



# UNOSAT

## Tropical Cyclone IRMA-17.

### Population exposure analysis in Caribbean

### 7 September 2017 (Update 2)

Population Exposure Analysis

**7 September 2017**

**Geneva, Switzerland**

**UNOSAT Contact:**

Email: [unosat@unitar.org](mailto:unosat@unitar.org)

T: +41 22 767 4020 (UNOSAT Operations)

24/7 hotline: +41 76 411 4998

**Postal Address:**

UNITAR – UNOSAT, IEH  
Chemin des Anémones 11,  
CH-1219, Genève, Suisse



## Overview

IRMA-17 is a category 5 tropical cyclone currently moving forward in the Caribbean to the northwest. Since 06 September 2017 at 00h00UTC, IRMA-17 has been hitting several Caribbean islands such as Antigua and Barbuda, Anguilla, St Kitts and Nevis, The British Virgin Islands and Puerto Rico, all of them located in the 120km/h wind speed zone. As of 7 September 2017, IRMA has maximum sustained winds of 296 km/h and is expected to hit more islands in the following hours, such as Turks and Caicos and The Bahamas, before moving north towards the state of Florida in the United States.

Based on data of the predicted tropical cyclone path, wind speeds from JRC (Warning 33 issued on 7 September 2017 at 09:00 UTC), and population data from WorldPop, UNITAR-UNOSAT conducted a population exposure analysis for the Caribbean, where nearly 2 Million people are living within 120km/h wind speed zone and more than 10 million people are living within wind speed zone of 90 km/h.

Population exposure estimates are based on expected cyclone track (JRC) and WorldPop data (1km resolution)

## Population Exposure in Caribbean



**37,247,000**

Total population of Caribbean (\*)

**21,240,000**

Total population living on **60km/h** wind speed zones

**10,604,000**

Total population living on **90km/h** wind speed zones

**1,930,000**

Total population living on **120km/h** wind speed zones

### Sources:

Cyclone Track: Joint Research Center-GDACs

Administrative Levels: GADM

Spatial Demographic Data: WorldPop (2015)

Analysis: UNITAR-UNOSAT (07/09/2017)

### Note:






(\*) Total population of Caribbean is considering only the following countries and territories: Anguilla, Antigua and Barbuda, Bahamas, British Virgin Islands, Cuba, Dominica, Dominican Republic, Guadeloupe, Saint Martin, Saint Barthelemy, Haiti, Montserrat, Sint Maarten, Saba, Sint Eustatius, Puerto Rico, Saint Kitts and Nevis, Turks and Caicos Islands and United States Virgin Islands. These countries and territories are within the wind speeds zones of 60km/h, 90km/h and 120km/h according to the expected cyclone track released as of 7 September 2017 (09:00 UTC).

The population exposure has been calculated using a 1Km resolution WorldPop dataset. This is a preliminary analysis & has not yet been validated in the field.

## Caribbean Population Exposed to sustained wind speed zones : Tropical Cyclone IRMA-17 (07/09/2017, 09h00 UTC)

Country /Territory	Total population	Wind Speed Zones (WSZ)			Total exposed population	%
		WSZ ≥ 120 km/h	90 km/h ≤ WSZ < 120 km/h	60 km/h ≤ WSZ < 90 km/h		
Puerto Rico	3,651,232	1,538,925	2,112,307		3,651,232	100.00%
Antigua and Barbuda	87,858	87,762	96		87,858	100.00%
United States Virgin Islands	93,173	75,758	17,415		93,173	100.00%
Saint Kitts and Nevis	47,897	47,175	723		47,897	100.00%
Turks and Caicos islands	45,020	45,020			45,020	100.00%
Sint Maarten	39,921	39,921			39,921	100.00%
Saint Martin	32,418	32,418			32,418	100.00%
British Virgin Islands	27,248	27,248			27,248	100.00%
Anguilla	12,316	12,316			12,316	100.00%
Cuba	11,266,280	11,563	2,623,127	7,558,993	10,193,683	90.48%
Saint Barthelemy	5,191	5,191			5,191	100.00%
Bahamas	343,735	3,394	21,545	308,024	332,963	96.87%
Sint Eustatius	2,390	2,390			2,390	100.00%
Saba	1,228	1,228			1,228	100.00%
Dominican Republic	10,470,773		4,162,553	6,264,473	10,427,025	99.58%
Haiti	10,596,666		1,346,590	6,903,974	8,250,564	77.86%
Guadeloupe	446,611		314,307	132,305	446,612	100.00%
Montserrat	5,068		5,068		5,068	100.00%
Dominica	72,119			72,119	72,119	100.00%
<b>Total</b>	<b>37,247,144</b>	<b>1,930,309</b>	<b>10,603,731</b>	<b>21,239,888</b>	<b>33,773,926</b>	<b>90.68%</b>

Expected structural damage within sustained wind speed zones greater than 120 km/h according to the Saffir-Simpson Hurricane Wind Scale:

Category	Sustained Winds	Type of Damage	Type of Damage Description
 1	74-95 mph 64-82 kt 119-153 km/h	Very dangerous winds will produce some damage	Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days
 2	96-110 mph 83-95 kt 154-177 km/h	Extremely dangerous winds will cause extensive damage	Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks
 3	111-129 mph 96-112 kt 178-208 km/h	Devastating damage will occur	Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes
 4	130-156 mph 113-136 kt 209-251 km/h	Catastrophic damage will occur	Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months
 5	157 mph or higher 137 kt or higher 252 km/h or higher	Catastrophic damage will occur	A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months

Source: National Hurricane Center & Business Insider

(Hurricane Category on map 1)



# CARIBBEAN

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## Tropical Cyclone IRMA-17 : Path and Wind Speed Zones Update 2 (as of 7 September 2017)

This map illustrates the tropical cyclone IRMA-17 path with low, medium and strong wind impact zones observed and predicted at 7 September 2017. The tropical cyclone path and wind speed zones were derived from Joint Research Centre data (Warning 33 issued the 07<sup>th</sup> September 2017 at 09:00 UTC). This is a preliminary analysis and has not yet been validated in the field. Please send ground feedback to UNITAR-UNOSAT.

### Legend

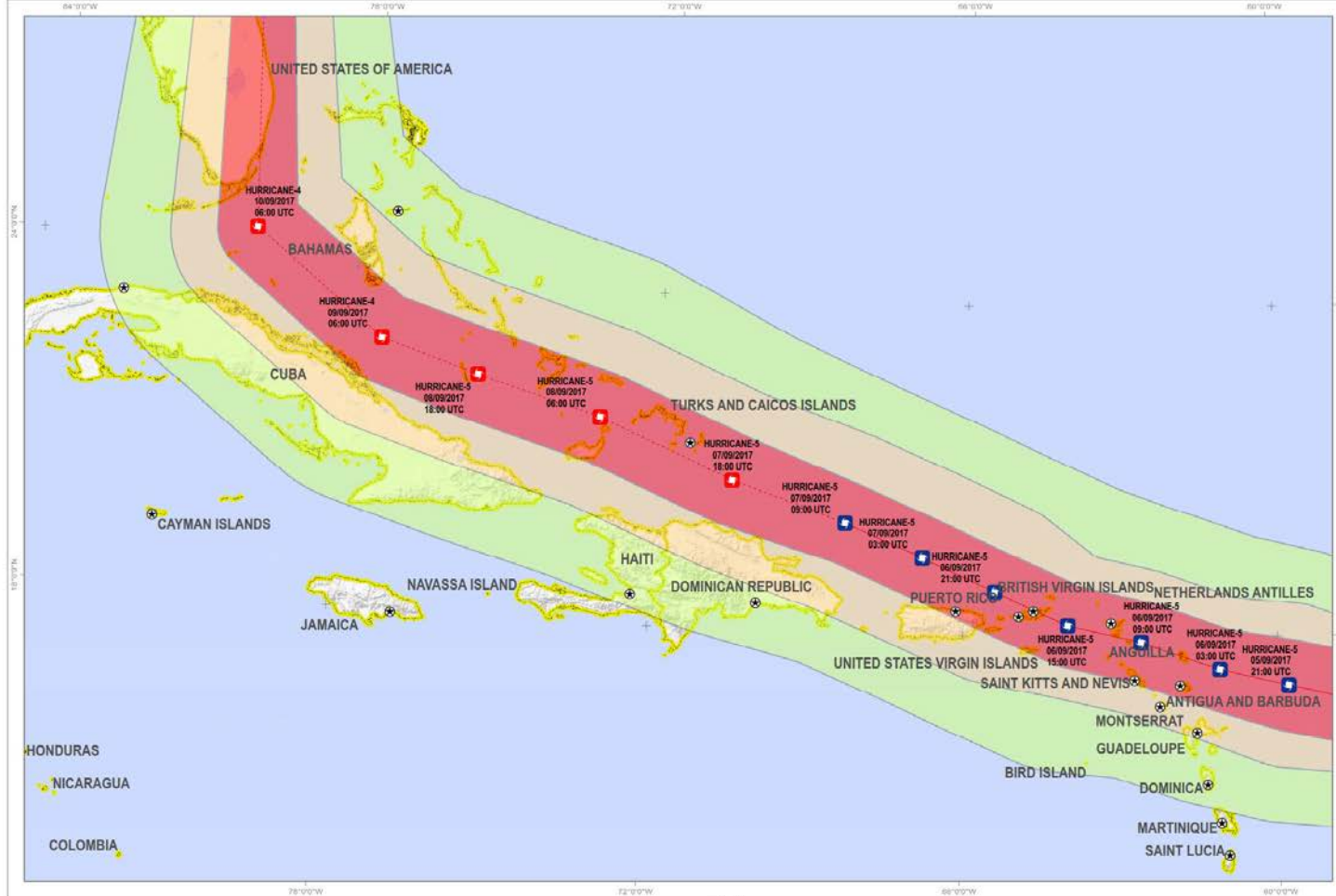
- Expected position
- Observed position
- Capital
- Track**
- Expected path
- Observed path
- Wind Speed Zone**
- 120 km/h
- 90 km/h
- 60 km/h
- International boundary

Map Scale for A3: 1:8,000,000



Analysis conducted with ArcGIS v10.4

Coordinate System: WGS 1984 UTM Zone 20N  
Projection: Transverse Mercator  
Datum: WGS 1984  
Units: Meter



Wind Speed Data: Joint Research Centre  
Date Series: 30 August 2017 - 12 September 2017  
Copyright: JRC  
Source: JRC

Baseline Data: GADM  
Analysis: UNITAR - UNOSAT  
Production: UNITAR - UNOSAT



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Map1: IRMA - 17 Cyclone path with low, medium and strong wind impact zones. Download pdf map from [here](#)