
Cuba	23	21.4	-277	-1.3	31	11	86	18	6,522	160	75.9	69.1
Czech Republic	26	34.1	-5	0.0	81	8	205	2	1,900	4	12.4	16.1
Denmark	5	10.7	-10	-0.2	43	5	196	1	1,450	3	14.4	34.0
Dominican Republic	14	28.4	0	0.0	20	5	79	15	5,657	29	25.1	51.9
Ecuador	106	38.1	1,372	1.2	302	33	640	62	19,362	197	50.7	18.3
Egypt, Arab Rep.	1	0.1	-20	-3.3	98	13	123	7	2,076	2	96.6	9.7
El Salvador	1	5.8	72	4.6	135	2	141	0	2,911	23	0.1	0.4
Eritrea	16	15.7	54	0.3	112	12	138	7	..	3	4.3	4.3
Estonia	21	48.6	-125	-0.6	65	4	204	3	1,630	0	5.0	11.8
Ethiopia	46	4.6	403	0.8	277	35	262	16	6,603	22	169.0	16.9
Finland	219	72.0	-80	0.0	60	5	243	3	1,102	1	28.3	9.3
France	153	27.9	-616	-0.4	93	18	283	5	4,630	2	73.2	13.3
Gabon	218	84.7	101	0.0	190	15	156	5	6,651	71	1.8	0.7
Gambia, The	5	48.1	-45	-1.0	117	3	154	2	974	3	0.2	2.3
Georgia	30	43.0	0	0.0	107	13	208	3	4,350	..	1.6	2.3
Germany	107	30.8	0	0.0	76	11	247	5	2,682	12	113.8	32.6
Ghana	63	27.8	1,200	1.7	222	14	206	8	3,725	115	12.7	5.6
Greece	36	27.9	-300	-0.9	95	13	255	7	4,992	2	4.6	3.6
Guatemala	29	26.3	537	1.7	250	6	221	6	8,681	77	21.7	20.0
Guinea	69	28.2	347	0.5	190	12	109	10	3,000	21	1.7	0.7
Guinea-Bissau	22	77.8	216	0.9	108	3	235	0	1,000	4	..	..
Haiti	1	3.2	70	5.7	20	4	62	14	5,242	27	0.1	0.4

Deforestation and biodiversity

	Forest area		Average annual deforestation ^a		Mammals		Birds		Higher plants ^b		Nationally protected areas	
	thousand sq. km 2000	% of total land area 2000	sq. km 1990–2000	% 1990–2000	Species 2002	Threatened species 2002	Species 2002	Threatened species 2002	Species 2002	Threatened species 2002	thousand sq. km 2003 ^c	% of total land area 2003 ^c
Honduras	54	48.1	589	1.0	173	10	232	5	5,680	108	7.2	6.4
Hungary	18	20.0	-72	-0.4	83	9	208	8	2,214	1	6.5	7.0
India	641	21.6	-381	-0.1	390	88	458	72	18,664	244	154.6	5.2
Indonesia	1,050	58.0	13,124	1.2	515	147	929	114	29,375	384	373.2	20.6
Iran, Islamic Rep.	73	4.5	0	0.0	140	22	293	13	8,000	1	78.5	4.8
Iraq	8	1.8	0	0.0	81	11	140	11	..	0	0.0	0.0
Ireland	7	9.6	-170	-3.0	25	5	143	1	950	1	1.2	1.7
Israel	1	6.1	-50	-4.9	116	14	162	12	2,317	0	3.3	15.8
Italy	100	34.0	-295	-0.3	90	14	250	5	5,599	3	23.2	7.9
Jamaica	3	30.0	54	1.5	24	5	75	12	3,308	206	..	..
Japan	241	66.1	-34	0.0	188	37	210	34	5,565	11	24.8	6.8
Jordan	1	1.0	0	0.0	71	10	117	8	2,100	0	3.0	3.4
Kazakhstan	121	4.5	-2,390	-2.2	178	16	379	15	6,000	1	72.9	2.7
Kenya	171	30.0	931	0.5	359	51	344	24	6,506	98	45.5	8.0
Korea, Dem. Rep.	82	68.2	0	0.0	..	13	150	19	2,898	3	3.1	2.6
Korea, Rep.	62	63.3	51	0.1	49	13	138	25	2,898	0	6.8	6.9
Kuwait	0	0.3	-2	-5.2	21	1	35	7	234	0	0.3	1.5
Kyrgyz Republic	10	5.2	-228	-2.6	83	7	168	4	4,500	1	28.9	15.0
Lao PDR	126	54.4	527	0.4	172	31	212	20	8,286	18	6.9	3.0
Latvia	29	47.1	-127	-0.4	83	4	216	3	1,153	0	8.3	13.4
Lebanon	0	3.5	1	0.3	57	5	116	7	3,000	0	0.1	0.5
Lesotho	0	0.5	0	0.0	33	3	123	7	1,591	0	0.1	0.2
Liberia	35	36.1	760	2.0	193	17	146	11	2,200	46	1.6	1.7
Libya	4	0.2	-47	-1.4	76	8	76	1	1,825	1	1.8	0.1
Lithuania	20	31.8	-48	-0.2	68	5	201	4	1,796	0	6.7	10.3
Macedonia, FYR	9	35.6	0	0.0	78	11	199	3	3,500	0	1.8	7.1
Madagascar	117	20.2	1,174	0.9	141	50	172	27	9,505	162	25.0	4.3
Malawi	26	27.2	707	2.4	195	8	219	11	3,765	14	10.5	11.2
Malaysia	193	58.7	2,369	1.2	300	50	254	37	15,500	681	18.7	5.7
Mali	132	10.8	993	0.7	137	13	191	4	1,741	6	45.1	3.7
Mauritania	3	0.3	98	2.7	61	10	172	2	1,100	0	17.4	1.7
Mauritius	0	7.9	1	0.6	..	3	..	9	..	..	0.2	7.8
Mexico	552	28.9	6,306	1.1	491	70	440	39	26,071	..	194.7	10.2
Moldova	3	9.9	-7	-0.2	68	6	175	5	1,752	0	0.5	1.4
Mongolia	106	6.8	600	0.5	133	14	274	16	2,823	0	180.1	11.5
Morocco	30	6.8	12	0.0	105	16	206	9	3,675	2	3.1	0.7
Mozambique	306	39.0	637	0.2	179	14	144	16	5,692	36	65.9	8.4
Myanmar	344	52.3	5,169	1.4	300	39	310	35	7,000	37	2.0	0.3
Namibia	80	9.8	734	0.9	250	15	201	11	3,174	5	112.0	13.6
Nepal	39	27.3	783	1.8	181	31	274	25	6,973	6	12.7	8.9
Netherlands	4	11.1	-10	-0.3	55	10	192	4	1,221	0	4.8	14.2
New Zealand	79	29.7	-390	-0.5	..	8	..	63	..	..	79.3	29.6
Nicaragua	33	27.0	1,172	3.0	200	6	215	5	7,590	39	21.6	17.8
Niger	13	1.0	617	3.7	131	11	125	3	1,460	2	97.5	7.7
Nigeria	135	14.8	3,984	2.6	274	27	286	9	4,715	119	30.1	3.3
Norway	89	29.0	-310	-0.4	54	10	241	2	1,715	2	20.9	6.8
Oman	0	0.0	0	0.0	56	9	109	10	1,204	6	43.3	14.0
Pakistan	24	3.1	394	1.5	188	19	237	17	4,950	2	37.8	4.9
Panama	29	38.6	519	1.6	218	20	302	16	9,915	193	16.2	21.7
Papua New Guinea	306	67.6	1,129	0.4	214	58	414	32	11,544	142	10.4	2.3
Paraguay	234	58.8	1,230	0.5	305	10	233	26	7,851	10	13.9	3.5
Peru	652	50.9	2,688	0.4	460	49	695	76	17,144	269	78.1	6.1
Philippines	58	19.4	887	1.4	153	50	404	67	8,931	193	17.0	5.7
Poland	90	29.7	-175	-0.2	84	15	233	4	2,450	4	37.7	12.4
Portugal	37	40.1	-570	-1.7	63	17	235	7	5,050	15	6.0	6.6
Puerto Rico	2	25.8	5	0.2	..	2	..	8	0.3	3.5

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	thousand sq. km 2000	% of total land area 2000	sq. km 1990–2000	% 1990–2000	Species 2002	Threatened species 2002	Species 2002	Threatened species 2002	Species 2002	Threatened species 2002	thousand sq. km 2003 ^c	% of total land area 2003 ^c
Romania	64	28.0	-147	-0.2	84	17	257	8	3,400	1	10.8	4.7
Russian Federation	8,514	50.4	-1,353	0.0	269	45	528	38	11,400	7	1,317.3	7.8
Rwanda	3	12.4	150	3.9	151	9	200	9	2,288	3	1.5	6.2
Saudi Arabia	15	0.7	0	0.0	77	8	125	15	2,028	3	823.3	38.3
Senegal	62	32.2	450	0.7	192	12	175	4	2,086	7	22.3	11.6
Serbia and Montenegro	29	28.3	14	0.0	96	12	238	5	4,082	1	..	..
Sierra Leone	11	14.7	361	2.9	147	12	172	10	2,090	43	1.5	2.1
Singapore	0	3.0	0	0.0	85	3	142	7	2,282	54	0.0	4.9
Slovak Republic	22	..	-203	-1.0	85	9	199	4	3,124	2	11.0	..
Slovenia	11	55.0	-22	-0.2	75	9	201	1	3,200	0	1.2	6.0
Somalia	75	12.0	769	1.0	171	19	179	10	3,028	17	5.0	0.8
South Africa	89	7.3	80	0.1	247	42	304	28	23,420	45	67.2	5.5
Spain	144	28.8	-860	-0.6	82	24	281	7	5,050	14	42.5	8.5
Sri Lanka	19	30.0	348	1.6	88	22	126	14	3,314	280	8.7	13.5
Sudan	616	25.9	9,589	1.4	267	23	280	6	3,137	17	123.6	5.2
Swaziland	5	30.3	-58	-1.2	..	4	..	5	..	..	0.6	3.5
Sweden	271	65.9	-6	0.0	60	7	259	2	1,750	3	37.5	9.1
Switzerland	12	30.3	-43	-0.4	75	5	199	2	3,030	2	11.9	30.0
Syrian Arab Republic	5	2.5	0	0.0	63	4	145	8	3,000	0	..	..
Tajikistan	4	2.8	-20	-0.5	84	9	210	7	5,000	2	5.9	4.2
Tanzania	388	43.9	913	0.2	316	42	229	33	10,008	236	263.3	29.8
Thailand	148	28.9	1,124	0.7	265	37	285	37	11,625	78	71.0	13.9
Togo	5	9.4	209	3.4	196	9	117	0	3,085	9	4.3	7.9
Trinidad and Tobago	3	50.5	22	0.8	100	1	131	1	2,259	1	0.3	6.0
Tunisia	5	3.3	-11	-0.2	78	11	165	5	2,196	0	0.5	0.3
Turkey	102	13.3	-220	-0.2	116	17	278	11	8,650	3	12.3	1.6
Turkmenistan	38	8.0	0	0.0	103	13	204	6	..	0	19.7	4.2
Uganda	42	21.3	913	2.0	345	20	243	13	4,900	33	48.5	24.6
Ukraine	96	16.5	-310	-0.3	108	16	245	8	5,100	1	22.6	3.9
United Arab Emirates	3	3.8	-78	-2.8	25	3	34	8	..	0	0.0	0.0
United Kingdom	28	11.6	-170	-0.6	50	12	229	2	1,623	13	50.3	20.9
United States	2,260	24.7	-3,880	-0.2	428	37	508	55	19,473	..	2,372.2	25.9
Uruguay	13	7.4	-501	-5.0	81	6	115	11	2,278	1	0.5	0.3
Uzbekistan	20	4.8	-46	-0.2	97	9	203	9	4,800	1	8.3	2.0
Venezuela, RB	495	56.1	2,175	0.4	323	26	547	24	21,073	67	562.7	63.8
Vietnam	98	30.2	-516	-0.5	213	40	262	37	10,500	126	12.0	3.7
West Bank and Gaza	..	..	..	..	..	1	..	1	..	..	..	..
Yemen, Rep.	4	0.9	92	1.8	66	5	93	12	1,650	52	..	..
Zambia	312	42.0	8,509	2.4	233	12	252	11	4,747	8	237.1	31.9
Zimbabwe	190	49.2	3,199	1.5	270	12	229	10	4,440	14	46.8	12.1
World	38,611 s	29.7 w	93,952 s	0.2 w							13,750.0 s	10.7 w
Low income	7,939	26.1	60,183	0.7							2,285.5	7.7
Middle income	22,743	33.0	38,904	0.2							6,454.0	9.4
Lower middle income	20,316	36.2	23,971	0.1							4,271.0	7.7
Upper middle income	2,427	19.0	14,933	0.6							2,183.0	17.3
Low & middle income	30,682	30.9	99,087	0.3							8,739.5	8.9
East Asia & Pacific	4,284	27.0	7,025	0.2							1,454.8	9.2
Europe & Central Asia	9,463	39.6	-8,342	-0.1							1,610.2	6.8
Latin America & Carib.	9,552	47.6	46,701	0.5							2,237.8	11.2
Middle East & N. Africa	168	1.5	-239	-0.1							1,169.3	11.3
South Asia	780	16.3	979	0.1							228.6	4.8
Sub-Saharan Africa	6,435	27.3	52,963	0.8							2,038.8	8.7
High income	7,929	25.9	-5,135	-0.1							5,010.5	19.5
Europe EMU	853	35.0	-2,965	-0.4							324.9	13.5

a. Negative numbers indicate an increase in forest area. b. Flowering plants only. c. Data may refer to earlier years. They are the most recent reported by the World Conservation Monitoring Center in 2003. d. Includes Luxembourg.

About the data

The estimates of forest area are from the Food and Agriculture Organization's (FAO) State of the World's Forests 2004, which provides information on forest cover in 2000 and an estimate of forest cover in 1990. The current survey is the latest global forest assessment and the first to use a uniform global definition of forest. According to this assessment, the global rate of net deforestation has slowed to 9.5 million hectares a year, a rate 20 percent lower than that previously reported. No breakdown of forest cover between natural forest and plantation is shown in the table because of space limitations. (This breakdown is provided by the FAO only for developing countries.) For this reason the deforestation data in the table may underestimate the rate at which natural forest is disappearing in some countries.

Deforestation is a major cause of loss of biodiversity, and habitat conservation is vital for stemming this loss. Conservation efforts traditionally have focused on protected areas, which have grown substantially in recent decades. Measures of species richness are among the most straightforward ways to indicate the importance of an area for biodiversity. The number of small plants and animals is usually estimated by sampling plots. It is also important to know which aspects are under the most immediate threat. This, however, requires a large amount of data and time-consuming analysis. For this reason global analyses of the status of threatened species have been carried out for few groups of organisms. Only for birds has the status of all species been assessed. An estimated 45 percent of mammal species remain to be assessed. For plants the World Conservation Union's (IUCN) 1997 IUCN Red List of Threatened Plants provides the first-ever comprehensive listing of threatened species on a global scale, the result of more than 20 years' work by botanists from around the world. Nearly 34,000 plant species, 12.5 percent of the total, are threatened with extinction.

The table shows information on protected areas, numbers of certain species, and numbers of those species under threat. The World Conservation Monitoring Centre (WCMC) compiles these data from a variety of sources. Because of differences in definitions and reporting practices, cross-country comparability is limited. Compounding these problems, available data cover different periods.

Nationally protected areas are areas of at least 1,000 hectares that fall into one of six management categories defined by the WCMC:

- Scientific reserves and strict nature reserves with limited public access.

- National parks of national or international significance (not materially affected by human activity).
- Natural monuments and natural landscapes with unique aspects.
- Managed nature reserves and wildlife sanctuaries.
- Protected landscapes and seascapes (which may include cultural landscapes).
- Areas managed mainly for the sustainable use of natural systems to ensure long-term protection and maintenance of biological diversity.

Designating land as a protected area does not necessarily mean that protection is in force. For small countries that may only have protected areas smaller than 1,000 hectares, this size limit in the definition will result in an underestimate of the extent and number of protected areas.

Threatened species are defined according to the IUCN's classification categories: endangered (in danger of extinction and unlikely to survive if causal factors continue operating), vulnerable (likely to move into the endangered category in the near future if causal factors continue operating), rare (not endangered or vulnerable but at risk), indeterminate (known to be endangered, vulnerable, or rare but not enough information is available to say which), out of danger (formerly included in one of the above categories but now considered relatively secure because appropriate conservation measures are in effect), and insufficiently known (suspected but not definitely known to belong to one of the above categories).

Figures on species are not necessarily comparable across countries because taxonomic concepts and coverage vary. And while the number of birds and mammals is fairly well known, it is difficult to make an accurate count of plants. Although the data in the table should be interpreted with caution, especially for numbers of threatened species (where knowledge is very incomplete), they do identify countries that are major sources of global biodiversity and show national commitments to habitat protection.

The dataset on protected areas is tentative and is being revised. Due to variations in consistency and methodology of collection, the quality of the data are highly variable across countries. Some countries update their information more frequently than others, some may have more accurate data on extent of coverage, and many underreport the number or extent of protected areas.

Definitions

- Forest area is land under natural or planted stands of trees, whether productive or not.
- Average annual deforestation refers to the permanent conversion of natural forest area to other uses, including shifting cultivation, permanent agriculture, ranching, settlements, and infrastructure development. Deforested areas do not include areas logged but intended for regeneration or areas degraded by fuelwood gathering, acid precipitation, or forest fires. Negative numbers indicate an increase in forest area.
- Mammals exclude whales and porpoises.
- Birds are listed for countries included within their breeding or wintering ranges.
- Higher plants refer to native vascular plant species.
- Threatened species are the number of species classified by the IUCN as endangered, vulnerable, rare, indeterminate, out of danger, or insufficiently known.
- Nationally protected areas are totally or partially protected areas of at least 1,000 hectares that are designated as scientific reserves with limited public access, national parks, natural monuments, nature reserves or wildlife sanctuaries, and protected landscapes and seascapes. The data do not include sites protected under local or provincial law. Total land area is used to calculate the percentage of total area protected (see table 3.1).

Data sources

The forestry data are from the FAO's State of the World's Forests 2004. The data on species are from the WCMC's electronic files and the IUCN's 2002 IUCN Red List of Threatened Animals and 1997 IUCN Red List of Threatened Plants. The data on protected areas are from the United Nations Environment Programme and WCMC.