

Situation of Malaria in the Region of the Americas, 2000-2012¹



**Pan American
Health
Organization**



**World Health
Organization**

REGIONAL OFFICE FOR THE **Americas**

¹ Document prepared by the Regional Malaria Program, Pan American Health Organization with data from Annual Country Report- 2013

Malaria in the Region of the Americas

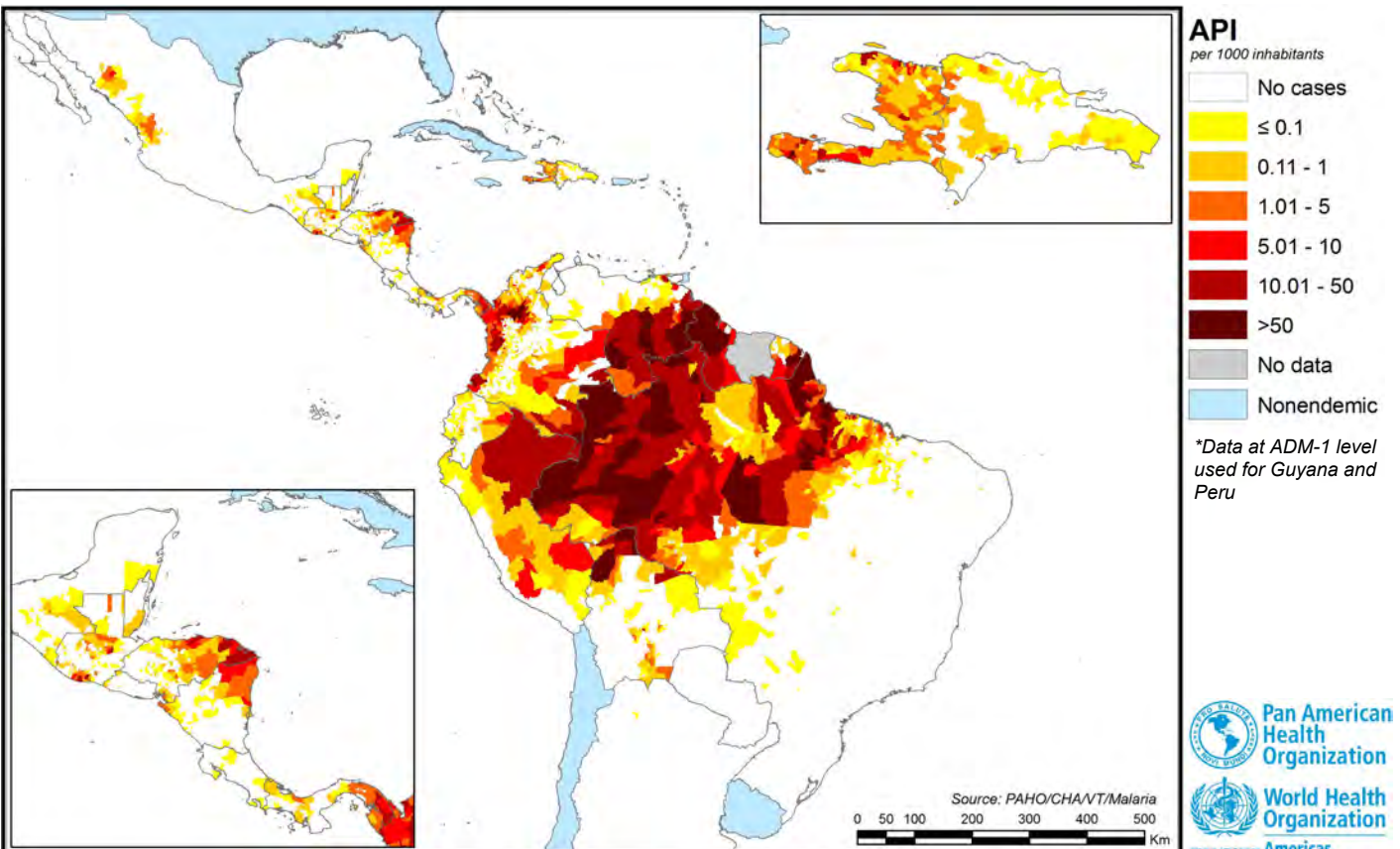
Following the trend in 2011, malaria continued to decrease in 2012 after having increased in 2010 and 2009. Compared to the previous year, there was a 5% decline in 2012, less than the 27% observed in 2011. Since 2000, the Region of the Americas has decreased malaria morbidity by 60%. This decrease has been slightly greater in *Plasmodium falciparum* and mixed infections (62%) than in *P. vivax* infections (60%). Of the 21 malaria endemic countries in the region, 13 have already reached the Millennium Development Goal (MDG)-6 of 75% reduction in malaria morbidity by the year 2015 compared to the year 2000. Another 5 countries are on the way of meeting their MDG goal in the coming years. However three countries have shown increase in the number of cases in the same period. Mortality has shown a similar trend with 108 deaths due to malaria reported in the year 2012, a 72% reduction since 2000.

In all 469,378 cases of malaria were reported in 2012, with Guyana, Nicaragua, Panama, Peru and Venezuela reporting an increase in 2012 compared to 2011. Malaria has been increasing in Guyana and Venezuela since 2009, primarily associated with increased activity in gold mining areas in both countries. In Panama the increase is limited to the Darien province and to La Moskitia area in Nicaragua. Both these areas have high proportion of indigenous people, and are border areas with limited geographical and cultural accessibility. In Peru, especially in Loreto, malaria almost doubled from 11,793 cases in 2011 to 23,266 in 2012, reaching levels similar to those reported in 2008 and 2009. Decreased malaria control activities, the need of which was further increased by floods in the province in the first months of 2012, could have been the reason for this increase. A slight increase in 2012 was also noted in Bolivia.

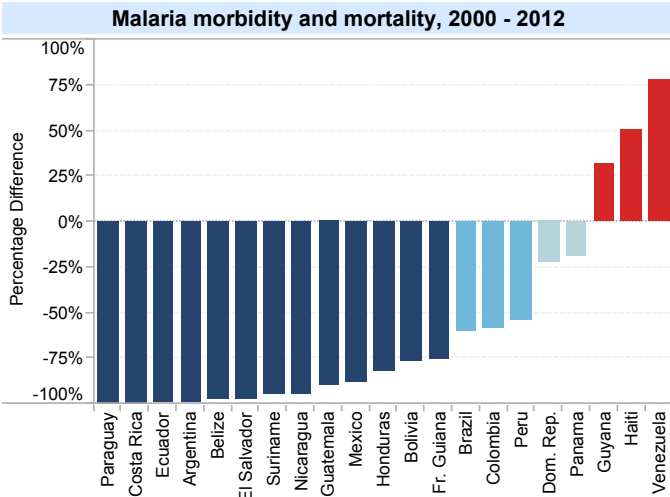
Six countries were in pre-elimination phase in 2012, namely Argentina, Costa Rica, El Salvador, Ecuador, Mexico and Paraguay. Belize has also been added to this list in 2013. Argentina and Paraguay reported zero (0) autochthonous cases in 2012. Costa Rica reported only 8 cases of which 1 was imported and 1 was due to parenteral transmission. Worryingly 3 of these autochthonous cases were due to *P. malariae* infections, a species which has not been reported in the country since 1970. This shows that maintaining a high quality microscopy network in eliminating countries is necessary, as also the inclusion of blood banks in routine surveillance. An outbreak due to a relapse case was reported in El Salvador as the person didn't complete the treatment. Adherence to treatment is of prime importance, especially so in countries eliminating malaria and in border-areas adjacent to them, which requires cross-border collaboration.

Indoor residual spraying (IRS) and use of insecticide treated bednets (ITNs) are being implemented in almost all the endemic countries of the Region. Suriname & Haiti don't use IRS for malaria control and Guyana has recently started using it. In 2012, data for IRS activities was not available for French Guiana & Peru. In the rest of the countries, a declining trend in IRS coverage is observable, largely on account of decreasing incidence of malaria and increasing number of areas with low malaria transmission. ITNs as a strategy is not used for malaria control in low risk areas and countries like Argentina, Paraguay, Belize, El Salvador and Panama. Data for ITNs distributed was not available for the years 2011 or 2012 for Peru. Haiti distributed 2 million LLINs in 2012, being the largest quantity distributed by any country in the last decade. This resulted in that for the first time in the Americas, it was reported that a higher number of people were protected by ITNs than by IRS. A declining trend in the use of ITNs was seen in the rest of the countries, especially in Guatemala.

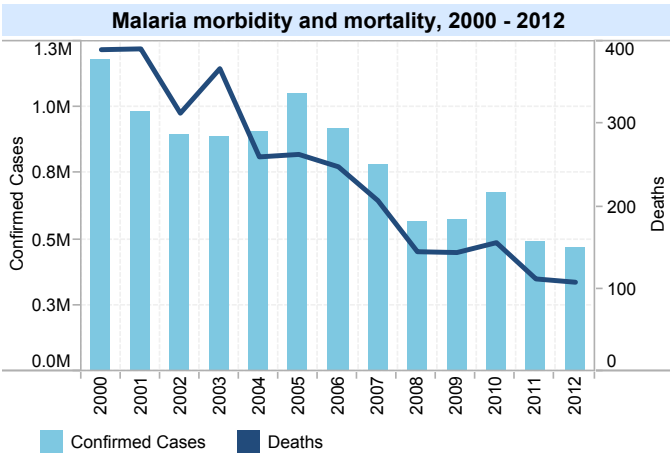
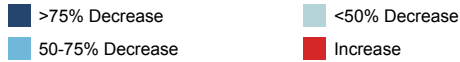
Total funding available for malaria dipped slightly in 2012 at the Regional level, mostly due to decreased funding from external sources. At the Regional level, Government budget for malaria remained near constant; however at the level of countries it declined in Venezuela (60%), Guatemala (48%), Ecuador (41%), Honduras (40%), Bolivia (29%) and Brazil (22%) compared to 2011. Government budget data was not reported by Haiti and Suriname in 2012. It is important to note that among the agencies providing external funding for malaria in the Americas, the Global Fund and the USAID are principal agencies.



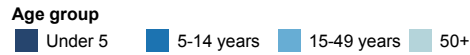
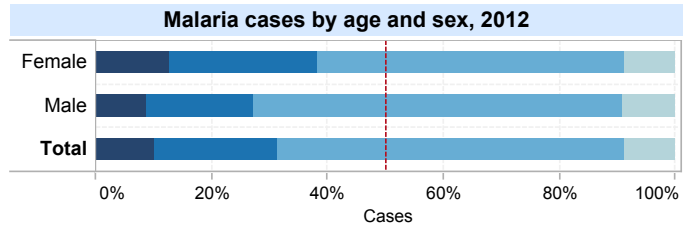
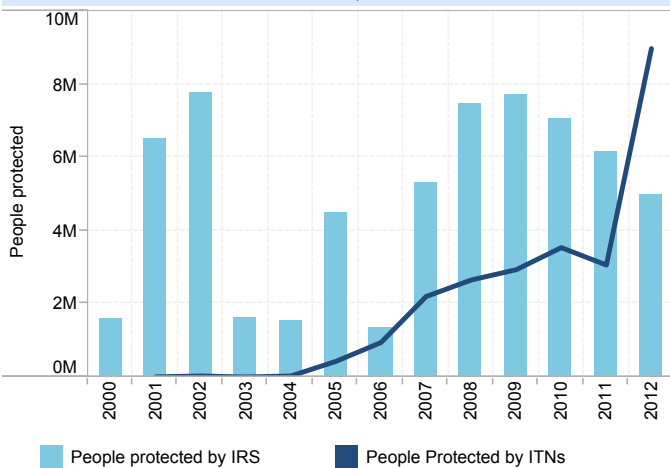
Of the 21 malaria endemic countries in the region, chloroquine with primaquine is used as the first line of therapy for *Plasmodium falciparum* in 9 of these. All of these countries belong to the Central American sub-region, the island of Hispaniola or Mexico, areas where no known resistance to the drug exists. Artemether-Lumafantrine combination is used in nine of the countries while the rest use artesunate-mefloquine as the treatment of choice for *P. falciparum*. Chloroquine and primaquine, with 7 or 14 days of treatment, is used as the first line of treatment for *P. vivax* in all the countries of the Region.



Dom. Rep. - Dominican Republic
Fr. Guiana - French Guiana



People protected by indoor residual spraying and insecticide treated bednets, 2000 - 2012

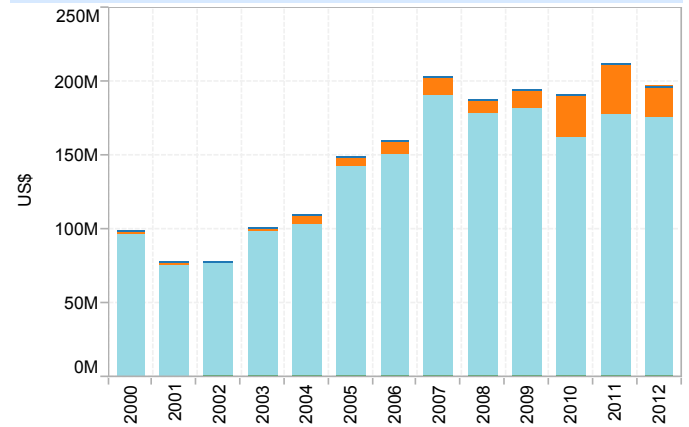


First line of treatment for malaria by species type in the Region of the Americas

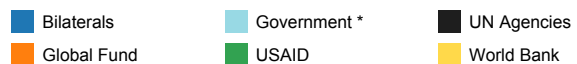
Country	<i>P. falciparum</i>	<i>P. vivax</i>
Argentina	AL	CQ+PQ
Belize	CQ+PQ(1d)	CQ+PQ(14)
Bolivia	AS+MQ+PQ	CQ+PQ(14)
Brazil	AL+PQ; AS+MQ+PQ	CQ+PQ(7); CQ+PQ(14)
Colombia	AL	CQ+PQ(14)
Costa Rica	CQ+PQ(1d)	CQ+PQ(7); CQ+PQ(14)
Dominican Republic	CQ+PQ(3d)	CQ+PQ(14)
Ecuador	AL	CQ+PQ(14)
El Salvador	CQ+PQ(1d)	CQ+PQ(14)
French Guiana	AL; AQ+PG	CQ+PQ
Guatemala	CQ+PQ(3d)	CQ+PQ(14)
Guyana	AL+PQ(1d)	CQ+PQ(14)
Haiti	CQ+PQ(1d)	CQ+PQ(14)
Honduras	CQ+PQ(1d)	CQ+PQ(14)
Mexico	CQ+PQ	CQ+PQ
Nicaragua	CQ+PQ(1d)	CQ+PQ(7)
Panama	AL	CQ+PQ(7); CQ+PQ(14)
Paraguay	AL	CQ+PQ
Peru	AS+MQ	CQ+PQ
Suriname	AL+PQ(1d)	CQ+PQ(14)
Venezuela	AS+MQ+PQ(1d)	CQ+PQ(14)

CQ- Chloroquine PQ- Primaquine MQ- Mefloquine
AS- Artesunate AL- Artemether & Lumefantrine
AQ- Atovaquone PG-Proguanil
For *P. falciparum* (1d) = 45mg of Primaquine in one dose on first day
(3d) = 15 mg of Primaquine per day for 3 days
For *P. vivax* (7) = 30mg of Primaquine per day for 7 days
(14) = 15 mg of Primaquine per day for 14 days

Financing for Malaria control, 2000 - 2012



* Data missing for 2000-12 for Haiti, since 2005 for Suriname, 2006-08 for Venezuela. Data available only for 2006 for French Guiana



Malaria in countries in pre-elimination phase in the Region of the Americas, 2010-2012

Country	Year	Total Cases	Cases Investigated	Imported	Autochthonous P. falciparum	Imported P. falciparum	Imported P. vivax	Active Foci
Argentina	2010	72	72	46	0	0	46	...
	2011	18	18	18	0	0	18	...
	2012	4	4	4	0	0	4	0
Costa Rica	2010	114	114	4	0	2	2	...
	2011	17	17	6	0	4	2	...
	2012	8	8	1	0	0	1	1
Ecuador	2010	1,888	1,888	17	245	13	4	...
	2011	1,233	1,233	14	288	8	6	...
	2012	558	558	14	68	12	2	4
El Salvador	2010	24	24	7	0	2	5	...
	2011	15	15	6	1	2	4	...
	2012	19	19	6	0	3	3	10
Mexico	2010	1,233	1,233	7	0	7	0	...
	2011	1,130	1,130	6	0	6	0	...
	2012	842	842	9	0	9	0	71
Paraguay	2010	27	27	9	0	5	4	...
	2011	10	10	9	1	6	3	...
	2012	15	15	15	0	11	4	15

... No data available

Malaria in countries in control phase in the Region of the Americas, 2010-2012

Country	Year	Total Population at Risk	Slides Examined	Confirmed Cases	P. falciparum and mixed infections	Slide Positivity Rate (x100)	Annual Parasite Index (x1000)
Belize	2010	277,831	27,366	150	1	0.55	0.54
	2011	277,831	22,996	79	1	0.34	0.28
	2012	64,744	20,789	37	1	0.18	0.57
Bolivia	2010	3,283,487	133,463	13,769	808	10.32	4.19
	2011	1,321,178	143,272	7,143	231	4.99	5.41
	2012	5,212,078	121,944	7,415	348	6.08	1.42
Brazil	2010	44,126,491	2,711,432	334,668	51,048	12.34	7.58
	2011	38,163,081	2,476,335	267,146	35,273	10.79	7.00
	2012	23,342,760	2,325,775	242,758	35,379	10.44	10.40
Colombia	2010	10,244,320	521,342	117,650	34,334	22.57	11.48
	2011	10,252,284	396,861	64,436	15,404	16.24	6.29
	2012	9,603,584	346,599	60,179	15,721	17.36	6.27
Dominican Republic	2010	8,464,920	469,052	2,482	2,480	0.53	0.29
	2011	6,663,374	421,405	1,616	1,614	0.38	0.24
	2012	6,787,117	415,808	952	950	0.23	0.14
French Guiana	2010	231,151	14,373	1,608	604	4.96	6.96
	2011	209,823	14,429	1,209	376	3.50	5.76
	2012	138,870	13,638	900	264	6.60	6.48
Guatemala	2010	6,539,604	235,075	7,198	35	3.06	1.10
	2011	5,883,321	195,080	6,817	67	3.49	1.16
	2012	6,057,530	186,645	5,346	68	2.86	0.88
Guyana	2010	698,795	212,863	22,935	14,401	10.77	32.82
	2011	698,795	201,693	29,471	20,309	14.61	42.17
	2012	698,795	196,622	31,601	20,293	16.07	45.22
Haiti	2010	9,923,243	270,427	84,153	84,153	31.12	8.48
	2011	9,928,243	180,227	32,969	32,969	18.29	3.32
	2012	9,372,365	161,236	25,423	25,423	15.77	2.71
Honduras	2010	5,768,357	148,243	9,685	985	6.53	1.68
	2011	5,690,024	151,785	7,615	605	5.02	1.34
	2012	5,478,118	137,165	6,434	581	4.69	1.17
Nicaragua	2010	2,925,874	535,914	692	154	0.13	0.24
	2011	2,575,374	521,904	925	150	0.18	0.36
	2012	3,198,774	536,278	1,235	236	0.23	0.39
Panama	2010	2,649,531	141,038	418	20	0.30	0.16
	2011	1,624,216	116,588	354	1	0.30	0.22
	2012	2,402,289	107,711	844	1	0.78	0.35
Peru	2010	6,134,666	744,627	31,545	2,374	4.24	5.14
	2011	4,499,236	702,894	24,989	3,018	3.56	5.55
	2012	14,900,322	758,723	31,436	3,399	4.14	2.11
Suriname	2010	78,400	16,533	1,771	721	10.71	22.59
	2011	63,351	15,135	795	331	5.25	12.55
	2012	80,000	17,464	569	126	3.26	7.11
Venezuela	2010	5,398,659	400,495	45,155	12,385	11.27	8.36
	2011	5,705,160	382,303	45,824	11,167	11.99	8.03
	2012	5,689,293	410,663	52,803	13,302	12.86	9.28

* Belize was classified as being in control phase in 2012, although from 2013 it is considered to be in pre-elimination phase.

Trend in districts (ADM-2) with highest malaria burden in the Region of the Americas, 2010-2012

Sifontes in Venezuela alone reported more than 31000 cases in 2012, and mirrors the increasing malaria trend shown by the country in the last few years. Adjoining district in Guyana, Mobilissa/La Reconnaissance has shown a similar increasing trend. Malaria incidence in other high burden districts in the Amazonas region has also increased in 2012, especially those in the Amazonas state of Brazil. However, Manaus, which used to be the district with the highest burden in the Americas, has reduced malaria significantly in the past few years. A similar trend is seen in El Bagre in Colombia. Data for Peru was partially available at district level. Districts of Loreto have reported an increase in cases compared to 2010, especially those of the province Maynas.

In Mesoamerica, Trujillo of Honduras reported an increase in malaria in 2012 due to an outbreak consequent to social unrest. Increase was also seen in the two highest burden districts of Guatemala, namely La Gomera and Panzos, probably on account of increased and better surveillance. On the other hand a reduction was observed in most districts of the La Moskitia region bordering Honduras and Nicaragua, especially Puerto Lempira in Honduras and Waspan in Nicaragua.

In the Island of Hispaniola, the 25 most high burden districts were all in Haiti. The most number of cases reported in Dominican Republic in 2012 were from Dajabon (99 cases), a border district where the majority of the cases confirmed are imported from Haiti. Although Port de Paix in the north of Haiti reported the most cases in 2012, it is primarily because of a major public hospital that exists in the district/commune. Weaknesses in the malaria surveillance system in Haiti have prevented in pinpointing the actual distribution of malaria incidence in the country.

Change from previous year

■ Decrease ■ Increase ■ No data

Island of Hispaniola

District	Country	2012	2011
Port De Paix	Haiti	2,769	1,182
Delmas	Haiti	1,700	642
Petit Goave	Haiti	1,405	1,050
Chardonnières	Haiti	1,241	1,976
Cavaillon	Haiti	1,079	1,044
Carrefour	Haiti	847	134
Croix-Des-Bouquets	Haiti	703	184
Aquin	Haiti	678	882
Saint-Marc	Haiti	648	305
Port-au-Prince	Haiti	641	296
Jeremie	Haiti	503	996
La Chapelle	Haiti	397	486
Corail	Haiti	388	266
Plaine du Nord	Haiti	370	453
Petion-Ville	Haiti	365	321
Port Margot	Haiti	360	640
St. Louis du Sud	Haiti	307	963
Les Cayes	Haiti	279	332
Gonaives	Haiti	258	111
Torbeck	Haiti	257	384
Miragoane	Haiti	256	341
Les Anglais	Haiti	234	710
Cerca La Source	Haiti	230	
Verrettes	Haiti	220	222
Bas Limbe	Haiti	206	207

* Data at Commune levels used for Haiti

Amazonas

District	Country	2012	2011	2010
Sifontes	Venezuela	31,396	28,143	21,342
Anajas	Brazil	19,323	13,530	22,811
Cruzeiro do Sul	Brazil	16,055	10,842	22,198
Porto Velho	Brazil	15,570	15,915	23,261
Itaituba	Brazil	14,179	7,711	10,432
Mobilissa/La R**	Guyana	12,067	10,942	7,894
Manaus	Brazil	9,768	14,649	17,900
Eirunepe	Brazil	9,269	3,166	3,734
El Bagre	Colombia	6,570	7,549	14,894
Atalaia do Norte	Brazil	5,723	2,121	3,538
Oeiras do Para	Brazil	5,716	12,732	14,581
Mancio Lima	Brazil	5,205	4,182	5,727
Jacareacanga	Brazil	4,912	4,128	7,596
Tabatinga	Brazil	4,438	1,263	2,158
Sao Paulo de O***	Brazil	4,199	639	868
Barima/Amakura	Guyana	4,082	4,350	4,868
Labrea	Brazil	4,068	2,058	1,737
Ipixuna	Brazil	4,067	294	610
Sao Gabriel*	Brazil	4,049	4,901	9,556
Rodrigues Alves	Brazil	3,701	2,887	4,340
San Juan Bautista	Peru	3,612		918
Cedeno	Venezuela	3,604	2,815	4,940
Coari	Brazil	3,027	2,035	3,272
Gran Sabana	Venezuela	2,985	2,086	4,549
Tefe	Brazil	2,956	1,940	2,194

* Sao Gabriel da Cachoeira , ** Mobilissa/La Reconnaissance, ***Sao Paulo de Olivenca
Data at District (ADM2) level not available for 2011 & 2012 for Suriname & partially for Peru

Central America and Mexico

District	Country	2012	2011	2010
Trujillo	Honduras	1,376	947	492
La Gomera	Guatemala	1,231	1,055	1,054
Puerto Lempira	Honduras	870	929	1,437
Panzos	Guatemala	843	391	62
Sonaguera	Honduras	560	284	213
Tocoa	Honduras	513	444	489
Masagua	Guatemala	509	539	149
Santa Lucia*	Guatemala	472	319	199
Tiquisate	Guatemala	459	381	327
Waspan	Nicaragua	336	468	473
Chisec	Guatemala	292	265	241
Juticalpa	Honduras	290	727	1,189
Olanchito	Honduras	279	178	123
Villeda Morales	Honduras	274	329	437
Puerto Cabezas	Nicaragua	253	68	23
Saba	Honduras	244	208	247
Santa Catalina**	Guatemala	243	121	28
Catacamas	Honduras	228	622	1,110
El Viejo	Nicaragua	186	64	40
Pinogana	Panama	173	118	64
Brus Laguna	Honduras	167	496	362
Chepo	Panama	160	58	97
Talanga	Honduras	149	118	16
Roatan	Honduras	149	538	506
Bonanza	Nicaragua	135	23	5

* Santa Lucia Cotzumalguapa

** Santa Catalina La Tinta