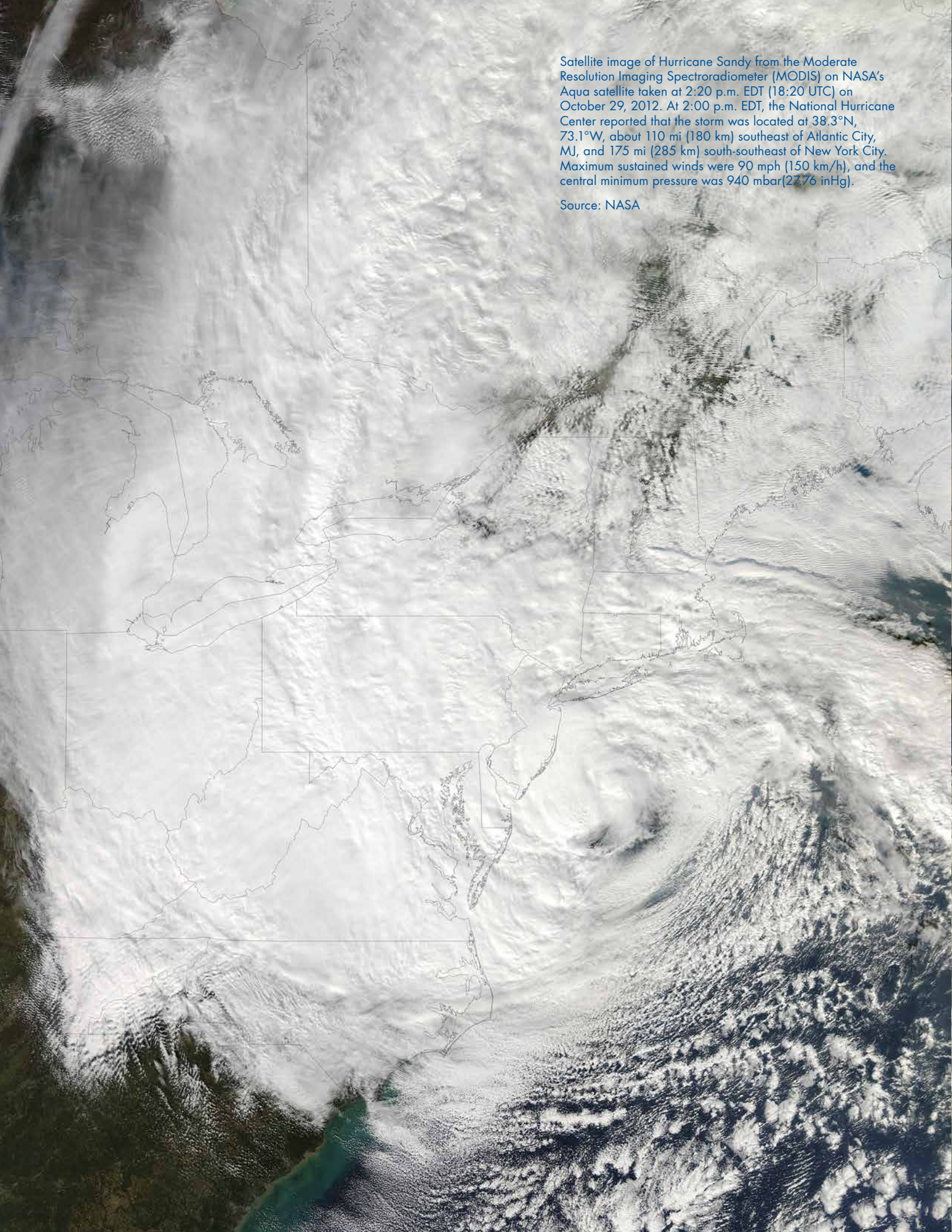


Superstorm Sandy a Year Later:

A Record-setting Storm and
a Record-setting Response

A Crawford & Company Situation Paper:
October 2013



A satellite image of Hurricane Sandy, showing a large, dense cloud system with a well-defined eye and spiral bands of clouds. The hurricane is positioned over the Atlantic Ocean, just off the coast of the Northeastern United States. The landmasses of the United States and parts of Canada are visible, with state and provincial boundaries outlined in thin white lines. The ocean surface shows some texture and color variations, likely due to wind and chlorophyll levels. The overall image is in grayscale, typical of satellite imagery from MODIS.

Satellite image of Hurricane Sandy from the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite taken at 2:20 p.m. EDT (18:20 UTC) on October 29, 2012. At 2:00 p.m. EDT, the National Hurricane Center reported that the storm was located at 38.3°N, 73.1°W, about 110 mi (180 km) southeast of Atlantic City, NJ, and 175 mi (285 km) south-southeast of New York City. Maximum sustained winds were 90 mph (150 km/h), and the central minimum pressure was 940 mbar(27.76 inHg).

Source: NASA



Superstorm Sandy— A Storm unlike Any Other

Late in October 2012—one month away from the end of the six-month hurricane season—the unique, enormous tropical storm Sandy hit the United States East Coast at a right angle, and, before it dissipated, the storm that came to be nicknamed “Superstorm Sandy” caused billions of dollars of damage across dozens of states and affected millions of American’s lives.

What would become Superstorm Sandy developed normally in the Atlantic Basin. On October 22, 2012, in the western Caribbean Sea, a tropical depression intensified in less than a day to Tropical Storm Sandy, which made landfall in Cuba on October 25 and the Bahamas the following day. By October 27, Sandy turned toward the northwest and then tracked northeast along the U.S. East Coast. On October 28, Sandy came back toward the U.S., and by October 29, Sandy became the largest Atlantic hurricane on record as it moved toward the New Jersey coast¹.

The Storm Strikes

Sandy was the 18th named storm of the busy 2012 Atlantic hurricane season² and it was a unique storm in several ways, beginning with how it approached New Jersey and New York from the east. Storms typically approach from the south³, and a recent statistical analysis estimates that the track of the storm—which took a very rare left-hand turn in the Atlantic before hitting the East Coast perpendicularly (and spectacularly)—has an average probability of happening only once every 714 years⁴.

The storm also progressively downgraded from hurricane to tropical storm to post-tropical status, an unusual degradation pattern⁵, but because it was so unusually large tropical storm force winds covered an area approximately 1,000 miles in diameter, including most of the Eastern Seaboard⁶.

Sandy made landfall along the southern New Jersey shore on Monday, October 29 at 8:00 p.m. ET, approximately five miles southwest of Atlantic City, New Jersey with sustained winds of 90 mph. A number of factors contributed to the storm’s intense destructive power. Sandy’s vast size, in combination with its slow offshore movement, low pressure, and its timing of landfall during a full moon⁷—one of the highest tides of the month—that made tides 20 percent higher than normal⁸.

Superstorm Sandy was one of the largest, most destructive natural events in recent U.S. history, with a large part of damage due to flooding from *its*

Power outages in the United States and Canada

(Source: U.S. Department of Energy; State/local emergency management agencies)

State/Province	Peak Outages	State/Province	Peak Outages
Connecticut	630,001	North Carolina	16,001
Delaware	45,001	Ohio	267,001
Illinois	1,151	Pennsylvania	1,270,001
Indiana	10,001	Rhode Island	122,001
Kentucky	8,401	Tennessee	2,101
Maine	91,001	Vermont	18,001
Maryland	600,001	Virginia	300,001
Massachusetts	370,001	West Virginia	272,001
Michigan	154,001	Ontario (Canada)	145,001
New Hampshire	210,001	Quebec (Canada)	49,001
New Jersey	2,615,001	Nova Scotia (Canada)	14,001
New York	2,100,001	Total U.S. & Canada Outages	9,310,000

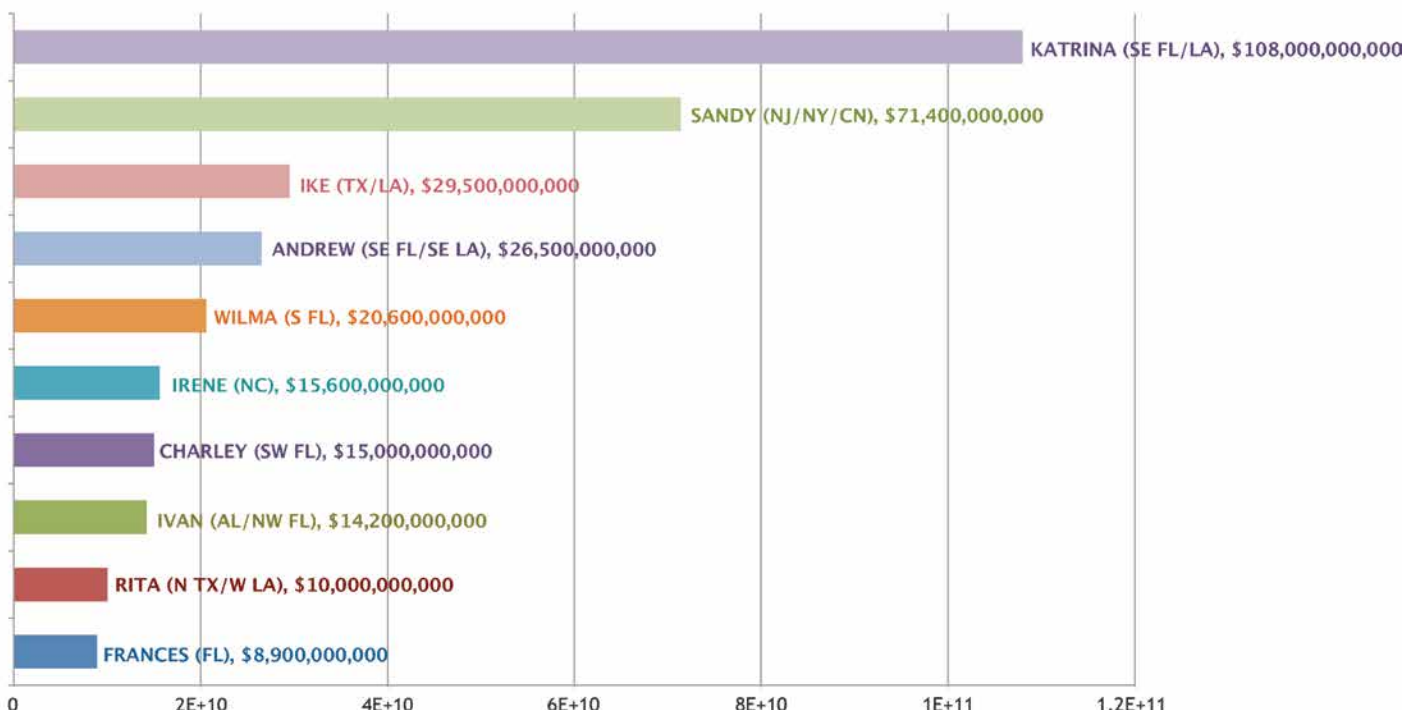
catastrophic surge, which accounted for fully 65% of Sandy's total insured loss. Sandy caused water levels to rise along the entire East Coast of the United States from Florida northward to Maine⁹. Another key factor that contributed to the storm's massive damage was that the storm struck directly at one of the most densely populated areas of the country. By the time the storm dissipated over western Pennsylvania on October 31¹⁰, there were at least 147 direct deaths recorded across the Atlantic basin due to Sandy, with 72 of these fatalities occurring in eight mid-Atlantic and northeastern United States¹¹. At least 75 indirect deaths occurred either before, during, or after the storm¹².

While the most severe damage occurred in New York, New Jersey, and Connecticut, overall Sandy affected 24 states, including *the entire Eastern Seaboard from Florida to Maine*, and west across the Appalachian Mountains into the Midwestern states of Michigan and Wisconsin¹³. The storm generated heavy snows across the central Appalachians, especially in West Virginia and the mountains of western North Carolina. Due to the large amount moisture brought by the storm and the timing of late October, cumulative snowfall totals of up to 36 inches along with strong winds produced blizzard conditions. Closer to the East coast, parts of the Mid-Atlantic region experienced more than a foot of rainfall, resulting in river, stream, and creek flooding¹⁴.

Power outages (in many cases lasting multiple days) were reported in 15 states, affecting more than 8.5 million customers¹⁵ and causing severe business interruption and contingent business interruption insurance losses¹⁶; some coastal areas of New Jersey were without power for months after the storm¹⁷. Hurricane Sandy is certain to rank as one of the costliest natural catastrophes in U.S. history, with current projected economic losses reaching *\$82 billion in New York, New Jersey, and Connecticut alone*¹⁸. It will take months to years for all insurance claims to be settled, and a final, definitive financial loss amount determined¹⁹.

Costliest Hurricanes in the United States (U.S. Mainland) 1900-2013

Source: National Oceanic and Atmospheric Administration (NOAA), Eqecat.



Crawford's Capabilities and Initial Response

Sandy was a storm that would fully flex Crawford's extensive catastrophe services experience and technology.

Crawford Catastrophe Services (CAT) has more than 40 years of experience of handling major catastrophic events such as Superstorm Sandy. Crawford's current CAT management team had personally handled all of the top ten insured loss-producing U.S. hurricanes, from Hurricane Gilbert in 2005 to Irene in 2011, but Sandy was not like any storm they had previously encountered. Because of its scope, Sandy also required the services of Crawford Global Technical Services® (GTS®), which focuses on large, complex claims, and has the largest, most experienced team of strategic loss managers and technical adjusters in the world.

Crawford's Marine and Transportation team of experts was on call to assist with Sandy's anticipated effects on ports, marinas, intermodal facilities, and associated vehicles and infrastructure. These team members are highly qualified and experienced professionals from all areas of the marine, transportation, and insurance industries (including ex-seagoing senior officers with Master Mariners or engineering qualifications and general cargo experience, naval architects, industrial engineers and maritime insurance specialists in ocean and inland transit cargoes, and specialists in subrogation and recovery), who can quickly deploy to the site of the incident.

In addition to commercial and residential property, marine and transportation concerns,

Crawford also had to be prepared for another usual victim of hurricanes—automobiles. From flooding to impacts from downed trees and tree limbs to road craters, storms can wreak enormous damage on cars, trucks, buses and other motor vehicles. Crawford offers a comprehensive suite of services which can accommodate motor vehicle claims management needs ranging from private automobiles to tanker trucks or other specialty equipment. Where applicable, heavy equipment appraisal—as well as automobile and heavy equipment managed repair programs— is also offered. Its network of trained and credentialed adjusters utilizes the latest technology to deliver comprehensive, accurate appraisals promptly.

Crawford also had a unique capability ready to address the results of the storm for commercial and residential property, Contractor ConnectionSM, the largest, fully independent network of managed contractor repair for insurance companies and consumers. Contractor Connection is the only national network of managed contractors vetted and overseen by a robust quality control tracking system measuring time, costs, and customer

"What do you think about Sandy?

Any worries?"

*Email from Kevin Frawley, chief executive officer,
Crawford Property & Casualty – Americas,
as the storm was forming*

*"I haven't been terribly impressed with this
one from the beginning. My sense is that
it'll be minimal. If it moves noticeably back
to the west, it could become something
larger. Will know more in 24 to 48."*

*Email response from Bud Trice, vice president,
Crawford Catastrophe Services*

Crawford Command Center



satisfaction. Its approved contractors specialize in emergency response, general repairs, disaster restoration, and all manner of general residential and commercial restoration work. Claim representatives screen assignments and refer homeowners who are interested in using an approved network contractor who will provide high quality service backed by a two-year workmanship warranty. Contractor Connection's contractor credentialing requirements are the strictest in the industry, as all network members must undergo rigorous credentialing process prior to acceptance into the network and are recertified on an annual basis. As Sandy developed, management at Contractor Connection also began following the storm.

Formal tracking of Sandy began on Monday, October 22. As the storm originated and began evolving, Crawford's Catastrophe (CAT) management team began monitoring real-time feeds of all relevant news and weather data and maintained constant contact with the field force via the Command Center. Located in Crawford's world headquarters, the Command Center houses an experienced team of business analysts who constantly monitor key performance indicators of all open U.S. claims using proprietary software and the latest technology for recording, analyzing, and securely transmitting data. During Sandy the Command Center's capabilities were expanded to include performance dashboards, providing consolidated visualization of claims data. Dashboard data displayed included claims volume broken down by delivering unit, e.g., GTS® or CAT, staffing, call center volume, daily received claims, daily closed claims, performance metrics, unit workloads, resource allocation, mapping, and other key performance information. The Command Center also was able to provide special data requests such client-specific reports and historical comparisons.

Date	# of Flight Cancellations
October 28	1,501
October 29	7,977
October 30	7,074
October 31	2,989
November 1	873
November 2	78
Total	20,492

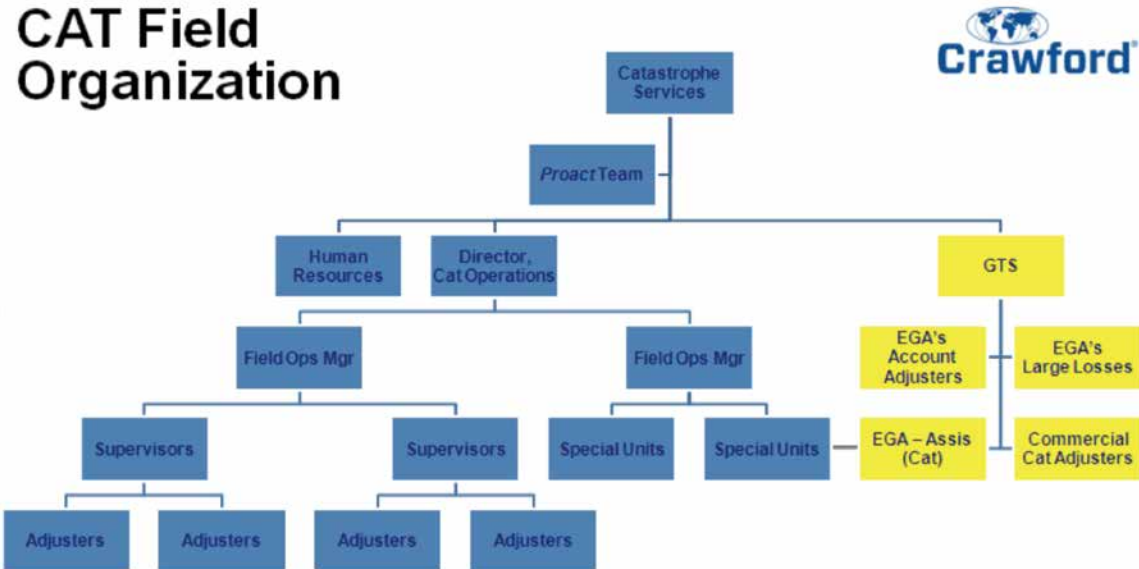
Flight cancellations
(Source: FlightAware)

Pro-ActSM, the company's proprietary response task force of multidisciplinary professionals empowered to leverage all of Crawford's corporate resources, began meeting to evaluate and plan a detailed response on October 25. Crawford's ClaimsAlert[®], a centralized claim intake call center that receives and processes claims, 24 hours a day, seven days a week, began preparing for a significant increase in claim assignments, while ClaimsAlert[®] in Canada prepared to handle overflow calls from the U.S.

CAT Connection also came into play during this key preparation phase. CAT Connection is Crawford's proprietary event resource management system available to all of the company's adjusters. The self-service system links Crawford U.S. employees into a real-time virtual workforce that integrates directly to the Crawford Management System and helps expedite claims set-up. CAT Connection also connects to the company's Human Resource system, allowing for faster activation and deployment of adjusters. Additionally, the system allows adjusters to accept specific event-related requests for standby and deployment. CAT Connection allows Catastrophe adjusters all over the country to maintain contact even in difficult circumstances.

ClaimsAlert was just one part of an end-to-end claims reporting process that Crawford would use for Sandy. An important part of that process for at least one insurer was *integrated claims intake*.

CAT Field Organization



Using Crawford's systems in conjunction with IVANS (the largest insurance data exchange in the U.S.), integrated claims intake provides a fast, seamless, and accurate method of processing claims from events such as Sandy in a direct route from adjuster to Crawford to IVANS to insurers. For one major insurer, three months before Sandy hit, Crawford had built a process where all the insured's policy-level detail was contained within a database accessible by Crawford's call center operators in Atlanta and Waterloo, Ontario. For Sandy the operators were be able to respond to insured's calls quickly, and since the system was connected to Crawford's claim system it allowed field adjusters to rapidly respond. With the system, Crawford was be able to intake a large number of claims automatically for the insurer, resulting in reduced costs, streamlined operations, and increased responsiveness.

Staging and Deployment

The Crawford Induction Team that would assist in bringing adjusters on board, prepping them, and assigning them to the field, deployed to Richmond, Virginia, as the storm was moving in to the East Coast. Richmond was a modestly sized, relatively central location for coordination and personnel disbursement that lacked the density of a larger city such as New York, which could become a severe logistical problem if its infrastructure was affected by the storm. Once it was set up, the Induction Team began in-processing of employees, including temporary license processing for 16 states, immigration paperwork for Canadian adjusters, cost database updates, client-specific briefings, and field deployment to the work zone. The broad effort involved many more people than just Catastrophe Services, as Crawford's Information Communications Technology, Human Resources, Compliance, Finance, Regional and headquarters support people all began putting in extra time

and effort to meet the huge service demands created by Sandy.

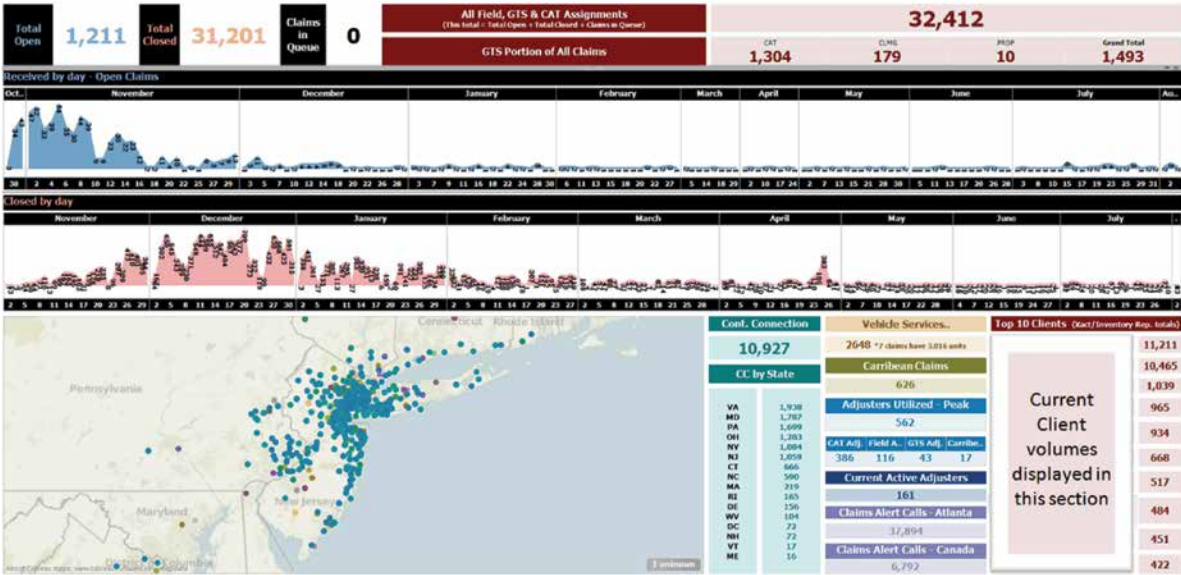
Crawford's Effort and Adjuster Challenges

Superstorm Sandy was an unprecedented event in terms of scope and Crawford's efforts; the response to Sandy was the largest in the company's more than 70-year history. Initially the biggest challenge for adjusters was travel delays due to cancelled flights, major gasoline shortage and massive infrastructure damage such as downed power lines, washed out roads and bridges, nonfunctioning traffic lights and entire blocks of neighborhoods reduced to rubble. Nearly 20,000 flights were cancelled, with Newark, JFK, and La Guardia airports all closed for at least three days.

Once on the ground, adjusters dealt with the lack of gasoline and lodging, and restrictions on access—for some neighborhoods only residents were allowed access due to fears of looting and vandalism.

As the storm came in towards the United States and prepared to make landfall on October 29, Crawford increased field staff deployments in affected areas ranging from Virginia to Massachusetts and the inland states of Ohio and West Virginia. It began using the Allentown, Pennsylvania office as a control point for redeployment of adjusters to the high volume claims areas of heavily populated New York and New Jersey.

While adjusters were fanning out, Sandy-related claims began coming in, and the types of claims included cars and other vehicles, marine, transportation such as rail lines, property damage to schools, businesses, amusement arcades, boardwalks, retail stores, healthcare facilities, standalone homes and high-value brownstone homes.



Crawford Claims Numbers

Number of U.S. states where claims were handled	16
Number of countries for claims	3 (United States, Jamaica, Bahamas)
Number of adjusters deployed	562
Number of calls received	44,085

Crawford Claims volume

Area/Type of Claims	Number of Claims
Caribbean	626
GTS®	1,473
Vehicles	5,657
Contractor Connection SM Direct Repair	10,927
Catastrophe Field Operations	30,061
Total:	48,744

11,050 estimates returned in first 20 days

Crawford's clients were able to monitor the adjusting progress and access claim reports from ClaimsAlert® on demand via XactAnalysis®, a claims analysis and reporting tool for the property insurance industry. As claims flow through Crawford's network, the software constantly monitors the data to help adjusters, insurers, and repair contractors catch errors, report on progress, and benchmark performance.

As adjusters were deployed and claims began to come in at ever accelerating rates it was clear that Sandy would be a long-term event with record levels of claim activity. Claims Crawford saw ranged from a damaged door on a house to flooding of the Statue of Liberty near New York

City, and in dollar amounts from a few hundred dollars to millions of dollars.

Claiming a Record

Crawford's connected technology systems and processes—including ClaimsAlert®, CAT Connection, and integrated claims intake — helped speed claims intake, evaluation and settlement, but some claims would not be settled until well into 2013 or possibly even much later. Just as Crawford had a record number of adjusters deployed, it also handled a record number of claims resulting from a single event, as the claims table shows.

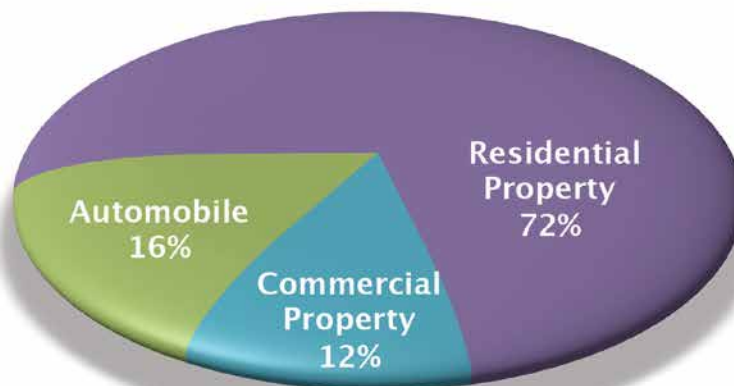
Additionally, other important Sandy claims-related adjusting points were:

- Crawford handled *approximately 4%* of the more than 1.5 million claims from the storm.
- According to industry estimates, total amount of insured losses overall for the storm were \$18.75 billion.
- Leading states for number of claims and amount of losses were *New York, New Jersey, Pennsylvania*, and then the rest of the states directly affected by the storm.

While settling some complex claims may take years, many claims were settled in six months or less. In April 2013 the Insurance Information Institute stated that insurance regulators in New Jersey and New York—the two Northeast states with the most damage by Sandy—reported that insurers had settled 93 percent of the Superstorm Sandy claims they received. The Institute went on to say that the estimates of claims payments do not include claims for flood damage insured under

Total Superstorm Sandy Claims Handled by the Insurance Industry by Type

1,580,000 Total Claims



the federal government's National Flood Insurance Program (NFIP)²⁰. One issue with a number of claims was the problem of flood insurance.

The Problem with Flood Claims

Most residential flood insurance is provided through the U.S. government managed National Flood Insurance Program. The NFIP was created in 1968 due to a widespread belief that flood hazard was uninsurable just through private insurance companies. The NFIP is based in the Federal Emergency Management Agency (FEMA), and makes flood insurance available to voluntarily participating communities. When communities join the program they agree to adopt baseline floodplain management regulations, and with this adoption the community residents become eligible to purchase a flood insurance policy²¹.

According to a study conducted shortly after the storm "This analysis shows that many homes and business owners who sustained flood damage from Sandy did not have a flood insurance policy²²." While claims were settled, the lack of flood insurance did mean that some losses were not completely covered by policies in force at the time of the storm. This situation pointed out the need for additional communities and individuals to consider obtaining flood coverage.

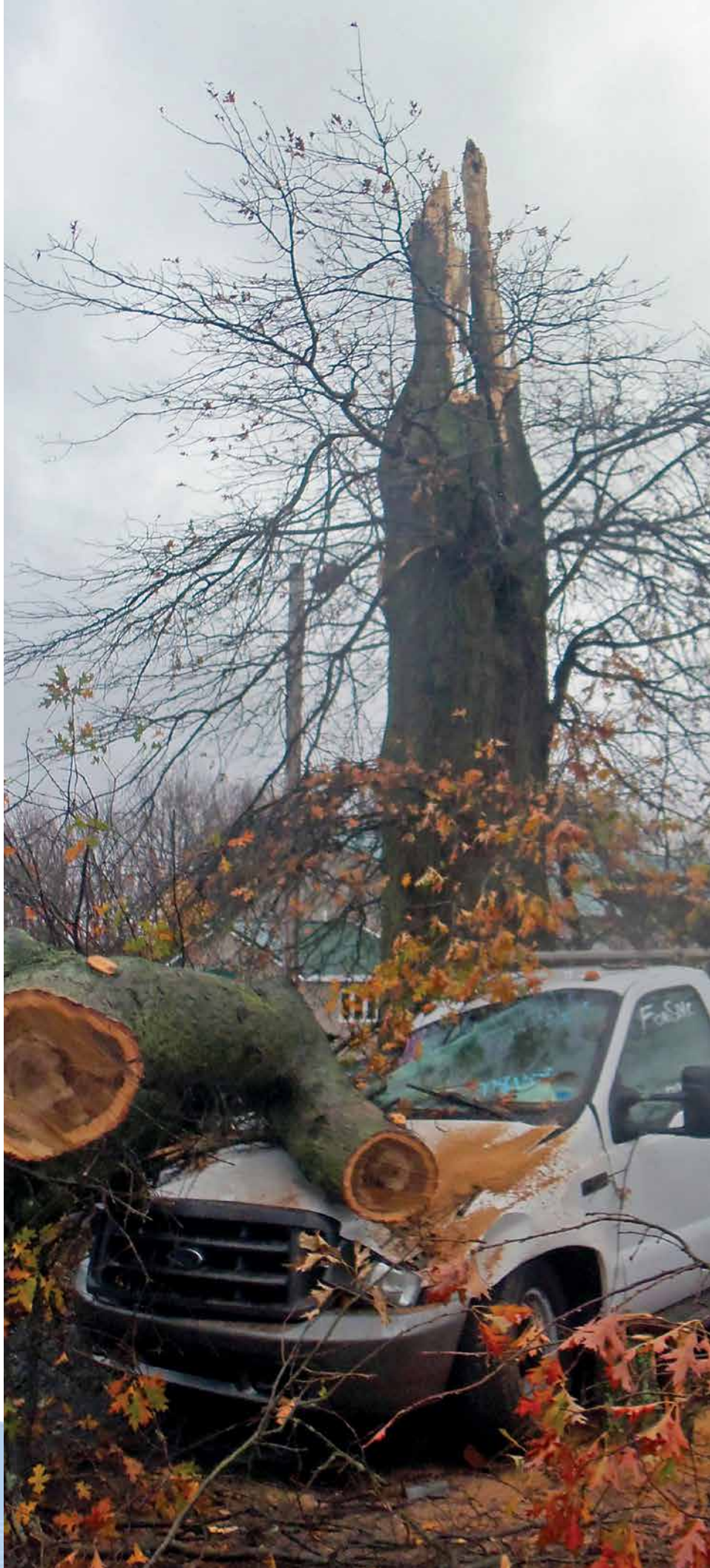
Regulatory, Legislative and Industry Changes after Sandy

A momentous event such as Superstorm Sandy creates wide-ranging repercussions for both state governments and private industries, including the insurance industry. In the wake of Sandy both states and the federal government took steps to manage the storm's effects, while the insurance industry began taking stock of how it might change its approach to catastrophic claims.

Regulatory Changes

Due to its size and destructive impact in the Northeast, Sandy generated innovative regulatory responses from several states in that region, responses that had a significant effect on the insurance industry post-storm.

On November 29, 2012, New York Governor Andrew Cuomo instituted emergency regulations on insurers to accelerate claims processing from hundreds of thousands of New York state residents whose residential or commercial properties were damaged or destroyed by Superstorm Sandy. One regulation Cuomo announced was a



requirement reducing the time limit for insurance company claims adjusters to respond to a claim to six days from 15 days. Governor Cuomo also said that New York's insurance regulator would post to the agency's website report cards on insurers' performance to make the companies more accountable for their response to customers needing storm-related assistance²³.

Governor Cuomo also announced soon after Sandy struck that New York homeowners would not have to pay hurricane deductibles on insurance claims from damage caused by the superstorm since the storm was not a hurricane, and the New York State Department of Financial Services informed the insurance industry that hurricane deductibles should not be triggered for Sandy²⁴. Later, in early 2013, New Jersey Governor Chris Christie and Governor Cuomo announced plans to offer a mediation program option to Sandy victims who are in claims disputes with their insurers²⁵.

For the federal government, a major reaction was an attempt to increase the borrowing rate—to allow for funding to pay claims—from the National Flood Insurance Program (NFIP). The funding was requested by the Obama administration and could only be approved by Congressional legislation, but so far Congress has waited to see the outcome of legislation passed earlier in 2012²⁶. The funding increase was necessary as the NFIP incurred \$18 billion of debt after Hurricane Katrina, and had remained in debt since that storm²⁷. Only months before the storm, in summer 2012, Congress passed and the President signed the *Biggert-Waters Flood Insurance Reform Act of 2012*; the most important provisions of the legislation were designed to put

the NFIP on a more solid fiscal foundation and build a catastrophic reserve fund to provide for unusually high claims²⁸.

Insurance Industry Changes

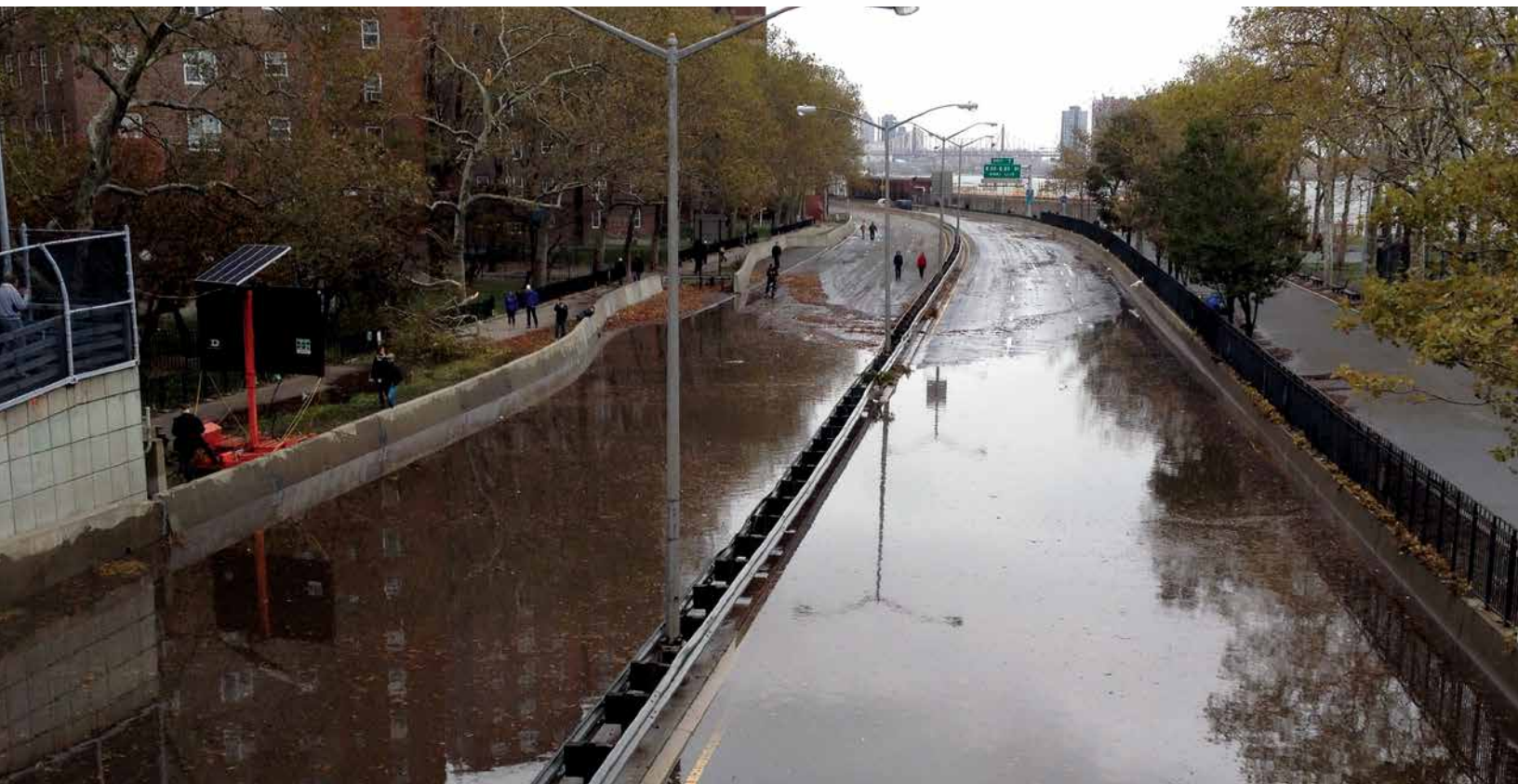
Sandy also resulted in the insurance industry considering what changes it might make in anticipation of future storms in order to more carefully manage exposure. While insurers' policies and procedures have evolved over decades to manage assumptions covering almost every conceivable disaster; Sandy's unique aspects—its unprecedented size, striking directly at the densely populated Northeast, and the massive storm surge—meant that they needed to re-evaluate their operations.

According to the analysis *State of the Market NAPCO Property Catastrophe Insurance Insights Spring 2013*²⁹; "While Sandy's impact on insurance pricing has been limited; the storm has forced insurers to reconsider their catastrophe exposures in the Northeast as they try to determine the new norm...Insurers are now considering how to manage exposures in the Northeast. Accounts located in the mid-Atlantic and Northeast may see more restrictive policy terms and conditions in coming months. Insureds with no adverse loss history are likely to see a stable market that may become increasingly competitive on price. Businesses that have experienced significant losses may see some additional price increases and may have increased difficulty in obtaining coverage for flood or windstorms."

Sandy's scope affected insurers across a very wide range of industries. *Trade Only Today*, a website for marine industry professionals, stressed that

Looking north toward Jacob Riis Houses from FDR Drive, in Manhattan's Lower East Side, showing flood damage from Superstorm Sandy.

Source: Beth Carey, via Wikimedia Commons.



"Hurricane Sandy will change the way marinas are insured... It won't just be marina owners who see rising rates. The huge marine loss inflicted by Sandy will be felt by marine businesses and boat owners across the nation"³⁰.

During panel discussions at a major insurance industry event—the 2013 Property/Casualty Joint Industry Forum in New York in January 2013—CEOs from major insurers and other insurance experts summarized what could be the eventual results of the storm for the industry. According to the panelists, the industry consequences of Sandy could include "Adjustments to pricing, policy limits and deductibles for damage caused by named storms are likely to occur... Additionally, greater attention should be paid to the concentration and interconnectivity of catastrophe risk in densely populated areas, risk management and insurance education for policyholders and the implementation of risk mitigation measures in order to stem the rising tide of catastrophe losses in the U.S. and worldwide."³¹

The Present and Future of Storms – the 2013 Hurricane Season

As mentioned earlier, in a recent study by Timothy Hall of the NASA Goddard Institute for Space Studies and Adam Sobel of the Department of Applied Physics and Applied Mathematics at Columbia University, they predicted that a hurricane of Sandy's intensity or greater making New Jersey landfall at a angle similar to Sandy's would not occur again for more than 700 years³².

Given the prediction by Hall and Sobel it is important to consider that the statistical projections of time intervals between storms of Sandy's magnitude should be viewed with some additional context. The misconception among the general public is often that hundreds of years must pass before a similar storm is generated. In fact, these researchers are saying that there is a one in seven hundred chance of recurrence, and the reality is that a storm such as Sandy can occur at any time—it could develop this year, next year, or any year. Sandy was an anomaly, and the nature of an anomaly is that it is not subject to a precise schedule or prediction.

However, given anticipated climate changes that would include overall global warming, the frequency and severity of storms may be altering significantly, both currently and in the future. The 2013 Atlantic Hurricane season started June 1 (and concludes at the end of November), and it's



of special interest given the widespread damage in caused by Sandy. Several predictions for this year's hurricane season have been issued by various weather forecasters both within and outside of the United States. Two well-known predictors of hurricanes, Philip J. Klotzbach and William M. Gray of the Department of Atmospheric Science at Colorado State University in Fort Collins, CO, issued their initial predictions in April 2013, with planned updates as the season progressed.

Source: AccuWeather.com, October 3, 2013

According to Klotzbach and Gray, "We anticipate that the 2013 Atlantic basin hurricane season will have enhanced activity compared with the 1981-2010 climatology...We anticipate an above-average probability for major hurricanes making landfall along the United States coastline and in the Caribbean³³." Considering the massive amount of damage that Sandy did last year that prediction is problematic. But was not the only prediction that came out in the spring of 2013; throughout May 2013 there was a consensus that 2013 was going to have a lot of hurricanes³⁴

However, as the 2013 hurricane season developed through the summer it was clear that it would have a late start. In fact 2013 was almost—missing the record by just a few hours—the latest start to a hurricane season ever, with Hurricane Umberto achieving Category 1 hurricane ranking on September 11, 2013³⁵. The late start to the 2013 hurricane caused a number of predictions to be revised, with some analysts reconsidering the activity level for the year and lowering expectations³⁶. According to Alex Sosnowski, expert senior meteorologist with AccuWeather.com, "With only two hurricanes so far, the 2013 Atlantic hurricane season is well behind the curve to reach the average number of hurricanes and is one of the least intense since 1950³⁷."

The Future of Hurricanes

A recent study published in the Proceedings of the National Academy of Sciences highlights the potential for a very significant increase in Atlantic hurricane surges due to rising temperatures. The authors analyzed a variety of predictors, including storm surge statistics from tide gauges to changes in global temperature patterns, concluding that:

"The most extreme events are especially sensitive to temperature changes, and we estimate a doubling of Katrina magnitude events associated with the warming over the 20th century... Statistically downscaling 21st century warming patterns from six climate models results in a twofold to sevenfold increase in the frequency of Katrina magnitude events for a 1 °C rise in global temperature³⁸."

In 2005, Hurricane Katrina was one of our country's deadliest and most destructive Atlantic hurricanes, responsible for more than 1,800 deaths and total insured property damage estimated at \$81 billion. Superstorm Sandy was a larger storm but not as destructive.

How Cities can Manage for Future Disasters

The economic stakes of readiness for future catastrophes such as Superstorm Sandy continue to get higher. According to *The Coastline at Risk: 2013 Update to the Estimated Insured Value of U.S. Coastal Properties*, since 2008 the insured value of properties in coastal areas of the United States increased at a compound annual growth rate of a bit less than 4%. The reports believes that as the economy recovers, the rate of growth will pick up, and at a historical rate of 7%, the total values insured would *double every 10 years*. The report specified the huge value of land along the coast, stating that the insured value of U.S. residential and commercial properties in coastal counties now exceeds \$10 trillion, and while New York edges Florida as the state with the highest coastal property values, at close to \$3 trillion, Florida has the largest proportion of its value in coastal counties at almost 80%³⁹.

A panel of experts gathered at the New York Academy of Sciences on January 24, 2013, to discuss how cities and smaller population areas can better prepare for these disasters. A www.livescience.com article summarizes the experts list of 10 lessons from Sandy that cities should note in preparing for future disasters, particularly those cities along coastlines:

1. **Know that sea level rise is the major problem.** The sea level in the New York City area has risen approximately a foot over the last century, and Sandy brought

a record storm surge to the southern tip of Manhattan, and that surge received a boost from the increase in sea levels.

2. **Know that storm barriers cannot solve everything.** The devastation caused by Sandy's storm surge prompted discussion of installing a barrier system in the waters surrounding New York. But a barrier system, which uses a gate to let ships, fish and water in and out, wouldn't address the real problem—sea-level rise. A short-term cost-benefit analysis does favor a storm barrier system, because the city could avoid improving its infrastructure. But a barrier would not provide a long-term solution, which would be costly.
3. **Discuss retreat upfront and clearly.** People can adapt to the increasing threat of storms in different ways, including moving when risks become too high, a strategy called managed retreat.
4. **Consider ways to make retreat possible if not desirable.** Cities and communities in the United States must implement new ways manage populations that would be naturally resistant to relocating. For example, a legal tool called land re-adjustment has shown success in the Netherlands, where much of the country is below sea level. When a community is threatened rising water, its land is re-allocated elsewhere and property lines redrawn. Tools used by the non-profit Nature Conservancy to protect land may also be effective, for instance, conservation easements limit how land can be used, particularly by prohibiting development.
5. **Re-envision the city's development.** With planning, commitment, and effort, a New York City better adapted to the threat of hurricanes and storms could be created. It would take enormous resources and overcoming individual's entrenched preferences for where and how they want to live. The new vision—and version—of the city would have a smaller footprint and probably be less dense. It could have more parks on the waterfront as buffers and other infrastructural changes such as modifying the electrical grid, emptying out the lower basements of skyscrapers and using them for parking, and halting vulnerable development such as housing along the waterfront.
6. **Think how nature can help.** As a result of development over the centuries, New York City, New Jersey and surrounding areas have lost wetlands and oyster reefs,

natural features that once protected the coast from storms. Restoring these features could help make the coast more resilient, by reducing wave velocity, storm surge height and erosion. Wetlands and oyster reefs also provide other benefits, such as the removal of contaminants from the water as they act as massive organic filters.

7. **Reconsider costs and longer-term needs.** According to the panel, on average, every \$1 spent to make infrastructure more resilient against pounding storms saves \$4 in costs later on, but still many communities will not commit the funds needed to protect their future.
8. **Don't just focus on the most recent event.** After a disaster like Sandy, the natural tendency is to discuss how to protect our shoreline but other disasters have to be planned for as well. Heat waves and disease are also major threats associated with climate change.
9. **Expect surprises.** By allowing greenhouse gas emissions to accumulate in the atmosphere, humans are conducting a giant experiment with the planet, but there will be surprises and situations that cities have to adapt to that cannot be predicted.
10. **Disasters may bring equity issues among economic classes.** Poor and rich neighborhoods can be exposed to risks associated with extreme events and climate change because of their location. As a result, it is important to avoid pitting these interests against one another in battles for resources needed to adapt, since poorer neighborhoods have less political influence⁴⁰.

In June 2013, New York Mayor Michael R. Bloomberg outlined a storm protection plan for the city of New York that incorporated a number of the actions similar to those put forward by the New York Academy of Sciences panel in January, including installing storm barriers and fortifying the power grid⁴¹.

Crawford is Ready

Crawford is able to respond quickly to natural and man-made disasters both in the U.S. and around the world. We have deeply experienced professionals, effective procedures and processes, proprietary and seamless policyholder to service center to client technology backed by the full resources and support of the world's largest independent provider of claims management solutions—a billion-dollar company with operations in more than 70 countries.



While Sandy was an exceedingly rare event that tested Crawford & Company's capabilities, Crawford was able to fully meet the needs of both the insured and insurers, scaling its considerable resources to adapt to the significant claims volume coming out of this major storm.

Regardless of the frequency or scale of future disasters, Crawford's extensive network of adjusters and all of its other professionals and staff are ready to assist as needed. If we may assist you please contact us:

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MTA employees using a pump train are working around the clock to pump seawater out of the L train's tunnel under the East River. The tunnel was flooded during the unprecedented 13-foot storm surge of Hurricane Sandy.

Source: Metropolitan Transportation Authority/
Patrick Cashin, via
Wikimedia Commons.

Endnotes

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