

Land Area Classification by Ecosystem Type

Source: United States Geological Survey (USGS), Global Land Cover Characteristics Database (GLCCD)

EarthTrends Data Tables:

Forests,
Grasslands, and
Drylands



Total Area (in square kilometers) classified as:

	Forests									
	Evergreen		Deciduous		Mixed	Shrublands		Savannas		
	Needleaf	Broadleaf	Needleleaf	Broadleaf		Closed	Open	Woody	Non-Woody	
WORLD	4,858,707	13,479,749	1,959,892	2,229,308	9,930,103	2,636,901	20,706,263	8,405,816	7,607,497	
ASIA (EXCL. MIDDLE EAST)	164,828	2,002,129	33,693	702,790	1,309,445	389,600	3,613,833	814,841	246,216	
Armenia	890	0	36	1,349	2,258	9	664	394	4,042	
Azerbaijan	476	5	7	9,385	2,097	1	8,676	223	1,922	
Bangladesh	0	8,396	0	1,484	6,948	1,742	1,350	480	0	
Bhutan	4,114	14	0	20,594	4,407	89	2,758	88	0	
Cambodia	10	40,037	0	12,869	19,075	3,119	763	2,516	23	
China	127,216	68,380	23,608	254,122	575,207	282,831	1,545,980	375,922	39,568	
Georgia	2,661	0	1	19,054	11,585	70	5,185	344	1,251	
India	4,235	90,761	0	63,184	97,509	27,243	257,947	244,791	1,040	
Indonesia	0	1,131,310	0	9,943	328	706	8	4,133	106,516	
Japan	10,386	2,061	723	3,067	196,899	16,926	1,447	29,865	13,388	
Kazakhstan	2,798	0	3,363	149	57,626	10	478,879	8,181	46	
Korea, Dem People's Rep	1,592	0	3	8,978	33,559	9	77	5,770	39,652	
Korea, Rep	1,486	0	3	1,459	22,896	1,187	84	6	37,147	
Kyrgyzstan	274	0	972	0	11,113	0	53,382	4,051	4	
Lao People's Dem Rep	37	93,224	0	40,144	52,436	1,766	20	5,759	0	
Malaysia	204	185,857	14	27,951	4,603	2,573	395	91	292	
Mongolia	2,128	0	4,645	3,695	22,969	0	449,803	43,867	782	
Myanmar	493	210,907	0	134,314	113,887	5,215	2,563	42,525	0	
Nepal	4,464	2,120	0	7,048	16,408	9,215	15,765	4,234	1	
Pakistan	117	75	0	135	268	10,741	289,652	598	81	
Philippines	0	24,710	0	692	0	85	0	0	4	
Singapore	0	0	0	0	0	0	56	8	0	
Sri Lanka	0	6,988	0	1,220	476	694	134	23	0	
Tajikistan	26	0	300	0	413	0	49,875	1,328	6	
Thailand	23	88,804	4	54,117	15,072	11,662	811	32,861	7	
Turkmenistan	7	0	0	8	105	0	259,118	7	15	
Uzbekistan	51	0	1	29	1,119	5	186,835	206	54	
Viet Nam	979	44,612	13	27,800	40,176	13,702	1,580	6,528	360	
EUROPE	1,811,420	1,763	1,926,091	461,372	5,114,041	444,583	3,205,911	664,743	21,512	
Albania	498	1	1	1,656	800	355	20	1,016	0	
Austria	15,388	0	40	14,782	15,536	87	2,512	190	0	
Belarus	2,435	0	142	1,319	2,801	0	2	0	0	
Belgium	1	0	0	176	679	0	14	0	0	
Bosnia and Herzegovina	179	3	0	22,344	5,299	23	0	223	0	
Bulgaria	935	121	0	23,355	3,158	57	1	136	3	
Croatia	96	7	0	20,763	1,383	177	149	1,338	0	
Czech Rep	1,099	0	1	4,852	11,628	0	2	0	0	
Denmark	476	0	0	115	58	0	3	0	0	
Estonia	5,531	0	11	0	4,998	2	0	0	0	
Finland	173,322	0	12,377	0	78,298	12,509	2,364	0	0	
France	13,533	3	17	45,151	34,439	2,928	3,537	4,914	0	
Germany	2,297	0	2	26,189	25,049	0	83	20	0	
Greece	525	89	0	7,816	11,315	14,231	1,025	8,275	4	
Hungary	32	0	1	8,164	1,709	0	0	14	0	
Iceland	617	0	476	0	12,813	21,841	1,508	351	0	
Ireland	47	0	33	451	94	0	2	2	0	
Italy	6,971	509	16	25,470	38,030	41,050	6,086	2,128	0	
Latvia	3,575	0	11	238	11,442	0	0	0	0	
Lithuania	1,686	0	0	640	4,662	0	0	0	0	
Macedonia, FYR	970	0	0	6,143	216	6	3	48	5	
Moldova, Rep	146	0	2	514	264	0	3	0	0	
Netherlands	103	0	1	206	345	0	6	0	0	
Norway	80,610	0	721	3	64,049	45,421	30,196	818	0	
Poland	1,270	0	10	10,857	11,445	0	7	5	0	
Portugal	58	247	0	18,463	55	17,314	288	4,875	140	
Romania	3,023	0	15	48,729	14,060	0	11	99	0	
Russian Federation	1,194,310	1	1,909,600	48,468	4,662,550	217,730	3,105,540	617,117	21,229	
Serbia and Montenegro	2,976	0	0	30,498	1,193	71	4	55	0	
Slovakia	150	0	8	12,664	6,580	2	1	4	0	
Slovenia	259	0	0	10,978	823	0	24	5	0	
Spain	4,282	782	12	51,286	16,057	51,487	33,097	22,641	131	
Sweden	276,668	0	2,402	63	51,409	19,208	14,378	6	0	
Switzerland	6,439	0	15	3,058	3,919	64	4,471	121	0	
Ukraine	9,647	0	163	11,124	13,947	0	389	286	0	
United Kingdom	1,074	0	14	4,834	2,804	13	3	1	0	
MIDDLE EAST & N. AFRICA	28,361	27,167	108	59,342	28,320	180,769	2,295,205	18,587	57,750	
Afghanistan	86	1	3	59	114	349	309,610	445	3	
Algeria	11,431	11,954	0	0	0	62,912	128,982	1,186	603	
Egypt	43	2,179	0	0	0	2,492	3,782	1,126	1,673	
Iran, Islamic Rep	524	0	3	13,111	4,451	94	566,473	1,598	8,440	
Iraq	750	0	2	529	605	0	166,390	39	3,724	
Israel	8	0	0	126	10	0	6,666	23	0	
Jordan	0	0	0	7	0	0	46,063	7	0	
Kuwait	0	0	0	0	0	0	4,345	0	0	
Lebanon	13	0	12	0	3	0	1,859	3	89	
Libyan Arab Jamahiriya	24	13	0	0	0	13,004	20,520	317	96	
Morocco	7,907	11,433	0	0	0	75,424	79,904	465	536	
Oman	3	0	0	0	0	0	43,094	0	0	
Saudi Arabia	12	0	0	6	0	0	532,258	2	0	
Syrian Arab Rep	77	0	3	99	234	9	99,398	42	19	
Tunisia	433	1,546	0	0	0	18,835	19,213	182	479	
Turkey	7,036	30	85	45,271	22,814	7,557	38,193	12,856	42,088	
United Arab Emirates	0	0	0	0	0	0	5,856	0	0	
Yemen	9	0	0	100	0	0	216,016	11	0	

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Total Area (in square kilometers) classified as:

	Grasslands	Permanent Wetlands	Croplands	Urban and Built-up	Cropland/ Natural Vegetation Mosaic	Snow and Ice	Barren or Sparsely Vegetated	Water Bodies
WORLD	10,541,721	984,328	15,206,323	256,332	11,586,898	2,621,872	18,332,436	3,494,824
ASIA (EXCL. MIDDLE EAST)	4,054,433	16,475	5,614,818	38,970	2,620,418	60,413	2,327,680	467,431
Armenia	2,080	16	8,139	357	8,055	0	0	1,369
Azerbaijan	4,114	9	30,941	713	23,769	0	1,728	1,760
Bangladesh	608	3,476	93,841	225	8,424	0	336	11,951
Bhutan	3,994	0	840	0	1,221	874	916	5
Cambodia	239	0	75,932	121	21,902	0	23	6,077
China	1,814,840	4,927	1,753,350	7,602	939,461	13,427	1,389,250	121,170
Georgia	1,129	142	12,246	518	14,652	0	427	552
India	26,203	1,471	1,742,140	5,906	370,788	14,633	100,560	42,425
Indonesia	48,441	3	363,251	4,931	185,247	0	0	55,092
Japan	1,909	4,195	43,910	4,693	29,395	0	17	13,535
Kazakhstan	1,179,600	412	278,098	4,013	500,136	0	120,550	81,454
Korea, Dem People's Rep	977	1	27,759	362	849	0	27	2,547
Korea, Rep	188	0	17,858	748	10,552	0	0	4,470
Kyrgyzstan	53,162	209	21,549	851	32,240	319	13,690	7,456
Lao People's Dem Rep	72	0	15,734	18	19,392	0	0	2,058
Malaysia	757	15	70,381	384	30,419	0	1	6,511
Mongolia	806,108	506	8,398	116	28,238	0	171,508	16,090
Myanmar	2,239	13	134,770	427	7,839	54	441	13,811
Nepal	11,111	1	38,905	30	28,482	3,159	5,929	522
Pakistan	18,899	914	237,801	1,250	11,465	20,807	275,792	9,017
Philippines	234	0	123,379	242	131,064	0	0	15,776
Singapore	26	1	169	215	2	0	2	76
Sri Lanka	2	0	24,143	212	30,005	0	4	2,841
Tajikistan	17,675	124	15,607	486	18,958	7,140	28,259	2,106
Thailand	360	1	271,973	983	29,162	0	322	8,486
Turkmenistan	35,351	3	14,871	636	21,050	0	135,770	4,275
Uzbekistan	21,994	29	80,314	2,318	42,223	0	81,594	29,265
Viet Nam	2,058	7	106,520	576	75,155	0	526	6,267
EUROPE	715,448	590,482	3,921,065	95,703	2,124,154	131,388	755,316	755,583
Albania	120	0	19,255	39	3,934	0	0	928
Austria	1,461	235	26,797	501	5,031	508	32	604
Belarus	443	0	52,768	759	144,276	0	0	1,944
Belgium	39	0	25,071	659	3,845	0	0	41
Bosnia and Herzegovina	29	0	16,358	24	6,748	0	0	202
Bulgaria	338	0	55,395	849	25,668	0	0	798
Croatia	33	0	21,318	95	9,037	0	5	1,779
Czech Rep	67	0	55,245	805	4,552	0	0	300
Denmark	8	0	34,583	589	3,333	0	0	3,613
Estonia	41	0	1,687	125	29,577	0	1	3,739
Finland	2,841	0	6,232	103	4,729	11	267	40,662
France	2,461	56	400,422	3,400	30,003	380	79	5,626
Germany	599	2	268,970	8,405	19,775	1	6	4,985
Greece	559	0	60,043	286	20,843	0	3	6,604
Hungary	20	0	65,747	1,447	14,091	0	0	1,572
Iceland	2,479	820	65	7	410	24,471	30,938	5,495
Ireland	239	775	20,079	287	43,120	0	0	4,168
Italy	3,222	200	140,257	1,242	27,512	800	128	6,290
Latvia	6	0	9,198	284	37,951	0	0	1,571
Lithuania	10	0	11,291	214	45,073	0	0	1,144
Macedonia, FYR	34	0	12,030	80	5,350	0	0	549
Moldova, Rep	147	0	13,016	883	18,281	0	0	319
Netherlands	31	0	25,224	1,285	6,013	0	2	2,420
Norway	16,749	526	7,695	725	3,689	3,597	34,898	30,280
Poland	208	0	219,567	1,736	60,226	0	10	5,071
Portugal	8	0	15,962	199	30,121	0	19	2,007
Romania	1,734	0	117,870	2,218	45,672	0	0	3,314
Russian Federation	666,639	576,693	1,525,630	38,318	987,706	99,732	677,696	502,571
Serbia and Montenegro	95	0	39,737	780	25,146	0	0	1,132
Slovakia	29	5	25,672	243	3,183	0	0	200
Slovenia	95	0	6,364	35	1,760	0	1	15
Spain	2,431	0	151,285	790	160,354	0	2,971	8,022
Sweden	3,891	10	9,788	2,359	10,996	355	8,093	44,125
Switzerland	2,015	286	14,922	274	2,489	1,533	77	1,668
Ukraine	5,827	0	285,366	16,106	238,535	0	90	14,397
United Kingdom	321	10,874	157,115	9,514	44,891	0	0	12,535
MIDDLE EAST & N. AFRICA	595,532	315	438,721	6,833	426,110	3,204	8,124,727	60,114
Afghanistan	161,146	68	40,971	538	32,232	3,204	91,707	1,610
Algeria	9,523	0	21,111	242	1,171	0	2,070,550	1,259
Egypt	4,165	0	24,098	453	2,155	0	934,757	5,592
Iran, Islamic Rep	224,539	93	54,681	1,276	92,674	0	645,424	10,874
Iraq	3,578	10	23,347	678	36,702	0	192,882	7,307
Israel	17	2	1,853	433	5,528	0	5,417	529
Jordan	42	1	2,477	124	1,529	0	38,604	449
Kuwait	0	0	0	195	0	0	12,095	199
Lebanon	1,771	0	2,025	83	4,183	0	0	171
Libyan Arab Jamahiriya	2,324	0	1,306	92	137	0	1,580,320	2,240
Morocco	14,624	0	13,931	378	277	0	196,662	1,979
Oman	4	1	1,389	20	99	0	262,731	2,404
Saudi Arabia	126	38	1,501	676	2,900	0	1,419,090	2,364
Syrian Arab Rep	2,423	19	22,411	220	21,231	0	40,742	1,037
Tunisia	9,059	0	13,150	97	547	0	91,026	842
Turkey	160,341	80	209,440	920	216,206	0	735	15,630
United Arab Emirates	0	1	9	94	15	0	64,057	769
Yemen	1,846	2	2,174	53	712	0	202,617	1,806

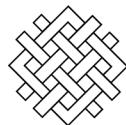
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	Evergreen			Deciduous			Shrublands		Savannas	
	Needleaf	Broadleaf	Needleleaf	Broadleaf	Mixed	Closed	Open	Woody	Non-Woody	
SUB-SAHARAN AFRICA	0	3,506,988	0	14,360	142,699	470,029	2,043,077	3,525,418	4,223,949	
Angola	0	478,354	0	0	12,450	0	42,889	142,052	394,500	
Benin	0	2,814	0	0	0	9	7	30,795	77,965	
Botswana	0	1,268	0	0	73	0	126,862	4,032	92,954	
Burkina Faso	0	12	0	0	0	0	2,374	66,457	132,254	
Burundi	0	3,212	0	0	59	1,470	0	2,465	1,165	
Cameroon	0	156,239	0	0	0	23	139	161,043	41,163	
Central African Rep	0	67,016	0	0	0	0	0	433,834	39,508	
Chad	0	223	0	0	0	73	68,254	201,696	243,145	
Congo	0	234,258	0	0	0	0	35	50,302	41,177	
Congo, Dem Rep	0	1,501,950	0	0	3,958	6,864	599	408,334	84,362	
Côte d'Ivoire	0	48,339	0	0	0	0	14	75,120	126,224	
Equatorial Guinea	0	15,506	0	0	0	0	23	2,112	1,259	
Eritrea	0	38	0	0	0	1,083	23,670	2,824	26,085	
Ethiopia	0	46,224	0	0	12,584	176,081	234,201	159,191	188,242	
Gabon	0	180,186	0	0	0	0	554	26,653	21,067	
Gambia	0	570	0	0	0	95	32	3,462	1,952	
Ghana	0	15,738	0	0	0	30	190	23,998	129,826	
Guinea	0	13,941	0	0	0	125	1	132,806	72,250	
Guinea-Bissau	0	2,230	0	0	0	658	56	18,160	5,782	
Kenya	0	26,468	0	0	2,006	125,746	94,943	125,746	25,865	
Lesotho	0	6	0	0	0	0	199	0	13,021	
Liberia	0	30,325	0	0	0	0	0	19,892	3,664	
Madagascar	0	110,638	0	14,360	0	0	1,039	19,766	312,994	
Malawi	0	15,416	0	0	659	1,013	29	2,263	40,550	
Mali	0	15	0	0	0	167	137,729	184,258	119,494	
Mauritania	0	0	0	0	0	14	56,168	98	10,062	
Mozambique	0	137,822	0	0	35,891	4,072	101	13,025	270,002	
Namibia	0	588	0	0	1	0	356,423	328	85,346	
Niger	0	1	0	0	0	5	148,535	2,115	40,066	
Nigeria	0	22,343	0	0	0	172	457	382,835	278,711	
Rwanda	0	2,791	0	0	115	3,995	0	2,832	1,027	
Senegal	0	3,561	0	0	0	453	16,863	61,653	34,876	
Sierra Leone	0	14,063	0	0	0	0	3	21,352	5,642	
Somalia	0	1,080	0	0	23	100,713	403,116	37,435	12,635	
South Africa	0	42,328	0	0	6,334	0	240,233	3,119	134,505	
Sudan	0	3,808	0	0	1,818	7,960	76,241	475,495	553,187	
Tanzania, United Rep	0	193,194	0	0	60,528	25,077	1,054	28,796	139,440	
Togo	0	369	0	0	0	1	35	5,133	44,787	
Uganda	0	9,208	0	0	530	11,368	129	88,091	3,540	
Zambia	0	115,247	0	0	4,199	2,569	105	94,606	260,203	
Zimbabwe	0	5,744	0	0	1,407	0	3,420	10,715	110,929	
NORTH AMERICA	2,647,225	361	0	852,793	2,841,979	651,718	3,878,819	385,027	30,204	
Canada	1,468,180	38	0	89,903	2,192,180	305,164	2,080,240	7,954	28	
United States	1,179,040	323	0	762,890	649,674	346,504	1,785,080	377,066	30,173	
C. AMERICA & CARIBBEAN	197,796	366,629	0	105,323	247,000	12,510	424,989	303,541	44,134	
Belize	921	11,948	0	0	359	0	3	208	27	
Costa Rica	1,210	29,576	0	0	1,971	0	290	2,064	1,304	
Cuba	0	0	0	0	25,369	0	0	19,128	0	
Dominican Rep	0	0	0	0	21,801	0	0	5,743	0	
El Salvador	1,109	2,925	0	0	2,337	0	0	31	91	
Guatemala	13,318	40,538	0	0	7,923	5	71	1,774	1,713	
Haiti	0	0	0	0	3,412	0	0	2,756	0	
Honduras	8,548	44,935	0	12	9,205	0	50	1,893	3,599	
Jamaica	0	0	0	0	6,411	0	0	1,333	0	
Mexico	160,672	145,954	0	105,311	153,440	12,491	423,808	257,479	35,196	
Nicaragua	9,486	57,355	0	0	2,170	0	14	2,344	1,436	
Panama	2,454	29,673	0	0	7,980	0	220	5,832	595	
Trinidad and Tobago	0	3,368	0	0	41	0	5	3	64	
SOUTH AMERICA	3,278	6,843,144	0	0	227,216	470,840	1,203,350	1,887,503	1,280,227	
Argentina	0	57,650	0	0	31,544	227,531	518,789	270,956	52,809	
Bolivia	0	408,741	0	0	2,590	142	218,406	237,143	41,988	
Brazil	0	4,041,330	0	0	1,132	233,215	18,101	978,688	772,451	
Chile	0	3,668	0	0	186,663	7,282	97,439	21,747	954	
Colombia	1,048	634,414	0	0	723	274	46,858	42,356	139,199	
Ecuador	0	82,667	0	0	25	173	42,687	25,121	3,831	
Guyana	0	172,086	0	0	937	44	1,842	2,614	10,703	
Paraguay	0	83,478	0	0	517	4	5	151,301	96,175	
Peru	0	657,552	0	0	526	57	239,718	36,736	7,166	
Suriname	0	131,336	0	0	15	97	72	1,341	1,133	
Uruguay	0	621	0	0	39	141	93	405	3,114	
Venezuela	2,230	492,086	0	0	2,187	1,863	19,171	118,244	149,063	
OCEANIA	0	729,496	0	0	0	15,562	4,007,120	801,626	1,703,088	
Australia	0	328,223	0	0	0	19	4,007,120	773,781	1,623,280	
Fiji	0	0	0	0	0	0	0	0	0	
New Zealand	0	60,911	0	0	0	0	0	14,650	29,238	
Papua New Guinea	0	314,783	0	0	0	12,980	0	12,182	43,339	
Solomon Islands	0	11,267	0	0	0	2,128	0	388	4,217	
DEVELOPED	4,476,217	435,652	1,931,494	1,347,332	8,245,454	1,113,291	12,369,311	1,885,935	1,859,464	
DEVELOPING	376,691	13,042,025	28,398	848,648	1,665,246	1,522,320	8,302,993	6,515,351	5,747,616	

Land Area Classification by Ecosystem Type



Total Area (in square kilometers) classified as:

	Grasslands	Permanent Wetlands	Croplands	Urban and Built-up	Cropland/ Natural Vegetation Mosaic	Snow and Ice	Barren or Sparsely Vegetated	Water Bodies
SUB-SAHARAN AFRICA	1,830,431	65,259	1,701,876	6,146	1,888,509	0	4,432,653	358,644
Angola	34,619	558	63,802	133	63,982	0	12,641	6,385
Benin	94	256	416	36	3,704	0	71	522
Botswana	225,979	3,493	26,383	79	90,901	0	7,700	224
Burkina Faso	31,009	0	54	61	39,149	0	1,837	113
Burundi	21	0	1,319	14	15,136	0	122	2,329
Cameroon	1,665	1,826	66,425	192	30,149	0	3,256	4,591
Central African Rep	0	0	76,028	102	3,481	0	314	909
Chad	120,272	0	1,640	51	15,773	0	621,721	3,549
Congo	1,554	243	4,517	38	7,817	0	2,321	3,366
Congo, Dem Rep	3,788	177	61,903	516	176,856	0	18,804	68,775
Côte d'Ivoire	487	3,914	26,861	75	37,583	0	1,602	2,474
Equatorial Guinea	98	1,726	485	4	5,108	0	28	744
Eritrea	15,443	0	1,226	18	3,451	0	46,374	1,069
Ethiopia	57,109	0	130,671	165	46,466	0	73,714	7,565
Gabon	1,624	4,052	6,146	33	14,865	0	864	5,875
Gambia	105	492	1,881	1	1,407	0	20	785
Ghana	221	5,845	10,271	93	43,209	0	3,877	6,757
Guinea	176	619	8,887	26	15,360	0	137	1,776
Guinea-Bissau	449	1,119	685	2	2,445	0	13	2,518
Kenya	19,358	0	41,264	172	75,122	0	34,484	13,279
Lesotho	9,226	0	395	0	7,653	0	3	30
Liberia	1,081	1,535	10,089	4	28,680	0	8	1,150
Madagascar	43,265	0	24,478	0	54,814	0	4,400	9,062
Malawi	145	0	26,675	24	7,402	0	2,948	21,851
Mali	126,317	0	4,987	36	30,285	0	643,616	9,392
Mauritania	71,098	412	2,067	5	46	0	897,930	3,739
Mozambique	2,849	0	234,368	9	63,434	0	9,590	17,775
Namibia	168,419	0	9,160	85	56,735	0	145,973	2,548
Niger	253,153	0	924	27	14,987	0	724,810	1,210
Nigeria	17,435	13,202	36,868	494	139,717	0	9,500	10,617
Rwanda	120	0	1,861	9	10,046	0	351	2,108
Senegal	31,177	3,615	19,360	32	15,454	0	6,261	3,394
Sierra Leone	94	929	15,008	5	13,374	0	41	2,332
Somalia	5,260	0	1,188	34	13,444	0	61,968	2,108
South Africa	290,108	0	143,791	2,039	320,397	0	34,274	5,661
Sudan	178,392	20,688	75,208	507	52,334	0	1,035,330	9,740
Tanzania, United Rep	64,915	0	222,024	112	142,361	0	3,699	64,026
Togo	66	252	1,096	26	5,506	0	22	93
Uganda	2,918	47	62,933	106	22,371	0	2,624	39,339
Zambia	8,814	0	109,447	305	143,197	0	3,143	12,841
Zimbabwe	41,299	0	157,761	471	53,358	0	1,548	4,400
NORTH AMERICA	1,334,091	231,844	1,437,205	81,577	1,634,879	2,353,200	2,038,148	1,090,969
Canada	54,899	223,679	290,485	4,057	395,394	307,719	1,743,920	745,060
United States	1,278,960	6,131	1,146,720	77,520	1,239,480	71,501	168,615	315,552
C. AMERICA & CARIBBEAN	333,104	20,416	403,755	3,385	182,704	21	15,988	53,613
Belize	1,011	151	6,263	1	251	0	7	1,015
Costa Rica	52	0	8,406	25	5,315	0	19	1,071
Cuba	7,507	4,571	48,201	406	0	0	98	4,832
Dominican Rep	5,750	4,401	9,743	127	0	0	0	976
El Salvador	102	0	6,862	180	6,513	0	0	508
Guatemala	5,665	2	27,948	213	8,811	0	2	1,376
Haiti	5,173	3,559	11,565	15	0	0	5	872
Honduras	2,272	380	32,262	68	8,046	0	0	1,701
Jamaica	1,255	483	1,243	42	0	0	0	300
Mexico	301,448	1,669	193,863	1,884	130,316	21	14,918	23,595
Nicaragua	336	130	29,603	42	15,138	0	0	10,532
Panama	603	0	18,030	78	6,822	0	1	2,568
Trinidad and Tobago	25	0	11	80	1,331	0	0	122
SOUTH AMERICA	1,101,213	58,369	1,128,852	16,625	2,670,937	25,166	556,810	272,898
Argentina	540,646	3,172	368,279	3,292	509,632	3,119	165,341	28,477
Bolivia	65,840	2,752	16,882	116	77,470	0	5,565	12,621
Brazil	116,212	51,525	584,276	9,832	1,557,090	0	9,308	133,090
Chile	86,521	8	14,185	628	49,929	22,047	227,405	29,138
Colombia	44,792	123	49,648	528	148,532	0	16,680	15,676
Ecuador	16,987	88	23,702	259	37,299	0	12,653	3,896
Guyana	1,514	3	809	9	17,913	0	55	3,056
Paraguay	10,912	130	6,684	293	46,699	0	0	3,533
Peru	133,590	53	15,970	184	71,756	0	113,147	19,795
Suriname	192	212	105	12	5,153	0	20	5,960
Uruguay	66,098	162	37,973	268	64,879	0	1	4,154
Venezuela	17,794	141	10,316	1,202	81,957	0	6,539	12,845
OCEANIA	567,046	1,120	531,302	6,983	30,955	789	19,875	88,018
Australia	411,185	1,120	489,979	5,766	842	0	19,875	43,416
Fiji	0	0	0	0	0	0	0	1,569
New Zealand	122,379	0	21,323	1,137	0	789	0	15,899
Papua New Guinea	32,176	0	5,672	52	27,756	0	0	16,695
Solomon Islands	360	0	5,383	0	603	0	0	3,985
DEVELOPED	4,190,010	826,553	6,520,891	201,240	4,776,273	518,856	3,109,452	2,023,472
DEVELOPING	6,341,288	157,727	8,656,703	54,982	6,802,393	2,055,325	15,161,745	1,123,798

Technical Notes

VARIABLE DEFINITIONS AND METHODOLOGY

All ecosystem classifications reported here are published using the International Geosphere-Biosphere Programme (IGBP) definitions. Please consult the IGBP website (<http://www.igbp.kva.se/>) for further details.

Global land cover areas, given in hectares, were determined by the Global Land Cover Characteristics (GLCC) project. The project used a framework of temporal and spatial patterns of satellite data, in conjunction with ancillary data, to assign a vegetation classification to each pixel. WRI used GLCC global data to calculate land cover by country. Below are definitions of each ecosystem area.

Evergreen needleleaf forests are dominated by trees with a percent canopy cover of greater than 60% and height exceeding 2 meters. Almost all of its trees remain green all year. Its canopy is never without green foliage.

Evergreen broadleaf forests are dominated by trees with a percent canopy cover of greater than 60% and height exceeding 2 meters. Almost all of its trees remain green year all year. Its canopy is never without green foliage.

Deciduous needleleaf forests are dominated by trees with a percent canopy cover of greater than 60% and height exceeding 2 meters. It consists of seasonal needleleaf tree communities with an annual cycle of leaf-on and leaf-off periods.

Deciduous broadleaf forests are dominated by trees with a percent canopy cover of greater than 60% and height exceeding 2 meters. It consists of seasonal broadleaf tree communities with an annual cycle of leaf-on and leaf-off periods.

Closed shrublands are lands with woody vegetation less than 2 meters tall and with shrub canopy cover greater than 60%. The shrub foliage can be either evergreen or deciduous.

Open shrublands are lands with woody vegetation less than 2 meters tall and with shrub canopy cover is between 10-60%. The shrub foliage can be either evergreen or deciduous.

Woody Savannas are lands with herbaceous and other understory systems, and with forest canopy cover between 30-60%. The forest cover height exceeds 2 meters.

Non-Woody Savannas are lands with herbaceous and other understory systems, and with forest canopy cover between 10-30%. The forest cover height exceeds 2 meters.

Grasslands are lands with herbaceous types of cover. Tree and shrub cover is less than 10%.

Permanent wetlands are lands with a permanent mixture of water and herbaceous or woody vegetation that cover extensive areas. The vegetation can be present in either salt, brackish, or fresh water.

Croplands are lands covered with temporary crops followed by harvest and a bare soil period (e.g., single and multiple cropping systems). Note that perennial woody crops will be classified as the appropriate forest or shrub land cover type.

Urban and built-up areas are covered by buildings and other man-made structures. Note that this class will not be mapped from the AVHRR imagery but will be developed from the populated places layer that is part of the Digital Chart of the World (Defense Mapping Agency, 1992).

Cropland/natural vegetation mosaics are lands with a mosaic of croplands, forests, shrublands, and grasslands in which no one component comprises more than 60% of the landscape.

Snow and ice covered areas are lands under snow and/or ice cover throughout the year.

Barren and sparsely vegetated areas are lands of exposed soil, sand, rocks, or snow and never has more than 10% vegetated cover during any time of the year.

Water bodies are oceans, seas, lakes, reservoirs, and rivers. They can be either fresh or salt water bodies.

The GLCC describes the method used to classify vegetation types as a "multitemporal unsupervised classification of NDVI data with post-classification refinement using multi-source earth science data." NDVI data are a measure of "greenness" derived from satellite data. The satellite data in this study were from the Advanced Very High Resolution Radiometer (AVHRR), and have a resolution of 1 X 1 km. The other data sets employed were a digital elevation model to help model ecological factors that govern natural vegetation distribution, ecoregions data to help determine where vegetation would be stratified by seasonal impacts, and maps of soils, vegetation, and land cover to help with the post-classification refinement.

The GLCC study derived land cover classifications from satellite data in five steps:

1. AVHRR data preparation: In this step the daily satellite data are composited into one monthly value so as to provide higher-quality, cloud-free images. Masks are applied to screen out built-up areas, water bodies, permanent ice, and barren areas, all areas where NDVI is not a useful indicator of land cover type.
2. Unsupervised classification: Those areas not screened out are classified using an automated classification approach called unsupervised clustering, often used where location and characteristics of specific classes are unknown. Groupings of pixels with similar properties, including annual sequences of greenup, peak, and senescence, are identified. The clustering is controlled by predetermined parameters for the number of iteration and resulting clusters.
3. Preliminary Labeling: After clusters are determined, the characteristics of each are investigated to determine the land cover type or types fall within it. This involves inspecting the spatial patterns and spectral or multi-temporal statistics of each class. Statistics and graphs of each are generated and their relationship to existing ancillary data is described. The graphs and statistics are then interpreted and a land cover type or types are assigned to each class. Generally, three interpreters label each class.
4. Postclassification Stratification: This step separates classes containing two or more disparate land cover types. This step is important because disparate land cover types, usually a natural and agricultural land cover types, are often clustered together due to spectral similarities. These problems are usually solved using criteria based on the relationship between the confused seasonal greenness classes and selected ancillary data sets. Elevation and ecoregion data are often the most useful ancillary data sets.
5. Final Land Cover Characterization: The final step is to derive a collection of attributes that describe the characteristics of each seasonal land cover region. The classifications are then labeled according to various commonly-used schemes and published. WRI publishes the version labeled according to the International Geosphere-Biosphere Programme (IGBP).

Please see the GLCC database website (http://edcdaac.usgs.gov/glcc/globdoc2_0.html) for more information about the data and approach. You may also download the data there for use with GIS software.

FREQUENCY OF UPDATE BY DATA PROVIDERS

The satellite data used to develop the Earth cover classifications were recorded over a 12-month period spanning from April 1992 to March 1993. The approach used to classify the satellite data into different land cover types was implemented and refined over the course of the following decade, with version 2.0 being released in 2001.

DATA RELIABILITY AND CAUTIONARY NOTES:

Following publication of the GLCC database, a number of scientific teams assessed the accuracy of the GLCC's approach by comparing the results with higher-resolution satellite imagery. These teams found that the accuracy of the GLCC's approach was, depending on the assessment approach, in a range from 60 to nearly 80 percent, meaning that the assessment teams' classification of a given area agreed with the GLCC's classification between 60 and 80 percent of the time.

Given the relatively high level of potential for misclassification, the area of land in each classification should be treated as estimated rather than an exact interpretation of the earth's surface.

SOURCES

Loveland, T.R., Reed, B.C., J.F., Brown, J.F., Ohlen, D.O., Zhu, Z., Yang, L. Merchant. J. 2000. *Global Land Cover Characteristics Database (GLCCD) Version 2.0*. Available online at: http://edcdaac.usgs.gov/glcc/globdoc2_0.html .