

TROPICAL CYCLONES AND CLIMATE CHANGE

**COMMUNICATING
THE IMPACTS ON NEW YORK CITY
AND THE COURSES OF ACTION**

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1. Motivation

Over eight million people¹² reside in New York City, in an area that has been historically ravaged by tropical cyclones. In a changing climate, how will the general behavior and the impacts of these systems evolve?

a. Goals

The primary goal will be to communicate the current scientific projections regarding the trends in tropical cyclone activity and impacts, primarily storm surge flooding. With this information, it is hopeful that coastal residents will take an active role in building a resilient coast by working with policymakers, scientists, and each other.

i. Tactics

Hurricane Sandy in 2012 caused 43 deaths, flooded almost 90,000 buildings, and inflicted nineteen billion dollars' worth of damage¹. This event, while not directly attributable to a changing climate, served as an impetus for coastal residents and policymakers to more seriously consider resiliency. Many New Yorkers vividly remember living through Hurricane Sandy, so the event will be used as a reference when communicating future impacts. This also incorporates narrative elements into the strategy, which has been shown to have a more resonant impact with audiences.

This communications strategy is rooted in science and information will be presented objectively. While this may hamper the initial “hype” around the topic, the long-term credibility and applications of this strategy will be stronger than if communicated from the standpoint of an alarmist.

ii. Measuring Success

Success will be measured through the amount of physical and online interactions and the presence of the topic in future policy discussions.

Physical interactions refer to in-person interactions between communicators and the audience, including attendance at the public science event, requests for interviews by members of the press, and consultations solicited by local policymakers.

Online interactions refer to engagements with posts on social media (shares, likes, retweets, views, etc.).

If successful, communities will press elected leaders to consider action for a more resilient coastline capable of withstanding the impacts of tropical cyclones.

b. Audience

The audience will be narrowed by geography. The communicated content pertains to residents of New York City. Of the eight million residents¹², 400,000 reside in the one percent annual chance floodplain⁷. Also, per the US Census, the demographics of New York City are young and diverse, with 65.4% of the population between the ages of 18 and 65 and a majority non-white population¹⁵. These statistics will be given special consideration when selecting social media platforms, but most of the communicated content will be location centric.

i. Audiences Targeted on Social Media Platforms

To reach as many residents of New York City as possible, a wide variety of common social media platforms will be employed to disseminate the messages.

Wikipedia pages entitled “Tropical Cyclones and Climate Change” and “Tropical Cyclones” will be edited to reflect the messages set forth by this communication strategy.

Twitter will be used to share the messages to both residents and outside parties who may have an interest in learning about the impact of climate change on tropical cyclones and coastal resiliency in New York City.

Facebook will be used to reach elder residents, as the platform has a large share of older users².

YouTube will be used as it has a large reach across all age groups².

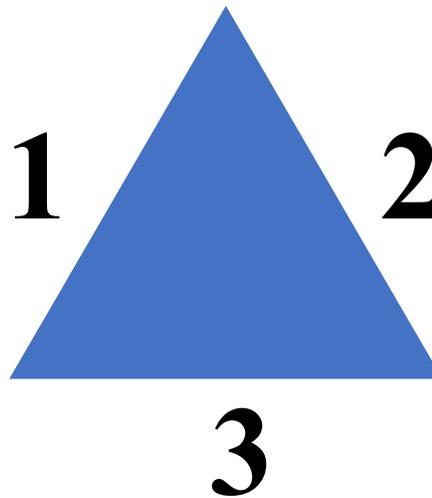
ii. Generic Member of the Target Audience

Chris, age 30, lives on Staten Island, and vividly remembers Hurricane Sandy flooding the lower floors of his building. He was trapped in his apartment for days until the water was pumped out.

Despite the threat of sea level rise and other adverse impacts of climate change, Chris refuses to move. New York City is home. Chris wonders how tropical cyclones like Hurricane Sandy will be different in a changed climate, and how best to make the community resilient to these impacts.

Many of Chris’s neighbors are also curious and do not fully understand the scientific projections for a changing climate.

2. Message Triangle



Audience	Residents of New York City (Geographical Focus)
Goal	Communicate the impacts of climate change on tropical cyclone activity.
Message	Coastal residents will feel the greatest impacts in a changing climate; developing a resilient coast is necessary to preserve lives and protect property.
1	<p>General Trends in Tropical Cyclone Activity with 2°C Warming</p> <ul style="list-style-type: none"> • The number of tropical cyclones, globally, will likely not change.⁹ • The portion of storms which reach Category 4 and 5 status will increase by about 13%.⁹ • Expect more storms to reach higher intensities, but the amount of storms to remain the same.
2	<p>Storm Surge Flooding</p> <ul style="list-style-type: none"> • Flooding was the second-highest cause of weather related fatalities in the United States in 2018¹⁷. • 400,000 residents of New York City live in the one percent annual chance floodplain⁷. • Sea levels will rise 11-21” by 2050⁶, allowing storm surge to spread further inland. • Rainfall rates are projected to increase by 14%⁹, increasing the likelihood of flooding beyond the immediate coast.
3	<p>Coastal Resiliency Efforts</p> <ul style="list-style-type: none"> • Efforts should focus on coastal flooding. • Hurricane Sandy in 2012 served as a wake-up call for policy makers and coastal residents. • Regulations have been strengthened by the City Government. • A sea wall will be built along the Staten Island Coastline capable of withstanding coastal flooding of 15.6ft, two feet higher than that caused by Hurricane Sandy¹⁶.

3. Press Release

NEW YORK CITY PANEL ON CLIMATE CHANGE LAUNCHES NEW CAMPAIGN

The New York City Panel on Climate Change (NPCC) has today launched a new campaign to educate residents on how tropical cyclones and their impacts will evolve in a changing climate. This information will allow the coastal communities at highest risk to work together towards building a resilient New York City.

“New York City is at risk of being impacted by tropical cyclones, and many wonder how these impacts will be different in a changing climate,” says Aidan Mahoney, lead author of the communications strategy. “Our goal is to bring the science directly to the residents of New York City and initialize a dialogue with our coastal communities.”

Tropical cyclones are storms that form over warm ocean water and can produce strong winds, heavy rain, and storm surge flooding. “Tropical cyclone” is the most general term for tropical depressions, tropical storms, and hurricanes. The amount of tropical cyclones globally will likely not change. However, the portion of this amount to reach Category 4 and 5 status will increase by about 13%. So, expect to see more storms reaching higher intensity but the amount of storms, globally, to remain the same.

The factor most closely associated with tropical cyclone strength is wind. However, flooding exceeded wind as the second highest cause of weather-related deaths in the United States in 2018. Flooding from storm surge, in which tropical cyclones push water onshore, already presents a dangerous situation to coastal residents. In New York City, 400,000 residents are in the one percent annual chance floodplain. With 11 to 21 inches of sea level rise projected by the year 2050, storm surge flooding will spread further inland. Additionally, rainfall rates are projected to increase by 14%, increasing the likelihood of flooding beyond coastal areas.

“We encourage residents to explore the resources provided by local government, including checking if they’re located in a flood zone at maps.nyc.gov/hurricane,” said Mahoney.

Since Hurricane Sandy in 2012, which served as an impetus for coastal resident and policymakers to seriously consider coastal resiliency efforts, regulations have been strengthened at all levels of government and engineering initiatives have been examined and undertaken. A sea wall will be built along most of the Staten Island coastline, capable of withstanding coastal flooding of 15.6ft, two feet higher than that caused by Hurricane Sandy.

The campaign will blanket Twitter, Facebook, YouTube, and Wikipedia with this information. Additionally, a podcast was produced that features Helen Cheng, a Coastal Resilience Specialist at New York Sea Grant and the Science and Resiliency Institute at Jamaica Bay. Cheng talks about some of her work with New York City’s coastal communities and shares her perspective on the issues of science communication, climate change, and coastal resiliency.

###

4. Blog Post

Nearly [60 million people](#) live in coastal counties along the Atlantic and Gulf Coast, at risk of experiencing impacts from tropical cyclones. Additionally, over eight million people reside in New York City, in an area that has been historically ravaged by tropical cyclones. In a changing climate, how will these impacts and the general behavior of these systems evolve?

The amount of tropical cyclones will likely not change. However, the portion of this amount to reach Category 4 and 5 status will [increase by about 13%](#). So, expect to see more storms reaching higher intensity but the amount of storms to remain the same.

Flooding from storm surge, in which tropical cyclones push water onshore, already presents a dangerous situation to coastal residents. In New York City, [400,000 residents](#) are in the one percent annual chance floodplain. As sea levels rise, storm surge flooding will spread further inland. Additionally, rainfall rates are projected to [increase by 14%](#), increasing the likelihood of flooding beyond coastal areas. Flooding was the [second highest cause of weather related death](#) in the United States in 2018, exceeding wind, the factor most closely associated with tropical cyclone strength.

Faced with this problem, how can both the government and residents of New York City work to mitigate the impacts? With coastal flooding of paramount concern, efforts should focus on this threat. Since Hurricane Sandy in 2012, which served as a wake-up call for policy makers and coastal residents affected, [regulations have been strengthened](#) at all levels of government and engineering initiatives have been examined and undertaken. A [sea wall will be built](#) along most of the Staten Island coastline, capable of withstanding coastal flooding of 15.6 feet, two feet higher than that caused by Hurricane Sandy. Projects such as this will save lives and protect property.

Climate measures weather patterns over long periods of time; singular events cannot be attributed directly to climate change. Often, “hype” surrounds tropical cyclones as they threaten communities and gives rise to cursory conclusions. This communications strategy will seek to present the previous three talking points in accordance with the message triangle model, targeting an audience of coastal residents in New York City. Per the [US Census](#), coastal residents trend older and more diverse, so Facebook, which has a [large share of older users](#), and YouTube, which has a [wide reach across age groups](#), will be used in addition to Twitter and Wikipedia.

Visuals showing storm surge inundation and flooding from tropical cyclones will be shared to convey the severity of these impacts. Satellite imagery will be used when referencing tropical cyclone strength. My experiences during Hurricane Sandy can be used anecdotally, but must be framed in order to reduce assumptions that Hurricane Sandy was caused directly by climate change. The ideal time for this campaign is during a period in which tropical cyclones are trending within the new cycle, to counter and clarify the “hype.” However, with climate change a predominant topic in the current discourse, the relevancy of this campaign remains strong.

[\(View the blog post online\)](#)

5. Visual Materials

Visuals will be used to enhance the informational content and make a larger impression upon the target audience.

a. Video

The video is available [here](#). It is three minutes and thirty-seven seconds in length, and communicates the talking points listed in the messaging triangle. Images complement and enhance the narrated material. The events of Hurricane Sandy are drawn upon as historical analysis and to capture the attention of the audience.

b. Podcast

The podcast is available [here](#). It is twelve minutes and thirty-seven seconds in length. After speaking the talking points shown in the messaging triangle, Helen Cheng, a Coastal Resilience Specialist at New York Sea Grant and the Science and Resiliency Institute at Jamaica Bay, is featured in an interview. She speaks about her work communicating science and improving resiliency in New York City's coastal communities. Additionally, Helen Cheng provides her own perspective on the greatest threats to coastal communities in a changing climate and the most promising remedies.

c. Images

Images showing storm surge inundation and flooding from tropical cyclones will be shared to convey the severity of these impacts. Satellite imagery will be used when referencing tropical cyclone strength. These components will be part of the video and infographic.

d. Infographic

The infographic is available [here](#). It can easily be parsed into multiple panels, allowing for easy application to social media posts. Furthermore, the infographic can be printed as posters, for display in public places. One of these public places can be the New York City subway system, which often has a plethora of advertisements and campaigns on display. The infographic can also be rearranged into physical brochures for distribution at local events or at information kiosks.

6. Digital Platforms

A digital presence is essential in the twenty-first century and is an effective way to disseminate the message of this strategy.

a. Twitter

Twitter is a platform that serves 145 million monetizable daily active users¹⁴. 64% of Twitter users are between the ages of 18 and 49, making it an effective tool to reach the young population of New York City. The 240-character limit requires any communicated information to be distilled and focus on the key points. Tweets can be supplemented by photos, video, and hyperlinks to websites. Hashtags used in tweets link that tweet to specific topics and categories.

Five tweets will be sent in logical succession from a topical introduction through a conclusion. Accompanying the text will be an infographic or supporting image. For drafts of each tweet, please refer to Appendix 2b.

b. Wikipedia

Wikipedia pages entitled “Tropical Cyclones and Climate Change” and “Climate Change in New York City” will be edited to reflect the messages set forth by this communication strategy. This will expose the messages to a wide variety of readers.

c. Facebook

Facebook will be used to reach elder residents, as the platform has a large share of older users⁵. Much like Twitter, posts can be supplemented by photos, video, and hyperlinks to websites. Hashtags can also be used but are less prevalent on the platform. There is no character limit, allowing for longer posts, but it is recommended posts are shorter in length to keep the attention of the target audience and ensure the full message is interacted with.

Five posts will be sent in logical succession from a topical introduction through a conclusion. Accompanying the text will be an infographic or supporting image. These posts will be the same as those posted on Twitter to maintain consistency in the communicated content.

d. YouTube

YouTube will be used as it has a large reach across all age groups⁵. It is the most widely used social media platform used by American adults¹¹. Content shared on YouTube are primarily videos or, in some cases, audio.

The project video and podcast audio will be uploaded. In addition, short fifteen to thirty second clips can be created that can be shared as public service advertisements.

7. Public Science Event

Outreach is an integral part of science communication. Working directly with the impacted communities increases the focus on and reception of the key messages.

The public science event will be organized through the lens of outreach. Hosted in New York City's coastal communities, audience question and answer will follow an approximately thirty-minute presentation. This format allows for the conveyance of the information proposed by this communication strategy, while also encouraging community members to bring their own concerns before the experts. Additionally, community members can inquire about possible ambiguities in the presented information, allowing for active improvement of the communication strategy.

This event can be easily applied to an online setting, via livestream on Twitter, Facebook, or YouTube. The same presentation can be given, and questions asked by users in the comments section can be answered live.

i. Location of Event

The event will be held in New York City's coastal communities, so as to be able to speak directly with the people affected by the strategy's messages. An online event can also be held to make the material accessible for those who are unable to attend the in-person event.

ii. Attendees

The attendees will be the community members at greatest risk of experience the impacts of tropical cyclones. They will be curious as to what they should expect in a changing climate and how best to prepare for the impacts.

iii. Advertising

This event will be advertised physically through the posting of flyers and posters, and online social media campaigns and advertisements.

APPENDIX

1. Wikipedia

Wikipedia pages entitled “Tropical Cyclones and Climate Change” and “Climate Change in New York City” will be edited to reflect the messages set forth by this communication strategy.

a. Three Sources Added

10. [^] US Department of Commerce, NOAA. "Weather Related Fatality and Injury Statistics" [↗](#). *www.weather.gov*. Retrieved 2019-11-25.
11. [^] Gornitz, Vivien; Oppenheimer, Michael; Kopp, Robert; Orton, Philip; Buchanan, Maya; Lin, Ning; Horton, Radley; Bader, Daniel (March 2019). "New York City Panel on Climate Change 2019 Report Chapter 3: Sea Level Rise" [↗](#). *Annals of the New York Academy of Sciences*. **1439** (1): 71–94. doi:10.1111/nyas.14006 [↗](#). ISSN 0077-8923 [↗](#).
12. ^{^ a b} Gornitz, Vivien; Oppenheimer, Michael; Kopp, Robert; Horton, Radley; Bader, Daniel A.; Orton, Philip; Rosenzweig, Cynthia (2018). "Enhancing New York City's Resilience to Sea Level Rise and Increased Coastal Flooding" [↗](#) (PDF). *NASA Technical Reports Server*.
13. [^] NYC Planning. (2016). *Info Brief - Flood Risk in NYC. Info Brief - Flood Risk in NYC*. Retrieved from <https://www1.nyc.gov/assets/planning/download/pdf/plans-studies/climate-resiliency/flood-risk-nyc-info-brief.pdf> [↗](#)
14. [^] US Army Corps of Engineers - New York District, & New York State Department of Environmental Conservation. (2016). *South Shore of Staten Island, New York Coastal Storm Risk Management - Interim Feasibility Study for Fort Wadsworth to Oakwood Beach - Final Report*. Retrieved from <https://www.nan.usace.army.mil/Missions/Civil-Works/Projects-in-New-York/South-Shore-of-Staten-Island/> [↗](#)
16. ^{^ a b} Knutson, Thomas; Camargo, Suzana J.; Chan, Johnny C. L.; Emanuel, Kerry; Ho, Chang-Hoi; Kossin, James; Mohapatra, Mrutyunjay; Satoh, Masaki; Sugi, Masato; Walsh, Kevin; Wu, Liguang (2019-08-06). "Tropical Cyclones and Climate Change Assessment: Part II. Projected Response to Anthropogenic Warming" [↗](#). *Bulletin of the American Meteorological Society*: BAMS–D–18-0194.1. doi:10.1175/BAMS-D-18-0194.1 [↗](#). ISSN 0003-0007 [↗](#).

b. One Paragraph Added to Two Pages

Coastal Flooding [\[edit \]](#)

Flooding was the second highest cause of weather related fatalities in the United States in 2018^[10]. The projected 11-21 inches of sea level rise in New York City by 2050^[11] will compound the impacts of coastal flooding. The damage caused by *Hurricane Sandy* in 2012 served as an impetus for policymakers and residents to more seriously consider coastal resiliency efforts^[12]. Since then, regulations have been strengthened^[12] to better protect the 400,000 New Yorkers in the one percent annual chance floodplain^[13]. Additionally, in May 2017, New York Governor *Andrew Cuomo* announced the construction of a 5.3 mile seawall along the Staten Island coastline capable of withstanding coastal flooding of 15.6 feet, two feet higher than that caused by Hurricane Sandy. When completed, the seawall will reduce damages by approximately \$30 million^[14].

Overall Frequency [\[edit \]](#)

There is currently no consensus on how climate change will affect the overall frequency of tropical cyclones.^[16]

Frequency of Intense Tropical Cyclones [\[edit \]](#)

While trends in overall frequency are inconclusive, a greater percentage (+13%) of tropical cyclones are expected to reach Category 4 and 5 strength with 2°C warming.^[16] This finding was from a study that sought to ascertain generalizations regarding how tropical cyclone activity will change if the average mean temperature of the Earth increases by 2°C.

c. Communicating on the Talk Page

Major Page Update? [\[edit \]](#)

There is a lot of new and ongoing research into this topic. I think it would be wise to discuss an overhaul in the page. Personally, it might be helpful to declutter some of the older research/trends and reorganize the sections to present the information more coherently. Thoughts? -ADM4700 (talk) 04:12, 24 October 2019 (UTC)

Yes, please do! The article need sit. Femke Nijse (talk) 06:14, 24 October 2019 (UTC)

2. Other Social Media

a. Platforms Used

Twitter, Wikipedia, Facebook, and YouTube will be used, as previously discussed in Section 6.

b. Five Tweets

Tweet #1, Scheduled for 19 November 2019 at 9:00am:

Are you a resident of #NewYorkCity? Did you know that #NYC can be impacted by tropical cyclones?

This week, I'll be sharing the science on how tropical cyclones may behave differently with #ClimateChange and the path towards a #ResilientNYC.

#CUSciStory



Tweet #2, Scheduled for 19 November 2019 at 9:05am:

Tropical cyclones (TCs) form over warm oceans and can produce strong winds, heavy rain, and storm surge.

With #GlobalWarming of 2°C, the global amount of TCs will not change.

However, the portion of TCs which reach Cat 4/5 status will  by approx. 13%.

#ResilientNYC #CUSciStory



Tropical Cyclone Frequency

Will New York City see more tropical cyclones?

13%
Increase in Category 4 and 5 Storms

The amount of tropical cyclones will likely not change. So, New York City can expect to see the same amount of tropical cyclones.

However, the portion of storms which reach Category 4 and 5 status will increase by about 13%.

Expect to see more storms reaching higher intensity but the amount of storms to remain the same.

Tweet #3, Scheduled for 20 November at 12:00pm:

Tropical cyclones produce #StormSurge by pushing water onshore.

With 11-21" of #SeaLevelRise in #NYC by 2050, floods will reach further inland.

400,000 residents live in the 100-year floodplain. #KnowYourZone! Visit maps.nyc.gov/hurricane.

#ResilientNYC #CUSciStory



Storm Surge

Tropical Cyclones push water ashore, causing life-threatening coastal flooding.

11-21"

Sea Level Rise by 2050
Sea level rise will allow floodwaters to reach further inland.

#2
Cause of Fatalities

Flooding was the second highest cause of weather related fatalities in 2018.

400,000
Residents in the 100-year Floodzone

100-year floods will be up to four times as frequent by 2050.
For reference, flooding from Hurricane Sandy was approximately a 100-year flood event.
Increasing rainfall rates will increase the extent of land flooding.

Tweet #4, Scheduled for 21 November at 12:00pm:

#HurricaneSandy in 2012 served as a wake-up call for New Yorkers.

Since then, steps have been taken to build a #ResilientNYC, including updating regulations and infrastructure.

The largest project? A 5.3 mile seawall will be built along the #StatenIsland coast.

#CUSciStory

Coastal Resiliency

Courses of action that can be taken to mitigate the impacts.



Hurricane Sandy served as a wake-up call for policy makers and coastal residents.

Changes were made to the NYC Building Codes and critical infrastructure was retrofitted to increase resiliency.

A 5.3 mile seawall will be constructed along the Staten Island coast, capable of withstanding flood levels up to 15.6ft.



Rendering of the seawall.
Photo: Office of Gov. Andrew Cuomo

\$30,374,000

Reduction in Damages with the Seawall

Tweet #5, Scheduled for 22 November at 9:00am:

#NewYorkCity has succeeded at every challenge it faced. Improving our #CoastalResilience will be no different.

Want to learn more about #ClimateChange and #TropicalCyclones?

From @NOAA: <https://www.gfdl.noaa.gov/global-warming-and-hurricanes/>

From @nycgov: <https://www1.nyc.gov/site/orr/challenges/nyc-panel-on-climate-change.page>

#ResilientNYC #CUSciStory



Tweet Analytics as of 03 December 2019 at 1pm:



Aidan Mahoney @adm4700
Are you a resident of **#NewYorkCity**? Did you know that **#NYC** can be impacted by tropical cyclones?

This week, I'll be sharing the science on how tropical cyclones may behave differently with **#ClimateChange** and the path towards a **#ResilientNYC**.

#CUSciStory
pic.twitter.com/JN03WjVz33

Impressions	341
times people saw this Tweet on Twitter	
Total engagements	8
times people interacted with this Tweet	
Likes	4
times people liked this Tweet	
Retweets	1
times people retweeted this Tweet	
Media engagements	1
number of clicks on your media counted across videos, vines, gifs, and images	
Hashtag clicks	1
clicks on the hashtag(s) in this Tweet	
Profile clicks	1
number of clicks on your name, @handle, or profile photo	



Tropical cyclones produce #StormSurge by pushing water onshore.

With 11-21" of **#SeaLevelRise** in **#NYC** by 2050, floods will reach further inland.

400,000 residents live in the 100-year floodplain.
#KnowYourZone! Visit <http://maps.nyc.gov/hurricane>.

#ResilientNYC #CUSciStory
pic.twitter.com/1BC9BIWxFE

Impressions	377
times people saw this Tweet on Twitter	
Total engagements	8
times people interacted with this Tweet	
Likes	3
times people liked this Tweet	
Media engagements	2
number of clicks on your media counted across videos, vines, gifs, and images	
Retweets	1
times people retweeted this Tweet	
Link clicks	1
clicks on a URL or Card in this Tweet	
Detail expands	1
times people viewed the details about this Tweet	



Aidan Mahoney @adm4700
Tropical cyclones (TCs) form over warm oceans and can produce strong winds, heavy rain, and storm surge.

With **#GlobalWarming** of 2°C, the global amount of TCs will not change.

However, the portion of TCs which reach Cat 4/5 status will **↑** by approx. 13%.

#ResilientNYC #CUSciStory
pic.twitter.com/AHLDHjWX4q

Impressions	350
times people saw this Tweet on Twitter	
Total engagements	4
times people interacted with this Tweet	
Retweets	1
times people retweeted this Tweet	
Media engagements	1
number of clicks on your media counted across videos, vines, gifs, and images	
Likes	1
times people liked this Tweet	
Detail expands	1
times people viewed the details about this Tweet	



Aidan Mahoney @adm4700
#HurricaneSandy in 2012 served as a wake-up call for New Yorkers.

Since then, steps have been taken to build a **#ResilientNYC**, including updating regulations and infrastructure.

The largest project? A 5.3 mile seawall will be built along the **#StatenIsland** coast.

#CUSciStory
pic.twitter.com/BfRf96NBp

Impressions	423
times people saw this Tweet on Twitter	
Total engagements	20
times people interacted with this Tweet	
Media engagements	16
number of clicks on your media counted across videos, vines, gifs, and images	
Likes	2
times people liked this Tweet	
Replies	1
replies to this Tweet	
Retweets	1
times people retweeted this Tweet	

#TropicalCyclones?	
From @NOAA: https://www.gfdl.noaa.gov/global-warming-and-hurricanes/ ...	
From @nycgov: https://www1.nyc.gov/site/orr/challenges/nyc-panel-on-climate-change.page ...	
#ResilientNYC #CUSciStory pic.twitter.com/KDXsHYi0rV	
Impressions	380
times people saw this Tweet on Twitter	
Total engagements	8
times people interacted with this Tweet	
Likes	4
times people liked this Tweet	
Retweets	1
times people retweeted this Tweet	
Media engagements	1
number of clicks on your media counted across videos, vines, gifs, and images	
Detail expands	1
times people viewed the details about this Tweet	
Profile clicks	1
number of clicks on your name, @handle, or profile photo	

c. Content for Other Platforms

The above tweets will be slightly reformatted (removal of hashtags) and posted on Facebook at the same times. Additionally, Facebook is popular for live broadcasts and can be used for that purpose to interact with New York City’s coastal communities directly.

Facebook posts are linked as follows:

- [Post #1](#)
- [Post #2](#)
- [Post #3](#)
- [Post #4](#)
- [Post #5](#)

For YouTube, the [project video](#) will be uploaded. In addition, short fifteen to thirty second clips can be created that can be shared as public service advertisements.

3. Video and Podcast Description

a. Links to Files

The project podcast is available [here](#).

The project video is available [here](#).

b. Incorporating a Story Arc and the Messaging Triangle

The script for the podcast is available [here](#). The introduction invokes memories of Hurricane Sandy bearing down on New York City, capturing the audience's attention. Strong statistics are also shared to capitalize on the relevance of the following information. My personal experience during Hurricane Sandy is also shared to add to my credibility and emphasize my connections to the audience of fellow New Yorkers. Hurricane Sandy is referenced throughout the podcast, as it was the impetus for coastal residents and communities to seriously consider coastal resiliency.

Following the introduction, the three talking points are discussed in accordance with the messaging triangle for the project. Key messages are shared and explained.

Helen Cheng, a Coastal Resiliency Expert at New York Sea Grant and the Science and Resiliency Institute at Jamaica Bay, is then interviewed. She talks about some of her work with New York City's coastal communities and shares her perspective on the issues of science communication, climate change, and coastal resiliency.

The podcast concludes with an inspirational message of hope, motivating listeners to positively work towards building a resilient coast.

The video narration is the same, except does not include the interview. Visual aids such as satellite animations and informative graphics are used to enhance the narrated information.

c. Platforms Used

Both the video and podcast will be uploaded to YouTube, and the corresponding links will be shared across the other social media platforms used in this strategy.

d. Production Efforts

The podcast and video narration was recorded with the equipment in the whisper room. Audio was recorded directly into and edited in Hindenburg. The interview was conducted on Zencast, an online service that uses VoIP and records audio for each speaker. These files were then imported to Hindenburg for editing. Royalty free music was added to the podcast at appropriate moments.

The video was produced in iMovie, and paired audio with visuals. Some visuals were sourced from government agencies or used with attribution. Others were created in Microsoft PowerPoint and imported into iMovie.

Works Cited in Any Component of the Strategy or Supplemental Materials

- ⁰¹City of New York. (2013). *A Stronger, More Resilient New York*. Retrieved from <https://www1.nyc.gov/site/sirr/report/report.page>
- ⁰²Demographics of Social Media Users and Adoption in the United States. (2019, June 12). Retrieved from <https://www.pewresearch.org/internet/fact-sheet/social-media/>.
- ⁰³Feng, K., Xian, S., & Lin, N. (n.d.). Tuning deep flooding risk with adaptive strategy: An application for NYC. In *13th International Conference on Applications of Statistics and Probability in Civil Engineering, ICASP13*. doi: 10.22725/ICASP13.050
- ⁰⁴Garner, A. J., Mann, M. E., Emanuel, K. A., Kopp, R. E., Lin, N., Alley, R. B., ... Pollard, D. (2017). Impact of climate change on New York City's coastal flood hazard: Increasing flood heights from the preindustrial to 2300 CE. *Proceedings of the National Academy of Sciences, 114*(45), 11861–11866. doi: 10.1073/pnas.1703568114
- ⁰⁵Gornitz, V., Oppenheimer, M., Kopp, R., Horton, R., Bader, D. A., Orton, P., & Rosenzweig, C. (2018). Enhancing New York City's Resilience to Sea Level Rise and Increased Coastal Flooding. *NASA Technical Reports Server*. Retrieved from <https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20180007116.pdf>
- ⁰⁶Gornitz, V., Oppenheimer, M., Kopp, R., Orton, P., Buchanan, M., Lin, N., ... Bader, D. (2019). New York City Panel on Climate Change 2019 Report Chapter 3: Sea Level Rise. *Annals of the New York Academy of Sciences, 1439*(1), 71–94. doi: 10.1111/nyas.14006
- ⁰⁷NYC Planning. (2016). *Info Brief - Flood Risk in NYC*. Retrieved from <https://www1.nyc.gov/assets/planning/download/pdf/plans-studies/climate-resiliency/flood-risk-nyc-info-brief.pdf>

- ⁰⁸Knutson, T. R., Mcbride, J. L., Chan, J., Emanuel, K., Holland, G., Landsea, C., ... Sugi, M. (2010). Tropical cyclones and climate change. *Nature Geoscience*, 3(3), 157–163. doi: 10.1038/ngeo779
- ⁰⁹Knutson, T., Camargo, S. J., Chan, J. C. L., Emanuel, K., Ho, C.-H., Kossin, J., ... Wu, L. (2019). Tropical Cyclones and Climate Change Assessment: Part II. Projected Response to Anthropogenic Warming. *Bulletin of the American Meteorological Society*. doi: 10.1175/bams-d-18-0194.1
- ¹⁰Orton, P., Lin, N., Gornitz, V., Colle, B., Booth, J., Feng, K., ... Patrick, L. (2019). New York City Panel on Climate Change 2019 Report Chapter 4: Coastal Flooding. *Annals of the New York Academy of Sciences*, 1439(1), 95–114. doi: 10.1111/nyas.14011
- ¹¹Perrin, A., & Anderson, M. (2019, April 10). Share of U.S. adults using social media, including Facebook, is mostly unchanged since 2018. Retrieved from <https://www.pewresearch.org/fact-tank/2019/04/10/share-of-u-s-adults-using-social-media-including-facebook-is-mostly-unchanged-since-2018/>.
- ¹²Population - Current and Projected Populations. (n.d.). Retrieved from <https://www1.nyc.gov/site/planning/planning-level/nyc-population/current-future-populations.page>.
- ¹³Reed, A. J., Mann, M. E., Emanuel, K. A., Lin, N., Horton, B. P., Kemp, A. C., & Donnelly, J. P. (2015). Increased threat of tropical cyclones and coastal flooding to New York City during the anthropogenic era. *Proceedings of the National Academy of Sciences*, 112(41), 12610–12615. doi: 10.1073/pnas.1513127112
- ¹⁴Twitter Investor Relations. (2019). *Q3 2019 Letter to Shareholders*. Retrieved from https://s22.q4cdn.com/826641620/files/doc_financials/2019/q3/Q3-2019-Shareholder-Letter.pdf

¹⁵U.S. Census Bureau QuickFacts: New York City, New York. (2018, July 11). Retrieved from <https://www.census.gov/quickfacts/fact/table/newyorkcitynewyork/PST045218>.

¹⁶US Army Corps of Engineers - New York District, & New York State Department of Environmental Conservation. (2016). *South Shore of Staten Island, New York Coastal Storm Risk Management - Interim Feasibility Study for Fort Wadsworth to Oakwood Beach - Final Report*. Retrieved from <https://www.nan.usace.army.mil/Missions/Civil-Works/Projects-in-New-York/South-Shore-of-Staten-Island/>

¹⁷US Department of Commerce, & NOAA. (n.d.). Weather Related Fatality and Injury Statistics. Retrieved from <https://www.weather.gov/hazstat/>.