

Superstorm Sandy

Lessons learned: A risk management perspective

Report published by AGCS

Background

Superstorm Sandy made landfall as a post-tropical cyclone on the East Coast of the US on October 29, 2012 after cutting a destructive path through the Bahamas, Cuba, the Dominican Republic, Haiti, Jamaica and Puerto Rico.

The deadliest windstorm to have occurred in the Northeastern United States in 40 years (resulting in more than 280 fatalities), Sandy is also the second costliest storm in US history after Hurricane Katrina (2005), with economic losses now totaling \$70bn according to market estimates. Many individuals and businesses are still recovering from its damage.

This **Risk Bulletin** examines the cost of the disaster and the lessons learned, outlining what businesses need to do now to ensure they can mitigate the adverse financial impact of future storms.



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The 'new normal' of weather events

Tom Varney, Regional Manager, Americas, Allianz Risk Consulting

As the one-year anniversary of this devastating storm hitting the US mainland approaches, many businesses are still not adequately prepared for the impact extreme weather events can have on the running of their operations. Although Sandy has heightened risk awareness, many companies have yet to implement adequate changes, according to Allianz Group's specialist corporate insurer, Allianz Global Corporate & Specialty (AGCS).

"Many businesses are not as prepared as they could be," explains Tom Varney, Regional Manager for Allianz Risk Consulting in the Americas.

"Today businesses need to prepare for the 'new normal' of weather events and this can be a laborious process. For many companies it takes time – in some cases years – to appropriate funding and actually make the much-needed changes.

"For others it may just be about focusing on the right things at the right time. Allianz is committed to helping clients identify vulnerabilities, mitigate risk and be as prepared as possible."



Flood damage to businesses from Sandy

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Four things businesses must do

As terrible as the storm was, there are important business lessons to be learned in its aftermath. Allianz has identified four key steps businesses can implement now to be better prepared for future extreme weather events:

1) Update and test emergency preparedness plans:

Preparation before the storm minimizes property damage and reduces business interruption. Allianz recommends that every business has a comprehensive written emergency response plan that is reviewed and tested annually. A good plan has the support of senior management, site-specific recommendations and clear delineation of responsibilities. Allianz risk consultants routinely help draft recommendations for improvements.

2) Review business contingency plans:

The crucial role a business contingency plan plays in the aftermath of an event has become more apparent as a result of recent natural catastrophes such as Sandy. The storm hit the Northeast on a Monday, which made it difficult for employees to develop and implement business contingency plans while preparing their homes and families for the storm. A well-developed contingency plan provides businesses with the tools to get back up and running as quickly as possible. For many companies, business contingency plans must take a global view as supply chains continue to expand, particularly in Asia and Latin America. Supply chain complexities are increasing but industries can make them more resilient.

3) Understand your insurance policy:

Business owners should take the time to read their current policy and discuss with their brokers what's covered and where there may be gaps. Determine if the limits of liability are in line with the current dollar value of the cost to repair or replace the damage. Consider adding an extended period of indemnity clause to the business interruption coverage to support the business until it returns to its pre-loss financial condition.

4) Know what to prepare for:

Planning for a wind event involves different preparation than planning for flooding. In the case of Sandy, the storm came ashore at high tide on a full, harvest moon. Full moon conditions at the onset of a hurricane lead to increased storm surge heights and the potential for more severe flooding.

The majority of Sandy preparation was based on a high wind event, leaving many businesses unprepared for the flooding caused by the storm surge. As more sophisticated tracking models are introduced in the wake of the storm, more accurate information will be available.

Sandy: quick economic facts

- Total economic losses from Sandy have now reached \$70bn¹
- Sandy damaged or destroyed about 650,000 homes and knocked out power to 8.5 million customers²
- Insured losses total approximately \$25.85bn. Private insurance companies account for approximately three quarters (73%) of this total³
- Auto, homeowners and business insurance claim payouts total \$18.75bn⁴
- The rest is covered by the National Flood Insurance Program (\$7.1bn)⁵
- Sandy is the third costliest insured US natural catastrophe after Hurricanes Katrina (\$48.7bn) and Andrew (\$25.6bn), based on private insurance company losses only⁶
- Some 1.58 million Sandy claims have been filed with private insurance companies, most of which were homeowners' insurance claims (71.5%)⁷
- Businesses accounted for almost half (47.6%) of the privately-insured loss from Sandy⁸
- The average commercial claim was more than \$44,500, compared with about \$6,500 for homeowners⁹
- It is estimated that the storm will cost \$30bn when flood, marine and aviation insurance claims are all included¹⁰

Sources: **1** New York Climate Week 2013, **2** Insurance Information Institute (III), **3** Insurance Services Office's Property Claim Services (PCS) unit, **4** III, PCS **5** III, National Flood Insurance Program, **6** III, PCS **7** III, PCS **8** III PCS **9** III, PCS **10** III, Munich Re, as of March 2013



Approximate number of claims for AGCS, ranging from damaged cargo to flooded premises



Jersey shore damage caused by Sandy

© Annika Schuenemann

Five costliest natural catastrophe events worldwide by overall losses



11.3.2011
Earthquake, tsunami Japan:
 Honshu, Aomori, Tohoku, Miyagi, Sendai, Fukushima, Mito, Ibaraki, Tochigi, Utsunomiya



25-30.8.2005
Hurricane Katrina, storm surge US:
 LA, New Orleans, Slidell, MS, Biloxi, Pascagoula, Waveland, Gulfport



17.1.1995
Earthquake Japan:
 Hyogo, Kobe, Osaka, Kyoto



12.5.2008
Earthquake China:
 Sichuan, Mianyang, Beichuan, Shifang, Wenchuan, Ya'an, Chengdu, Ngawa, Guangyuan



24-31.10.2012
Superstorm Sandy, storm surge:
 Bahamas, Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico, US, Canada



Sources: Munich Re, Geo Risks Research, NatCat Service, as of March 2013. Sandy loss figure, according to New York Climate Week 2013



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Superstorm Sandy Q&A

Andrew Higgins, Technical Manager, Americas, Allianz Risk Consulting

Q: Does Sandy show that storm activity in the densely populated New York area is increasing? Is this due to climate change?

A: Since 1861, 35 tropical storms and hurricanes have passed through the New York area. That is an average of one tropical storm or hurricane every four to five years. It might appear as if more hurricanes are hitting the New York area now, but history doesn't necessarily support that theory. For example, in 1888, the New York area was hit by a tropical storm and a Category 3 hurricane within a three week period. Also, two Category 3 hurricanes hit New York during the summer of 1893. It is possible that global warming has increased the odds of a hurricane hitting the east coast of the US, but it is very difficult to prove at this point.

Q: What made Sandy so different from Hurricane Irene, for example, which was forecast to hit New York a year earlier but did not cause that much damage?

A: There are several reasons why Sandy resulted in much more damage to the area than Irene:

- Irene approached the New York area from the southwest having already made landfall. Sandy on the other hand, approached the area from the east. This unusual path maximized the winds and storm surge directed at the shores of Long Island and New Jersey.
- Sandy was a much slower-moving storm than Irene. Its progress through the region resulted in more damage than the fast-moving Irene, which moved through the New York area in a couple of hours.
- Sandy was a massive storm in terms of geographic area, with a diameter of gale force winds of over 1,000 miles. Sandy's damage spread over a much larger area than Irene.
- Sandy hit the New York and New Jersey area during high tide, which increased the height of the storm surge.



Q: Sandy made landfall just a month before the official end of the hurricane season (November 30). Is it an unusual anomaly to have such a strong storm so late in the year?

A: There were 87 Atlantic tropical storms in November between 1851 and 2011, of which 57 turned into hurricanes. In fact, several hurricanes have hit the New York area late in the hurricane season in the past:

- October 28-30, 1866 Category 1 Hurricane
- October 22-28, 1872 Category 1 Hurricane
- October 26-November 4, 1899 Category 2 Hurricane

There have even been a few tropical storms and hurricanes that have formed in the month of December over that time period. Although rare, a hurricane of Sandy's magnitude is not unheard of in the months of October and November.

Q: Is it true that the full moon led to a stronger impact of Sandy, due to the high tide causing a more intense storm surge than usual?

A: Yes, the full moon made the storm surge worse, since high tides along the Eastern Seaboard rise about 20 percent higher than normal during a full moon.

Q: In terms of flood protection, many affected areas clearly had lessons to learn from Sandy. What recommendations would you give to business owners?

A: Flood levels created by Sandy's storm surge approached the 1,000 year event. Currently, in the US, we design our buildings to be located above the 100 year or 500 year flood event, not the 1,000 year flood event. Unless, a change is made to the current model building codes, a 1,000 year flood event will always result in massive flooding. Businesses should develop and maintain a formal flood emergency plan if they are located in or close to a flood zone.

Many businesses suffered interruption losses due to the extended loss of power. They should consider installing emergency generators that can operate a portion, if not all, of the critical equipment in the facility.

Depending on the construction and design of the building, flood gates and flood doors can be used to greatly reduce the amount of flood water that enters a building during a flood event.

Finally, I would recommend that all equipment critical to the operation of the building like electrical switchgear, transformers, generators, fire pumps, etc. be raised to a level above the 1,000 year flood elevation.

Costliest storms in US insurance history

Katrina	\$48.7bn	2005
Andrew	\$25.6bn	1992
Sandy	\$18.8bn	2012
Ike	\$13.4bn	2008
Wilma	\$11.1bn	2005
Charley	\$9.2bn	2004
Ivan	\$8.7bn	2004
Hugo	\$7.8bn	1989
Rita	\$6.7bn	2005
Frances	\$5.6bn	2004

Source: PCS, III inflation adjustments to 2012 dollars using the CPI

Sandy is the third costliest storm in US insurance history

8 of the 10 most costly storms in insurance history have occurred in the past nine years

Insurers pick up the tab for Sandy damage

Fast claims settlement:
93% of New York and New Jersey claims
in less than six months

Less than six months after Sandy made landfall the insurance industry had settled more than 90% of claims submitted in the hardest-hit states of New Jersey and New York, demonstrating the robust role the sector plays in helping to rebuild the economy in the wake of a major catastrophe.

More than half of the 1.5 million claims for Sandy-related damage to homes, vehicles, boats and businesses were filed in these two states alone. The others were filed in a dozen other states as well as the District of Columbia, according to the Insurance Information Institute (III). This figure does not include claims for flood damage insured under the federal government's National Flood Insurance Program (NFIP).

The damage caused by Sandy generated 1.1 million claims from homeowners, 250,000 from vehicle owners and more than 200,000 claims from business owners. According to III, although business claims accounted for only 13% of those filed, at present they currently account for 48% of all dollars paid, largely because the value of commercial property is often higher than that of residential.

In addition business interruption coverage reimburses a business owner for lost profits during the time it is unable to open.

Sources: PCS, III



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More than half of the claims for Sandy-related damage were filed in New York and New Jersey



© John Huntington

Sandy damage in Brooklyn, New York

The total damage in the city of New York alone is estimated at €14bn (\$19bn). There are 400,000 people living in the threatened areas of New York, with 270,000 workplaces and 68,000 buildings

Source: Allianz



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Responding to the Sandy claims challenge

Terry Campbell, Head of Marine Claims, Americas, AGCS

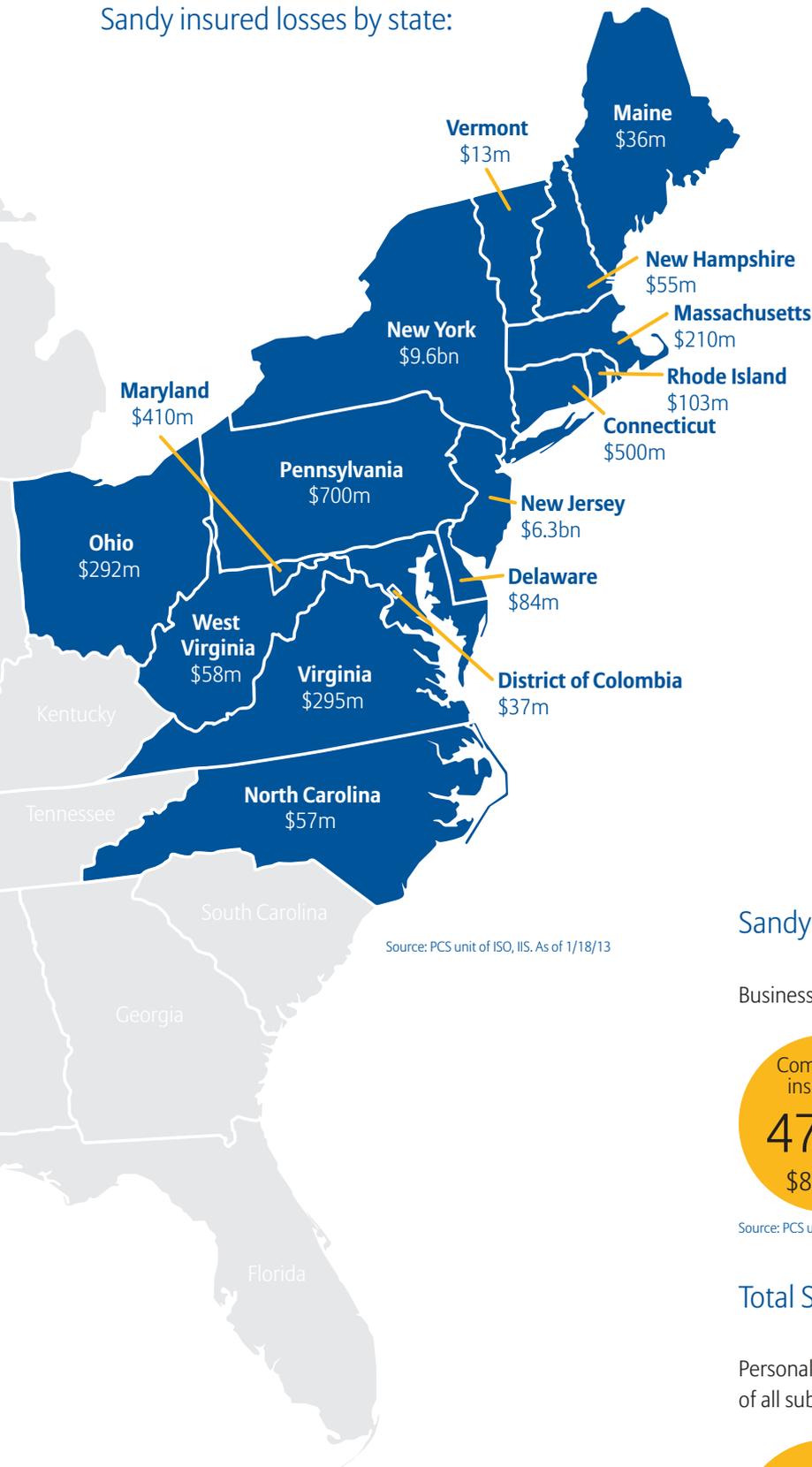
"Allianz Global Corporate & Specialty set an example by delivering outstanding claims services," says Terry Campbell, Head of Marine Claims, Americas.

"Our regional adjusting team was deployed before the storm so they could be on site and adjust the first clients' claims the day after Sandy," he says. "We made the first advance payment of \$2m within 48 hours. Today, one year after Sandy, our marine team has paid approximately 92% of our 800 plus complex commercial claims.

"Sandy brought to us many challenges, both personally and professionally. Many of the staff were affected by the storm, either to their personal property or just being unable to secure consistent connectivity to our network.

"The coordination of these efforts to reach out to our customers while trying to handle some of the personal losses bestowed upon the claims team was extraordinary. Our team, which spans from California to Puerto Rico, all contributed and worked around the clock to lend support. This was our proudest moment."

Sandy insured losses by state:



Source: PCS unit of ISO, IIS. As of 1/18/13

Private/public insurance claims payments for Sandy

Private insurance companies accounted for approximately three quarters (73%) of the total insured loss bill to date of approximately \$25.85bn



Source: PCS unit of ISO, National Flood Insurance Program

Sandy insured losses by line:

Businesses accounted for almost half (47.6%) of the losses



Source: PCS unit of ISO. As of 7/23/13

Total Sandy claims

Personal claims accounted for almost three quarters (71.5%) of all submitted



Source: PCS unit of ISO. As of 7/23/13

The calm before the storm?

Comparing recent Atlantic hurricane seasons

Last year's Atlantic hurricane season brought 19 tropical storms, with 10 developing into hurricanes, well above the annual average figure of 12 storms and six hurricanes.

Only four of these events made landfall in the US including Sandy - the 18th tropical storm of the season - which was officially a post-tropical cyclone when it hit on October 29.

In comparison the 2013 Atlantic hurricane season has been much quieter so far, producing 11 tropical storms by October 9, just two of which became hurricanes. Humberto became the first hurricane of this season on September 11, but did not make landfall in the US. According to catastrophe modeling agency RMS the storm fell three hours short of becoming the latest-forming

first hurricane of the season on record. Only 2002 had to wait longer for its first hurricane of the year in the form of Gustav. This year is only the second time no hurricane-strength storms have formed during the first half of the season, which runs from June 1 to November 30.

According to the National Hurricane Center there have been only 17 years when the first Atlantic hurricane formed after September 4.

The record was set back in 1905 when the first hurricane did not appear until October 8.

During an average season the first hurricane develops by August 10, followed by a second hurricane on August 28. The first major hurricane should arrive by September 4.

Sources: National Hurricane Center, IIS, RMS, Reuters



Tracking Sandy's path to landfall in New Jersey

Source: National Hurricane Center

The highest storm surge measured by tide gauges in New Jersey was **8.5 feet** over normal levels at Sandy Hook and the highest in New York was more than **12.5 feet** at Kings Point on the western edge of the Long Island Sound.

Source: IIS

Sandy is the 77th name to be retired from the official list of Atlantic basin tropical cyclones by the World Meteorological Organisation's (WMO) hurricane committee. It will be replaced by Sara, beginning in 2018. Other recently retired names include Ike, Irene and, of course, Katrina.



Satellite imagery of Sandy off the East Coast of the US

Increasing coastal values - Sandy: a near miss?

Sandy hitting the East Coast of the US as a post-tropical cyclone should act as a warning to businesses to ensure they are prepared for the impact a category three or four hurricane would have in the region, with an event of this magnitude forecast to result in insured losses in excess of \$100bn, in part because of huge increases in population and development.

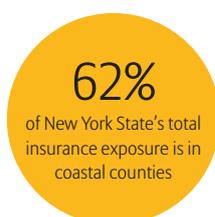
A report from risk modeling firm, Karen Clark & Co (KCC) calculates that if the Great New England Hurricane of 1938, which struck Long Island on September 21 as a Category 3 storm by current Saffir-Simpson measuring standards, happened today, it would cause insured losses of more than \$35bn, nearly twice those of Sandy (excluding its flood losses covered by NFIP). A similar storm, but tracking further to the west, would result in insured losses exceeding \$100bn.

“In the North East region, it’s not a question of the intensity of the storm but of its track,” the report states, adding that the New England Hurricane, which left close to 700 people dead and 63,000 homeless after storm surges exceeded 10 feet in some locations, could be designated as a one-in-100 year event.

“It will only take a Category 3 hurricane with the right track to cause industry losses far exceeding anything we’ve seen to date,” the report says.

The KCC report notes that according to historical records, several major hurricanes impacted the North East before 1900. Given this history, it’s reasonable to assume the 1938 storm is a 100-year type event for the region and has an estimated one percent annual probability of occurring.

Such a storm could make landfall anywhere along the Long Island, Rhode Island or Massachusetts coastlines. The different landfall points would result in dramatically different industry losses and damages because hurricanes are “right handed” in the northern hemisphere, with the strongest winds occurring from a few miles to 50 miles to the right of the storm center. Hurricanes that make landfall further to the west will cause greater damage because more of the right, or east, side of the storm will be over highly-populated areas.



Sandy versus the Great New England Hurricane

Although Sandy and the 1938 hurricane made landfall in different locations, there were some areas of overlap between the two storms, especially in northern New Jersey and New York, according to AIR Worldwide.

Both storms had extensive wind fields, with damaging winds observed many hundreds of miles away from the storm center, according to the catastrophe modeling firm. Whereas storms that travel north usually eventually veer toward the east, back out to the mid-ocean, both the 1938 storm and Sandy had their paths diverted westward by high pressure systems, and both storms were in the process of making an extratropical transition when they made landfall.

Most notably, both storms occurred during periods of astronomical high tide, contributing to the extraordinarily high storm surge both exhibited (The 1938 hurricane produced storm tides of 14 to 18 feet across most of the Connecticut coast, with 18- to 25-foot tides reported from New London east to Cape Cod).

While Sandy caused severe storm surge damage in many locations, it was less intense than the 1938 hurricane with respect to sustained maximum wind speeds, according to AIR. In fact, sustained winds were well below the Category 3 level winds recorded in 1938. Similarly, many of the North East locations most strongly impacted by storm surge in 1938 were spared by Sandy. Nonetheless, Sandy’s insured losses currently exceed \$18bn, according to the Property Claim Services unit (PCS).

Estimated value of insured¹ coastal properties vulnerable to hurricanes by state (\$bns)

Rank	State	Coastal	Total exposure ²	Coastal as a percent of total
1	New York	\$2,923.1	\$4,724.2	62%
2	Florida	\$2,862.3	\$3,640.1	79%
3	Texas	\$1,175.3	\$4,580.7	26%
4	Massachusetts	\$849.6	\$1,561.4	54%
5	New Jersey	\$713.9	\$2,129.9	34%
6	Connecticut	\$567.8	\$879.1	65%
7	Louisiana	\$293.5	\$823.0	36%
8	South Carolina	\$239.3	\$843.6	28%
9	Virginia	\$182.3	\$1,761.7	10%
10	Maine	\$164.6	\$285.5	58%

¹ Includes residential and commercial properties, as of December 31, 2012. Ranked by value of insured coastal property.

² Total exposure is an estimate of the actual total value of all property in the state that is insured or can be insured, including the full replacement value of structures and their contents, additional living expenses and the time value of business interruption coverage.

Source: AIR Worldwide.

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