

Practice as You Play: Using HSEEP Exercises to Evaluate a Storm Decision Support Tool

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Overview and Background

The Coastal Hazards Analysis Modeling and Prediction (CHAMP) system helps emergency managers anticipate consequences of major ocean storms by combining high-resolution storm models with a database of critical infrastructure vulnerabilities (see richamp.org.)

We’re using implementation research to understand how emergency managers apply CHAMP data to improve storm response decision-making.

HSEEP Functional Exercises

We conducted two functional exercises based on the U.S. Homeland Security Exercise and Evaluation Program (HSEEP), designed to answer research questions about implementing CHAMP for storm response.

- **Exercise 1** was held in Rhode Island’s State Emergency Operations Center (SEOC) in June 2023 with six RI Emergency Management Agency (RIEMA) staff who typically work in the SEOC during major storms.
- **Exercise 2** was held in December 2024 with eighteen (18) emergency managers and decision makers from agencies at the federal, state, and local levels in Southern New England.

PARTICIPANT FEEDBACK

- CHAMP can help inform executive leadership and gain buy-in for storm response decisions.
- CHAMP’s low-point analysis feature can be used to dynamically re-direct evacuation routes in real time.
- Giving infrastructure managers direct access to maintain their facility data would help keep the system current.
- Data on precipitation rates and riverine flooding would greatly enhance CHAMP’s utility.

FIGURE: Responses to Exercise 2 post-survey indicating: A.) If players found it easy to obtain data from CHAMP during the exercise; and B.) If players felt ready to use CHAMP in a real-world event after completing the exercise.

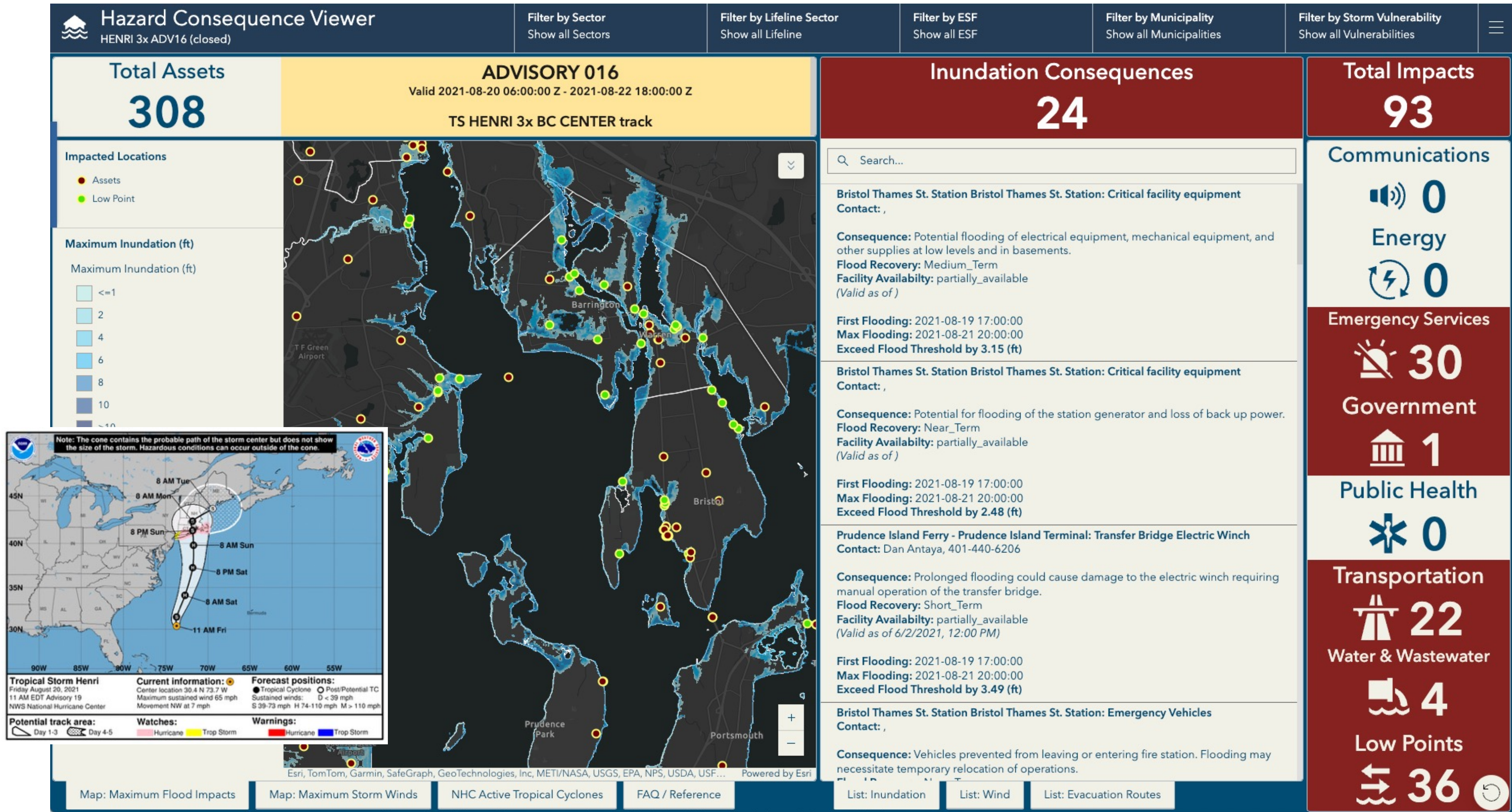
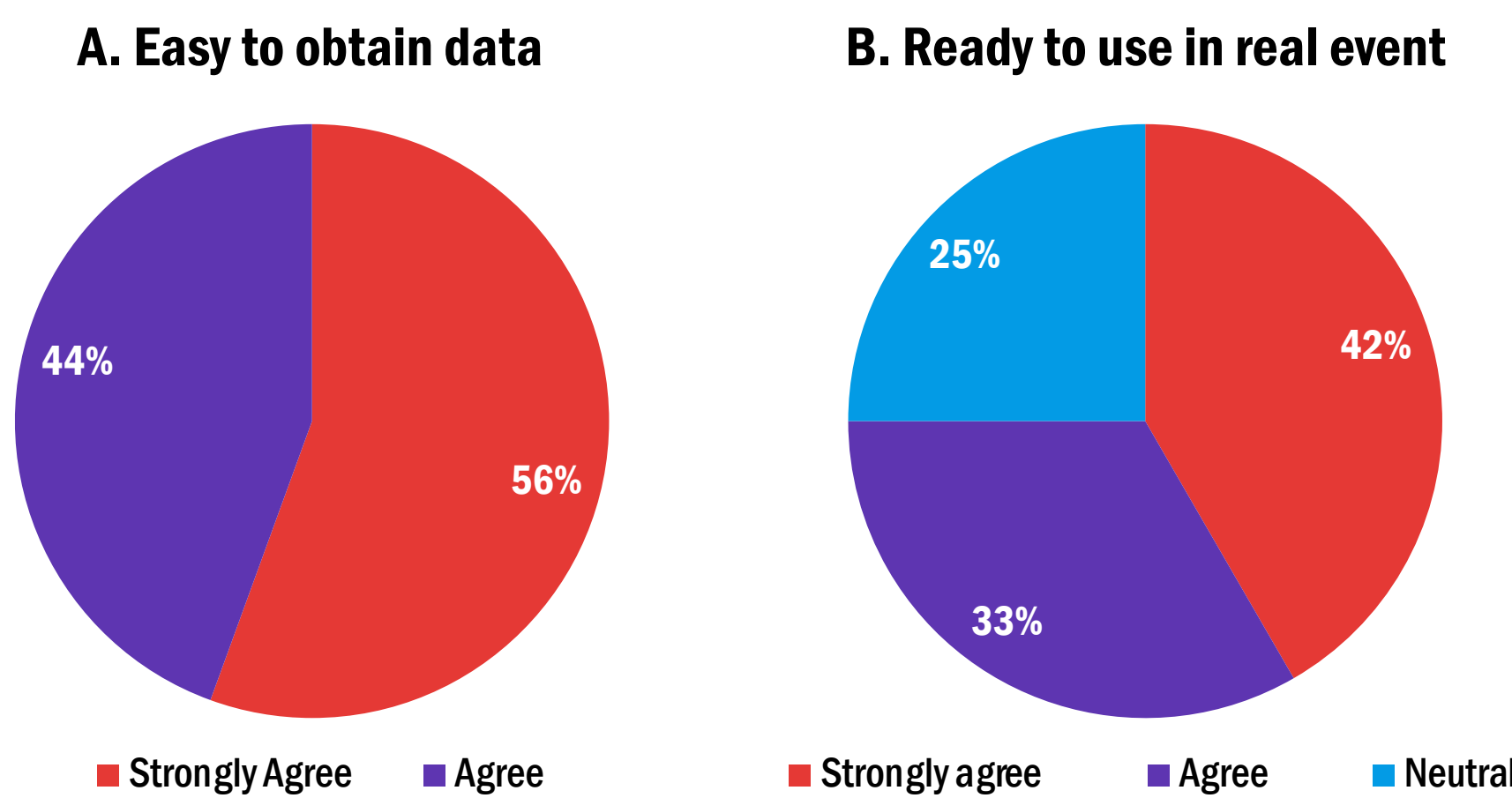


FIGURE: CHAMP dashboard showing predicted storm impacts for the modified storm simulation as of 48 hours prior to landfall. INSET: Corresponding National Hurricane Center advisory (#16) for Henri.

Study Results

- Participants successfully used CHAMP dashboards to identify specific impacts to local infrastructure for the scenario and described how data would be used in their storm response workflows.
- Consequence examples included roadway flooding, bridge closures, wastewater treatment plant inundation, damage to drinking water distribution systems, the potential for hazmat spills, and business continuity for emergency services.
- Decision points included shelter activation, evacuation of low-lying areas, traffic control, and public information and messaging. Players also identified challenges such as significant lead times required to open shelters and evacuate vulnerable areas.

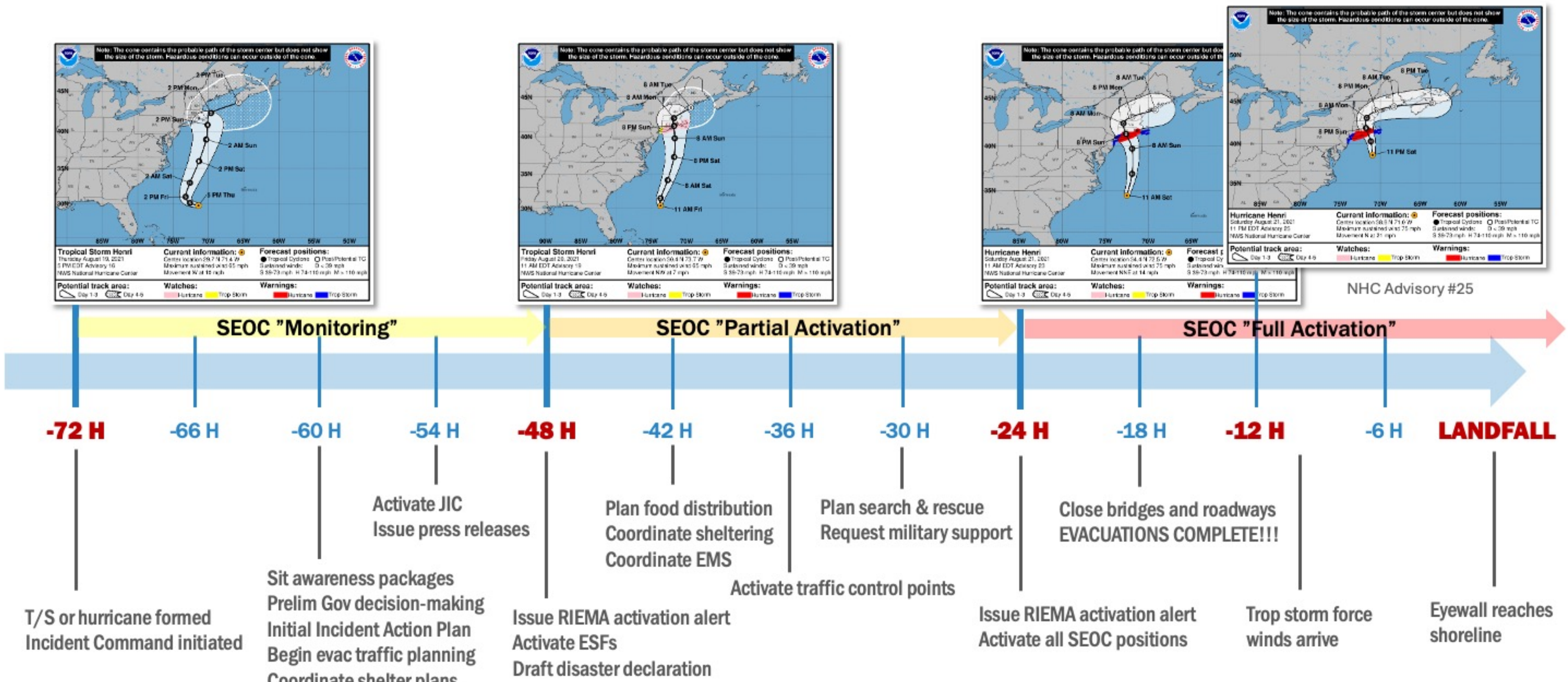


FIGURE: Storm forecast injects from SEOC functional exercise, aligned with RIEMA's 96-hour storm preparation timeline and timed to match delivery of National Hurricane Center advisories



PHOTO: Members of the CHAMP exercise team work with RIEMA staff in the State Emergency Operations Center during the 2023 SEOC functional exercise.

References

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