Connecticut Geospatial Information Systems Council

Storm Response and Recovery Assessment Group

Findings Report

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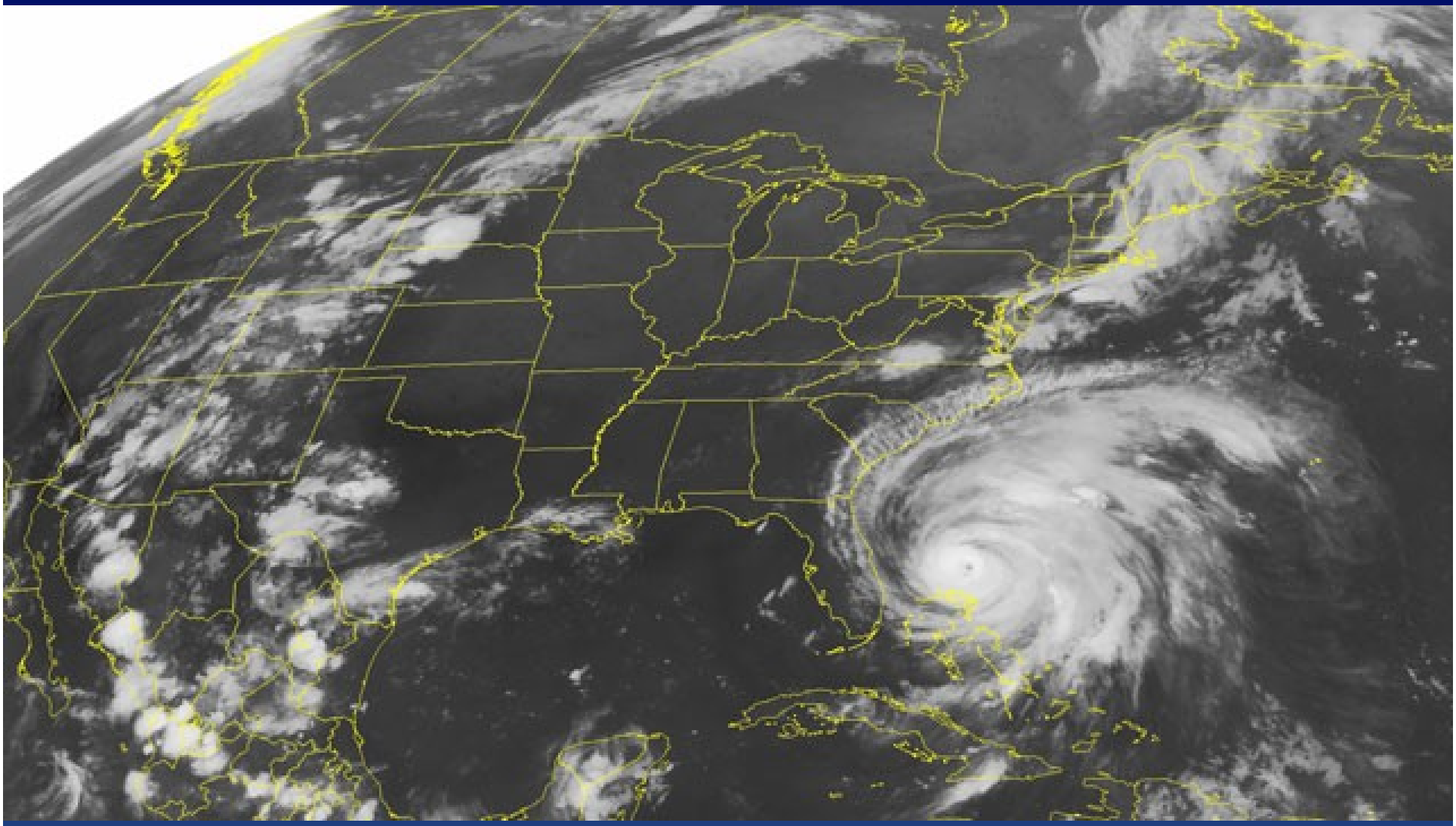
Rhode Island GIS User Group
August 14, 2012

Hurricane Irene 2011
International Space Station Astronaut Ron Garan

Tropical Storm Irene



NOAA satellite image taken Friday, Aug. 26, 2011, at 1:45 a.m. EDT shows Category 3 Hurricane Irene, now located about 460 miles south-southwest of Cape Hatteras, N.C

Tropical Storm Irene

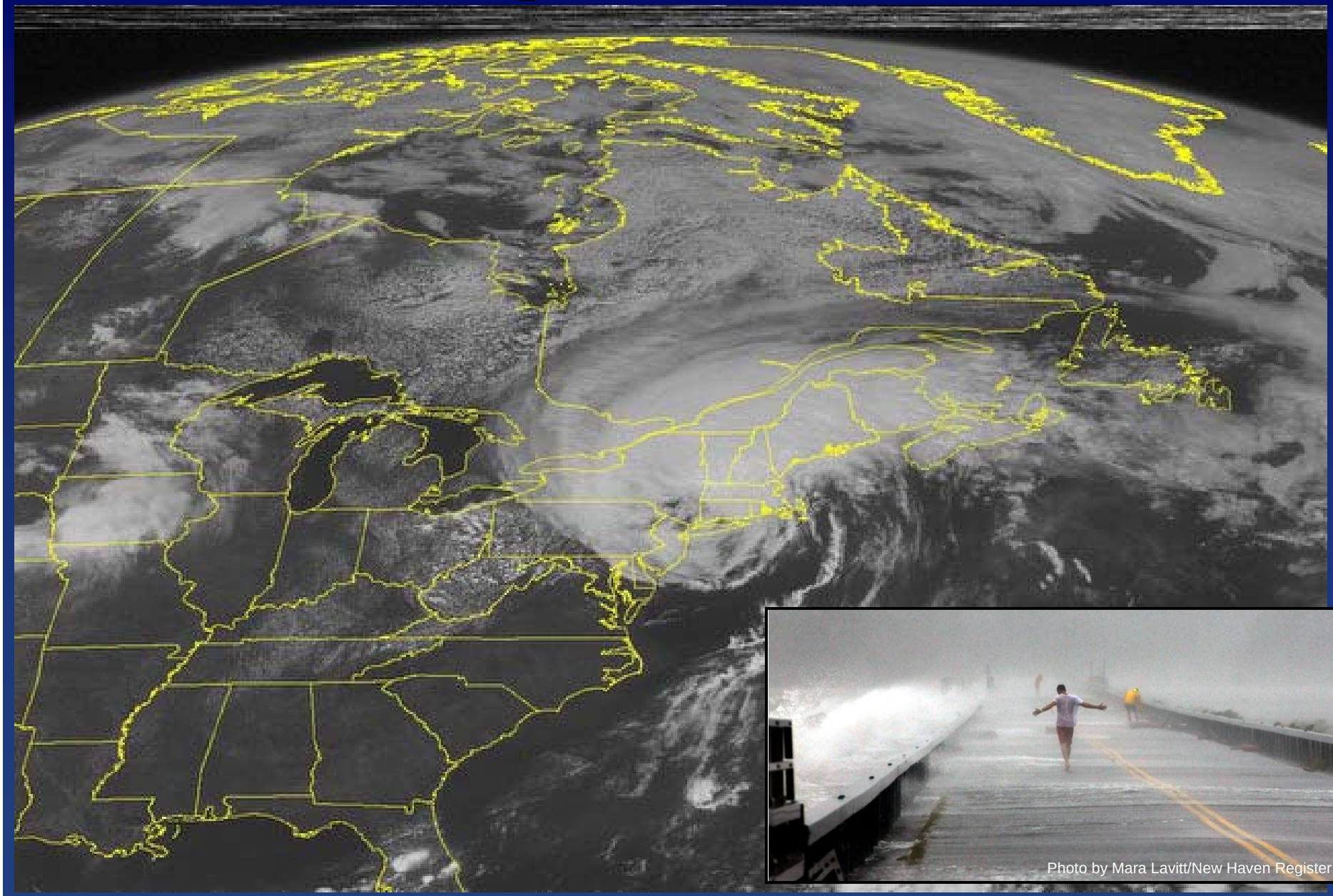


Photo by Mara Lavitt/New Haven Register

NOAA satellite image taken Sunday, August 28, 2011 at 1:45 PM EDT

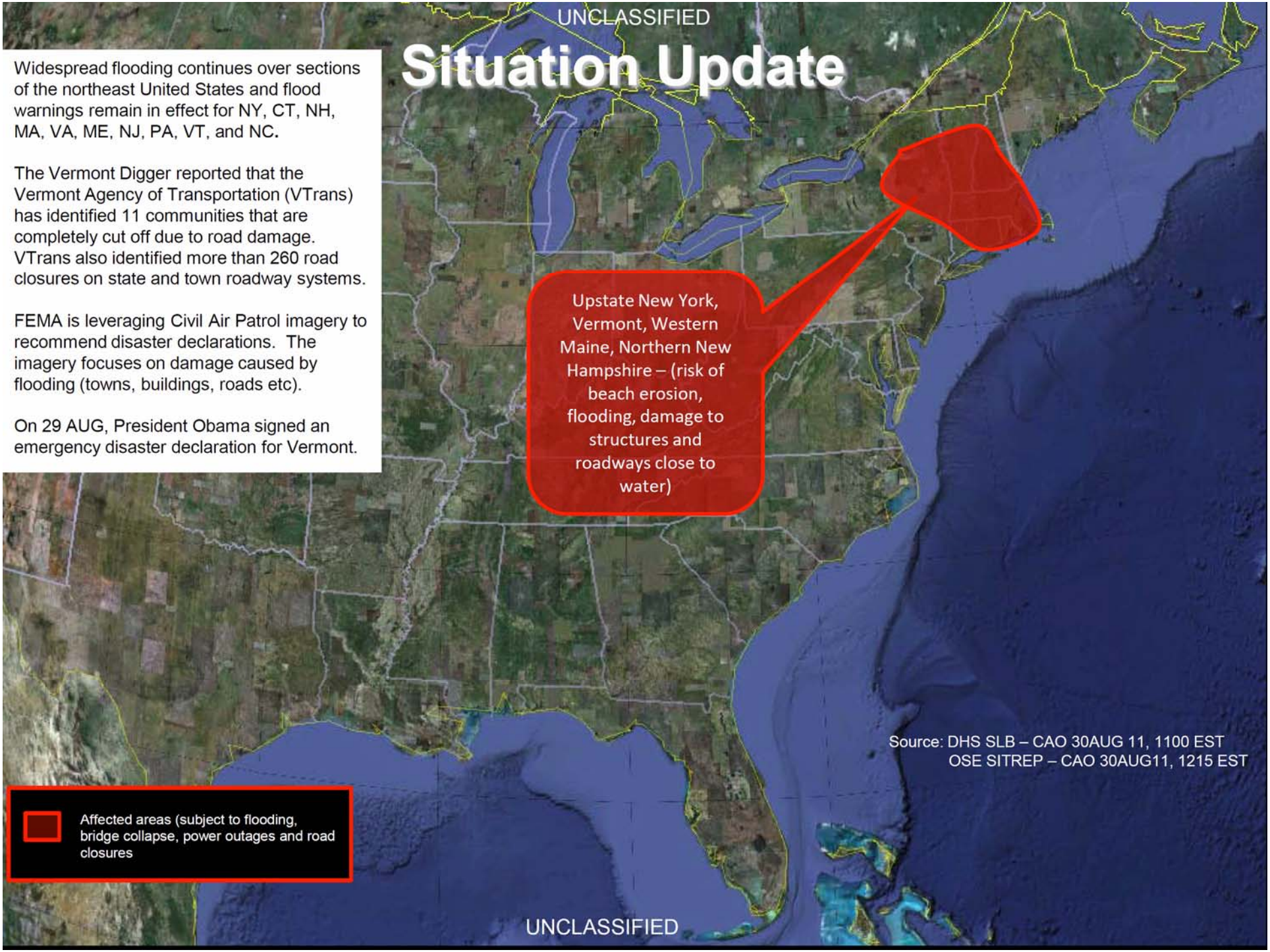
Situation Update

Widespread flooding continues over sections of the northeast United States and flood warnings remain in effect for NY, CT, NH, MA, VA, ME, NJ, PA, VT, and NC.

The Vermont Digger reported that the Vermont Agency of Transportation (VTrans) has identified 11 communities that are completely cut off due to road damage. VTrans also identified more than 260 road closures on state and town roadway systems.

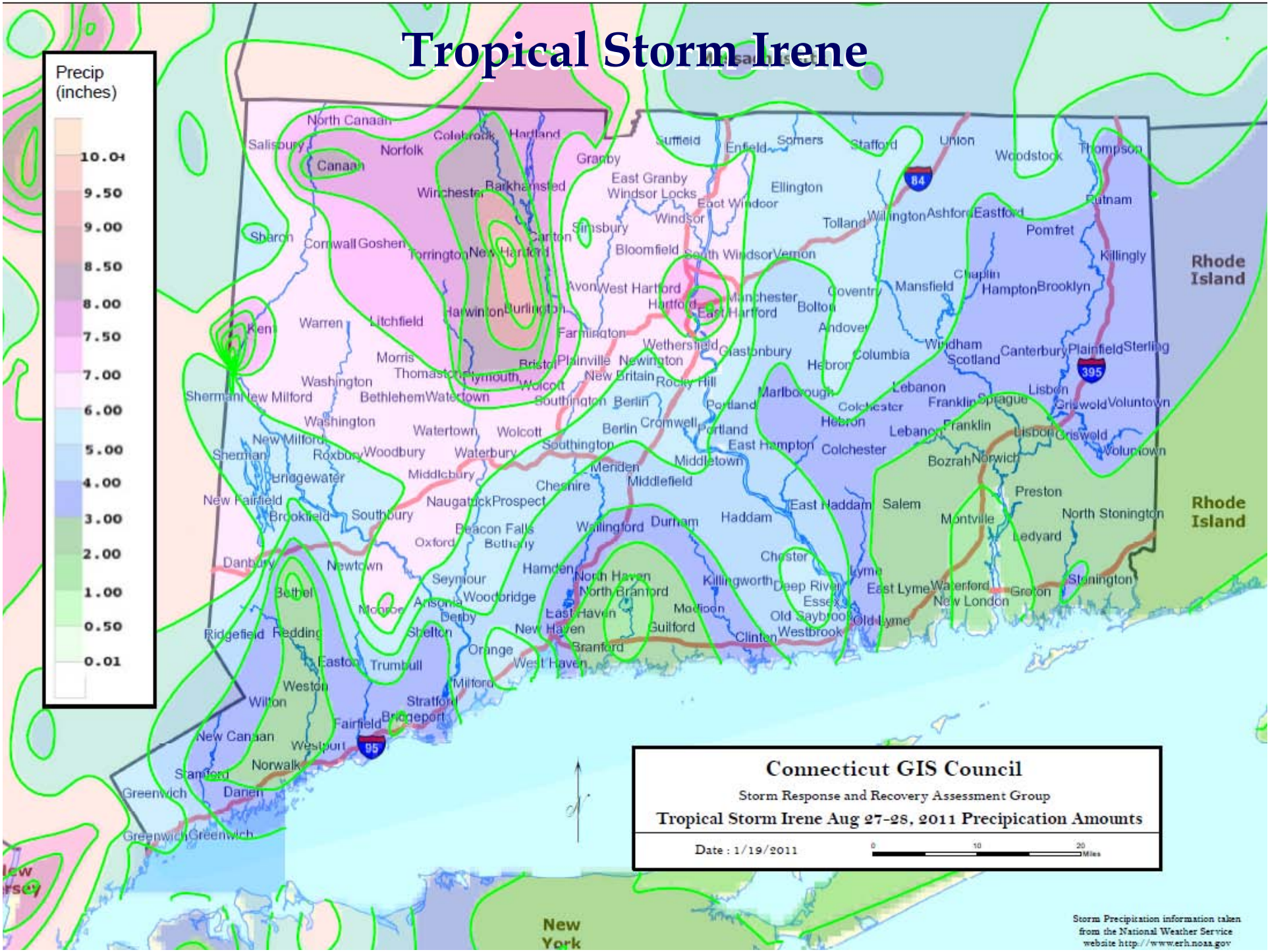
FEMA is leveraging Civil Air Patrol imagery to recommend disaster declarations. The imagery focuses on damage caused by flooding (towns, buildings, roads etc).

On 29 AUG, President Obama signed an emergency disaster declaration for Vermont.

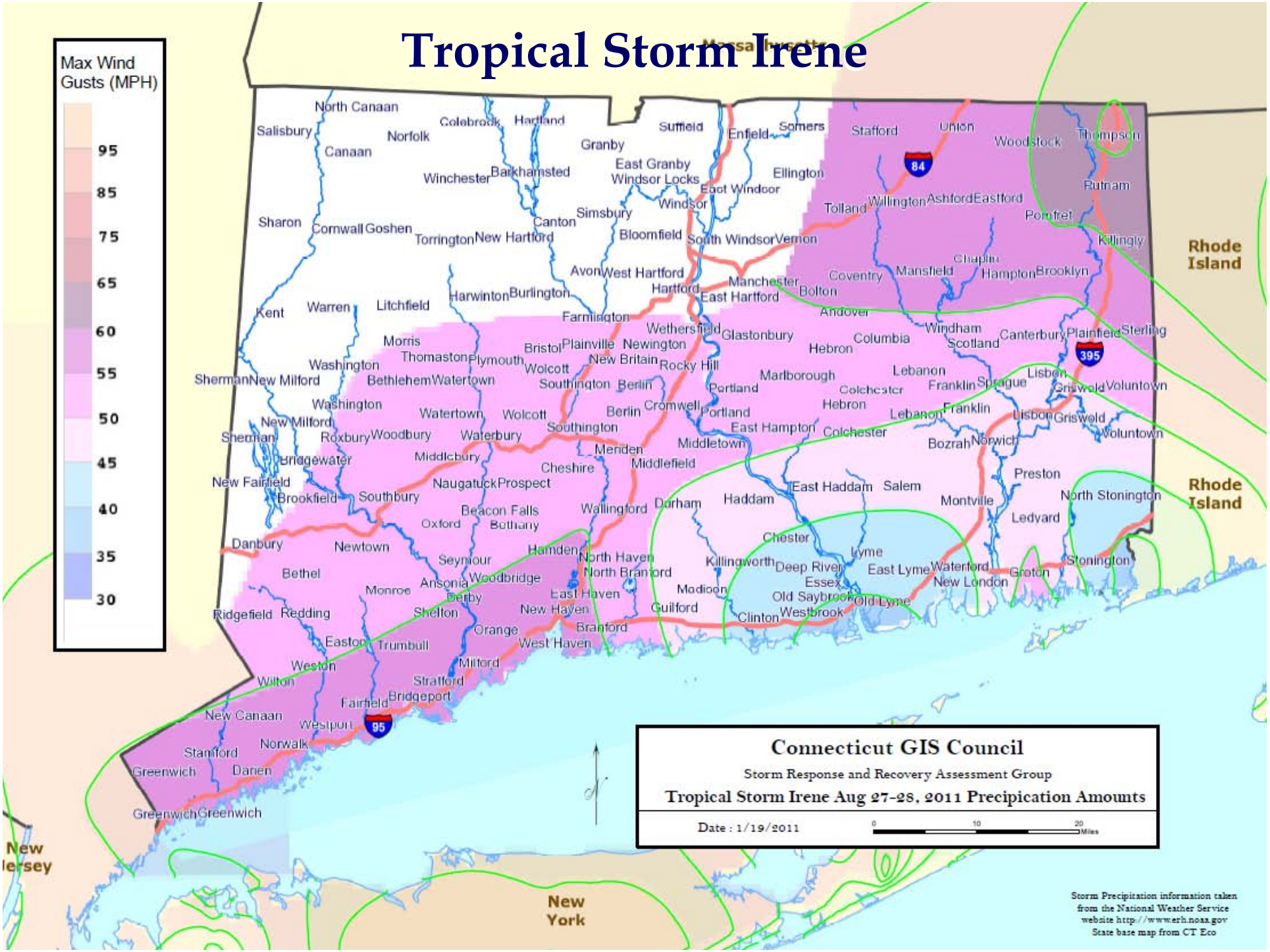


Source: DHS SLB – CAO 30AUG 11, 1100 EST
OSE SITREP – CAO 30AUG11, 1215 EST

Tropical Storm Irene



Tropical Storm Irene



Tropical Storm Irene

Photo: Cathy Zuraw / Connecticut Post

Connecticut GIS Council
Storm Response and Recovery Assessment Group
Tropical Storm Irene August 2011 Storm Surge Extent

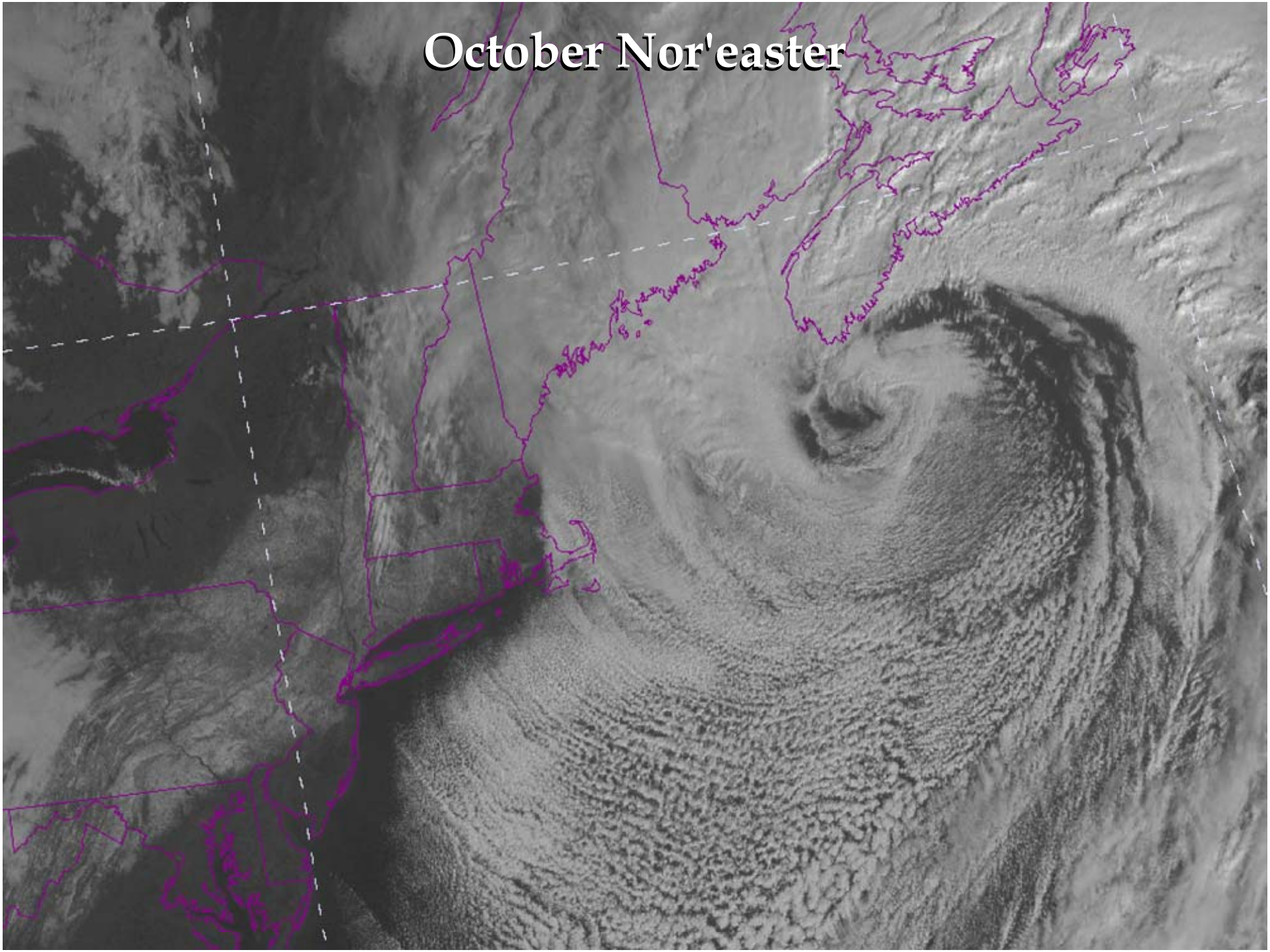
Date: 01/21/2012

0 5 10 20 Miles

Legend

Irene Storm Surge Extent (USGS/NOAA)

October Nor'easter



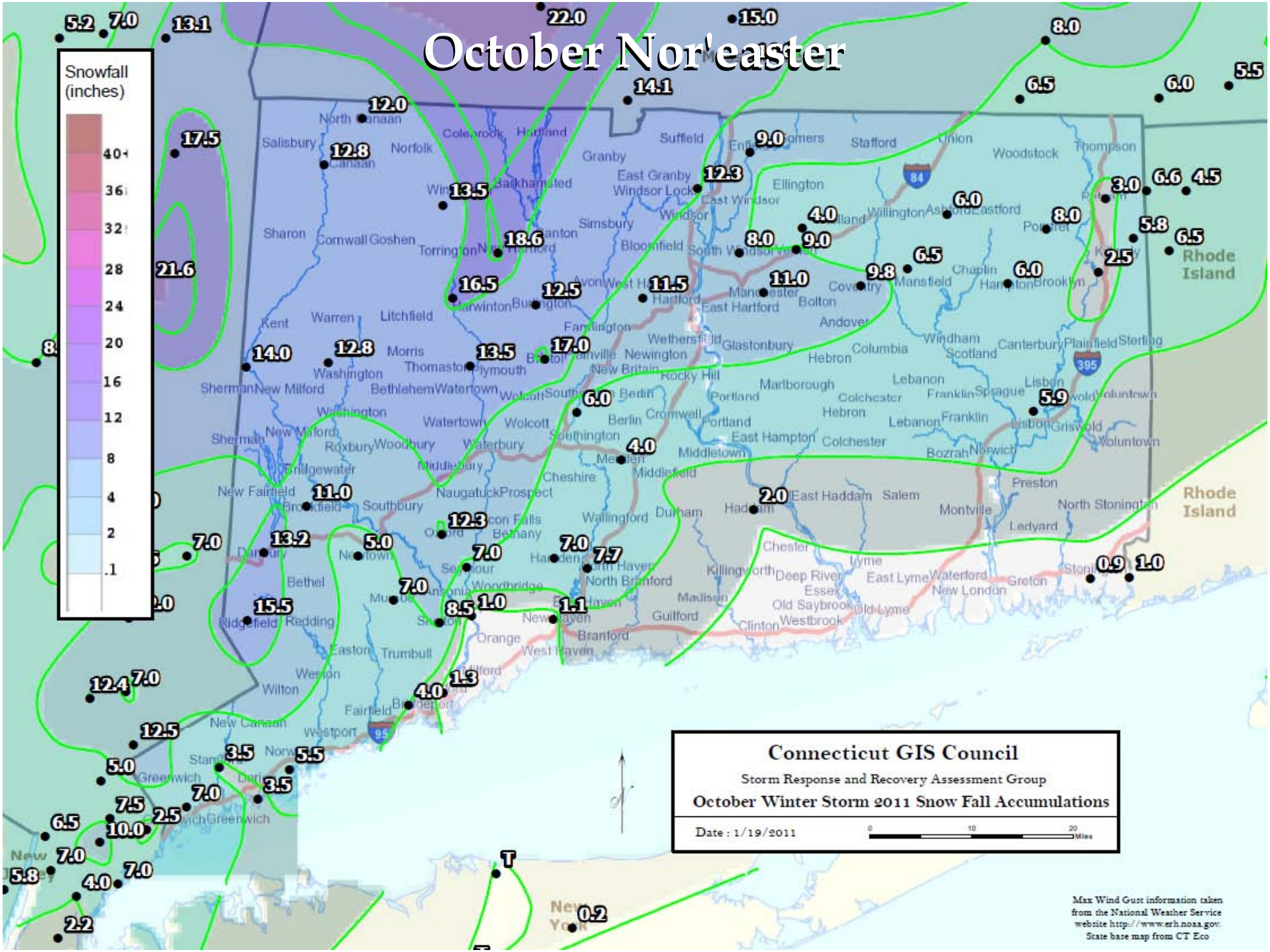
October Nor'easter

October Nor'easter

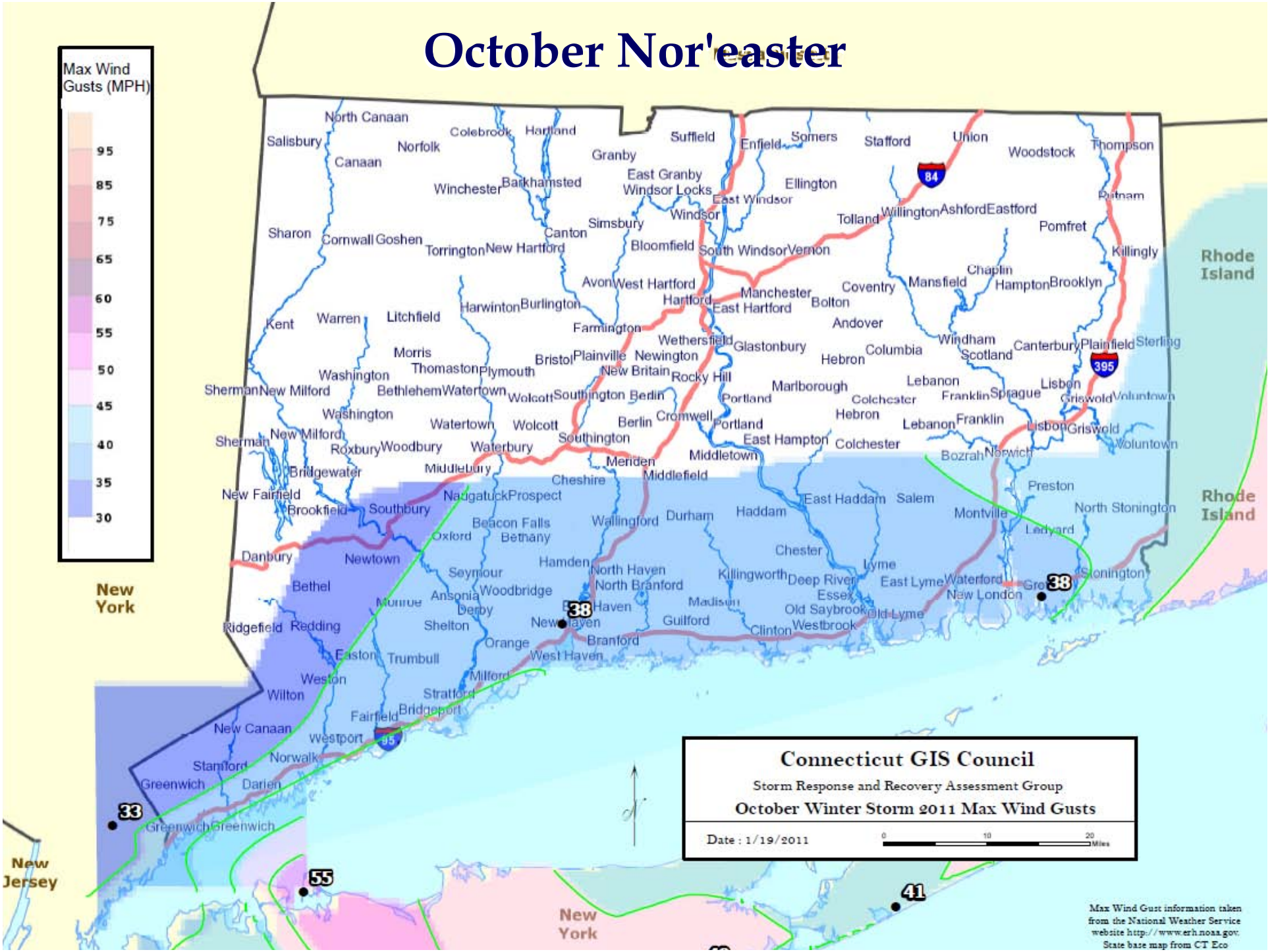
October 30, 2011 – Snow Cover

October Nor'easter

November 2, 2011 – Snow Cover


October Nor'easter
Snowfall (inches)
40
36
32
28
24
20
16
12
8
4
2
.1
Connecticut GIS Council
Storm Response and Recovery Assessment Group
October Winter Storm 2011 Snow Fall Accumulations
Date : 1/19/2011
0
10
20
Miles
Max Wind Gust information taken from the National Weather Service website http://www.erh.noaa.gov.
State base map from CT Eco
Rhode Island
Rhode Island

October Nor'easter



Background Information

On August 27, 2011, Connecticut was hit by Tropical Storm Irene, the most severe tropical storm to affect the State since Hurricane Gloria in 1985. Then, on October 29, 2011, an historic October Nor'Easter dumped snow on leaf-covered trees, bringing down limbs and power lines and causing even more severe power outages and damage.

Proposed Process for Enhancement of State Preparedness Planning
William J. Hackett, State Emergency Management Director

Credit: AP Photo

Credit: AP Photo/Jessica Hill

Photo: B.K. Angeletti / Connecticut Post

Background Information

- In response to the two major storms, members of the Connecticut GIS community voiced concerns and opportunities for greater use of GIS and data sharing in response to statewide storm events or other emergency management issues

- On November 17, 2011, the Connecticut GIS Council established a "Storm Response and Recovery Assessment Group" to review the use (or lack of use) of GIS Technology during Tropical Storm Irene and the October Nor'easter

- Assessment Group's focus was on various aspects of how GIS was used for pre-storm, storm, and post-storm response and recovery efforts at the local, regional, utility, state, and federal levels

- The goals of the assessment were to: identify what GIS strategies were used (or not), barriers encountered, best practices, and provide recommendations.

Background Information

CTGIS List Serv

“Did your office engage in storm pre-planning, response or recovery efforts?”

Out of 101 responses the answers were as follows:

58	Yes
26	Not Applicable
17	We could have but weren't utilized
101	**TOTAL**

Background Information

CONNECTICUT GEOSPATIAL INFORMATION SYSTEMS
Storm Response and Recovery Assessment Group

GIS Staff Questionnaire

Instructions: *Please fill out and answer the questions the best you can. Please be brief and to the point. Use details to describe your answers and use bullet points as necessary. Should your answer pertain to one particular storm event (e.g. Irene or Alfred) please indicate the storm in parenthesis in your response. Return all responses to Jeff Bolton at jeffrey.bolton@ct.gov.*

Name:

Employer:

Department/Unit:

Position:

Phone:

Email:

Primary Role in Storm Event:

List which Storm Primarily Impacted Your Area (list both if applicable):

PART I

A) Did your Emergency Operations Center (EOC) engage GIS resources? Explain.

PART II

Describe how GIS was used for each applicable phase of the storm(s). Include details on maps and technologies used (printed maps, software, applications, etc.), in addition to barriers to success. Barriers can pertain to data, staffing issues, communication, software, technological limitation, etc. Please attach any map products as applicable.

A) PRE-STORM

1. GIS actions or activities:

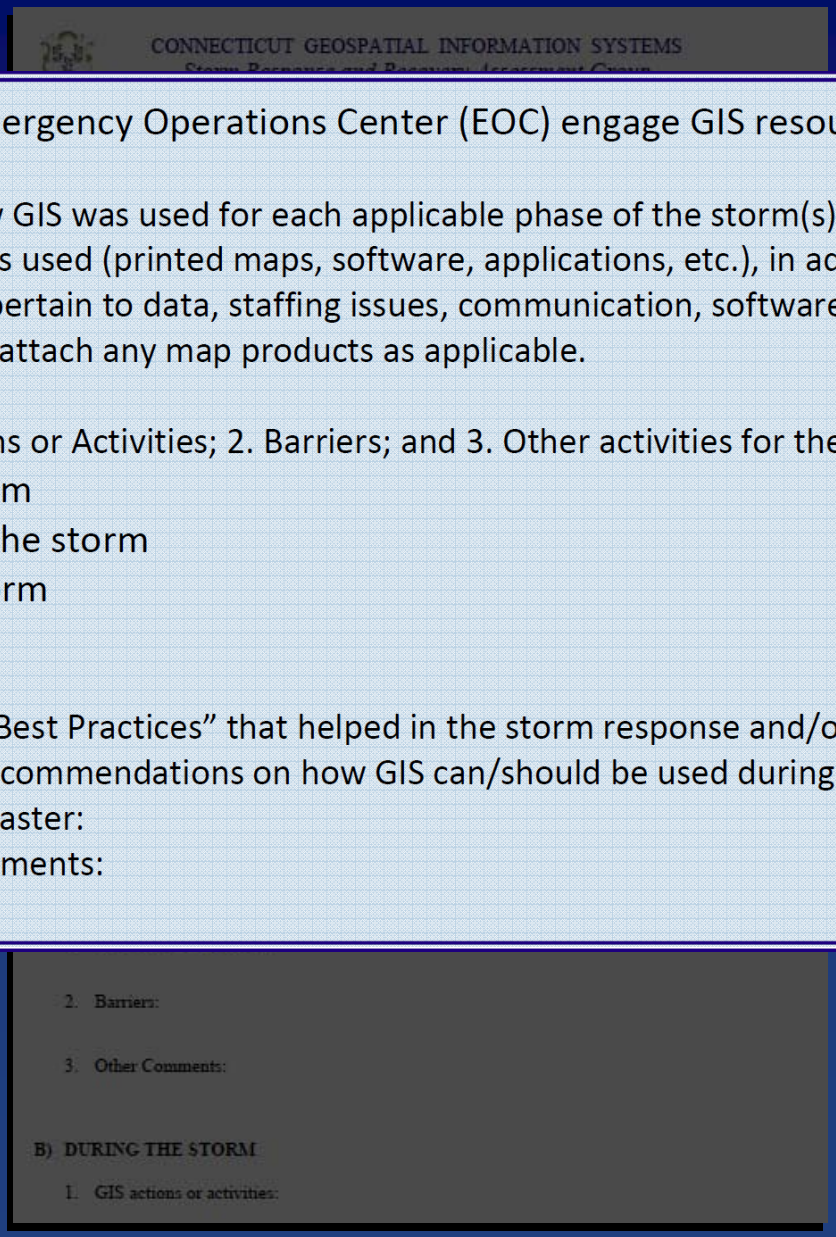
2. Barriers:

3. Other Comments:

B) DURING THE STORM

1. GIS actions or activities:

Background Information


CONNECTICUT GEOSPATIAL INFORMATION SYSTEMS

PART I Did your Emergency Operations Center (EOC) engage GIS resources? Explain.

PART II Describe how GIS was used for each applicable phase of the storm(s). Include details on maps and technologies used (printed maps, software, applications, etc.), in addition to barriers to success. Barriers can pertain to data, staffing issues, communication, software, technological limitation, etc. Please attach any map products as applicable.

Describe: 1. GIS Actions or Activities; 2. Barriers; and 3. Other activities for the following:

A) Pre-storm
B) During the storm
C) Post-storm

PART III

A) List your "Best Practices" that helped in the storm response and/or recovery efforts:
B) List any Recommendations on how GIS can/should be used during a local, regional, or statewide disaster:
C) Other comments:

2. Barriers:

3. Other Comments:

B) DURING THE STORM

1. GIS actions or activities:

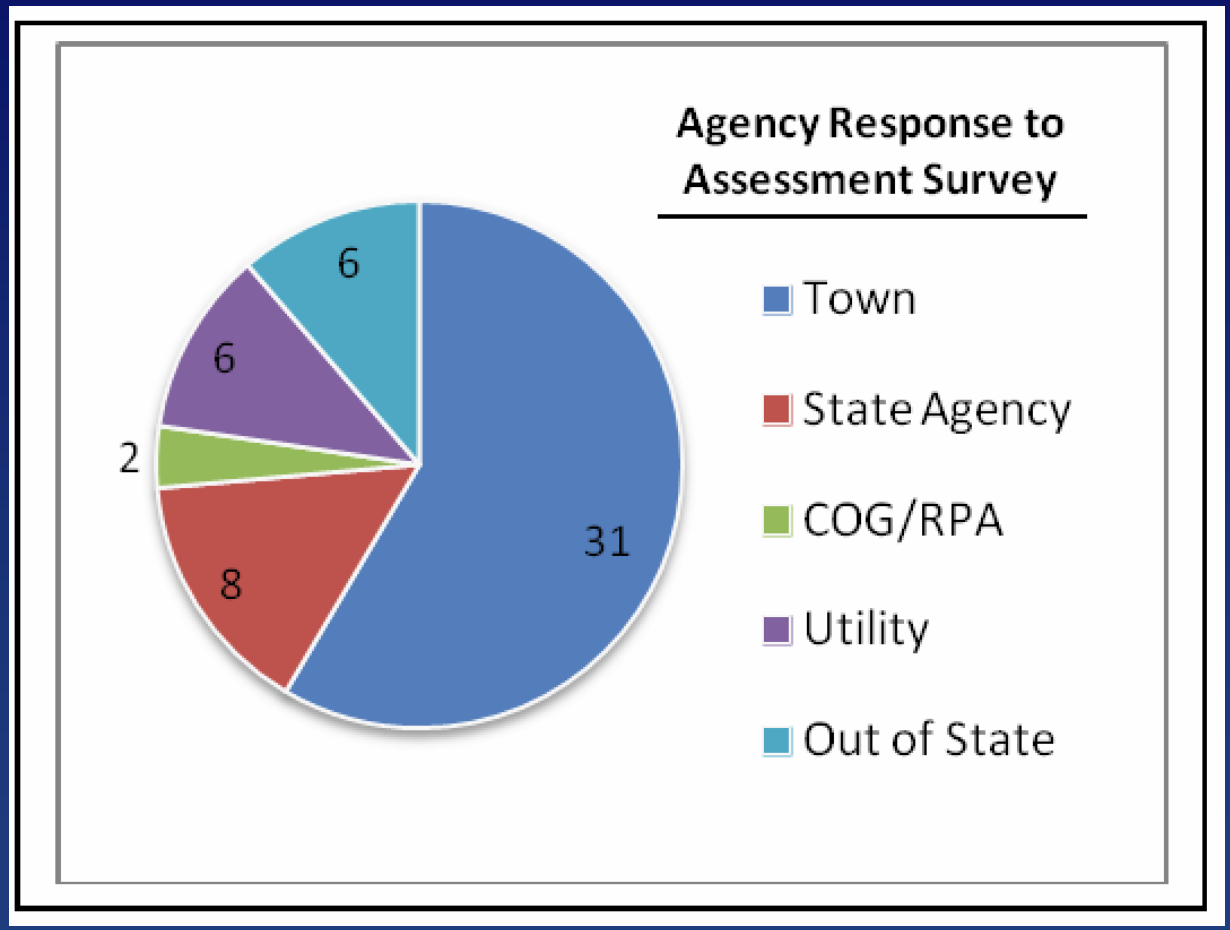
Background Information

The responses and reviews were grouped into four categories:

- Regional Planning Agencies and Councils of Government;
- 88 inland towns likely to have been more affected by the Nor'easter;
- 81 coastal towns likely to have been more affected by Tropical Storm Irene; and
- Connecticut and neighboring state agencies, utilities and the federal government.

Background Information

Entity Type	Number
Municipality	31
State Agency	8
COG/RPA	2
Utility	6
Out of State	6
TOTAL	**53**



Findings

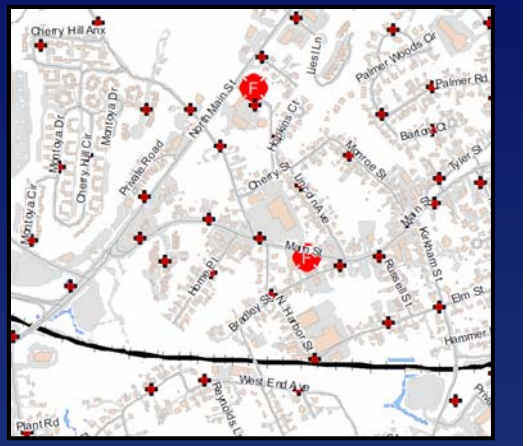
In order to understand the recommendations, it is important to highlight the typical barriers to success. The following are some of the barriers identified:

Highlighted Barriers to Success:

- Lack of awareness of GIS by upper management and decision makers was commonly cited on all levels.

- Lack of integration of GIS with the Emergency Operation Center (EOC).

- Disconnect between emergency managers and decision makers and the GIS tools they have at their disposal.



Findings

In order to understand the recommendations, it is important to highlight the typical barriers to success. The following are some of the barriers identified:

Highlighted Barriers to Success:

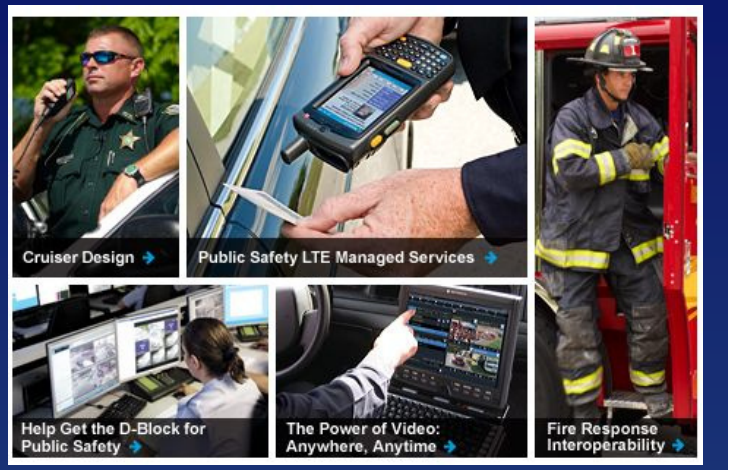
• A lack of knowledge about what GIS data is available and how it can be used to mitigate hazards and serve as a simple communication tool.

• Where GIS is available, the lack of staffing and training becomes an issue should an event span over days. Many EOCs were in operation for days on end making it difficult for many to have a GIS expert available at all times. This also led to on the spot GIS training to EOC operators, which is time consuming and in some case an inefficient use of resources.

Findings

In order to understand the recommendations, it is important to highlight the typical barriers to success. The following are some of the barriers identified:

Highlighted Barriers to Success:



- Field workers not having the tools to communicate their locations and actions back to the EOC prevented their efforts from being mapped and cataloged.

- Bureaucratic barriers that inhibit or discourage proactive communication/coordination between technical GIS staff and utility personnel/technical GIS staff.

Recommendations

- The Assessment Group identified key recommendations from the responses and interviews that best addressed the above barriers.

- Recommendations categorized into potential timeframes.

- Potential entities were identified.

- Many recommendations require broad support from the Connecticut GIS community and require inclusion versus exclusion.

- The Assessment Group did not tackle how each of these recommendations could be implemented nor identify which entity should take the lead.

Recommendations

RECOMMENDED IMPLEMENTATION SCHEDULE KEY		
0 - 6 months	6 - 12 months	1+ years

RECOMMENDATIONS	POTENTIALLY AFFECTED ENTITIES
1. Create a State GIS Emergency Response Team to be activated during a storm event and create a disaster plan to work with municipal GIS staff.	CT DESPP, State GeoLab, GIS Council, Utilities, Regional and Local Governments, HIFLD, FEMA, USGS, CT DEEP
2. Explore the use and application of the FEMA Region 1 Geospatial Working Group – New England Geospatial Emergency Response Procedures Manual.	CT DESPP, State GeoLab, GIS Council, Local Governments, HIFLD, FEMA, USGS
3. Establish a working group to address and create a conduit for utility companies, state and local governments to exchange and improve data, specifically critical infrastructure, in a way that is compliant with the Freedom of Information Act and addresses security risks.	CT DESPP, CT DEEP, Utilities, CT DAS, GIS Council, CT OPM, CT Siting Council, Regional and Local Governments

Recommendations

4. Create a GIS volunteer network (similar to GIS Corps)	GIS Council, CT DESPP
5. The State should make available two statewide GIS web applications (using ArcGIS Server), one public-facing and one secured with sensitive-critical data layers with a focus on disaster planning and response.	GIS Council, CT DESPP, CT DAS, CT OPM
6. Fully integrate GIS into the EOC response and recovery efforts by embedding trained-technical GIS staff in all EOC (state and local) briefings and strategy meetings.	CT DESPP, State GeoLab, EOC Directors, Utilities, Regional and Local Governments
7. Identification of critical customers for each town and the State of Connecticut (migrate from paper based systems in the field to real-time data collection system).	CT DESPP, Utilities, Local Governments
8. Promote and establish awareness of GIS availability from the top down in an organization so that decision makers and managers are communicating with their GIS staff and that all departments within an organization can access and participate in the advancement and use of GIS technologies.	GIS Council (Education Committee), CT DESPP, Utilities, Regional and Local Governments

Recommendations

9. Develop support for RPAs/COGs to facilitate GIS resource-sharing among member towns, especially towns with no GIS. Explore free GIS resources (ArcReader, ArcGIS Online, etc).	CT DESPP, GIS Council, CTOPM, Utilities, Regional and Local Governments
10. Conduct training sessions for GIS staff (state, regional, local, utilities) and EOC managers to expand the understanding of available GIS data, discuss strategies, forecasting-predictability modeling, post-event assessments, and GIS analysis relating to potential natural and human disasters.	CT DESPP, GIS Council (Education Committee), CT OPM, Utilities, Regional and Local Governments, CT GIS User 2 User Group
11. Identify, at a local level, fragile or sensitive utility infrastructure that could benefit from extra protection – tree trimming across the street, sand bagging, placement of jersey barriers.	Local Governments, Utilities
12. Establish a State GIS Coordinator that processes multidiscipline skills, is competent in GIS, and knowledgeable of diverse datasets to manage the data collection and distribution of GIS information.	GIS Council, CT DESPP, CT DAS, CT OPM

Recommendations

13. Create a fully documented library that catalogs all the available GIS resources and how to obtain them.	GIS Council, Regional and Local Governments
14. Have a method to incorporate citizen provided information on damage reporting at a local, regional and state level.	CT DESPP, GIS Council and Local Governments
15. Ensure that every town in Connecticut has access to GIS software and hardware, the resources to develop data and the training to implement it's use.	GIS Council, CT OPM, Regional and Local Governments
16. Establish controls to prevent taxpayers funding the duplication of acquisition efforts by utilities, local and state government.	GIS Council, Legislature, Regional and Local Governments, CT OPM, Utilities
17. Matching of electronic data to manual paper process to make repairs and report corrective measures taken (post-storm).	Utilities, CT DEEP, CT Siting Council

Recommendations

18. Interstate GIS coordination and sharing of data (server).	CT DESPP (GeoLab)
19. Create a State GIS Department/Office to manage the hardware, software and logistics of creating a GIS repository.	Governor's Office and Legislature
20. Standardize data formats so that information can easily be shared across agencies and departments.	GIS Council, Regional and Local Governments

Best Practices

Utilizing the most current data layers available

Distribute necessary information before the event occurs.

Set up map templates before the event.

Automate data collection process as much as possible.

Track and display citizen request calls by category type

Establish formal agreements with other entities for operational GIS assistance.

Fully functional GIS network in case of loss of Internet.

Pre established GIS “call list” to staff the event.

Handing town maps to utility workers

Mapping incidents in the field.

Best Practices

Identify residents on well water to make power restoration a priority in those areas.

Create and manage evacuation and sheltering options.

Make GIS staff part of the EOC.

Using National Hurricane Sea, Lake and Overland Surges from Hurricanes (SLOSH) data to anticipate flooding scenarios.

Inter-departmental and inter-agency coordination to prevent map making repetition.

Streaming live weather data from Hurrevac and NOAA.

Report Access

http://www.ct.gov/gis

Questions / Comments

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Eric Snowden – CRCG (860) 522-2217 Esnowden@crcog.org