AMAZONIA 2016

PROTECTED AREAS
INDIGENOUS TERRITORIES

[deforestation 2000-2015]

RAISG
AMAZONIAN NETWORK OF GEOREFERENCED SOCIO-ENVIRONMENTAL INFORMATION

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Indigenous Territories

areas of traditional ocupation and use
officially recognized

country	category
Bolivia	Indigenous Territory (Territorio Indígena Originario Campesino, registered)
Brasil	Indigenous Land (identified, declared or homologated)
Colombia	Indigenous Reservation (decreed)
Ecuador	Community Land registered or decreed)
Guyana	Amerindian land (decreed)
G. Francaise	Area of Collective Use Right for the Benefit of Local Communities
Perú	Native Communities (demarcated and registered)
	Peasant Communities
Venezuela	Indigenous Land (demarcated communitiy)

areas of traditional ocupation and use
not officially recognized, in process of being demarcated or without status information

country	category
Bolivia	request for registration or in process of registration
Brasil	*not shown on the map*
Ecuador	request for registration or in process of registration
Perú	Native Community in process of registration
Suriname	*without information*
Venezuela	areas of traditional use without demarcation or self-demarcated territory
*	communities registeres or awaiting registration (Perú)

indigenous reservation or "intangible zone"

country	category
Perú	Indigenous Reservation for isolated indigenous people
Ecuador	Zone set aside for voluntarily isolated indigenous people

proposed indigenous reservation
(Perú)

indigenous peoples who are "isolated, un-contacted or in process of establishing contact"
recent sighting or other indication

Natural Protected Areas

indirect use (strict protection)
exploitation of natural resources prohibited

acronym	category[1]	country
ARIE	Area of Special Ecological Importance	Guyane Française
AEC	Conservation Ecological Area	Ecuador
EE	Ecological Station	Brasil
MN	Monument Natural	Brasil, Venezuela, G. Française
PE	State Park	Brasil
PN	National Park	all countries
PNN	National Nature Park	Colombia
RNS	Wildlife Refuge	Brasil
RBi	Biological Reserve	Brasil, Ecuador
REc	Ecological Reserve	Brasil, Ecuador
RF	Forest Reserve	Suriname
RN	National Nature Reserve	Colombia, G. Française, Suriname
RNR	Regional Nature Reserve	Guyane Française
RPF	Fauna Production Reserve	Ecuador
SH	Historical Sanctuary	Perú
SN	National Sanctuary	Perú
SFF	Fauna and Flora Sanctuary	Colombia
SF	Flora Sanctuary	Colombia
SIN	Nature Site	Guyane Française

direct use (sustainable use)
utilization of natural resources permitted

acronym	category [1]	country
ACR	Regional Conservation Area	Perú
MUMA	Multiple Use Management Area	Suriname
APA	Environmental Protection Area	Brasil
APC	Area of Watershed and Biodiversity Protection	Bolivia
ARIE	Area of Special Ecological Importance	Brasil
ANCM	Conservation and Management Natural Area	Bolivia
ANMI	Integrated Management Natural Area	Bolivia
APM	Municipal Protected Area	Bolivia
BP	Protection Forest	Perú
FE	State Forest	Brasil
FN	National Forest	Brasil
EB	Biological Station	Bolivia
MN	Monument Natural	Bolivia
PDyANMI	Departmental Park and ANMI	Bolivia
PNyTI	National Park and Indigenous Territory	Bolivia
PNR	Regional Nature Park	Guyane Française
PR	Regional Park	Bolivia
RVS	Wildlife Reserve	Bolivia
RBF	Forest Biological Reserve	Guyane Française
RCEA	Ecological and Archaeological Scientific Reserve	Bolivia
RC	Community Reserve	Perú
RDS	Sustainable Development Reserve	Brasil
RByTI	Biosphere Reserve and Indigenous Territory	Bolivia
RVS	Wildlife Reserve	Bolivia
REx	Extractive Reserve	Brasil
RM	Municipal Reserve	Bolivia
RN	National Reserve	Bolivia, Perú
RNFA	National reserve of Andean Fauna	Bolivia
SVS	Wildlife Sanctuary	Bolivia

direct/indirect use
direct/indirect use

acronym	category	country
BP	Protective Forest	Ecuador
PNyANMI	Nacional Park and Integrated Management Natural Area	Bolivia

transitional categories
can be changed to other categories

acronym	category	country
AME	Special Management Area	Colombia
RF	Reserva Forestal (Ley 2a. de 1959)	Colombia
ZR	Zona Reservada	Perú

Notes:
1. In the toponyms, the Protected Areas are labelled (D), (M) or (R) to indicate State, Municipal or Regional respectively.
National Protected Areas are not indicated, nor those where this information is explicit in the category.
2. Because of scale, not all areas can be identified by name.
3. Data sources overleaf.

Deforestation in the Amazonia

source: RAISG, 2016

- cumulative until 2000
- 2010-2015 period
- non-forest natural ecosystem

Otras fuentes de referencia sobre deforestación o áreas antrópicas

sources:
- Savannah ad Pantanal in Brasil: CSR/Ibama/MMA, 2012, situation in 2011
- Amazonia inBrasil: Prodes, INPE, 2016, situation in 2015 (for areas not mapped by RAISG)
- Anthropic Areas in Perú: Cobertura Vegetal del Perú del 2015, MINAM
- Anthropic Areas in Ecuador: Cobertura y Uso de la Tierra 2014, MAE-MAGAP
- Deforestation in Bolivia: before 2000, Killeen et al, 2007; Deforestación 2000-2013: FAN, 2016

Symbols

Reference boundaries
- international
- departmental/state/provincial
- limit in dispute/litigation

Roads
- paved
- unpaved (or without information on floor)

Rivers
- main river
- lake

Cities
- national capital
- departmental/state/provincial capital
- main city
- reference locality

Amazon boundaries
- utilized by RAISG: biogeographic + administrative region (Brasil and Ecuador)
- biogeographic
- hydrographic basin

The cartographic data used have been obtained from multiple sources as described overleaf.

Geographic coordinates, SIRGAS 2000

Scale 1:5,000,000

0 50 100 200 300 400 km

Map prepared in March 2017

A AMAZONIAN NETWORK OF GEOREFERENCED SOCIO-ENVIRONMENTAL INFORMATION (RAISG)

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AMAZONIA 2016

PROTECTED AREAS AND INDIGENOUS LANDS

The **Amazonia 2016** map published by RAISG (Amazon Georeferenced Socio-environmental Information Network) provides information on Protected Natural Areas (ANPs), Indigenous Lands (TIs) and deforestation.

The main purpose of this publication is to contribute to overcoming fragmented perspectives and to promote integrated regional, national and international initiatives and processes that contribute to the consolidation of protected areas and indigenous territories (45.2% of the region) as an important part of the conservation and sustainable use of Amazonian ecosystems. This publication is the result of an ongoing collaboration by civil society organizations in the Amazonian countries, who seek to systematize, improve and integrate their databases in order to construct an integrated perspective on the Amazon.

The work has developed around a common agenda for thematic analysis and the development of shared and decentralized information management protocols. It is a continuous exercise that resembles a real "jigsaw puzzle".

It is important to emphasize that in order to develop a compatible cartographic representation for the different countries, the specificities of each needed to be considered, so as to arrive at common categories. Similarly, international boundaries were adjusted around a common base to avoid information gaps or overlaps. In the case of protected natural areas, information was classified in accordance with a common attribute, the use category, while indigenous territories were classified both according to specific national categories and the existence (or otherwise) of some form of official recognition.

Since 2008, RAISG has prioritized the development of its analysis of deforestation so as to estimate forest loss throughout the region, this being an indicator of the speed of landscape transformation and a key element in the monitoring processes. At the time, existing data were fragmented and provided only partial coverage – even within countries – because they had been generated according to different conceptual and methodological approaches. Other characteristics of the heterogeneous origin of the data were differences in geographical scales, periods, and titles and subheadings. A common analytical framework, known as the RAISG Protocol, was therefore developed, based on standardized concepts and tools. The baseline of the study was the year 2000, on which analysis of the five-year periods 2005-2010 and 2010-2015 in respect of TIs and ANPs was conducted.

Note: RAISG has chosen to retain country names in their national language in all versions of the map.

DEFORESTATION IN THE AMAZON 2000-2015

Forests in the Amazon region continue to decline as a result of deforestation. However, analysis by RAISG reveals that between 2000 and 2015 the rate of deforestation showed a general tendency to decrease.

In the period under analysis, 238,900 km² of original forest cover were lost. Forest loss changed from 113,200 km² in the first five-year period, to 79,900 km² in the second period, and to 45,800 km² in the third. However, this trend is not homogenous across the region. Brasil - with the highest percentage of deforestation in the Amazon – and Bolivia showed a marked declining trend. In contrast, in the Venezuelan Amazon the rate of deforestation increased, almost doubling in the period 2010-2015 compared to 2005-2010. In the remaining countries of the region there is no clear trend; however, deforestation increased in the second five-year period and declined in the third period (Table 1), except for Guyane Française.

In the case of indigenous territories, deforestation shows a trend similar to that observed across Amazonia as a whole. Results for five-year periods show that deforestation decreased from 9,195 km² in the first period to 9,109 km² in the second, and to 6,586 km² in the third. An analysis by category of indigenous territory shows a lack of homogeneity in the trend, revealing that deforestation has increased in indigenous territories without official recognition and has declined in those officially recognized (Table 2). At the country level, in Brasil, Colombia and Ecuador, deforestation has tended to decline, while in Guyane Française and Venezuela it is on the rise. In the remaining countries, the trend is not homogeneous, with ups and downs in the five-year periods analysed.

In Protected Natural Areas (ANPs) there was also a decrease in deforestation during the last two five-year periods, both in direct use and in indirect use areas. However, it should be noted that in sub-national direct use ANPs and in national transitional use ANPs, deforestation increased in the second five-year period and decreased in the third. In the case of national indirect use ANPs, the rate of deforestation was reduced by about 25% over the three periods studied.

Finally, it should be noted that 83% of deforestation in the Amazon during the period 2000 to 2015 was concentrated in the areas outside TIs and ANPs, recalling that, in 2000, these areas contained the smaller proportion of the region´s forests (just 43%). However, it is this unit of analysis which shows the most marked fall in deforestation between the first and the third five-year periods (respectively 97,519 km², 64,965 km², and 35,250 km²), and it is this that has determined the downward trend of deforestation in the region, given the sizeable proportion of the loss that it represents. Much of this reduction in deforestation outside TIs and ANPs has occurred in Brasil, the country which accounts for 64% of the Amazon.

It needs to be pointed out that the TI and ANP layer considered in the analysis covering the whole period includes new areas resulting from revisions made during the period. These revisions have resulted in new figures for TIs and ANPs for the period 2000-2010, compared with those previously published in 2015.

Table 1. Deforestation in Amazon countries (km²)

Countries	Surface of original forest cover	Cumulative deforestation until 2000	Deforestation rate		
			2000-2005	2005-2010	2010-2015
Bolivia	323,474	13,552	4,615	3,735	3,035
Brasil	3,552,125	463,620	94,989	58,767	29,627
Colombia	456,607	32,612	3,445	6,092	3,360
Ecuador	96,073	9,020	1,054	1,090	957
Guyana	192,405	3,097	785	821	303
Guyane Française	83,195	1,539	295	257	340
Perú	763,951	58,069	6,919	7,371	5,167
Suriname	150,254	5,664	194	263	231
Venezuela	394,116	9,852	889	1,523	2,781
total Amazonia	**6,012.201**	**597,024**	**113,186**	**79,918**	**45,802**

Figure 1. Deforestation in the Amazon, by country and five-year period (%)

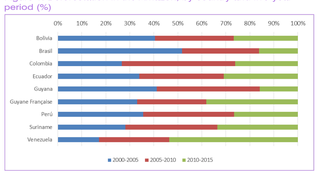


Figure 2. Distribution of estimated original forest cover and deforestation in the period 2000-2015, inside and outside of Amazon PNAs and ITs

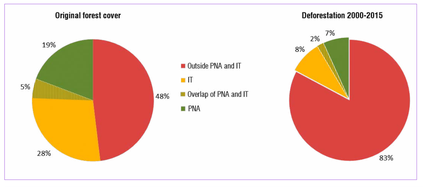


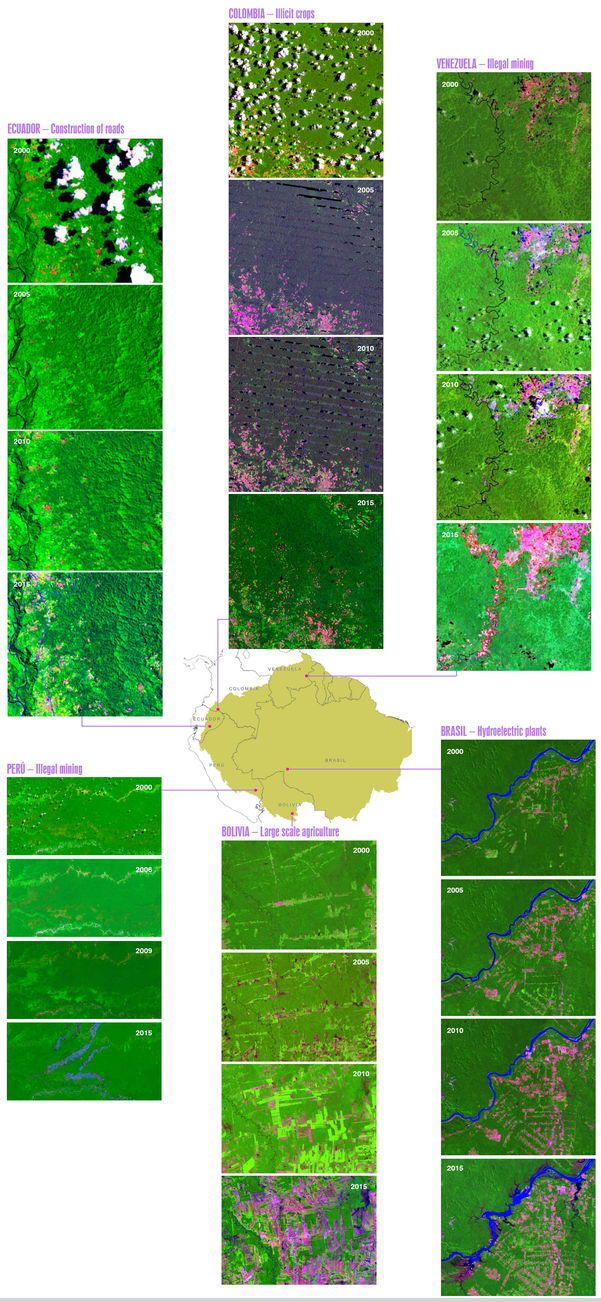
Table 2. Amazon deforestation by period (km²)

Unit	Surface of original forest cover	Cumulative deforestation until 2000	Deforestation rate		
			2000-2005	2005-2010	2010-2015
Outside PNA and IT	2,890,221	550,015	97,519	64,965	35,250
Indigenous Territories	1,965,284	31,141	9,195	9,109	6,586
IT not officially recognized	355,301	6,391	976	1,250	1,501
Proposed Indigenous Reservation	41,265	354	16	32	28
Territorial Reservation	30,569	199	47	35	12
IT officialy recognizede	1,538,149	24,196	8,156	7,792	5,045
Protected Natural Areas	1,466,120	20,431	7,888	7,086	5,468
State/departamental-direct use	296,876	2,190	1,482	1,581	1,349
State/departamental-indirect use	104,025	607	453	200	300
National-direct use	369,410	6,875	2,561	2,376	1,686
National-indirect use	652,374	6,153	2,903	2,165	1,661
National-direct and indirect use	4,087	16	1	11	3
National-transitional use	39,349	4,589	487	754	469

Causes of deforestation in the region

The main causes of deforestation in the Amazon region continue to be mechanized agriculture, small-scale agriculture and livestock. Agriculture shows up as the direct cause in almost all countries. In Perú, Guyana, Guyane Française, Suriname and Venezuela mining (legal and illegal) is also revealed as a direct cause. Deforestation for illicit crops should also be added to the list in the case of Colombia. In the case of Brasil, the construction of hydroelectric plants has caused deforestation in the extensive areas flooded by dams.

The construction and expansion of roads, mainly rural roads and highways, which favour the establishment or creation of new settlements, needs to be included among the current direct causes of deforestation in the region. In countries such as Ecuador and Perú, these are expected to be important contributors to forest loss in the coming years.



Amazonia and human population

	Bolivia		Brasil		Colombia		Ecuador		Guyana		Guyane Française		Perú		Suriname		Venezuela		total Amazonia	
Total population of the country (nº of inhabitants)	10,027,262		190,755,799		48,747,632		16,595,399		751,000		208,171		31,151,643		492,829		27,227,930			
Amazon population (nº of inhabitants)	1,476,539	14.7%	23,654,336	12.4%	1,954,096	4.0%	846,365	5.1%	751,000	100.0%	208,171	100.0%	4,362,450	14.0%	492,829	100.0%	1,725.120	6.3%	35,470.906	
Total area of the country (km²)	1,098,581		8,514.876		1,141.748		248,542		214,969		86,504		1,291.585		163,820		916,445		13,677.070	
Amazon area of the country(km²)	480,341	43.7%	5,008,316	58.8%	483,164	42.3%	116,270	46.8%	214,969	100.0%	86,504	100.0%	782,820	60.6%	163,820	100.0%	453,915	49.5%	7,788.119	56.9%
% **Area Amazonia within the country**	6.2%		64.3%		6.2%		1.5%		2.8%		1.1%		10.1%		2.1%		5.8%			

Protected Natural Areas and Indigenous Territories in Amazonia - calculated on the basis of the political boundaries of Amazonia by country[1] (information on protected areas and indigenous territories updated on june, 2016

Protected Natural Areas in Amazonia (km²)

area by category (km²) deducting areas superimposed on another more restrictive category[2]

	Bolivia		Brasil[3]		Colombia[4]		Ecuador[5]		Guyana		Guyane Française		Perú		Suriname		Venezuela		total Amazonia	
	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazonia total
INDIRECT USE Protection of biodiversity, geological and scenic landscape (aesthetic attributes) appropriate for tourism, education and research. Occupation by traditional populations not permitted, with the exceptions of Bolivia, Ecuador, French Guiana and Brazil.																				
National	39,786	8.3%	344,389	6.9%	94,239	19.5%	33,524	28.8%	6,640	3.1%	23,592	27.3%	92,364	11.8%	20,401	12.5%	170,106	37.5%	825,041	10.6%
State/Departmental			118,347	2.4%			161	0.1%		0.0%	2,618	3.0%		0.0%		0.0%		0.0%	121,125	1.6%
total	**39,786**	**8.3%**	**462,735**	**9.2%**	**94,239**	**19.5%**	**33,684**	**29.0%**	**6,640**	**3.1%**	**26,210**	**30.3%**	**92,364**	**11.8%**	**20,401**	**12.5%**	**170,106**	**37.5%**	**946,166**	**12.1%**
DIRECT USE Resource protection compatible with controlled use in accordance with management plans.																				
National	35,753	7.4%	292,462	5.8%		0.0%		0.0%		0.0%	35,584	41.1%	60,826	7.8%	5,646	3.4%		0.0%	440,347	5.7%
State/Departmental	67,673	14.1%	271,908	5.4%		0.0%		0.0%		0.0%		0.0%	24,993	3.2%		0.0%		0.0%	364,574	4.7%
total	**103,426**	**21.5%**	**564,370**	**11.3%**		**0.0%**	-	**0.0%**		**0.0%**	**35,584**	**41.1%**	**85,819**	**11.0%**	**5,646**	**3.4%**		**0.0%**	**794,845**	**10.2%**
TRANSITIONAL USE Reserved forest area that may or may not be converted into protected area or concession as a result of further study.																				
National		0.0%		0.0%	373,490	77.3%		0.0%		0.0%		0.0%	13,684	1.7%		0.0%		0.0%	387,174	5.0%
State/Departmental		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	0	0.0%
total		**0.0%**		**0.0%**	**373,490**	**77.3%**		**0.0%**		**0.0%**		**0.0%**	**13,684**	**1.7%**		**0.0%**		**0.0%**	**387,174**	**0.0%**
DIRECT/INDIRECT USE Areas of double categories.																				
National	434	0.1%		0.0%		0.0%	10,076	8.7%	3,717	1.7%		0.0%		0.0%		0.0%		0.0%	14,227	0.2%
State/Departmental		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	0	0.0%
total	**434**	**0.1%**		0.0%		0.0%	10,076	8.7%	**3,717**	**1.7%**		0.0%		0.0%		0.0%		0.0%	14,227	**0.2%**
total for Amazonia/country	**143,646**	**29.9%**	1,027.105	**20.5%**	**94,239**	**19.5%**	**43,760**	**37.6%**	**10,357**	**4.8%**	**61,794**	**71.4%**	**191,867**	**24.5%**	**26,047**	**15.9%**	**170,106**	**37.5%**	1,768.922	**22.7%**

Indigenous Territories in Amazonia (km²)[6]

area (km²)

	Bolivia		Brasil		Colombia		Ecuador[7]		Guyana		Guyane Française		Perú		Suriname		Venezuela		total Amazonia	
	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazonia total
IT officialy recognized	88,961	18.5%	1,156.483	23.1%	262,957	54.4%	44,510	38.3%	31,671	14.7%	7,068	8.2%	142,394	18.2%	ND		11,865	2.6%	1,745.909	22.4%
IT not officially recognized	40,821	8.5%		0.0%		0.0%	8,804	7.6%		0.0%		0.0%	11,447	1.5%	ND		312,967	68.9%	374,039	4.8%
Territorial Reservation		0.0%		0.0%		0.0%	11,876	10.2%		0.0%		0.0%	29,132	3.7%				0.0%	41,008	0.5%
Proposed Territorial Reservation		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	42,170	5.4%				0.0%	42,170	0.5%
total for Amazonia/country	**129,782**	**27.0%**	1,156.483	**23.1%**	**262,957**	**54.4%**	**65,190**	**56.1%**	**31,671**	**14.7%**	**7,068**	**8.2%**	**225,143**	**28.8%**	**ND**	**0.0%**	**324,832**	**71.6%**	2,203.126	**28.3%**

Protected Natural Areas and Indigenous Territories in Amazonia (km²) - Summary

	Bolivia		Brasil		Colombia		Ecuador		Guyana		Guyane Française		Perú		Suriname		Venezuela		total Amazonia	
	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazon region of the country	area	% of the Amazonia total
Protected Natural Areas	143,646	29.9%	1,027.105	20.5%	94,239	19.5%	43,760	37.6%	10,357	4.8%	61,794	71.4%	191,867	24.5%	26,047	15.9%	170,106	37.5%	1,768.922	22.7%
Indigenous Territories	129,782	27.0%	1,156.483	23.1%	262,957	54.4%	65,190	56.1%	31,671	14.7%	7,068	8.2%	225,143	28.8%	ND		324,832	71.6%	2,203.126	28.3%
Overlap between PNA and IT	47,002	9.8%	101,662	2.0%	31,765	6.6%	19,470	16.7%	997	0.5%	6,289	7.3%	32,125	4.1%	ND		166,641	36.7%	405,951	5.2%
Areas with no overlap	**226,426**	**47.1%**	**2,081,926**	**41.6%**	**325,431**	**67.4%**	**89,480**	**77.0%**	**41,031**	**19.1%**	**62,573**	**72.3%**	**384,885**	**49.2%**	**26,047**	**15.9%**	**328,297**	**72.3%**	3,566.097	**45.8%**

[1] The total length of the Amazon refers to: the biogeographical boundary of Bolivia, Colombia, Ecuador and Venezuela, the regional boundary in Ecuador (RAE) and Brazil (Amazon) and the whole countries Guyana, Guyane Française and Suriname. The length of PNA and IT that are partially within the Amazon were calculated by excluding the areas that are not part of it, while for coastal ANP it was considered only the continental extension. In these cases, the areas were calculated by using the Geographic Information System.
[2] The calculated area excludes overlapping between categories, using the following hierarchical order: national indirect use; state indirect use; national direct use; state direct use; national direct/indirect use; transitory use. The calculations in this section of table do not exclude overlaps with indigenous lands.
[3] The calculations for PNA in Brasil do not include areas from the APA (Environmental Protection Area) category.
[4] The figure for the Forestry Reserve, assigned to transitory use, does not refer to the original area but to the current area, including subtractions made to the reserve after its creation. It is not included in the total for PNAs in Colombia.
[5] The Protection Forest, included in the direct use areas, do not form part of Ecuador's National System of Protected Areas (SNAP).
[6] The calculated area in this section of the table does not exclude overlaps with PNA.
[7] The total area of IT excludes overlap of the Intangible Zones in other ITs (100% of the ZI).

CHANGES IN CARTOGRAPHIC INFORMATION ON TIs AND ANPs IN AMAZONIA: 2015-2016

In preparing this document, updated data for TIs and ANPs were used to calculate deforestation rates for the three five-year periods evaluated (2000-2015). The data for the previous periods differ from the results published by RAISG in 2015 as a result of the incorporation of new TI and ANP areas updated for each country to August 2016.

BOLIVIA: In this period, there have been no recorded changes to protected natural areas of Bolivia. However, we have included in our database the departmental ANP "Reserva Silvestre de los Rios Tahuamanu y Orthon", with an area of 522 km², created in 2013 and announced in late 2015.

Regarding indigenous territories, there are changes to the titled (officially recognized) area, due to the titling of small polygons in the TI Baure. On the other hand, adjustments were made to the classification of titling in several small polygons of different TIs on the basis of updated official information of the National Institute of Agrarian Reform (October 2015).

It should be noted that the present analysis uses a different geographical projection from the one used previously for the calculation of areas. As a result, the areas calculated here for both ANPs and TIs vary by almost 1% from those recorded in previous publications.

BRASIL: Analysis for Brasil includes four new TIs, with a total area of 35,859 km² (Kaxuyana-Tunayana, Jurubaxi-Téa, Sawré Muybu and Cobra Grande). The perimeters of these areas were identified by Funai.

Four new ANPs are included among national ANPs (Manicoré Biological Reserve, Acari National Park, and the Urupadi and Aripuanã National Forests), totalling 25,542 km². An Environmental Protection Area (APA Campos de Manicoré) was also created, however this category is not considered in the analysis. As for state level ANPs, the inclusion of two new areas (Tabuleiro do Embaubal Wildlife Reserve and Vitória de Souzel Sustainable Development Reserve), totalling 273 km² were recorded. In addition, the boundaries of the Rio Gregório Extractive Reserve were extended by 1,181 km².

COLOMBIA: Coverage of indirect use protected natural areas (ANPs) in Colombia does not reveal any significant change with respect to the previous publication. However, the polygon of the Special Management Area of the Macarena has been included because of its importance in the context of the Colombian Amazon, since it houses three natural parks (Sierra de la Macarena, Tinigua and Cordillera de los Picachos), as well as providing connectivity between the Andean and Amazonian ecosystems.

For indigenous territories (TIs), the main change is the expansion by 4,420 km² of the large Resguardo Vaupes, which now totals 39,158 km². In addition, four resguardos located in the Amazon foothills were included. There have also been relocations and changes in the areas of several *resguardos*, mainly in the departments of Nariño, Putumayo and Caquetá.

ECUADOR: Coverage of indigenous territories in the Ecuadorian Amazon has not seen significant changes. However, the legal recognition categories of several TIs were amended by official initiatives, including the Land Access and Mass Legalization project and the Socio Bosque Programme. These changes correspond mainly to the TI of the Shuar and represent less than 1% of the total TI area in Ecuador.

In the case of protected natural areas, the analysis of the latest period involves some minor adjustments, such as the inclusion of the national Colonso Chalupas Biological Reserve of 932 km², which almost entirely replaced a Protection Forest (BP) area. Other changes to BPs were the inclusion of the 6-Napo and Cuenca del Rio Paute areas, of 477 km² and 362 km² respectively, and the boundary changes to some existing areas, notably in the BP Subcuencas Altas de los Rios Antisana, Tambo, Tamboyacu y Pita, whose area was increased by 241 km².

The category of Protection Forests has been corrected for direct/indirect use, since BPs have conservation as their main purpose, but sustainable use is permitted within them.

PERÚ: Between 2015 and 2016 a significant change occurred in the category of national protected natural areas: the categorization as a national park of 95% of the Zona Reservada Sierra del Divisor. As regards regional ANPs, the Maijuna Kichwa Regional Conservation Area (ACR) was created in the Loreto region.

In the indigenous territories category, the area of the proposed Reserva Indígena Napo Tigre was increased by 2,660 km². On the other hand, the area of the proposed Reserva Indígena Cacataibo Sur suffered a reduction of more than 160 km², losing 35.6% of the area initially proposed. In the period analysed only two native communities, in the Ucayali region, received title according to information from SICNA (IBC). Another new feature is the incorporation of the cartographic base of the Peasant Communities of the Peruvian Amazon, with approximately 200 records. These changes have resulted in an increase of 19,985 km² in the TI area of the Peruvian Amazon compared to the previous total.

VENEZUELA: There have been no legal changes to ANPs and TIs in the Venezuelan Amazon since 2013. However, in the 2015 map some TIs without official recognition were mistakenly categorized as officially recognised TIs. This has been corrected in the present version of the map as well as in the calculation of the deforestation rates.

GUYANA, GUYANE FRANÇAISE AND SURINAME: RAISG has received no information about changes to the TI and ANP layer of these countries for the period 2013 to 2015.

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METHODOLOGY OF THE ANALYSIS OF DEFORESTATION IN THE AMAZON

The analysis of deforestation in the period 2000-2013 was carried out in accordance with the methodological protocol developed by RAISG member institutions. This protocol is based on ImgTools software, created by Imazon, which enables processing of Landsat 5, 7 and 8 satellite images. ImgTools is software written in the IDL (*Interactive Data Language*) programming language, which processes Landsat images using an NDFI (Normalized Difference Fraction Index) spectral mixture model and performs classification by means of decision trees. Satellite images with the lowest possible percentage of cloud cover are acquired from USGS (*US Geological Survey*) servers.

For the analysis of the period 2013-2015, the methodological protocol migrated to the *Google Earth Engine* (GEE) platform, a Google service that offers a large collection of Landsat satellite images at various levels of processing. The new protocol demanded an interface in the GEE platform for the development of codes that would make it robust enough for the construction of a large library of algorithms for processing satellite images. The updated methodological protocol allows processing of all images in a "Google Cloud Computer" computer cloud, which eliminates the need for downloading huge amounts of data. The images used are at the L1T level of geometric correction, which allows the use of several images from the same region to compose a temporal mosaic and reduce the areas with cloud presence. The protocol also includes auxiliary layers such as elevation, which is incorporated mainly to facilitate the differentiation between deforested areas and shadows generated by the relief, which frequently occurred with the previous method and required more time and effort in editing the classification.

With regard to Brasil, analysis of the period 2013-2015 combines information processed with ImgTools and the GEE platform. This is because there was considerable progress in analysing deforestation with ImgTools for this country when migrating to GEE. It is important to note that these are not two different methodologies, but rather that both protocols are based on the same processing method and image classification, although GEE is higher version, which is why migration to this platform has meant a breakthrough for RAISG.

Note on Estimated Original Forest Cover: The original forest cover information estimated in the 2015 RAISG study ("Deforestation in the Amazon 1970-2013") was made for each country based on the RAISG Amazonian boundary, from which were subtracted areas of bodies of water and areas classified as "non-forest" for the year 2000, according to the RAISG methodology. Now the estimated original forest cover has been obtained from the "forest" class resulting from the classification made by each country for the year 2000, following the RAISG methodology and generating a mosaic for the whole Amazon region.

Technical Note

Deforestation rates for the periods 2000-2005 and 2005-2010 have been recalculated after the publication in 2015 of the RAISG study "Deforestation in the Amazon (1970-2013)". This calculation was made according to the cartographic base of TIs and ANPs updated to August 2016. Additionally, the classifications have been reviewed by the technical team and readjusted in some cases to obtain more precise results. Below are the main reasons for the differences found, by country.

Brasil: In reviewing the periods 2000-2005 and 2005-2010 changes were introduced for the state of Mato Grosso, where the baseline used to calculate the deforestation rate was adjusted in accordance with the Prodes deforestation data for 2000. Previously, the baseline for this state comprised information from a series of images ranging from 1984 to 2000. Prodes data were used in other states and throughout the Brazilian Amazon to generate the 2000 baseline on which the deforestation rate is calculated. In addition, this version corrected some areas of the state of Pará that were previously recorded as deforested and are now listed as areas of forest degraded by burning or high impact logging.

Colombia: Data from the Colombian Amazon were recalculated for the previous periods and may vary from the previous publication. For this, the collected data processed for the latest period of analysis (2013-2015) was revised and the algorithm for estimating rates was corrected by adjusting the data.

Ecuador: deforestation figures for the Ecuadorian Amazon are higher in the present publication than previously published. This is because information from one of the areas of highest deforestation in the region had previously been omitted because of an error in reading the recorded images for units of analysis covering an area of 15,000 km². The incorporation of this information in the present analysis permits a more accurate view of the process of forest loss that occurred in the country between 2000 and 2015. After the finalization of this analysis of deforestation, the classification of Protection Forests was corrected to that of direct/indirect use.

Perú: deforestation figures for the periods 2000-2005 and 2005-2010 given in the present publication vary with respect to those contained in previous publications. This is because previous analysis omitted information from an area of approximately 500 km² deforested during the 2000-2010 period. The recalculation of the rate of deforestation has rectified this error.

RAISG

The AMAZON GEO-REFERENCED SOCIO-ENVIRONMENTAL INFORMATION NETWORK is a space for the exchange and networking of GIS-based socio-environmental information in support of processes that actively link collective rights to the promotion and sustainability of the socio-environmental diversity of the Amazon region.

RAISG produces the most comprehensive socio-environmental intelligence reports on Amazonia so that the region can be better understood, appreciated and looked after.

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