NCST Technical Investigation of Hurricane Maria (Puerto Rico)

Public Response to Emergency Communications

Project Leader: Dr. Katherine J. Johnson

Background/Motivation

- Rapid intensification of storm leading to short evacuation timelines
- Extensive damage and impact from Hurricane Maria on Puerto Rico; Irma prior impacts
- Multi-hazard environment: winds, floods, storm-surge, landslides
- Societal preference for sheltering in place
- Extended lack of communication among emergency and building officials, and the public after the storm
- Emergency rescues required in places across the island

Photos courtesy of NIST

Project Plan: Key Activities

Emergency Messages

Information Provider Interviews

Household Survey

Household Interviews

Project Plan: Key Activities

Emergency Messages
Qualitative content analysis of messages shared with the public before the storm

Information Provider Interviews

Household Survey

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Project Plan: Key Activities

Emergency Messages
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Information Provider Interviews
Insights on message content, distribution, and effectiveness

Household Survey

Household Interviews

Project Plan: Key Activities

Emergency Messages
Qualitative content analysis of messages shared with the public before the storm

Information Provider Interviews
Insights on message content, distribution, and effectiveness

Household Survey
Topics: risk awareness, access to info channels and sources, and factors for evacuation decision-making

Household Interviews

Project Plan: Key Activities

Emergency Messages
Qualitative content analysis of messages shared with the public before the storm

Information Provider Interviews
Insights on message content, distribution, and effectiveness

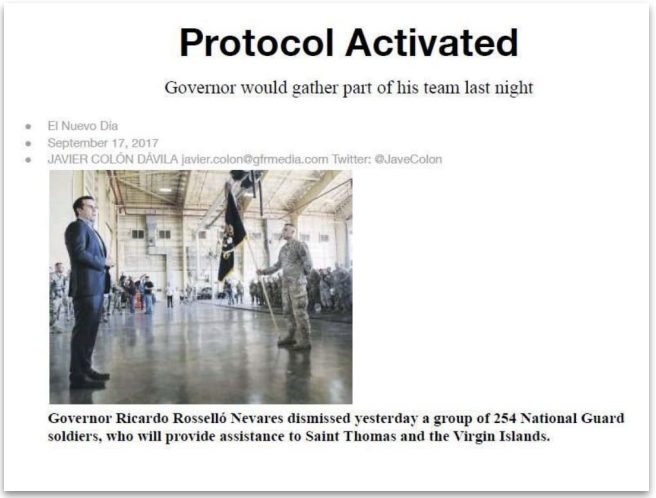
Household Survey
Topics: risk awareness, access to info channels and sources, and factors for evacuation decision-making

Household Interviews
More in-depth characterization of topics covered in survey

Progress:
Analysis of Emergency Messages (1/2)

- Messages from September 16-20, 2017, collected by NIST personnel
- Qualitative Content Analysis of long and short form messages, including from social media, using collaborative data analysis software
- All messages translated from Spanish to English for analysis
- Since message format and capacity differs, theoretical approaches for analyses are tailored by message type drawing upon well-established theory from emergency communications literature

Example news article:



Protocol Activated

Governor would gather part of his team last night

- El Nuevo Día
- September 17, 2017
- JAVIER COLÓN DÁVILA javier.colon@gfrmedia.com Twitter: @JaveColon

Governor Ricardo Rosselló Nevares dismissed yesterday a group of 254 National Guard soldiers, who will provide assistance to Saint Thomas and the Virgin Islands.

Example tweet:

Manejo de Emergencias
@NMEADpr

Director Ejecutivo junto al Gobernador de PR ofrecen conferencia de prensa ante la aproximación de la tormenta tropical María.

Ricardo Rosselló and 3 others

1:16 PM · Sep 17, 2017 · Twitter for iPhone

22 Retweets **2** Quote Tweets **27** Likes

Progress:
Analysis of Emergency Messages (2/2)

Long form message analysis *complete*:

- 43 news articles
- 12 press releases

Short form message analysis *in-process*:

- ~ 140 NOAA messages

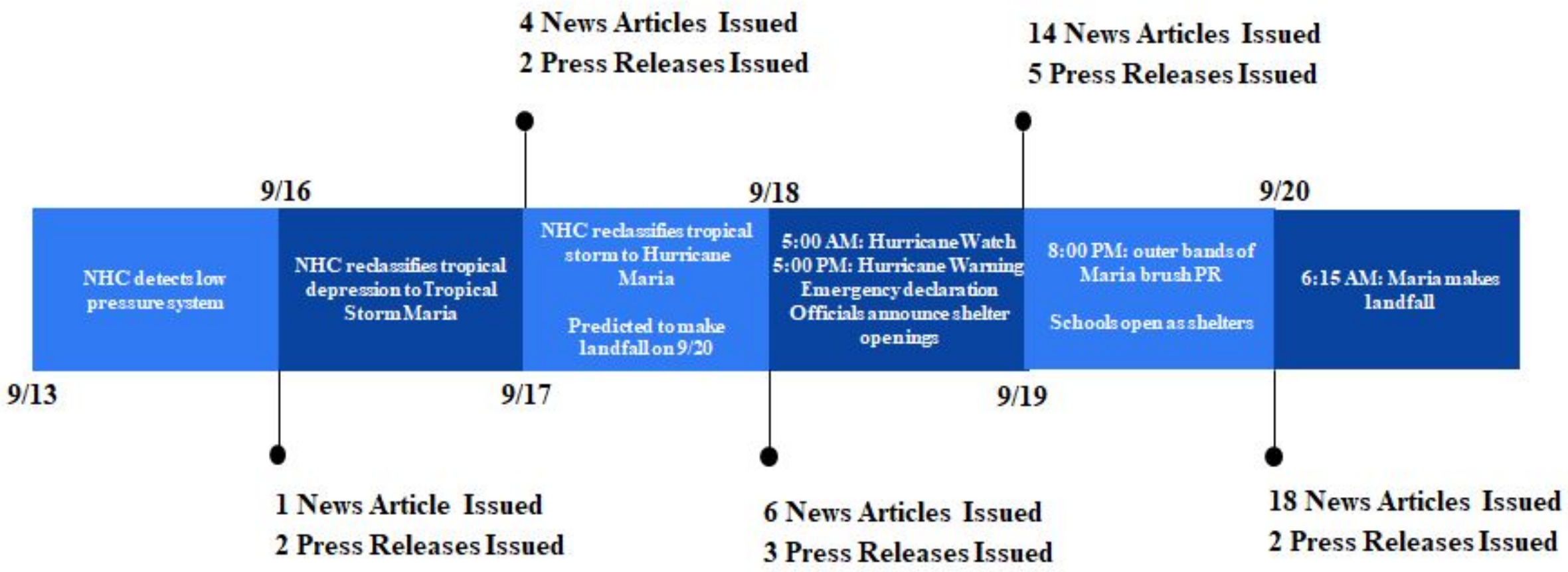
Social media analysis *in-process*:

- >2500 tweets

Example tweet:

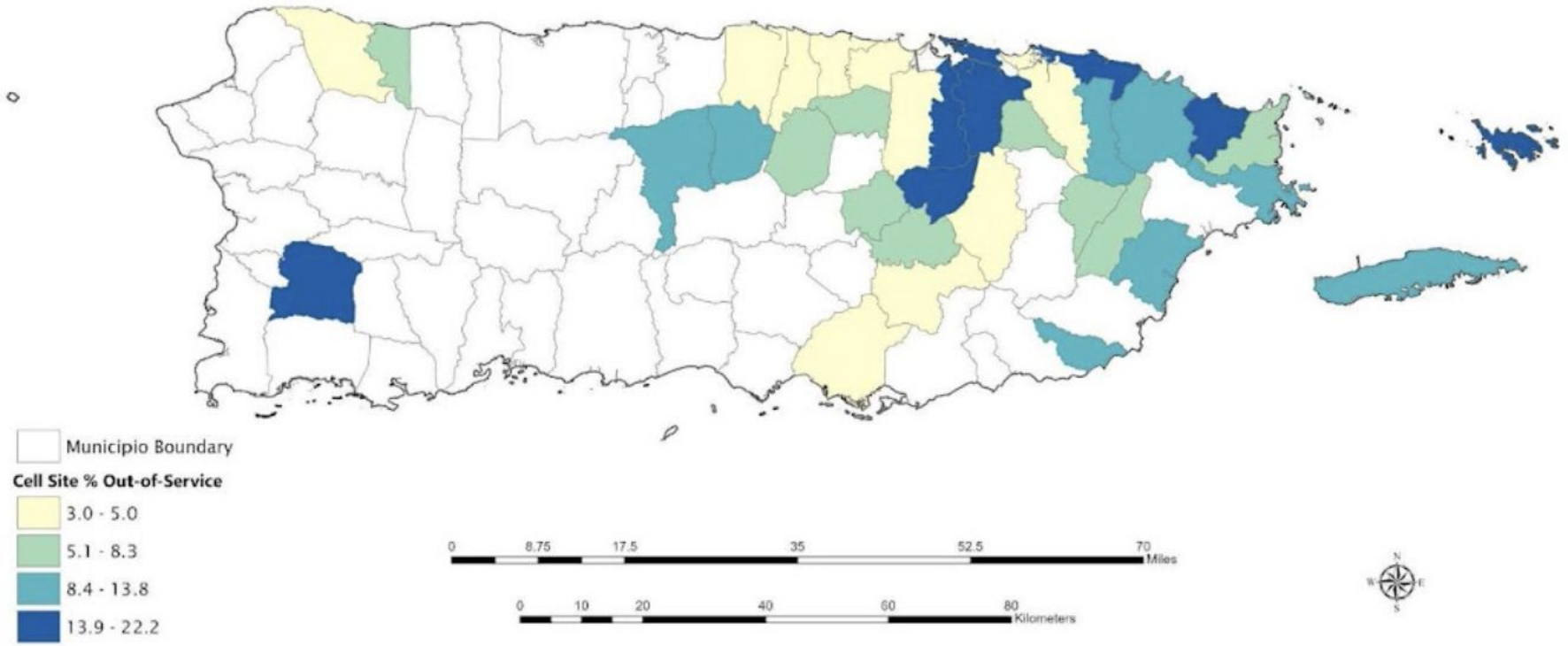
as of 5/2/22

Contextualizing Timing of Message Distribution



Contextualizing Geographical Variance of Message Distribution

% cell sites out of service on 9/14/17 after Hurricane Irma



preliminary NIST analysis, created from data from the FCC's Disaster Information Reporting System

Recent Progress:
Analysis of Information Provider Interviews

- Data collection conducted by contractors between Mar.-Sep. 2021
- Key interviewees determined by NIST
- Information providers interviewed include: mayors, emergency managers, meteorologists, forecasters and journalists, and government agency representatives
- (35) hour-long interviews conducted in Spanish or English, per the preference of the interviewee
- Transcripts processed and transmitted to NIST for analysis, each between 15-26 pages in length
- Ongoing coding is focused on emphasis of messages transmitted, audience of message, and partners involved in developing message

Recent Progress:
Household Survey Data Collection

- Stratified sample of 1,500 households across four study regions in-process (representing demographic characteristics, flood, and landslide risk)
- 78% complete, primarily in-person, significant improvement in response rate with weekend fieldwork
- Descriptive statistics and regression analyses will identify factors associated with decisions to take protection (evacuate), and role of emergency communications
- Coordination has begun with statisticians in the NIST Statistical Engineering Division regarding data analysis

Photo courtesy of Horsley Witten Group, Inc.

progress as of 5/30/22

Recent Progress:
Household Interview Data Collection

- Interview given as a phone follow-up with willing survey respondents who reflect appropriate geographic distribution
- Data collection in progress: 33% of 100 household interviews are complete
- Interview questions are focused on barriers to taking protective action, and unmet information needs before and during the hurricane
- Qualitative analyses are planned for household interview transcripts; these data can also be connected to the survey data for an enhanced perspective on responses across Puerto Rico

progress as of 5/30/22

Photo courtesy of NIST

Next Steps

- Complete Qualitative Content Analysis by Fall 2022
- Complete analysis of Information Provider Interviews Summer 2022
- Receive Household Survey data, expected Summer 2022
- Receive Household Interview data, expected Fall 2022
- Continue report writing for individual data collection efforts; work to identify and further assess cross-instrument issues and questions requiring additional consideration
- Continue collaboration across HM team to coordinate on key issues

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Project Leader: Katherine J. Johnson
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