Despite an unprecedented positioning of supplies and personnel by U.S. governmental agencies in anticipation of Hurricane Katrina’s 2005 strike on the U.S. Gulf coast (1), by the time the storm and subsequent flooding lashed the New Orleans metro area beginning on August 29, both local and federal officials found themselves struggling to mount a sufficient response to the storm and its aftermath in what soon evolved into a landscape-scale disaster. In this brief, three main areas of difficulty that contributed to a lack of situational awareness among officials managing the storm's response will be discussed: a lack of recognition of the novelty of this particular storm's process, the introduction of cognitive bias, and a presence of organizational bias. Afterwards, I will introduce an alternate decision-making framework - a modified Incident Management System (IMS) that would likely have increased awareness for officials during all phases of the Katrina crisis and potentially enabled a more efficient response.

Although hurricanes usually strengthen over warm Gulf waters and assume a general northwesterly direction early in their track, the final point of landfall, potential storm surge, and wind speeds are identifiable only within a narrow
timeframe of usually under twenty-four hours. National officials, as well as officials at the state and local levels in Louisiana all recognized Katrina as a significant storm, but there was little preparation for the worst-case scenarios including major pump failure or levee breach. The 2004 joint state and federal report "Southeast Louisiana

Catastrophic Hurricane Functional Plan" also did not consider widespread flooding in New Orleans due to breaches in the levees, and therefore, did not provide information about possible systems for early recognition, or how to distinguish a breach from an overtopping, or procedures for each situation. With communications disrupted at New Orleans Mayor Ray Nagin's Emergency Operational Center (EOC) during the storm, media reports of flooding were conflicting and sporadic, and only one federal representative was in a position to visualize and report on the ground situation in the city. After the storm's most powerful bands passed, search and rescue became the top priority, but taxed air and water rescuers had no centralized place to report where they deposited the rescued, or where citizens who had rescued themselves were congregating, thus allowing for thousands of people at the Civic Center and on overpasses to remain unrecognized and unaided. Along with interagency disorganization at the state level and leadership discordance at the federal level (especially within the Department of Homeland Security, DHS), these events cast a shadow on developing an accurate awareness of the situation,

specifically by not recognizing these novel aspects of Katrina's potential until they had contributed to an expansive crisis.

Discordance within DHS likely resulted from the disparate leadership styles of two of its leaders, FEMA Director Michael Brown (who was unhappy that his organization was subsumed by DHS) and Michael Chertoff, the Director of DHS. Procedural power plays and infighting within the FEMA/DHS union hindered communication between Brown and Chertoff, and likely slowed the federal response to the Katrina disaster, including Chertoff's declaration of the event as an incident of national significance. Brown also found communication lacking in Louisiana, especially between Governor Kathleen Blanco and local officials including Mayor Nagin. Brown claimed that the states disorganization made it impossible to set up a unified command and a coordinated response. The resultant interrupted information flow and guardedness within departments introduced organizational bias, and likely contributed to a slower triage of needs assessment during and after the storm. A unified command model is vital to overcoming organizational bias during a crisis, according to Pheifer, and inter-organizational information sharing during a crisis is the single most important lesson learned for responders from the September 11, 2001 terrorist attacks in New York.

Lack of accurate information about the status of the levees also led to an initial overconfidence for officials, especially at the national level, including FEMA head Michael Brown, who stated in a situation report twelve hours after landfall that the city's levees had not been breached when in fact, water from Lake Pontchartrain
was already spilling into the city from a break in the Industrial Canal. Along with the large-scale pre-event response by the federal government, this misinformation likely led to a relaxation in the perceived severity of the ongoing situation, and an introduction of cognitive bias that slowed the federal response when it became apparent twelve hours later that the city was largely under water.


A structure that would serve to unify command horizontally rather than vertically, in order to withstand the various personalities and demands involved as well as withstand the crisis, would likely have improved the situational awareness of the Hurricane Katrina crisis management team. A Team-B type approach could possibly provide some harmonizing benefit in this regard, but only after the initial storm had passed, due to its time demands on multiple members. The 2004 National Response Plan, a push-system prototype based on the current National Incident Management System and designed to streamline the federal response when states were overwhelmed by a crisis, was introduced during Katrina, but did not prevent either the organizational bias or the cognitive bias that was eventually introduced, especially at the federal level. These biases led to inadequate recognition of the novel problems occurring within the Katrina disaster and reduced the effectiveness of response actions.
The current Incident Management System, however, can serve as an excellent starting point for an effective decision-making structure, and if modified to emphasize situational anticipation, horizontal command, and communication, I submit it could have increased the situational awareness of those leading the response to Hurricane Katrina. Within the Planning section of the IMS, for example, use of available ethnographic data in unique ways could help focus attention on the novelties of an ongoing crisis like Katrina. Knowledge of the approximate number of indigent outpatients treated for drug addiction at the Charity Hospital clinic system could have helped anticipate the withdrawal desperation that resulted in assaults on Charity staff after the storm. Ethnographic knowledge of leadership patterns in populations of varying ethnicities including the Native American populations of St. Bernard and Plaquemines Parish could have shed valuable information about baseline conditions before and after the storm. Even careful consideration of the number and locations of New Orleans public housing units and health facilities could have led to a more effective evacuation of the city's poor and vulnerable populations, as well as a more efficient distribution of water and food.

The IMS command structure could have been used for unifying all Katrina leaders, first under Governor Blanco and then under FEMA head Brown after the incident response was nationalized. This would have allowed for a flattening of the confusing hierarchical structure under which actors from separate agencies operated and therefore, less organizational bias. The problems within the federal branch could also have been reduced with a more horizontal command organization that was embraced and acknowledged. Finally, under the Logistics section of the
IMS, a Sentinel unit could increase accuracy and timeliness of information updates, thereby reducing decision-makers' reliance on previous experience (Khaneman's system 1 heuristic analysis) and also reducing the cognitive bias that was introduced in large part by poor communication. Sentinels could include meteorological personnel already positioned to communicate with weather services, National Guard members, government and security personnel, media, first responders, logistics experts, and even members of the community identified as holding pertinent logistical knowledge through available ethnographic data. The Logistics commander would identify patterns, compile, and distribute findings of the Sentinel unit to gain real-time knowledge of changing conditions. In the Hurricane Katrina experience, impediments to communication, whether due to inter-agency or interpersonal miscommunication, lack of observers on the ground, or technology failures were likely the most powerful contributor to a lack of recognition of the novelty, the introduction of cognitive bias, and the introduction of organizational bias - all stumbling blocks to situational awareness for leaders attempting to mount an effective response during the crisis.