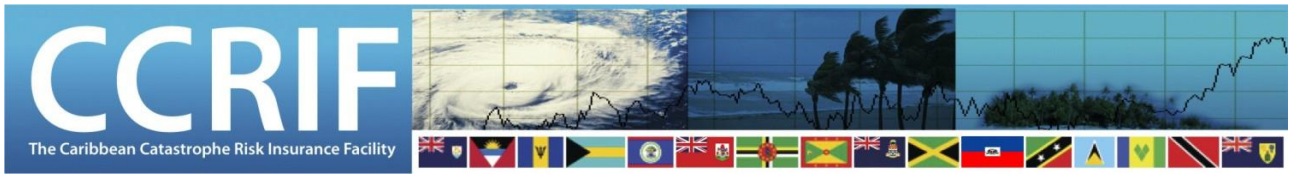

Tropical Cyclone Sandy (AL182012)

Event Briefing

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1 INTRODUCTION

On 22 October 2012, the National Hurricane Centre produced a weather outlook including a tropical wave within the southwestern Caribbean Sea. Approximately 320 miles (515 km) south-southwest of Kingston, Jamaica, the system became well organised and was named Tropical Depression Eighteen. The system was upgraded later that same day to Tropical Storm Sandy.

By the next day Sandy was moving in a north-northeast direction and was slowly strengthening. On 24 October, Sandy developed into a Hurricane while approaching the southeastern coast of Jamaica, with maximum sustained winds of 80 mph (130 km/h). By the evening, having crossed eastern Jamaica, the eye of Hurricane Sandy was located between Jamaica and Cuba, west of the coast of Haiti. From the centre of Sandy, the hurricane and tropical storm force winds extended outward up to 30 miles (45 km) and 140 miles (220 km) respectively.

Sandy was upgraded to a Category 2 Hurricane while moving off the coast of Cuba, approximately 185 miles (300 km) south of the central Bahamas islands. On 25 October, Sandy approached the Bahamas with maximum sustained winds still at 105 mph (165 km/h) and moving in a northerly direction at a speed of 20 mph (32 km/h). The maximum sustained winds decreased to 75 mph (120 km/h) the following day as the system continued to affect the islands before reaching the open Atlantic late on 26 October.

2 CCRIF MODEL OUTPUTS

Under CCRIF's loss calculation protocol, a CCRIF Multi-Peril Risk Estimation System (MPRES) report is required for any tropical cyclone affecting at least one of the 16 member countries with winds of greater than 39 mph. Tropical Cyclone Sandy qualified as a reportable event with two countries experiencing at least Tropical Storm force winds.

The wind footprint is one of the outputs from the CCRIF model. The modelled wind speed is consistent with surface wind speed estimates from NOAA-NHC (both the public wind footprint issued with each Advisory – see Figure 2 - and from the NHC research department's H*WIND algorithm, which rationalises all actual wind speed measurements collected on the ground and from flights and satellites.) CCRIF will also be requesting ground-based wind and other storm information from the relevant national and/or regional meteorological agencies in order to further verify the modelled wind field and storm surge.

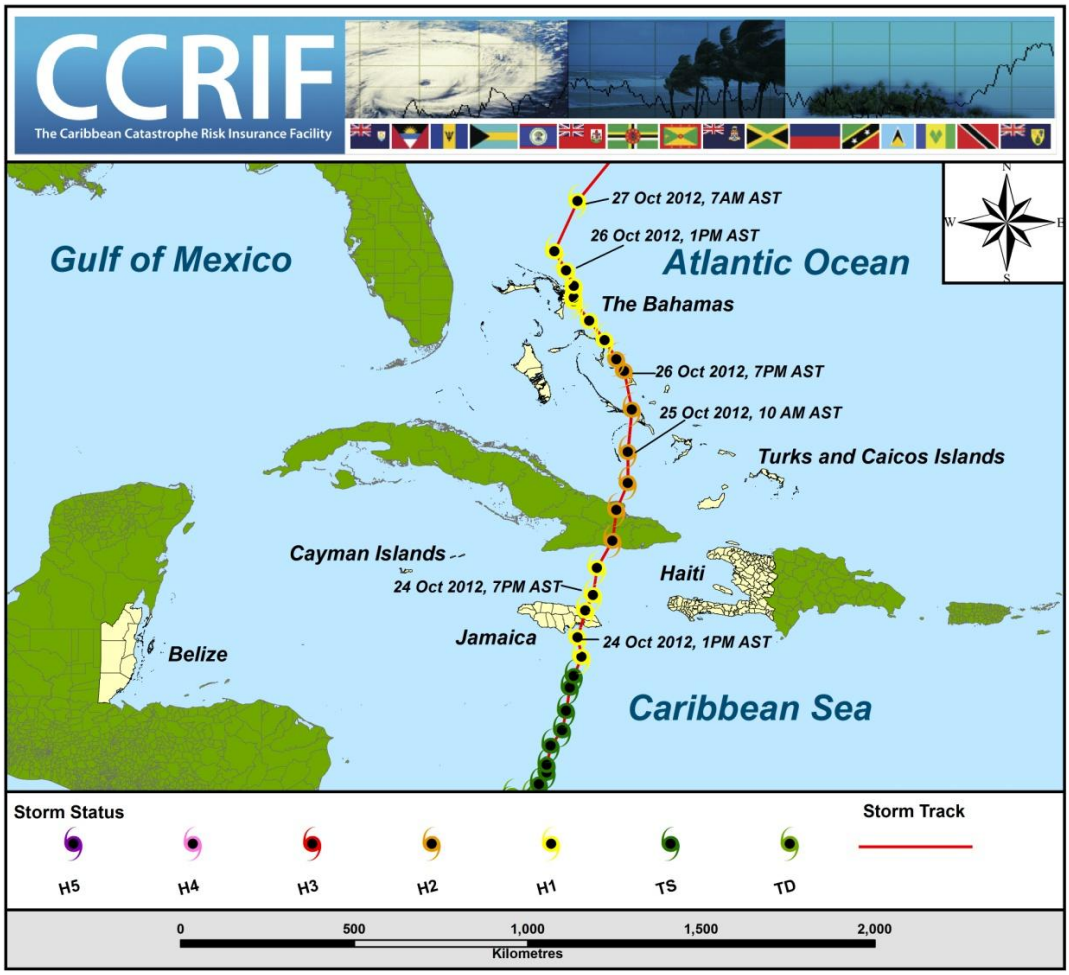

Figure 1 Map showing the path of Tropical Cyclone Sandy. *Source: NHC.*

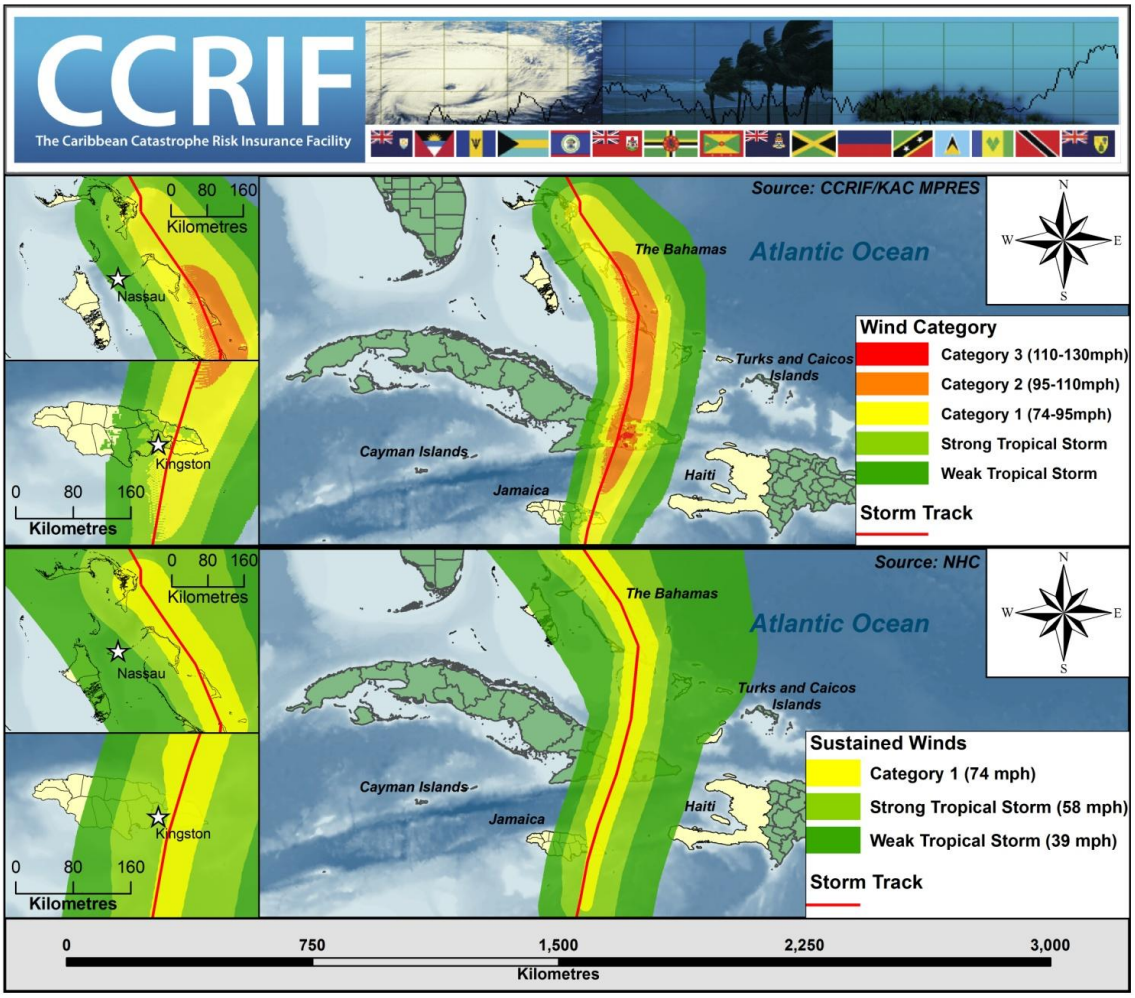

Figure 2 Comparison of NHC and CCRIF model wind footprint. *Source: NHC & CCRIF/KAC MPRES.*

3 IMPACTS

Based on the MPRES footprint, the CCRIF member countries affected by at least tropical storm force winds in the Central Caribbean Region from Sandy were Jamaica and the Bahamas. Sandy produced heavy rains as it passed west of the coast of Haiti but no part of Haiti was within the tropical storm wind footprint of MPRES.

3.1 Jamaica

As a result of the passage of Sandy across eastern Jamaica there were reports of damage to crops, roads, bridges and houses in the parishes of St. Mary, St. Thomas and Portland. Sandy brought strong winds, reaching hurricane force to the east of Kingston and in higher areas of the Blue Mountains, and heavy rains which caused flooding in all of the eastern parishes. Reports indicate that 1,046 persons occupied 67 hurricane shelters across the island.

Storm surge and heavy seas affected waterfront houses situated in the eastern Kingston neighbourhood of Caribbean Terrace. The Jamaica Public Service Company worked to restore power as 70 percent of its customer base was without electricity. Preliminary assessments suggest that damage was occasioned to approximately 200 utility poles, 240 spans of power lines as well as other components of electrical infrastructure. By 10 am on 25 October power had been restored to over 60% of those affected.

Preliminary estimates from the Ministry of Agriculture indicate that approximately 11,000 farmers were affected and about 1,500 hectares of crops destroyed which could amount to $1 billion (US$11 million) in damage. These preliminary estimates do not include livestock.

Disaster coordinators in the parish of St. Elizabeth received reports of fallen trees causing temporary blockages to the main road between Holland Bamboo Avenue and Black River. The Office for Disaster Preparedness and Emergency Management (ODPEM) stated that initial reports seem to indicate that land slippage may be “parish-wide” for the parish of Portland. ODPEM is presently attempting to assist residents of Portland who are marooned as a result of the Yallahs River being in spate. Affected communities include Cane River, Drummond to Habberstadt, Robertsfield, Halls Delight and East Portland.

There has been one confirmed fatality in Jamaica as a result of Sandy.

3.2 Haiti

The rain laden outer bands of Hurricane Sandy triggered extensive flooding which resulted in widespread damage to homes and crops. Affected areas include farms in Ille a Vache, homes in the fishing village of Tiburon and Les Cayes, where 50 patients were evacuated from a hospital along with 200 residents from a coastal settlement. More than 10,000 people were displaced and

thousands of homes were destroyed or damaged as a result of the passage of this storm. The Prime Minister has advised that the entire south of the country is under water.

The city of Les Cayes experienced approximately 27 inches of rain over a 24 hour period and Sandy appears to have dumped more rain than tropical storms Isaac and Tomas which affected similar parts of Haiti in August 2012 and October 2010 respectively.

A number of plantations were damaged and roads which link several cities in south and southwest Haiti were blocked and there were also reports of collapsed bridges.

The road which provides access to Les Anglais which is a small fishing village located in the south is impassable. There is the possibility that homes situated in this community may have been washed out to sea. Rivers were still rising in some communities such as Leogane as a result of excess runoff originating from the hillside.

The impact of Sandy may also serve to exacerbate the spread of the cholera epidemic which is affecting Haiti as 16 new cases had already been recorded since the passage of the storm.

Reports indicate that there were 51 fatalities as a result of this storm and 15 missing at this time. Authorities are still conducting their preliminary assessments as they have not been able to reach many of the affected areas due to the condition of the access road.

3.3 Bahamas

Preliminary reports indicate that the storm inflicted the most severe damage on Cat Island which took a direct hit, and Exuma where there was also damage to homes, downed trees and utility poles. There were reports of flooding and power outages on Acklins Islands and also flooding on Ragged Island. Abaco Island also experienced some flooding, collapsed trees and damage to roof shingles of buildings. There were reports of damage to crops on Long Island and structural damage to homes and roofs of several buildings.

Many homes in the area of Queen's Cove on Grand Bahama experienced severe flooding with roads in that area being impassable due to the height of the water. Grand Bahama International Airport was also affected by flooding especially in the parking area and the domestic terminal which could not be used to accommodate passengers arriving from New Providence and the other islands. The access road to East Grand Bahama for residents from Freeport was also impassable due to the height of the flood water which was said to have reached as high as six feet in some areas.

There were reportedly two deaths as a result of the passage of Sandy. Officials will be travelling to Long Island, Exuma and Cat Island on 30 October to assess the damage and losses caused on these islands.

4 CCRIF LOSS ESTIMATES

The preliminary runs of the CCRIF loss model generated modest government losses in the affected countries (Jamaica and the Bahamas), which in both cases was below each country's trigger level and therefore no payout will be due. For Jamaica, the modelled government loss for Sandy had a return period of around 6 years, while in the Bahamas it was about a once in 2 year loss event.

Our initial assessment of on-the-ground impacts indicates that government losses from wind and storm surge appear to be consistent with the model outputs. We note, however, that rain damage, which is not taken into account in the current CCRIF Tropical Cyclone model, will have caused additional impacts and was, in Haiti, the sole driver of damage.