A Cooperative Pilot Project on Weather and Emergency Management Decision Support

Jessica Losego
Renaissance Computing Institute – University of North Carolina at Chapel Hill

Ken Galluppi, Burrell Montz, Catherine Smith, Steve Schotz, Brian Etherton, Woody Roberts

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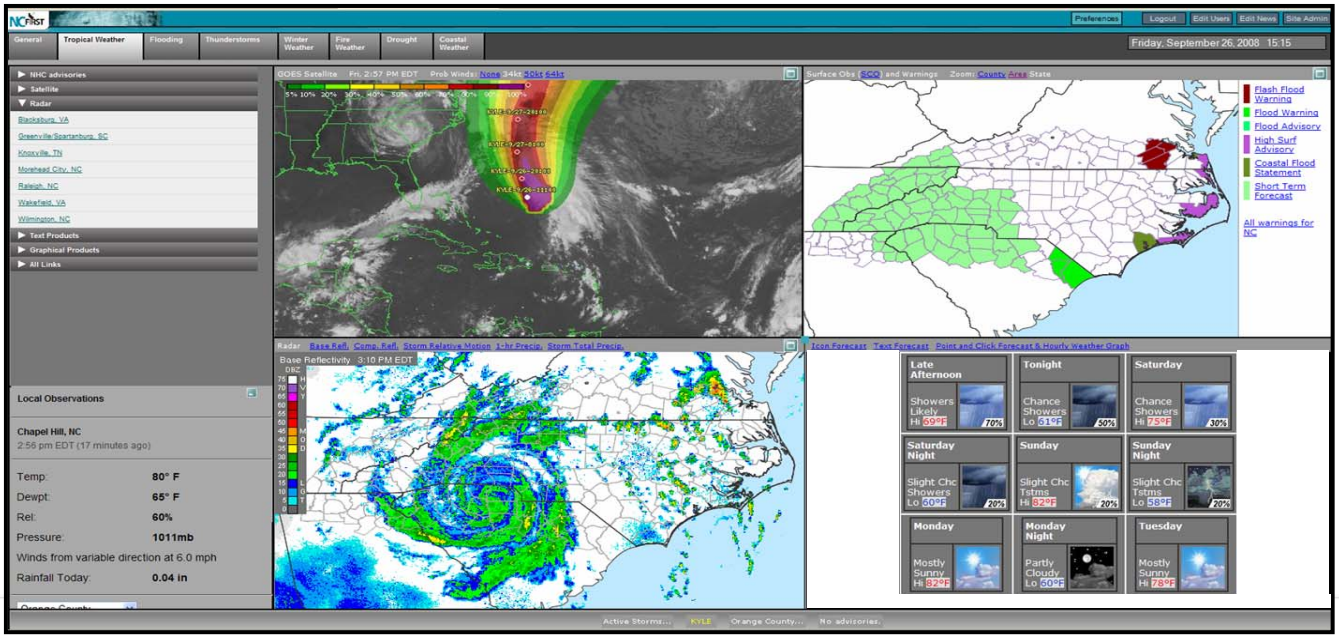
Weather and Emergency Management (WxEM)

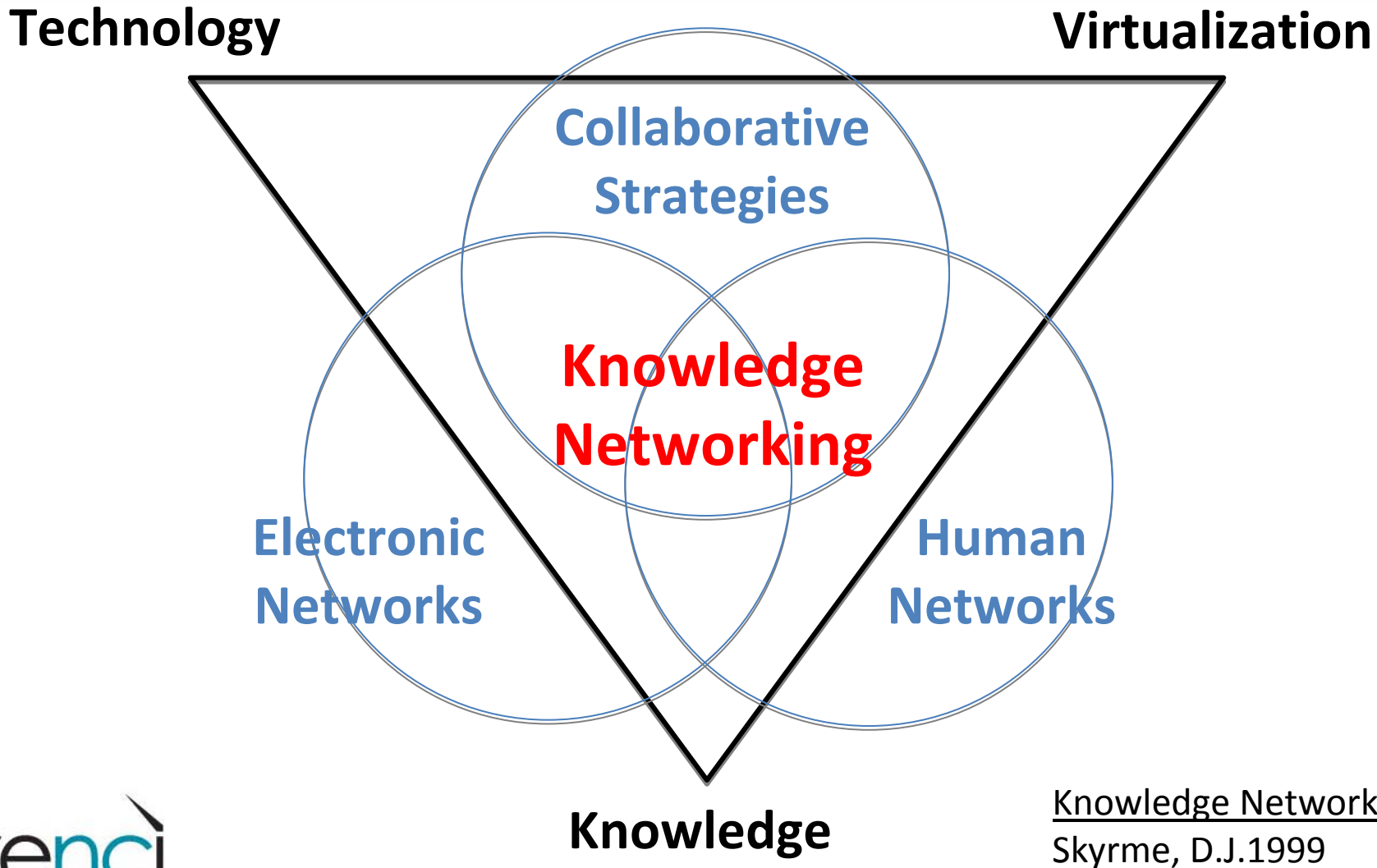
- Through rapid prototyping, our goal is to understand the potential impact of NWS products & services on critical EM decisions by examining EM processes, collaborations, and product & services utilization.
- Collaborators
  - RENCI
  - East Carolina University
  - NWS OS&T
  - NWS OCWWS
  - NOAA GSD
  - Local NWS Offices

How WxEM Began

- NC-FIRST
  - Weather information portal & training for NC EMs
  - EMs have trouble finding & understanding weather info
  - Now standard tool in NC EM community
- Still not solving the whole problem
  - Info can be hard to relate to decisions & impacts



Knowledge Networking



Knowledge Networking
Skyrme, D.J.1999

WxEM Knowledge Networking

- Human Dynamics-Social Science
  - Learn about decision processes, info flow, communication between groups
- Technology
  - From decision makers' perspective
  - How to translate, transmit, transform information to be usable
  - Rapidly develop prototypes to test
- Collaboration
  - Enables knowledge to be conveyed
  - Person-to-person & human-to-computer interaction

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First Steps

- Understand general processes for more than county EM director
- 3 focus groups
- 5 scenarios
- Collected data via CRC Cards

Emergency Support Function
#1: Transportation
#2: Communications
#3: Public Works and Engineering
#4: Firefighting
#5: Emergency Mgmt
#6: Mass Care, Emergency Assistance, Housing, and Human Services
#7: Logistics Mgmt and Resource Support
#8: Public Health and Medical Svc
#9: Search and Rescue
#10: Oil and HazMat Response
#11: Ag and Natural Resources
#12: Energy
#13: Public Safety and Security
#14: Long-Term Community Recovery
#15: External Affairs

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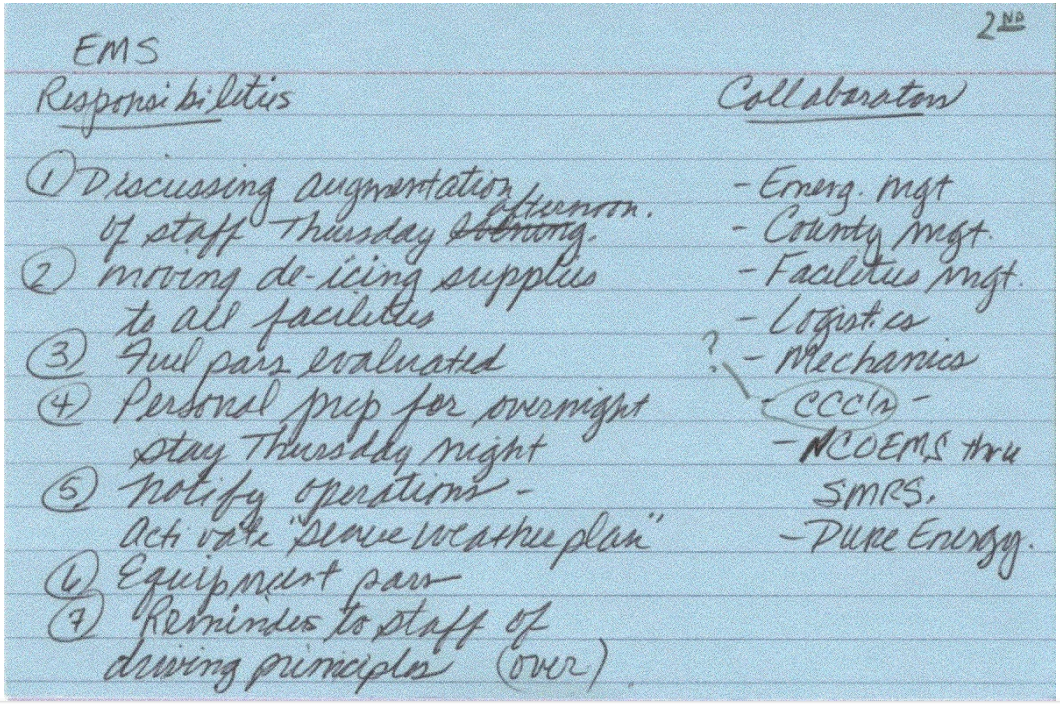
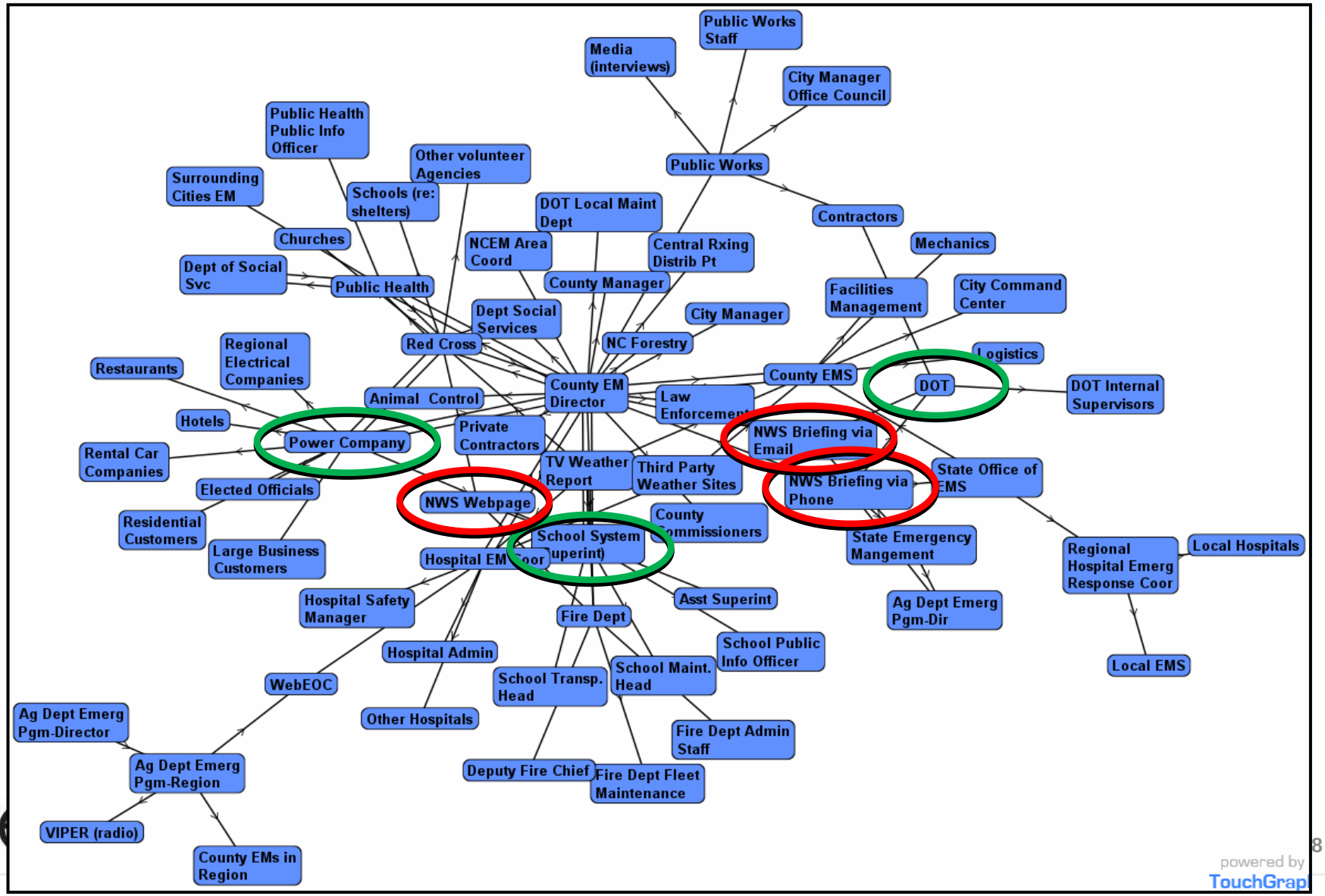
CRC Cards

- Class, Responsibility, and Collaboration
- Originally used for software design (Beck & Cunningham, 1989)
- Consistent way to collect information



CRC Cards to Knowledge Map



Winter Use Case: Critical Sub-Groups

- Critical Decision Makers: societal impact (on people)
  - Power companies
  - DOT
  - Schools
- Focus: Schools
  - What is the inclement weather decision process
  - Compare to county EM directors for generalization

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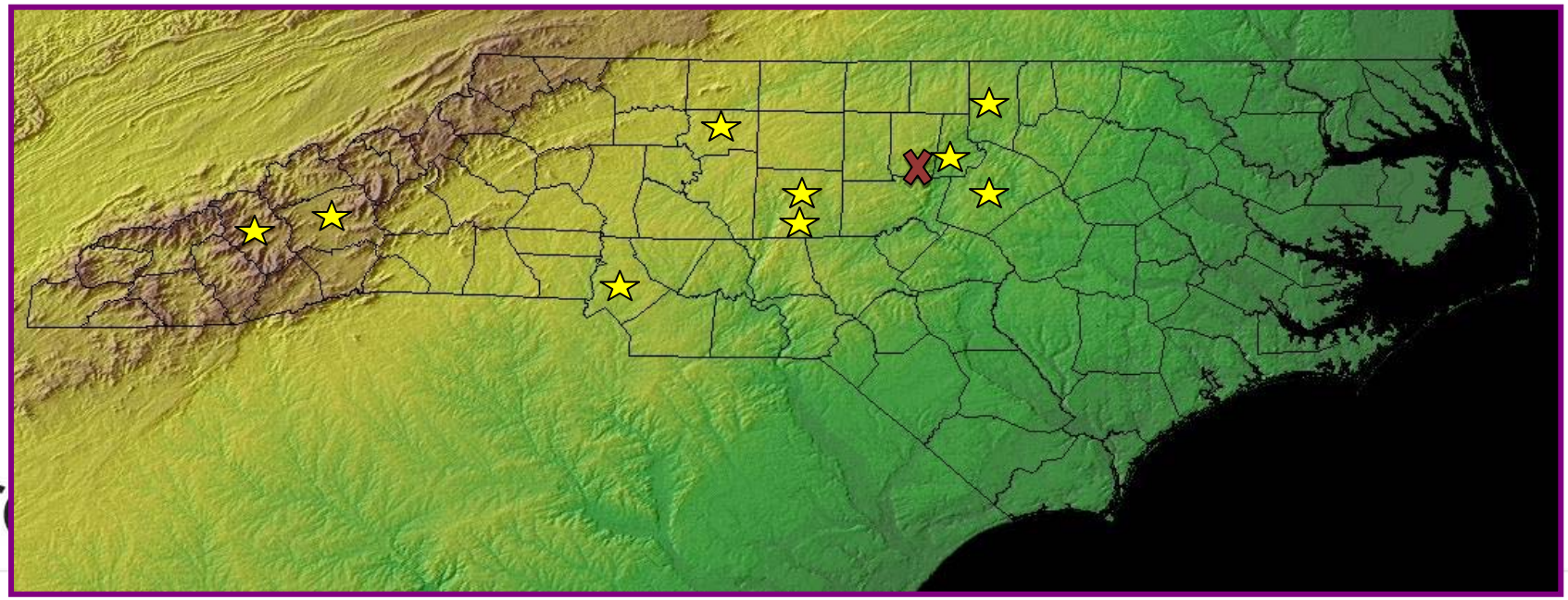
Schools

- 9 test schools
  - Chosen based on level of interaction with local NWS
  - Rural/urban
  - Geography
- Contacted via County EM



School Interviews

- Round 1: establish basic process
- Who gathers info?
  - Mostly transportation directors
  - Not trained on using weather information
  - Communication
- What info is needed to make decision?
  - Can struggle to find & understand this info
  - Onset time of precip, precip type, duration
  - Road conditions, road temperature

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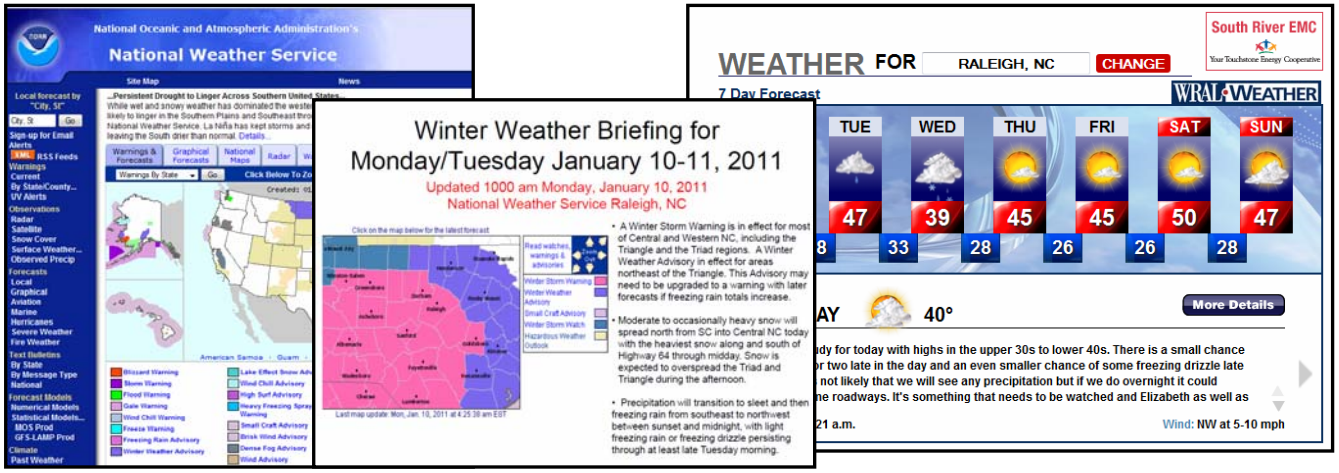
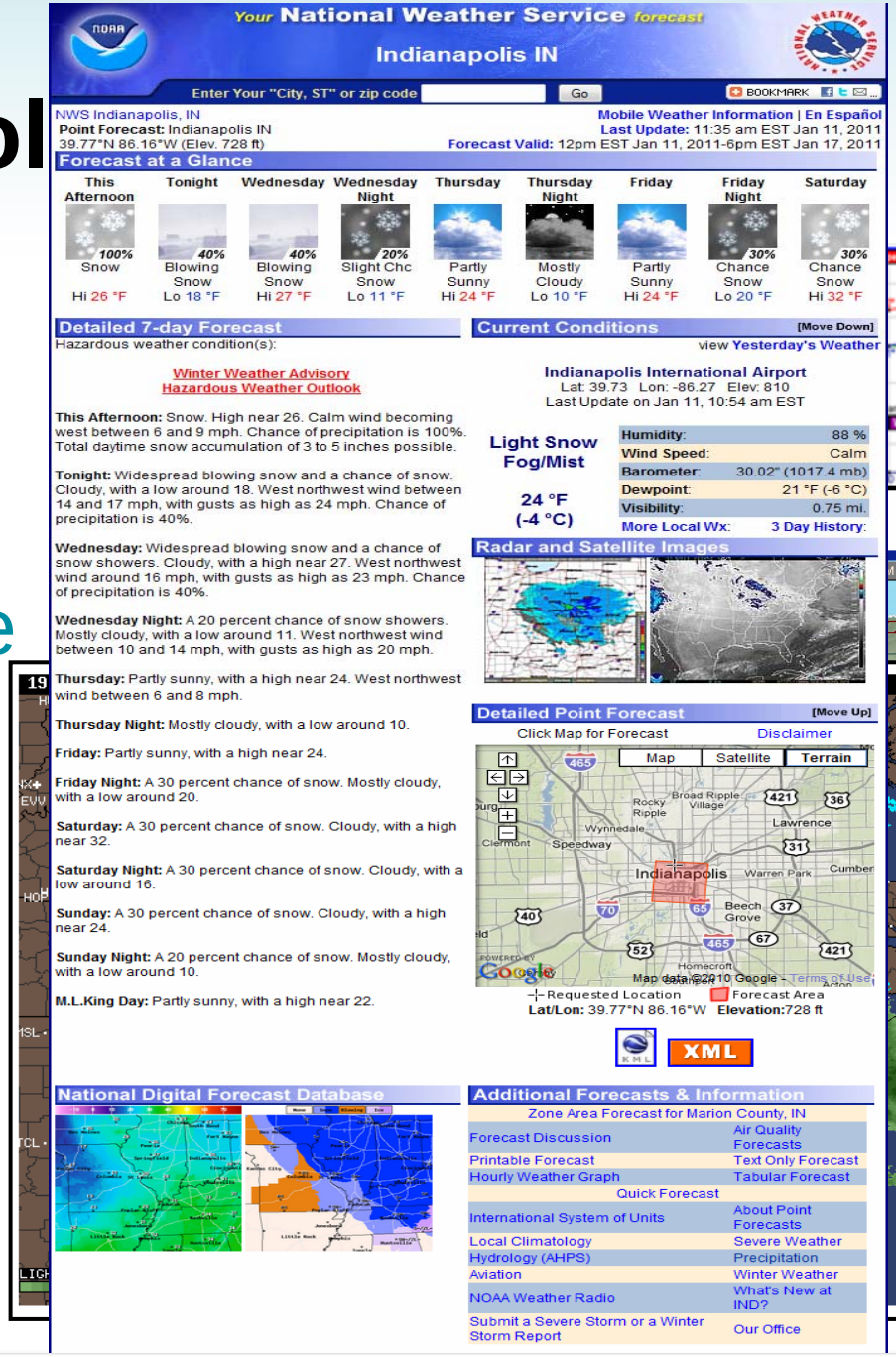
School Interviews

- Sources of info
  - Unanimous: TV
  - NWS: web page, email briefings, or phone calls
  - 1 uses no NWS info directly
  - 1 not aware NWS could be contacted for info
  - Not much interaction with county EM



School

- Round 2: follow-up after real storm
  - Timeline
  - Specific products
- Round 3: knowledge testing
  - Interpreting current products correctly?
  - Aware of existing NWS products?
- Survey



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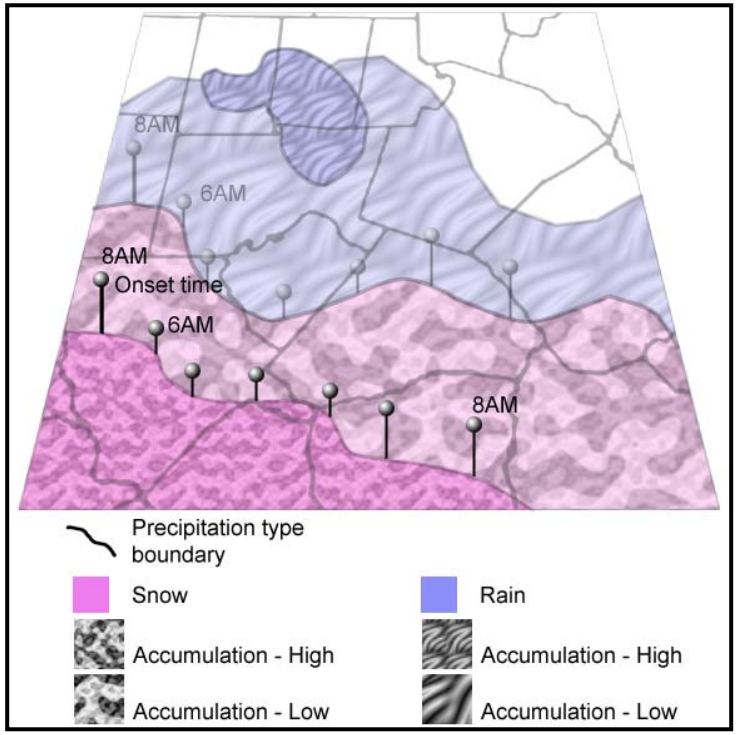
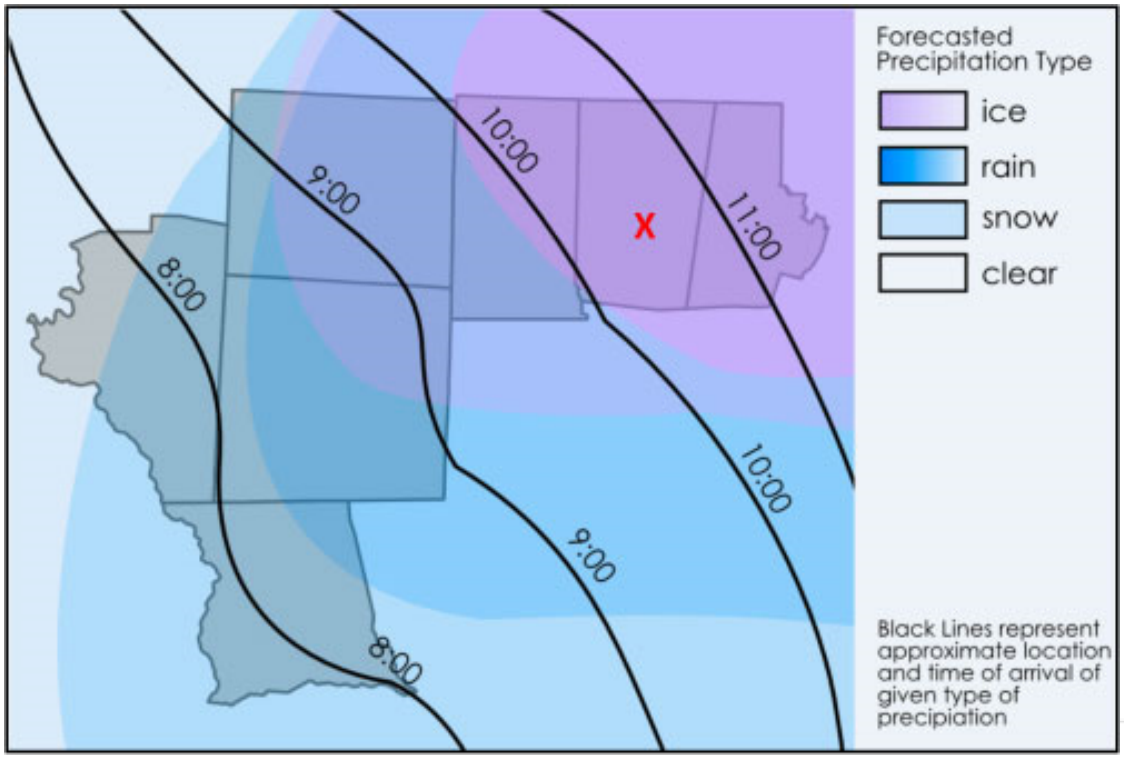
Rapid Prototyping – In Progress

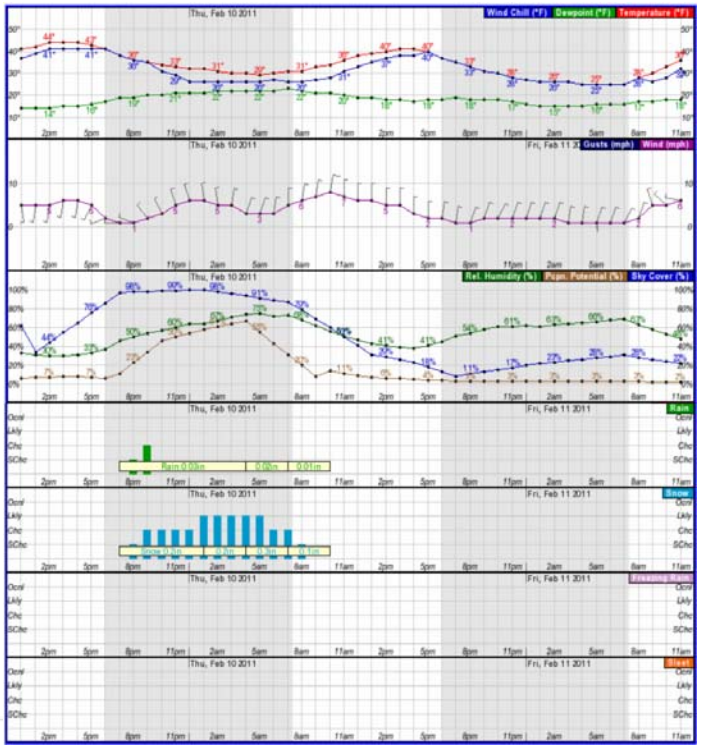
- Send ideas to 3 school reps
- Forecast Information Prototype
  - Take NWS forecast grids – visualize according to feedback
- Real-time Gathering & Sharing Prototype
  - "Map conferencing"
  - Share road temps, conditions, etc. in real-time for everyone to see



Onset Time of Precip Prototype

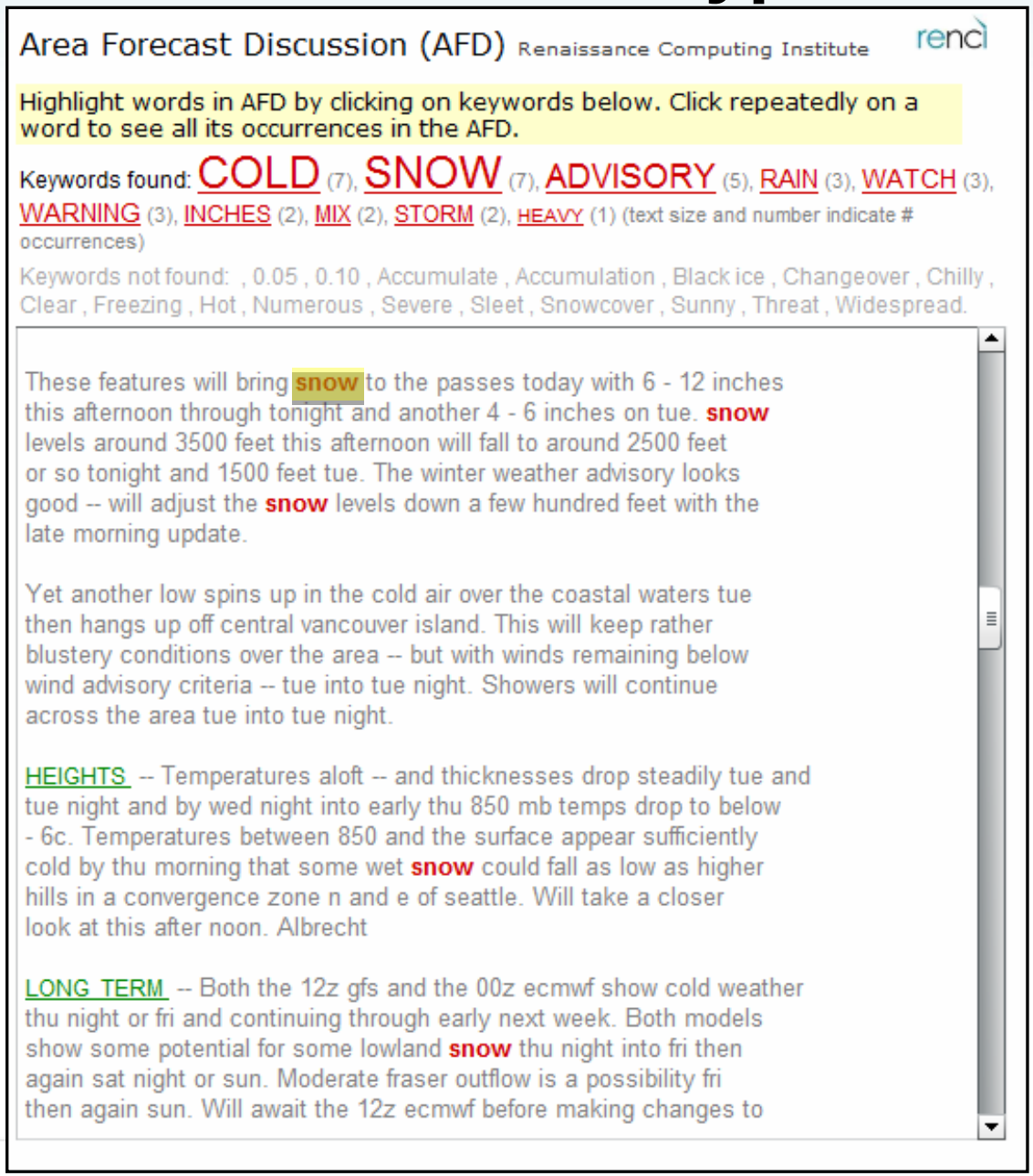
- Highest ranked:
  - Map with times
  - NWS Hourly Weather Graph
  - Combine on one display?





Area Forecast Discussion Prototype

- Highlight keywords, click to find
- Lower case letters



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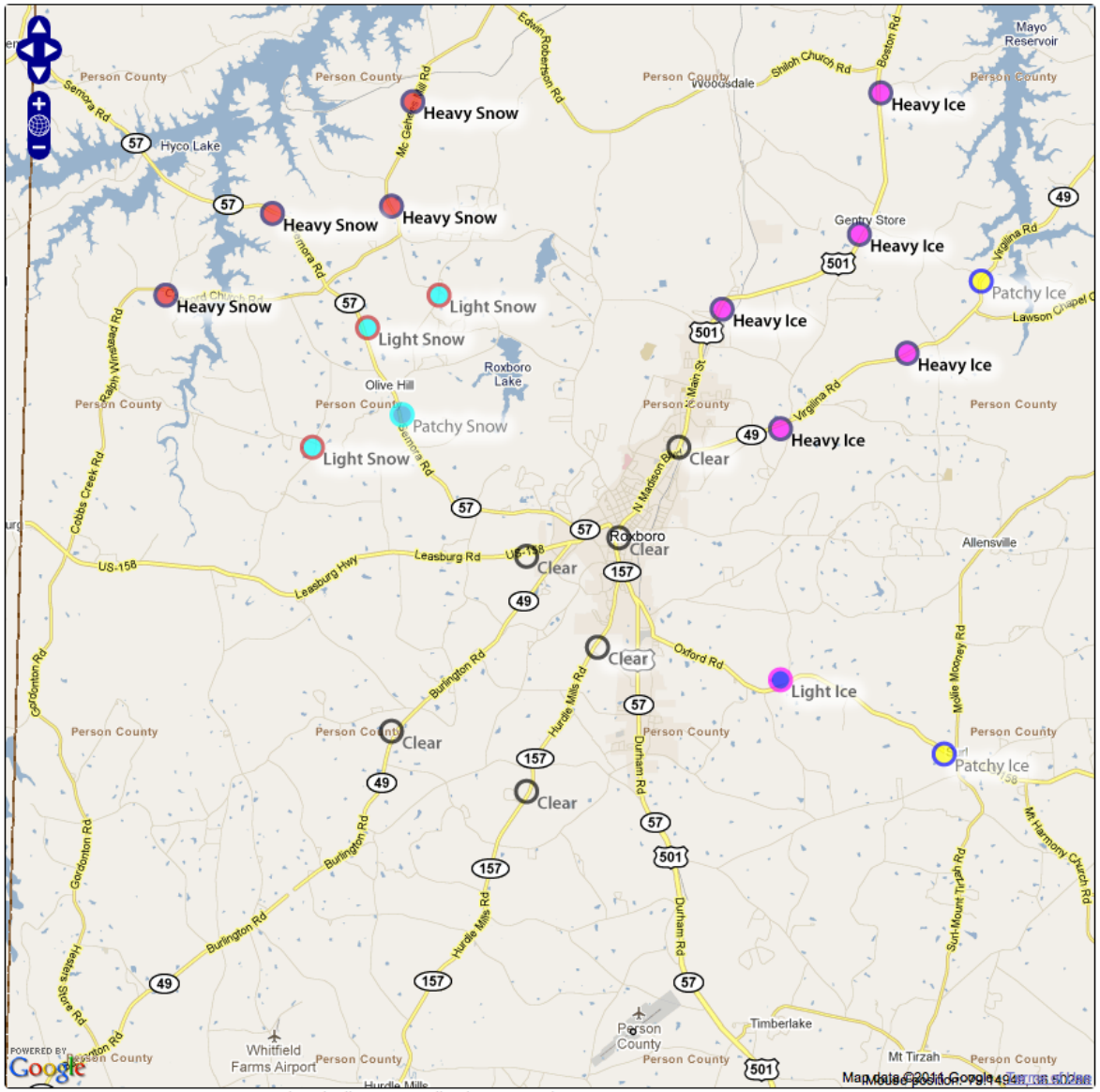
Gathering & Sharing Prototype

- Real-time reports from school transportation reps



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Next Steps – through June 30

- March: Winter Weather Phase
  - Continue rapid prototyping & testing
  - NC county EM conference – update
  - March 21-25: conduct school tabletop exercises & testing
- April-June: Begin Tropical Weather Phase
  - Verify methods & processes by studying tropical weather use case

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Summary

- Understand potential impact of NWS products & services on critical EM decisions
- Winter weather case study: focus on schools
  - Struggling to find/understand weather information
  - Biggest need: confidence in forecast and how it is conveyed
  - Available information isn't always pertinent to decisions they need to make
  - Their social networks are working, but not optimal for weather information
  - Decision makers are not weather savvy, and therefore rely on interpretations from many sources

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Contact Information

Jessica Losego

RENCI-UNC Chapel Hill

919-445-9663

jproud@renci.org