SECRETARY OF THE STATE
CAPITOL OFFICE
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STATE OF CONNECTICUT
GOVERNOR DANNEL P. MALLOY

S.T.O.R.M. IRENE PANEL SPECIAL MEETING MINUTES

Tuesday, October 25, 2011
10:00 a.m. - 3:00 p.m.
Legislative Office Building, Room 2B

Members Present: (Co-Chair) Joe McGee, (Co-Chair) Major General James Skiff , Terry Edelstein (joined at 11:40 a.m.), Lee Hoffman, Scott Jackson, Robert McGrath, and Cathy Osten

Members Absent: Peter Carozza

Call to Order: Major General James Skiff called meeting to order at 10:00 a.m. and noted that the panel's responsibility was to review the recent tropical storm Irene, but to also look more broadly at the state's response apparatus in general. He reviewed the agenda for those present.

A) Assessing Risk and Understanding Connecticut's Vulnerability to Extreme Weather
Panel 1

1) ***"The Realities of New England Hurricanes"***
Glenn Field, Warning Coordination Meteorologist, NOAA/ National Weather Service, Taunton, MA: Glenn Field gave this presentation to the Panel (see attachment A).
2) ***"Impact of Coastal Storm Surge in Connecticut"***
Gary Conte, Warning Coordination Meteorologist, NOAA/ National Weather Service, Upton, NY: Gary Conte gave this presentation to the Panel (see attachment B).
3) ***"Impact of a Category 3 Storm on Inland Connecticut"***
Doug Glowacki, Emergency Management Program Specialist, DESPP/DEMHS: Doug Glowacki gave this presentation to the Panel (see attachment C).
4) ***"Computerized Storm Projections for Coastal Resiliency along Connecticut's Coast"***
Adam Whelchel, Ph.D., Director of Science, The Nature Conservancy
Dr. Whelchel will discuss a state-of –the-art computer program, developed by The Nature Conservancy with NASA'S Goddard Space Institute and NOAA, that enables users to project future flooding impacts under different sea level rise and storm scenarios for specific neighborhoods and streets around Long Island Sound: Dr. Whelchel gave this presentation to the Panel (see attachment D).

Joe McGee asked the members of the Panel if they had any questions on the previous presentations.

Joe McGee asked Doug Glowacki for clarification on the wildland urban interface numbers that he discussed in his presentation, that Mr. Glowacki then provided.

Scott Jackson asked Gary Conte if there was anything surprising that he saw in the Irene event that was not predicted by the models. Gary Conte responded that he did not believe so. The SLOSH runs and worst-case-scenarios may have over forecasted by 1/2 to 1 foot higher, but that was based on a CAT 1 hurricane, and Irene was weakening as it moved. What was a surprise was when he looked at videos along CT coastline, was the amount of water that was above ground level. It was fairly closely predicted and a good storm surge forecast.

Scott Jackson asked Glenn Field about wind direction as an identifying characteristic of traditional storms to hit New England and the usual direction of wind. He questioned whether Irene was unusual in terms of the direction of wind. He noted that in his community, some trees fell with no identifiable cause, so they questioned whether it was a cause related to wind direction.

Glenn Field noted that it was a little unusual for the track to have been as far west, but past storms have tracked similarly.

Gary Conte noted that around the narrow wind bands of the eye, you can get spinoff tornadoes. Still, the National Weather Service didn't get the chance to go out and confirm tornadoes, although there were probably some pockets of higher wind damage in some areas around the rotating bands.

Lee Hoffman asked Doug Glowacki to clarify what the damage assessment for a CAT 3 storm in terms of dollars.

Doug Glowacki noted that the number was calculated by HazMH, which was created in early 90's in Florida. The tool uses direct building types, number of buildings, as well as formulas that calculate economic loss based on inability to travel following a major hurricane (duration of time for complete restoration of services). Building damage and projected economic losses make up the number, according to his recollection.

Lee Hoffman asked Dr. Whelchel if he had looked at calibrating the model and predicting what should have happened with Irene vs. what actually happened.

Dr. Whelchel said that they focused in on CAT 2 and 3 hurricanes and that they did not run the SLOSH models to enable that calibration.

Cathy asked Doug Glowacki if they had looked at invasive species in terms of their calculations on how many trees there are in Connecticut.

Doug Glowacki said that in 2010, they performed a limited tree count involving six communities. They found 100 trees per road miles to 1000 trees per road mile. They didn't look specifically at invasive species.

Joe McGee asked what the correlation is in terms of this storm's damage or is this what will happen when you have sustained winds of this magnitude?

Doug Glowacki responded that this storm covered the entire state in tropical storm force winds, but a major hurricane would also have that effect. Irene's 53 mph was the average wind gust. By the time you get to major hurricane, you are 1-200 times the damage level witnessed in Irene. Irene could be used as a case example of worst case tropical storm and plan from there.

Major General James Skiff asked if some models for an ice/snow emergency could be presented in writing for the panel to review.

Doug Glowacki responded that he would get that information and that the very same factors that make hurricane dangerous for the state are present in an ice storm or forest fires in terms of tree growth.

Glenn Field noted that there are concerns with ice storms when there is 1/2 inch of ice on power lines and surfaces of trees. 1-2 inch of ice is pretty dramatic in terms of potential damage.

Major General James Skiff suggested that in cases of ice storms sheltering would also become an issue.

Presentation 2

"Improving the resilience to weather hazards through risk management partnerships: The case of Storm Irene over Connecticut"
Prof. Emmanouil Anagnostou, Northeast Utilities Endowed Chair in Environmental Engineering, Civil and Environmental Engineering, University of Connecticut: Professor Emmanouil Anagnostou gave this presentation to the panel (see attachment E).

Joe McGee asked if hotspots and specific areas could be identified with this model.

Prof. Anagnostou said that it can probably tell you about one part of CT vs. another part of CT. If the resolution is improved, you could get more detailed information on the hotspots. The hotspots are a combination of many conditions.

Cathy Osten asked if they looked at pole age and density while compiling the pole data?

Prof. Anagnoustou said no, that the data was only based on the number of poles.

Cathy Osten also suggested that they look at age of infrastructure like waste water plants for example. Older facilities might be more fragile.

Prof. Anagnoustou agreed. He stated that they haven't looked at these plants yet and noted that it is important that operators of these facilities provide data that could then be compared to the flooding data, etc. He said that they know, based on old pictures and reports, all the floods and all the destruction that happened in CT, but they don't have the magnitude. They can go to those historical periods and compare that to future predictions.

Lee Hoffman noted that on slide 14, it looks like there is a significant statistical outlier for customers affected.

Prof. Anagnoustou agreed and noted that he thought it was an exceptionally different storm than the norm. They need to focus on what we want to categorize. He would suggest starting with major wind storms, then move on to stow storms, and ice storms.

Joe McGee announced that the next panel would be on risk assessment from the point of view of the utilities.

Lee Hoffman said that he would like to offer a brief statement. In his private practice as an attorney, he has, and will continue to have, clients that he represents that have interests that are adverse to Northeast Utilities, UIL, and or their subsidiaries.

He said that he does not believe that this adversely impacts his ability to participate on this panel. However, in an abundance of caution, he consulted with the State Office of Ethics about the matter, and that Office confirmed that given the advisory nature of this panel, the State Code of Ethics does not apply to his involvement.

He therefore believes that he can participate in this panel, however, he wanted to call it to the group's attention if there are any objections.

Joe McGee thanked Lee Hoffman for his statement and introduced the next presenter.

Panel 2

"Risk Assessment of Connecticut's Electric Infrastructure:"
1) "The Distribution System"
Charles Jones, Strategy and Risk Manager, ULI Holdings
Robert Hybsch, Vice President, Customer Operations, CL&P
Michael Ahern, Vice President, Utility Services, NU: Joe Thomas, Charles Jones, Robert Hybsch, and Michael Ahern gave this presentation to the panel (see attachment F).

Terry Edelstein joined the meeting as a voting member (11:40 a.m.)

2) ***"The Bulk Distribution System"***
Peter Brandien, VP, Systems Operations ISO New England: Peter Brandien gave this presentation to the panel (see attachment G).
3) ***"Power Generation"***
Skip Jordan, Site Vice President, Millstone Dominion: Skip Jordan gave this presentation to the panel (see attachment H).

Scott Jackson said that he has heard a lot about predictive capacity and seen that with additional data, more it helps the models. He asked the UI presenters, from a security standpoint, how can utilities participate in that endeavor? From capacity standpoint, what capacity do you have to put some of the road time to data collection?

The UI presenters said that they have internal models that are only based on their data. Now they are going to work with Department of Energy to use additional data for predictions. The more they can automate the data collection process, the better work can be done.

Scott Jackson stated, the use of more robust data to improve risk assessment is something that UI appears to be promoting and asked whether they be working with the state, other utilities, and/or universities.

The UI presenters said that the more stakeholders who can participate, the better we can be prepared. Most of their franchised territory was impacted by flooding. By working with CL&P data, they can improve predictions.

The CL&P presenters said that they reached out to UCONN more than a year ago and started the process to work together on damage prediction.

Joe McGee said that this panel was put together to assess risk and when you look at presentations on cat 3 storm, it's significant. He said that if you look at infrastructure of the electric system, based on 19th century technology - wooden poles and wire. Looking at the real possibility that exists for a very large storm to impact the state, he asked how do they assess that risk? If you look at what you spend over 10 years for system restoration ($1/2 billion in six year period for example) - if they took that $1/2 billion and hardened the system up front, would they mitigate costs for restoration?

The CL&P presenters said that it's the trees where they can have an effect - so they are calling for a better approach to vegetation management. They looked around other areas - Florida, Kentucky - they have found that undergrounding can be too costly. They have 17,000 miles of overhead distribution lines. The average costs of taking overhead lines and moving them underground is $1-2 million dollars per mile (a range). They said that they believe the majority of damage in a CAT 3 storm would be inflicted by trees, which is why they are recommending a statewide task force to address this problem.

Joe McGee said that in a CAT 3, even if you have trimmed trees, you are still going to have a major problem.

Major General James Skiff asked if they would say that our utility infrastructure is deteriorating and if there are any federal funds to assist in maintenance of the distribution system.

The CL&P presenters said that they do not believe the infrastructure for the distribution system is deteriorating. They have a robust maintenance program for the distribution system. They are not familiar that federal funds being available for rebuilding their system.

The UI presenters said that they are similar to CL&P in terms of maintenance programs. If there is a big storm, they rely on mutual assistance. It's a matter of how many resources they can bring in to handle the work. Federal funds could provide value with how local EOC centers are supported and is probably a good investment.

The UI presenters said that they have in place a maintenance and inspection program. These are supported by capital programs.

Lee Hoffman said that it sounds like CL&P and UI have data that compares the transmission system and distribution system restoration. If that data is in a good format to share, that would be helpful for the panel.

The CL&P presenters said that they have reliability indices that they can provide.

Lee Hoffman asked how the process works while involving outside resources and how do they train for these situations.

The CL&P presenters stated that in a storm they scale up.

The UI presenters said that in the UI service territory, there were about 100 miles of transmission wires with three tree contacts. Those were restored that day. On the distribution side, they had approximately 1700 tree contacts. The transmission system impact is much larger, which is why it is built to such a standard to prevent outages, part of the reason why the right-of-way is so large.

Terry Edelstein asked that in terms of communications to customers and businesses, going forward, what is the process for preparing to use advanced technology for communication.

The UI presenters stated that their processes can improve in terms of utilizing automation.

Cathy Osten asked if there were any significant issues with communications with their work crews during the storm event.

The CL&P presenters said that communications with their crews were through private communications. They had no real problems with the exception of one via cell phone when towers went down.

The UI presenters said that communications were successful through points of contact in the field. The cable industry was present in the storm center working with them as well as phone companies.

Lee Hoffman asked the CL&P presenters if they did something similar with coordinating with those companies.

The CL&P presenters said that they did have communications with AT&T and had a desk setup for cable companies as well.

Joe McGee said that he was not comfortable with the responses to his question asked on risk and infrastructure. He said that we will deal with trees, but in the case of a CAT 3 hurricane, he is asking a broader question on their infrastructure and its ability to withstand that kind of storm. He asked what

are they doing to harden their infrastructure and what would it cost. He said that he would request for them to present what they spent each of the last ten years. He asked what is that number in terms of what it takes to restore the system and what more should we be doing.

Joe McGee called a brief recess for approximately 20 minutes at 1:09 p.m.

Joe McGee reconvened the meeting at 1:45 p.m.

- **Background and Overview of Hurricane Preparedness Planning**
  - **DEMHS**
- **Response Management at the State Emergency Operations Center**
  - **William J. Hackett, State Director of Emergency Management, DESPP/DEMHS:** William Hackett presented to the panel on the above two topics (See attachment I).
  - **Michael Varney, State-wide Interoperability Communications Coordinator, DESPP/DEMHS (Evacuation, Commodities, Fuel, Debris, Donations Management):** Michael Varney presented to the panel (See attachment J).
- **Response Management in the DEMHS Regions/Lessons Learned and Best Practices**
  - **Robert Kenny, Regional Coordinator, Regions 1 and 2:** Robert Kenny presented to the panel (See attachment K).
  - **Anthony Scalora, Regional Coordinator, Region 4:** Anthony Scalora presented to the panel (See attachment L).
  - **Thomas Vannini, Regional Coordinator, Region 5:** Thomas Vannini presented to the panel (See attachment M).
- **Response to Recovery**
  - **Declarations Task Force/DR 4023**
  - **Recovery Task Force**
    - **Brenda Bergeron, Principal Attorney, DESPP/DEMHS:** Brenda Bergeron presented to the panel (See attachment N).
- **National Disaster Recovery Framework**
  - **Stephen DeBlasio, FEMA Federal Coordinating Officer for DR 4023:** Stephen DeBlasio presented to the panel.
- **Action Steps**
  - **William J. Hackett:** William Hackett presented to the panel (See attachment O).

Robert McGrath asked Mike Varney to give them an assessment of our statewide emergency notification system.

Mike Varney said that the systems created over the last ten years were all utilized. They monitored the public safety assets and throughout the storm there were no significant failures of communications assets that weren't quickly brought back up.

Scott Jackson directed his comments to Mr. Murrey, stating that in terms of wind magnitude, this storm was less than anticipated. About 1 tree per road mile appeared to go down. Looking at the CAT 3 storm

coming one day, the debris management would be extensive. He asked what plans were in effect for Irene and were there any locations where a large-scale effort was put in place.

Mr. Murrey said that the state has a very comprehensive debris management plan that was offered primarily by DEEP. It was based on a pilot program that FEMA had that encouraged the creation of a plan that combined pre-existing contracts for removal and monitoring of debris management. Included in that plan is a task force, which includes a fiscal component, decision-making component. This was a good opportunity for a functional exercise that was not catastrophic in nature.

Major General James Skiff asked a follow up question but to an earlier point; if we lost 97% of our emergency services, how would we recover from that?

William Hackett said that they are involved in an emergency management assistance compact and international compact to get assistance. Also, the National Guard is available. All of these resources would be used in this scenario.

Major General James Skiff asked how many CERT teams there are.

William Hackett said there are about 120, and not all of them were activated.

Joe McGee asked how many towns have EOC's.

William Hackett said that all towns have them, but not all of them were activated. He was not sure how many were not activated, but he would get that number.

Joe McGee said that he wished to ask about training. He said that he has been speaking to states about real-time training. Florida has four days of training in May to prep for hurricanes. He asked how we do our training in CT.

William Hackett said that we do training by region. There is also training offered by other federal components. There is a process by using Federal Homeland Security money, which starts off with a workshop, with a functional exercise next. It takes years to put together an exercise like this together.

Joe McGee asked if it includes utilities, town, and state in one exercise.

William Hackett said that they are done separately.

Joe McGee asked if it would make sense to do this as a group.

William Hackett said that he thought it was an excellent idea and something to look at.

Joe McGee asked if this is a budget issue for them in terms of staff requirements.

William Hackett said that this is definitely a budget issue and a staffing issue at this time.

Joe McGee asked how big of an undertaking this would be.

William Hackett said that it would not be as high as $1 million, but it would be more than $200,000 and would require backfill on overtime for first responders that do training on consecutive days. He said that it could be done regionally and they could get the numbers from an upcoming event as a guide. They also do the Millstone exercises that are required, which includes the entire zone and is a pretty large scale exercise.

Cathy Osten asked how the debris management plan interacts with the municipalities - including what comes from private homeowner areas and municipal areas.

Brenda Bergeron said that the plan is primarily for state owned lands and state roads, but it is possible for towns to also contract separately, but the process for going onto private property is regulated by statute. The town officials or private citizens could talk to their local emergency management director, who could be in touch with DEEP. Towns can designate temporary reduction sites which could be used as storage sites for a period of time ranging from months or perhaps a year or two depending on the category of the storm. DEEP issues an emergency authorization to allow for only storm debris for that location. DEEP would be able to turn around approval of a temporary site very quickly and is available for technical assistance.

Joe McGee asked that when we look at assessing risk, what state agency assesses risk in terms of storm impact. Specifically, is there one individual who looks to determine the overall risk we face in terms of infrastructure.

William Hackett said that multiple agencies are involved. DOT would handle this for infrastructure for example.

Joe McGee asked Mr. DeBlasio to clarify his point that the recovery officer might not be the same person as the response coordinator.

Mr. DeBlasio confirmed this.

William Hacket said that the best practice which occurred during the storm included naming a recovery office for a city, which handled the recovery phase while response was ongoing.

Joe Mcgee and Major General James Skiff thanked everyone for coming and participating in the discussion.

Adjournment: Joe McGee moved to adjourn the meeting at 3:08 p.m., seconded by Scott Jackson. All members present voted in favor. The motion carried.

Attachments

A. *"The Realities of New England Hurricanes"*
Glenn Field, Warning Coordination Meteorologist, NOAA/ National Weather Service, Taunton, MA

B. *"Impact of Coastal Storm Surge in Connecticut"*

Gary Conte, Warning Coordination Meteorologist, NOAA/ National Weather Service, Upton, NY

C. *"Impact of a Category 3 Storm on Inland Connecticut"*

Doug Glowacki, Emergency Management Program Specialist, DESPP/DEMHS

D. *"Computerized Storm Projections for Coastal Resiliency along Connecticut's Coast"*

Adam Whelchel, Ph.D., Director of Science, The Nature Conservancy

E. *"Improving the resilience to weather hazards through risk management partnerships: The case of Storm Irene over Connecticut"*
Prof. Emmanouil Anagnostou, Northeast Utilities Endowed Chair in Environmental Engineering, Civil and Environmental Engineering, University of Connecticut

F. "The Distribution System"

Charles Jones, Strategy and Risk Manager, ULI Holdings

Robert Hybsch, Vice President, Customer Operations, CL&P

Michael Ahern, Vice President, Utility Services, NU

G. *"The Bulk Distribution System"*

Peter Brandien, VP, Systems Operations ISO New England

H. *"Power Generation"*

Skip Jordan, Site Vice President, Millstone Dominion

I. Response Management at the State Emergency Operations Center
    - William J. Hackett, State Director of Emergency Management, DESPP/DEMHS

J. Michael Varney, State-wide Interoperability Communications Coordinator, DESPP/DEMHS (Evacuation, Commodities, Fuel, Debris, Donations Management)

K. Response Management in the DEMHS Regions/Lessons Learned and Best Practices
    - Robert Kenny, Regional Coordinator, Regions 1 and 2

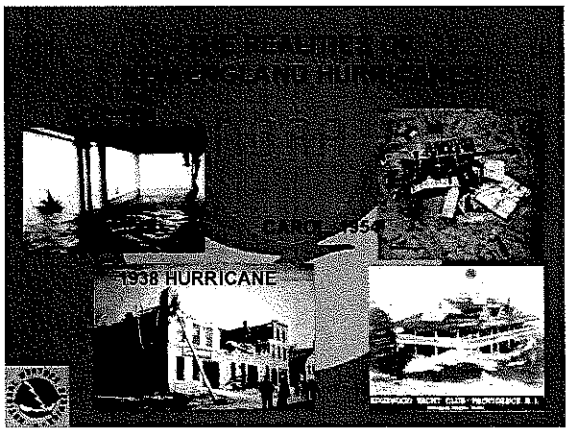
L. Anthony Scalora, Regional Coordinator, Region 4

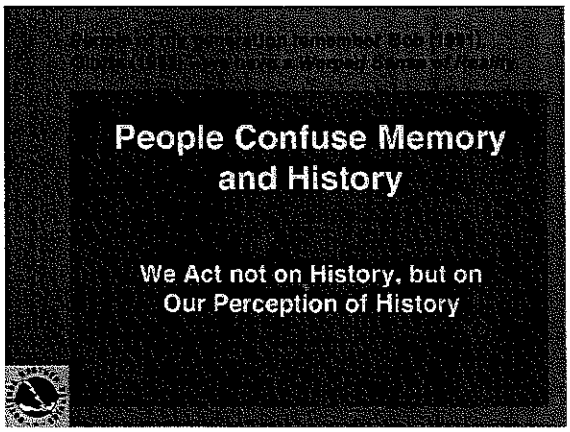
M. Thomas Vannini, Regional Coordinator, Region 5

N. Response to Recovery
    - Declarations Task Force/DR 4023
    - Recovery Task Force
        - Brenda Bergeron, Principal Attorney, DESPP/DEMHS

O. Action Steps
    - William J. Hackett

Submitted by:
Mike Caplet

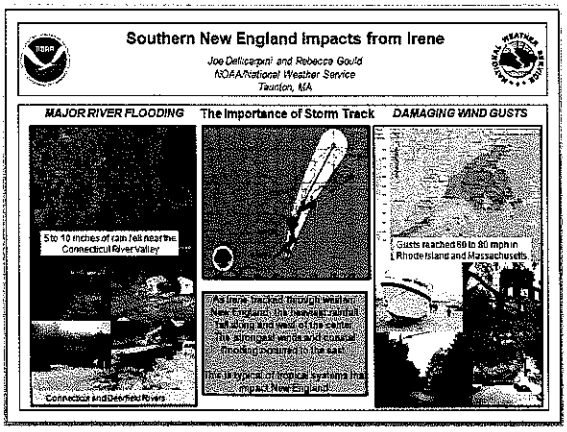




NEW ENGLAND HURRICANES

- Low frequency, but high impact events! They bring flooding rains, damaging winds, and devastating storm surge inundation.
- Typically accelerate & arrive sooner than you think
- Heavy rain along and left (west) of track.
- Strongest winds to the right (east) of track.
- Storm surge highest to the right (east) of track.

- Preparedness and being proactive is of the utmost importance.



Max wind **gusts**:
67 mph New Haven
63 mph Bridgeport

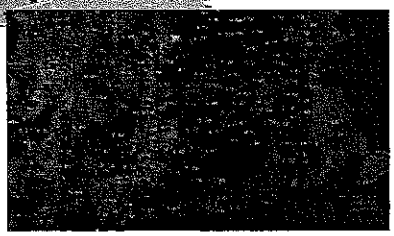
(83 mph Conimicut, RI)

Highest **sustained** winds:

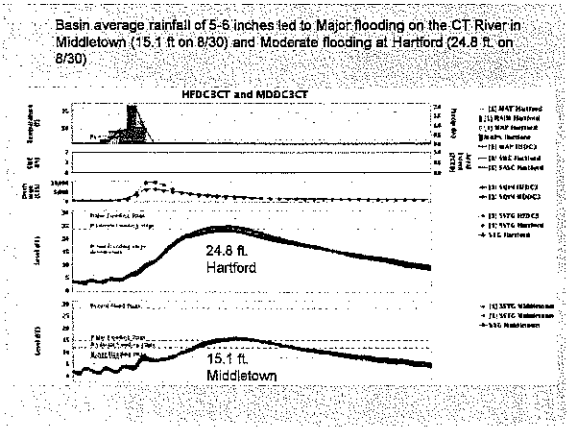
46 mph Bridgeport &
Groton, CT
(62 mph Conimicut, RI)

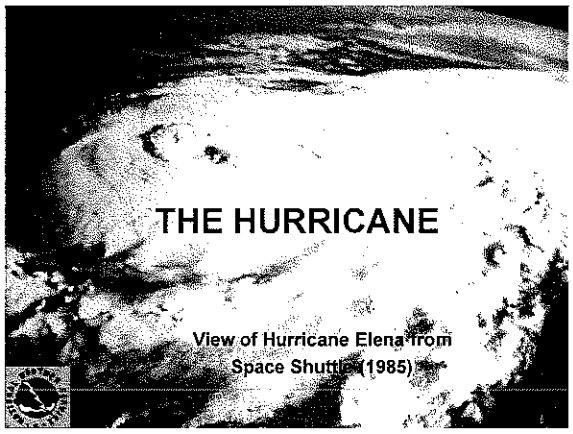
6-10 inches of rain fell in western CT – highest in Litchfield hills.

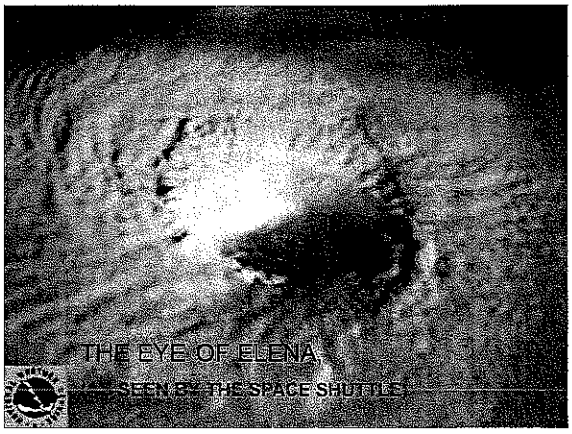
3-5 inches of rain fell in eastern CT

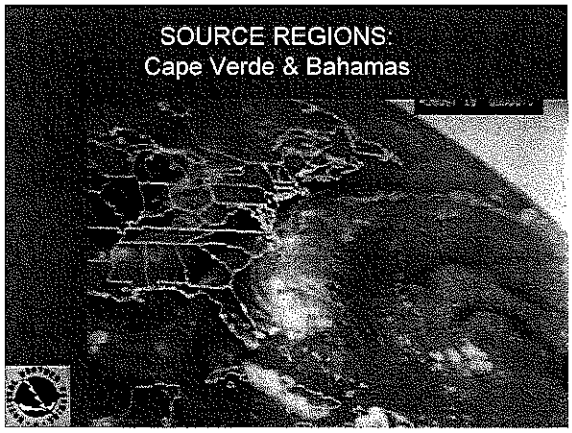


Basin average rainfall of 5-6 inches led to Major flooding on the CT River in Middletown (15.1 ft on 8/30) and Moderate flooding at Hartford (24.8 ft. on 8/30)





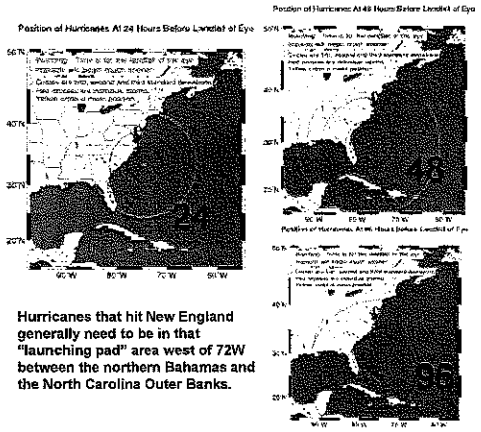




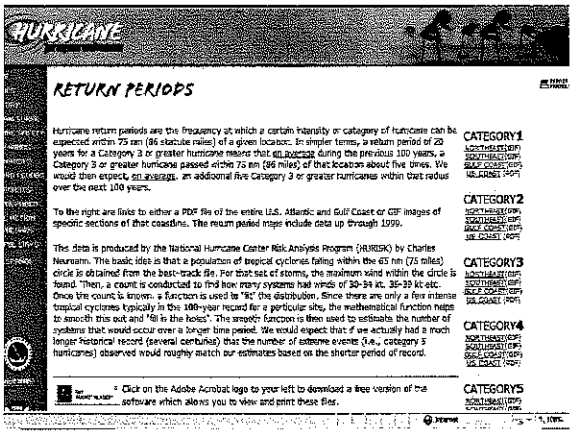
- Four Category 3 hurricanes in a 16 year period
  - Great New England hurricane of 1938
  - Great Atlantic Hurricane of 1944
  - Carol and Edna, Summer of 1954
  - Occurred within 12 days of each other!

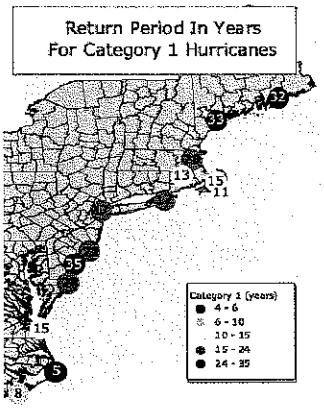
And none in past 57 years !

Low Frequency, High Impact!



Hurricanes that hit New England generally need to be in that "launching pad" area west of 72W between the northern Bahamas and the North Carolina Outer Banks.

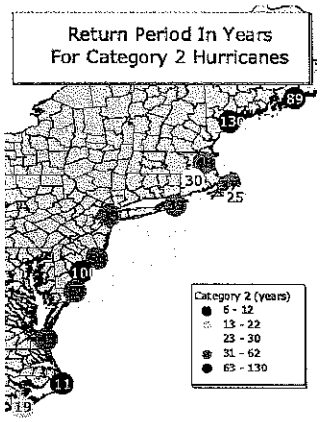




For Connecticut, every 17 years.

So, in a 20 year period, the probability is 118% of having a Category 1 passing within 86 miles (= 20 / 17).

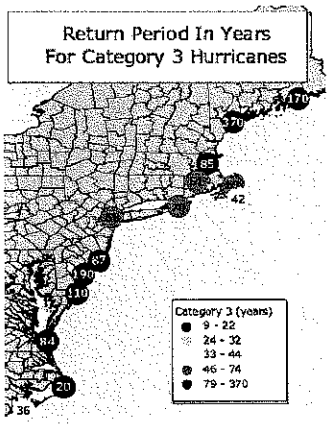
The last Category 1 that made actual landfall in southern New England was already 26 years ago – Hurricane Gloria in 1985.



For Connecticut, every 39 years.

So, in a 20 year period, the probability is 51% of having a Category 2 pass within 86 miles (= 20 / 39).

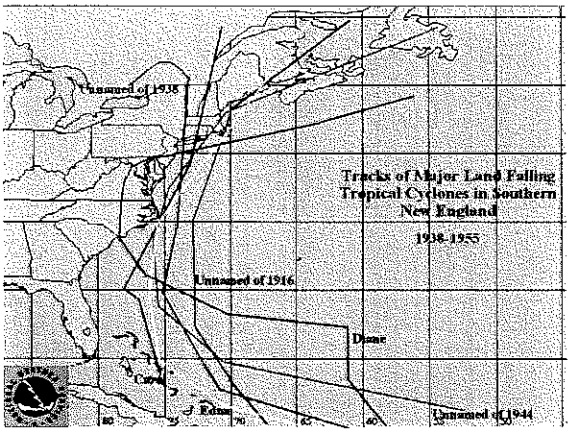
The last Category 2 storm to hit southern New England was 20 years ago – Hurricane Bob in 1991.



For Connecticut, every 69 years *on average*. (Remember, they can be bunched up – we had 4 Category 3 storms in a 16-year period from 1938-1954.)

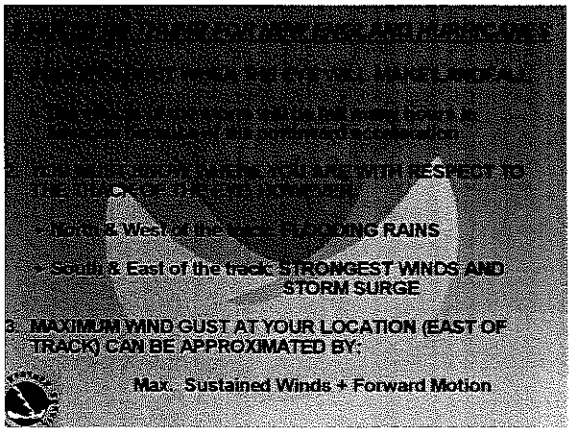
For Nantucket, every 42 years.

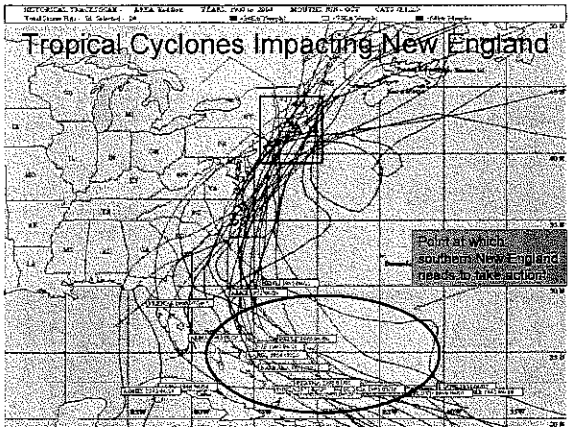
The last major hurricanes – Category 3 – to hit southern New England were ***57 years ago*** – Carol and Edna in 1954.

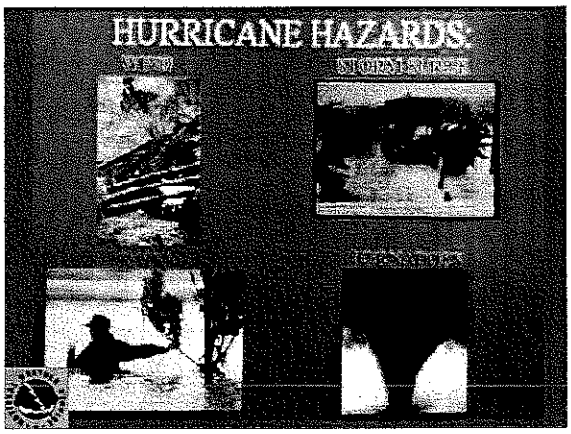


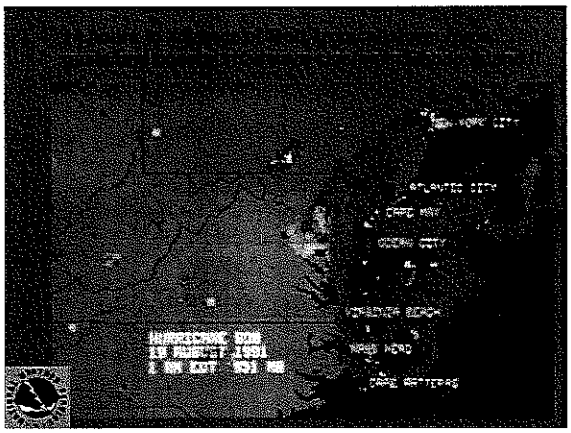
Common Characteristics

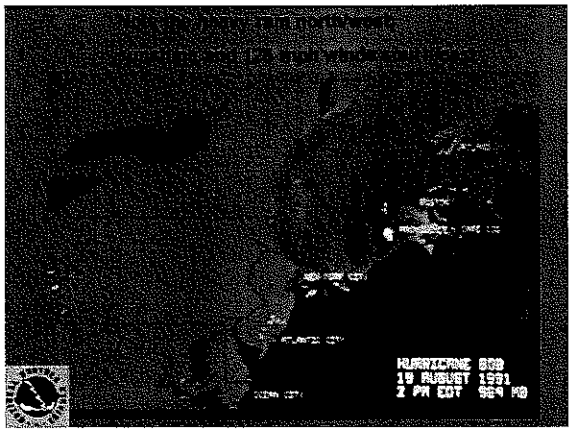
- **Rapid acceleration up the coast**
  - Average speed – 33 mph as they raced through
- **Heavy rainfall usually focused along and west of the storm track**
  - Nearly ½ of the storms since 1900 produced river/small stream flooding!
  - 6-8 inches of rainfall
- **High winds focused east of the track**
- **Storm surges focused east of the track**

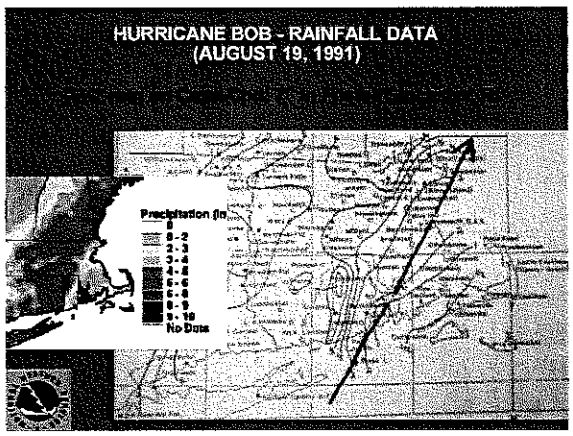


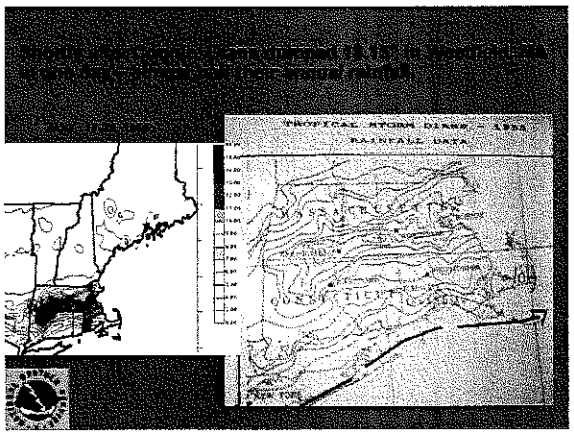

Tropical Cyclones Impacting New England
Point at which southern New England needs to take action

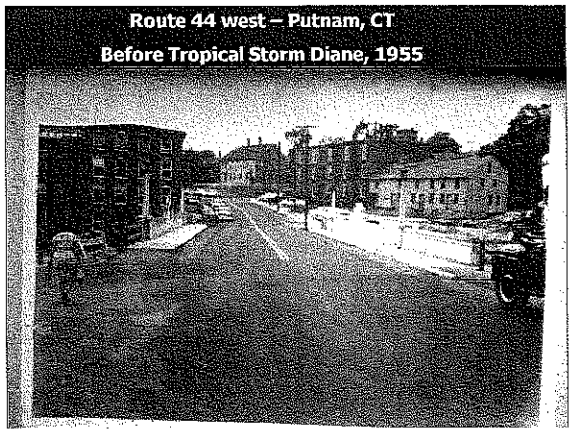

HURRICANE HAZARDS:

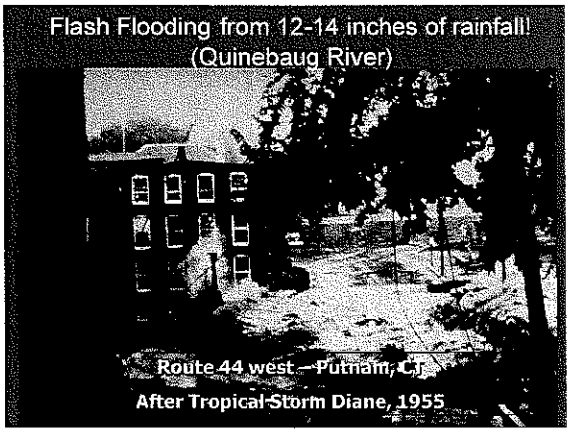

HURRICANE BOB
19 AUGUST 1991
2 PM EDT 964 MB

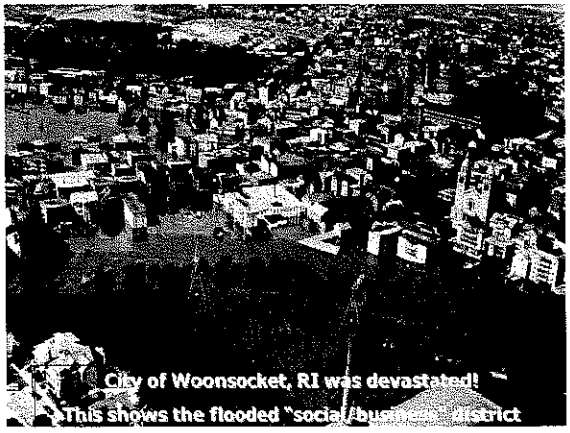

HURRICANE BOB
19 AUGUST 1991
2 PM EDT 964 MB


HURRICANE BOB - RAINFALL DATA
(AUGUST 19, 1991)
Precipitation (in.)
No Data




Route 44 west – Putnam, CT
Before Tropical Storm Diane, 1955


Flash Flooding from 12-14 inches of rainfall!
(Quinebaug River)
Route 44 west – Putnam, CT
After Tropical Storm Diane, 1955


City of Woonsocket, RI was devastated!

A SCENE ON MILLER RIVER AT WINCHENDEN, MASS.
Courtesy of International News Photos

NOW LET'S TALK ABOUT...

WIND...

TROPICAL CYCLONE DEFINITIONS

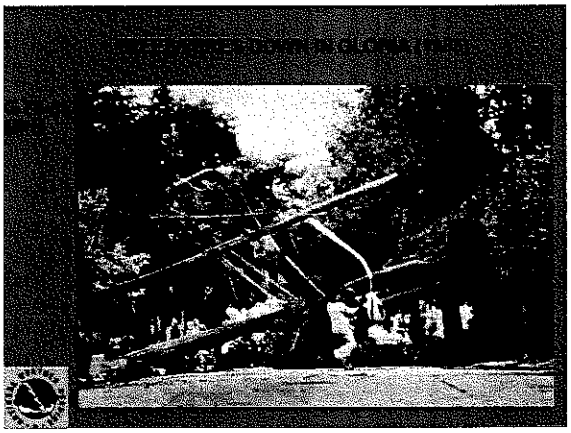
Tropical Depression: Sustained winds 38 mph or less

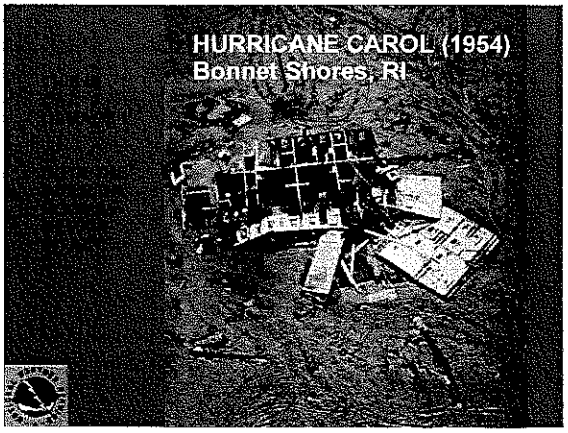
Tropical Storm: Sustained winds 39-73 mph

Hurricane: Sustained winds 74 mph or greater

Saffir/Simpson Hurricane Scale

	Category	Definition
Gloria	ONE	Winds 74-95 mph
Bob	TWO	Winds 96-110 mph
Carol, 1938	THREE	Winds 111-130 mph
Hugo	FOUR	Winds 131-155 mph
Camille, Andrew	FIVE	Winds greater than 155 mph

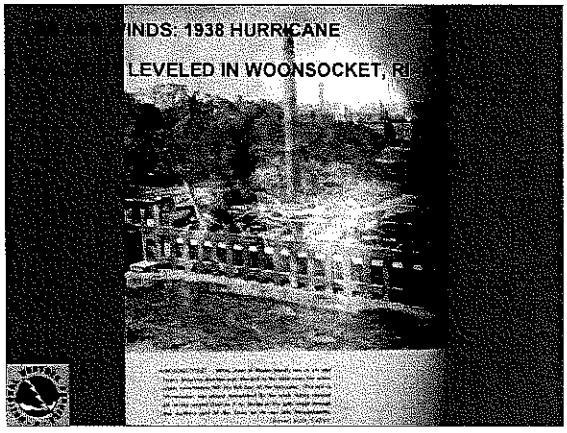


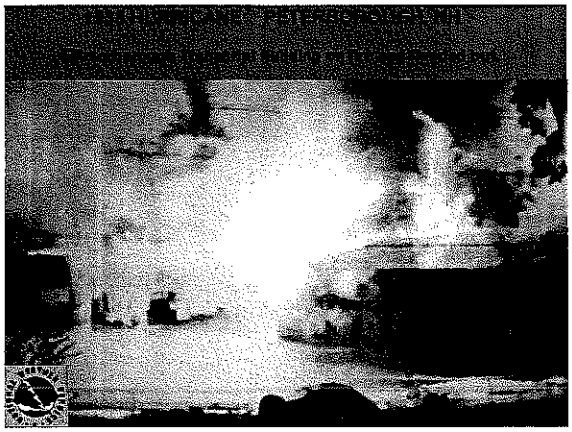


TREES DOWNED BY COUNTY
Hurricane, Sep 1938

Tolland County	29 million
Windham County	91 million
New London County	97 million
Middlesex County	14 million
Hartford County	7 million
Total	238 million

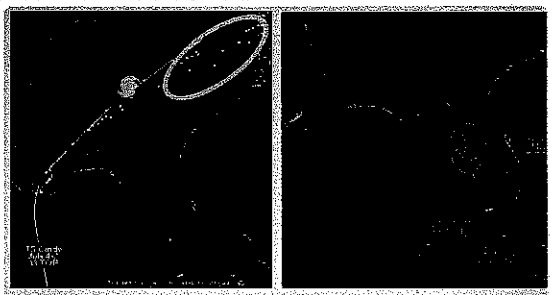
ource: Connecticut Forest and Park Association Report, November 1938



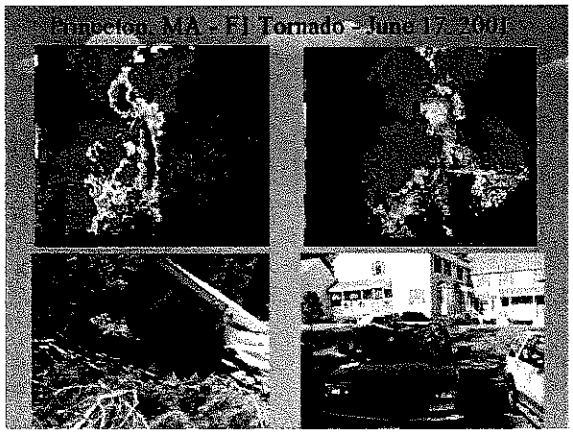


Tornadoes

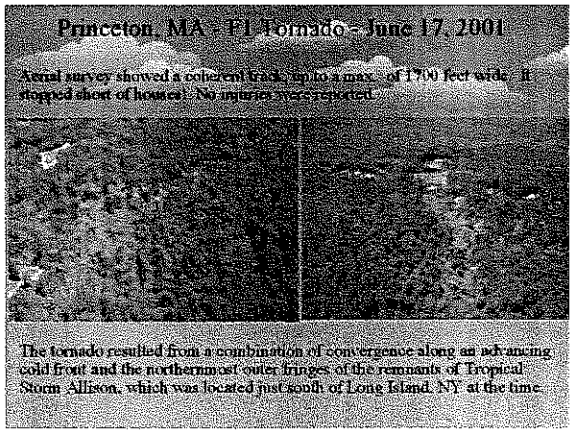
Greatest Tornado Threat



Tornadoes in Cindy and Dennis (2005)



Princeton, MA - F1 Tornado - June 17, 2001

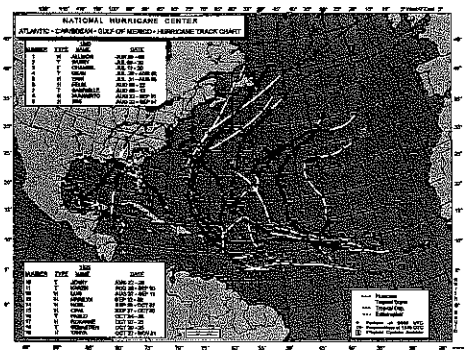


Princeton, MA - F1 Tornado - June 17, 2001

Aerial survey showed a coherent track, up to a max. of 1700 feet wide. It stopped short of houses. No injuries were reported.

The tornado resulted from a combination of convergence along an advancing cold front and the northernmost outer fringes of the remnants of Tropical Storm Allison, which was located just south of Long Island, NY at the time.

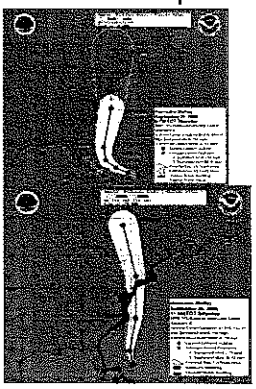
1995 – 19 NAMED STORMS – NONE HIT NEW ENGLAND



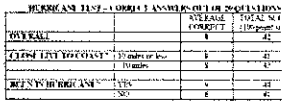
2007: **Allison** -> Andrea; **Iris** -> Ingrid; **Luis** -> Lorenzo; **Marilyn** -> Melissa; **Opal** -> Olga; **Roxanne** -> Rebekah;

Numbers are NOT Important!

- It only takes ONE Hurricane to make it a BIG Season
- PREPARE! PREPARE! PREPARE!



2005, Pre-Katrina
Mason-Dixon® Polling & Research, Inc.

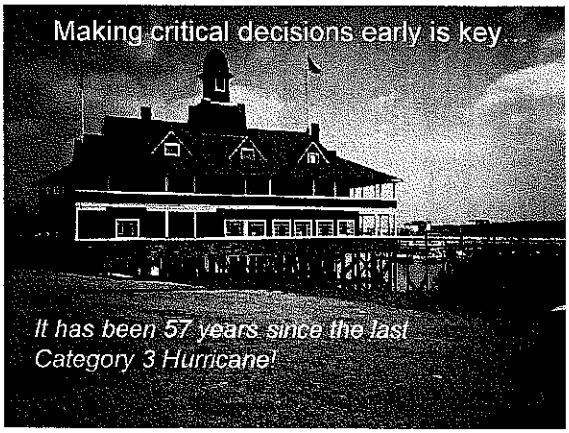


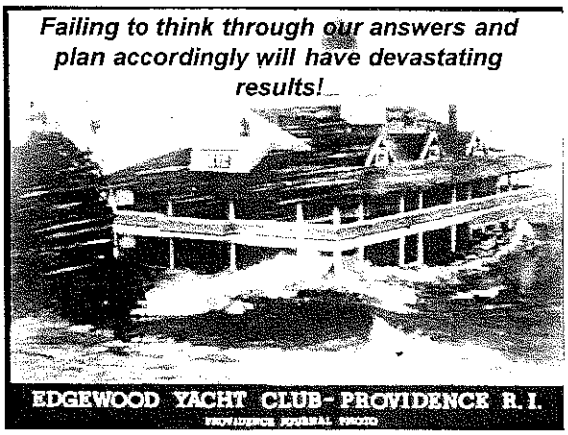
QUESTION: True or False? Candles are a good source of light in the event of a power failure.
True 56%
False 44%

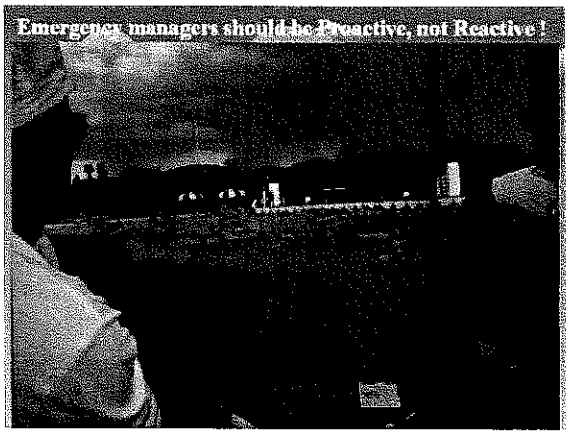
QUESTION: True or False? Masking tape will help prevent windows from shattering.
True 54%

QUESTION: Geographically, the majority of hurricane fatalities from drowning in the past 33 years have occurred:
A - On the open water 7%
B - Within two miles of the coast 19%

Even among those who live within 10 miles of the coast, 16% said they would probably not evacuate, and among those who have experienced a hurricane, an even higher 20% said they would probably not evacuate. Only 33% of coastal residents would evacuate early, as would only 39% of those who have experienced a hurricane before.







FLEEING HURRICANE GEORGES IN KEY WEST

(B)

Storm Surge

Storm Surge

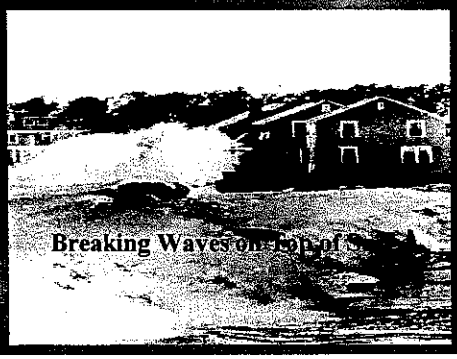
Storm Surge is the rise of water caused by high winds and low pressure, above the predicted astronomical tide.

Storm Tide is the *total water level* (referenced to a datum) during a storm (i.e. astronomical tide + storm surge + tidal anomaly)

Storm Surge

Storm Surge sweeps up to 100 miles north and east of the storm track

Highest Impacts will be Timing with a New/Full Moon and highest winds preceding the approach of high tide



Evacuation Planning

Based on Storm Surge Inundation Forecasts

- RUN from the Water
- Hide from the Wind

Storm Surge Impact Summary

No Two Storms Are the Same

For each Classification (Tropical Storm through a Category 3 Hurricane), Impacts vary Widely

Storm Surge from Tropical Storm Irene was What You Would Expect from a Category 1 Hurricane?

WHY?

- Irene was a Large Storm with a Large Wind Field that Moved North Along the Coast.
- Irene made Landfall Preceded by the Highest East Winds Coincident with a New Moon

Factors Affecting Storm Surge

Central Atmospheric Pressure (Accounts for up to 10% of Surge Height)

Intensity (Category 1: Weakest – 5: Strongest)

Forward Speed of the Storm

Size of the Storm

High winds covering larger areas produce larger and higher surges

Angle of Approach (Moving NW, N, NE)

Width and Slope of Continental Shelf

Local features – concavity of coastlines, bays, rivers, headlands, or islands

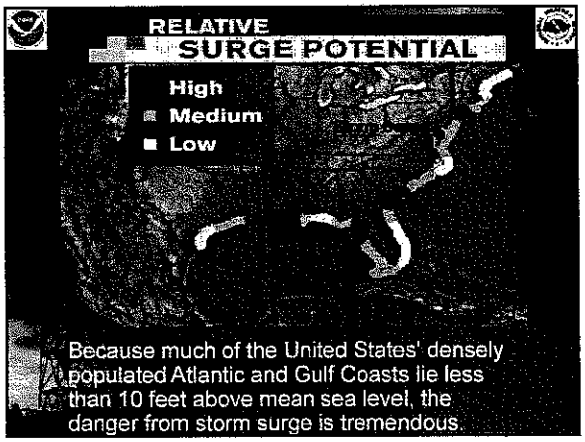
Other Factors to Consider

Astronomical Tides

- Is a New or Full Moon approaching?

Are the highest east winds forecast with the approach of low or high tide?

Is heavy rain forecast prior to landfall?



Because much of the United States' densely populated Atlantic and Gulf Coasts lie less than 10 feet above mean sea level, the danger from storm surge is tremendous.

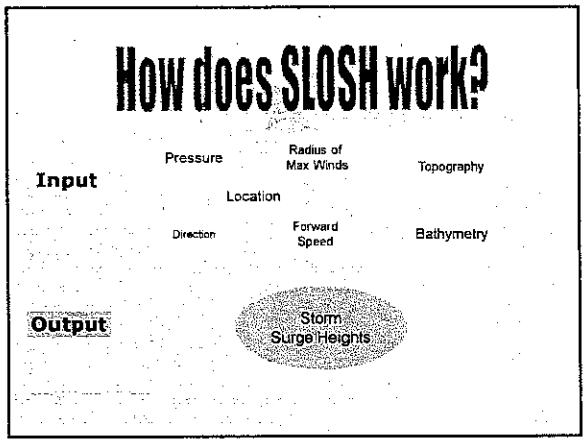
How do We Predict Surge?

Forecast Model called SLOSH (Sea Lake Overland Surges from Hurricanes)

Calculates water level at coast and inland

80 % Accurate

Used for evacuation "planning" when hurricane is more than 36 hours from landfall (BEFORE A HURRICANE WARNING ISSUED)



SLOSH does Not include

Rainfall amounts

River flow

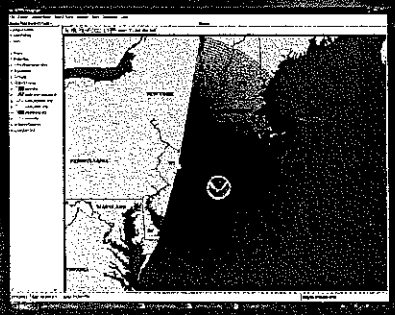
Wind driven waves

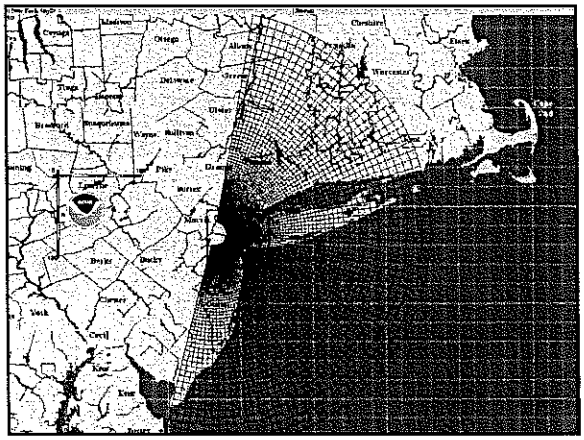
Accuracy of the SLOSH Model

"Rule of thumb" accuracy based on scientific analyses shows a 20% plus/minus verification of the calculated storm surge height.

For example: If SLOSH calculates a 10-foot storm surge, expect to see observed ranges of between 8 and 12 feet.

What Did SLOSH Predict for Irene? Long Island Sound Basin





SLOSH Surge Forecast

Category 1 Hurricane Moving N at 20 MPH during High Tide: 4-5 Feet

What Weather Conditions were Observed?

Central and Western Long Island Sound Buoys

Winds:

- *3hrs E 15g20kt*
- *3hrs E 20g25kt*
- *4hrs E 20-25g30-35kt*
- *7hrs E-SE 30g45kt*
- *3hrs SE-S 35g45-50kt till time of high tide around 15z*

Waves:

- *10 hrs 5-7ft seas until time of high tide*

Pressure:

- *35mb drop in 12hrs*
- *969 mb at 10 am*

What Surges were Observed?

Moderate to Major Coastal Flooding along the CT Shores of Long Island Sound

3 to 5 Feet storm surge during the morning high tide cycle on Sunday, August 28, 2011

Estimated 2 to 4 Feet of inundation Above Ground Level (AGL)

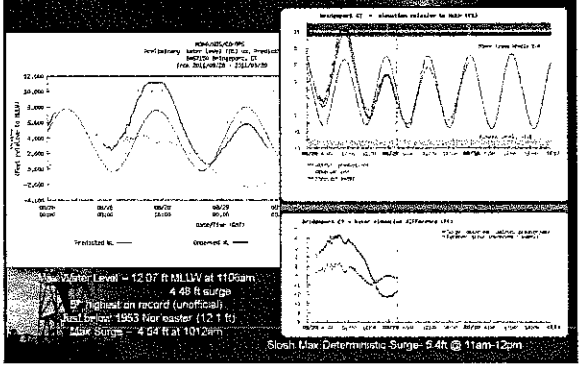
Extensive damage (flooded homes, roads, cars, and train yards)

Beach erosion varied considerably

CT Storm Surges 8/28/2011

Site Name	Max Storm Tide (ft) MLLW	MSL	Surge (ft)*	Time (EDT)
New London	6.55	5.01	3.48 3.74 (Max)	924 AM 1200 PM
New Haven	11.57	8.24	4.65	1036 AM
Bridgeport	12.12	8.50	4.48 4.54 (Max)	1106 AM 1012 AM

Bridgeport



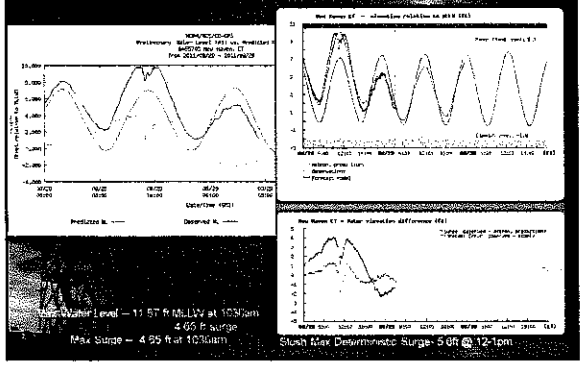
Bridgeport Seawall at Seaside Park

Photos by David Williams, former NYS DOT

Bridgeport Seawall at Seaside Park

Photos by David Williams, former NYS DOT

New Haven

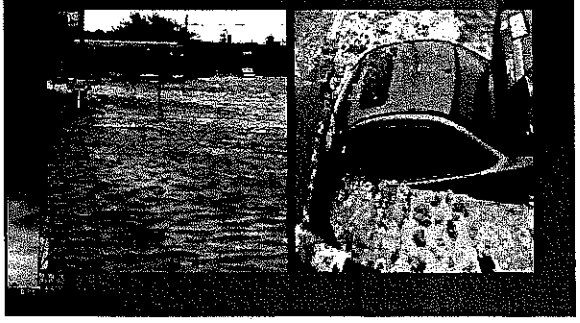


East Haven Cosey Beach Avenue

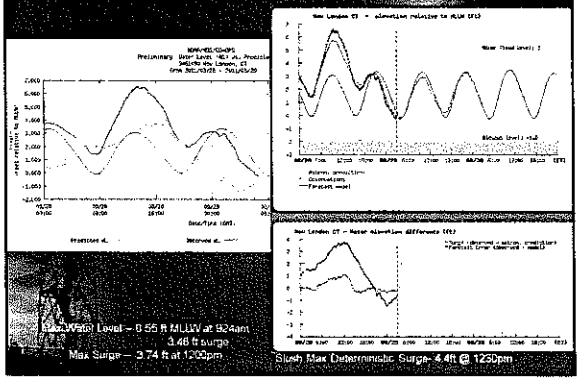
Photos by The Weather Channel/Storify

East Haven

Photos by The Weather Channel/Storify



New London



Groton CT Shores
Photos by City of Groton Officials

Groton CT Shores
Photos by City of Groton Officials

Once a Hurricane Warning is Issued

When hurricane is within 36 hours of Landfall:

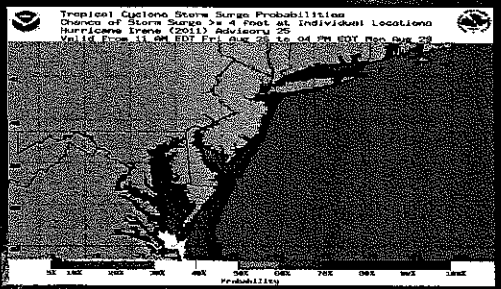
NWS Provides:

"REAL TIME" SLOSH forecasts

Probabilistic Surge Graphics:

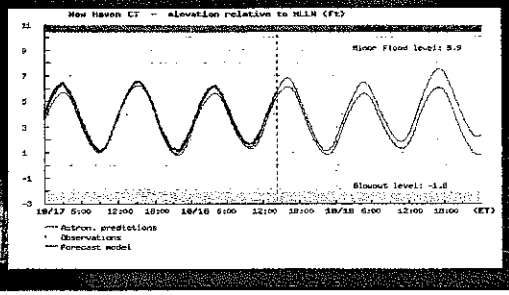
http://www.weather.gov/mdl/psurge/archive.php

Probability
At Least 4 Foot Storm Surge



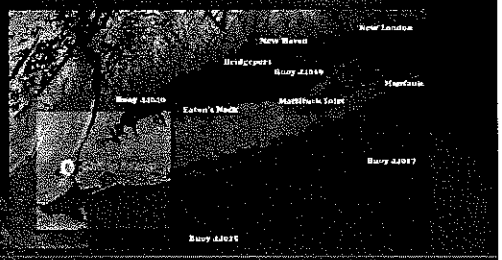
Stevens Institute Storm Surge Warning System (SSWS)

http://hudson.dl.stevens-tech.edu/SSWS



SUNY Stony Brook Storm Surge Forecasts

http://stormy.msrc.sunysb.edu



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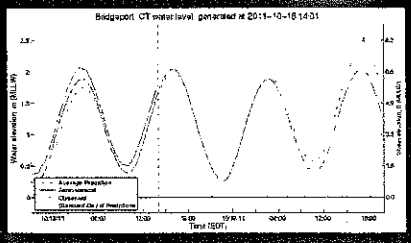
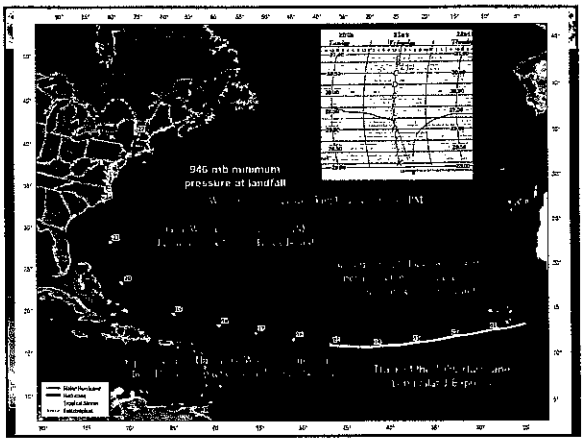




Storm Surge Destruction along Eastern CT Coast – 1938 Hurricane

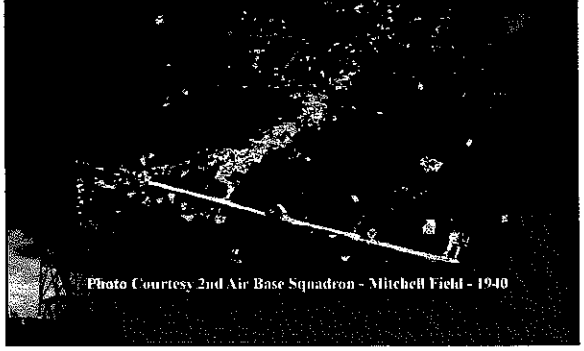


Photo Courtesy 2nd Air Base Squadron - Mitchell Field - 1940

CONNECTICUT'S NEXT MAJOR HURRICANE

Department of Emergency Services and Public Protection

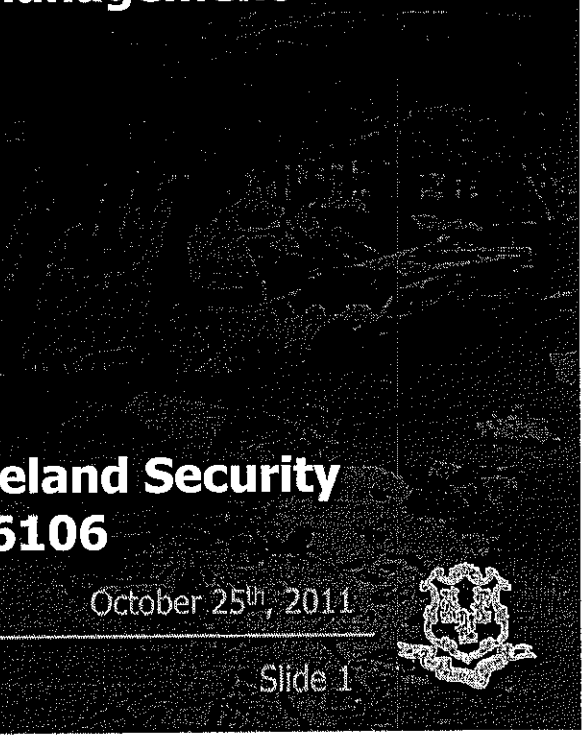
Reuben F. Bradford, Commissioner

William J. Hackett, Director of Emergency Management

Presented By

Douglas W. Glowacki

Program Manager
Division of Emergency Management and Homeland Security
25 Sigourney Street, Hartford, CT 06106



Executive Summary

The facts contained in the following presentation are based on the damage caused by Tropical Storm Irene combined with a comprehensive modeling of the damage to be expected from a major hurricane. Major hurricane damage has been modeled using the Hazards United States Multi-Hazard tool (HAZUS MH) developed by the Department of Homeland Security Federal Emergency Management Agency Mitigation Division Under a contract with the National Institute of Building Sciences.

COMPARISON OF TROPICAL STORM IRENE VS. A MAJOR HURRICANE

TROPICAL STORM IRENE	MAJOR HURRICANE
Wind Gusts from Irene reached a maximum of 67 MPH.	Instantaneous Maximum Wind Gusts in a fast moving major hurricane can reach close to 200 MPH.
T.S. Irene downed approximately 1 – 2% of the State's Trees	A major hurricane may down up to 70 - 80% of the State's trees.
T.S. Irene resulted in over 800,000 power outages requiring 9 days to fully restore.	A major hurricane may black out the entire state, some areas for an extended period of time (over a month).
Total damages estimated at 200 Million Dollars	Total damages estimated in the tens of billions of dollars.

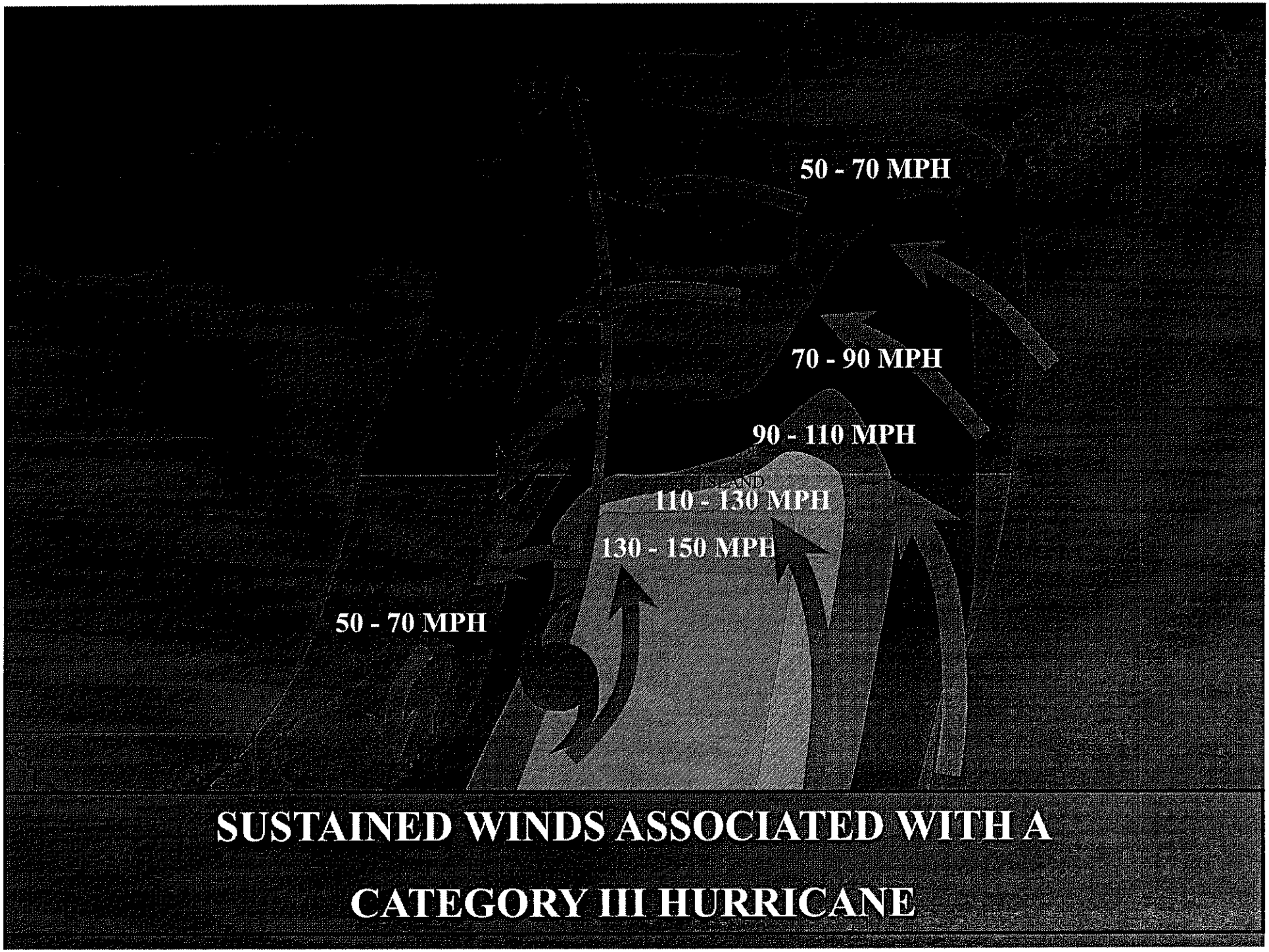
"THE HISTORY OF STORMS IN NEW ENGLAND DEMONSTRATES THAT THE WEST INDIAN (CAPE VERDE) HURRICANES MUST BE PLACED IN THE "TO-BE-EXPECTED" CLASS OF CATASTROPHE AND THAT THERE IS AN ESTABLISHED POSSIBILITY THAT ONE MAY OCCUR IN ANY YEAR"

TAKEN FROM: HURRICANE FLOODS OF 1938

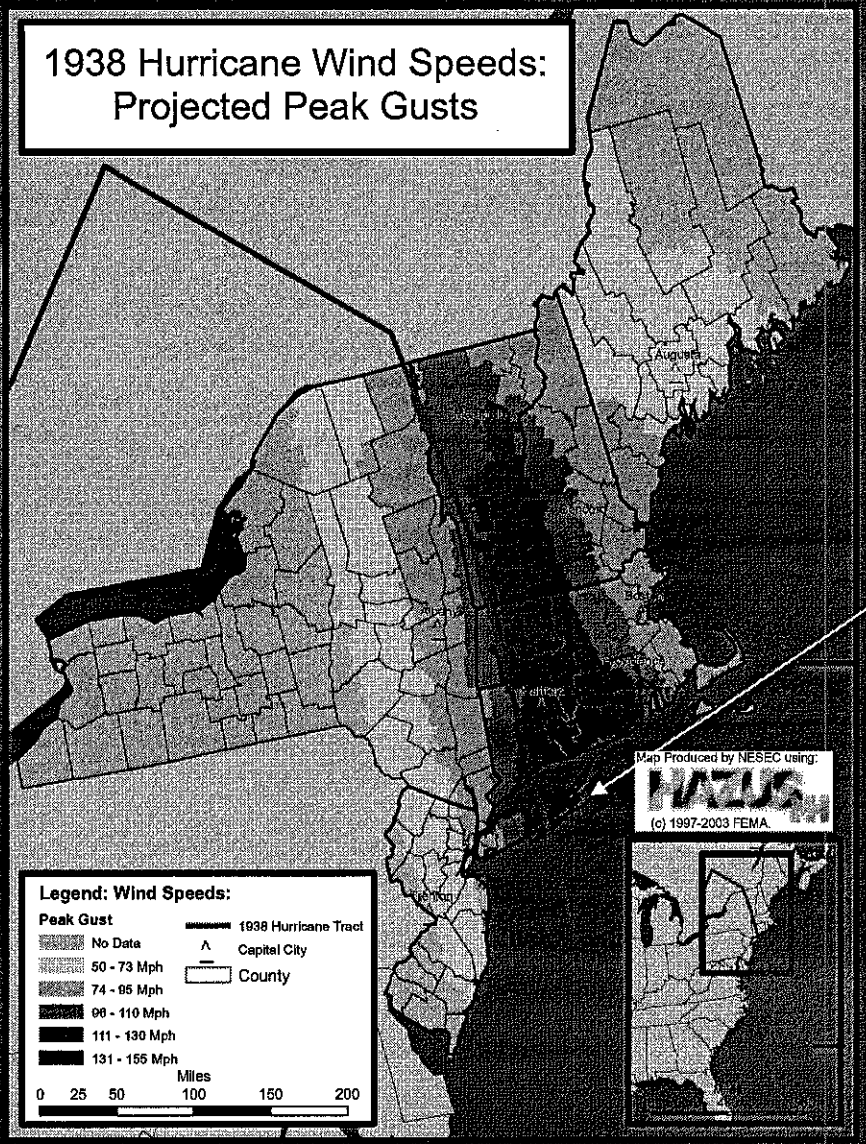
U.S.G.S. WATER SUPPLY PAPER #867

PUBLISHED 1940

Photograph of Hurricane Floyd off the Florida Coast on September 13th, 1999 C*ourtesy of NOAA*


50 - 70 MPH
70 - 90 MPH
90 - 110 MPH
110 - 130 MPH
130 - 150 MPH
50 - 70 MPH
SUSTAINED WINDS ASSOCIATED WITH A
CATEGORY III HURRICANE

HAZUS MH MODELED REPEAT OF THE 1938 HURRICANE



Maximum

Projected Peak Gust:

151 Mph in Southampton, NY

Estimated Damages to Connecticut

(HAZUS MH)

Direct Economic Losses to Buildings which are the Combined total of Building Damage and Economic Disruption

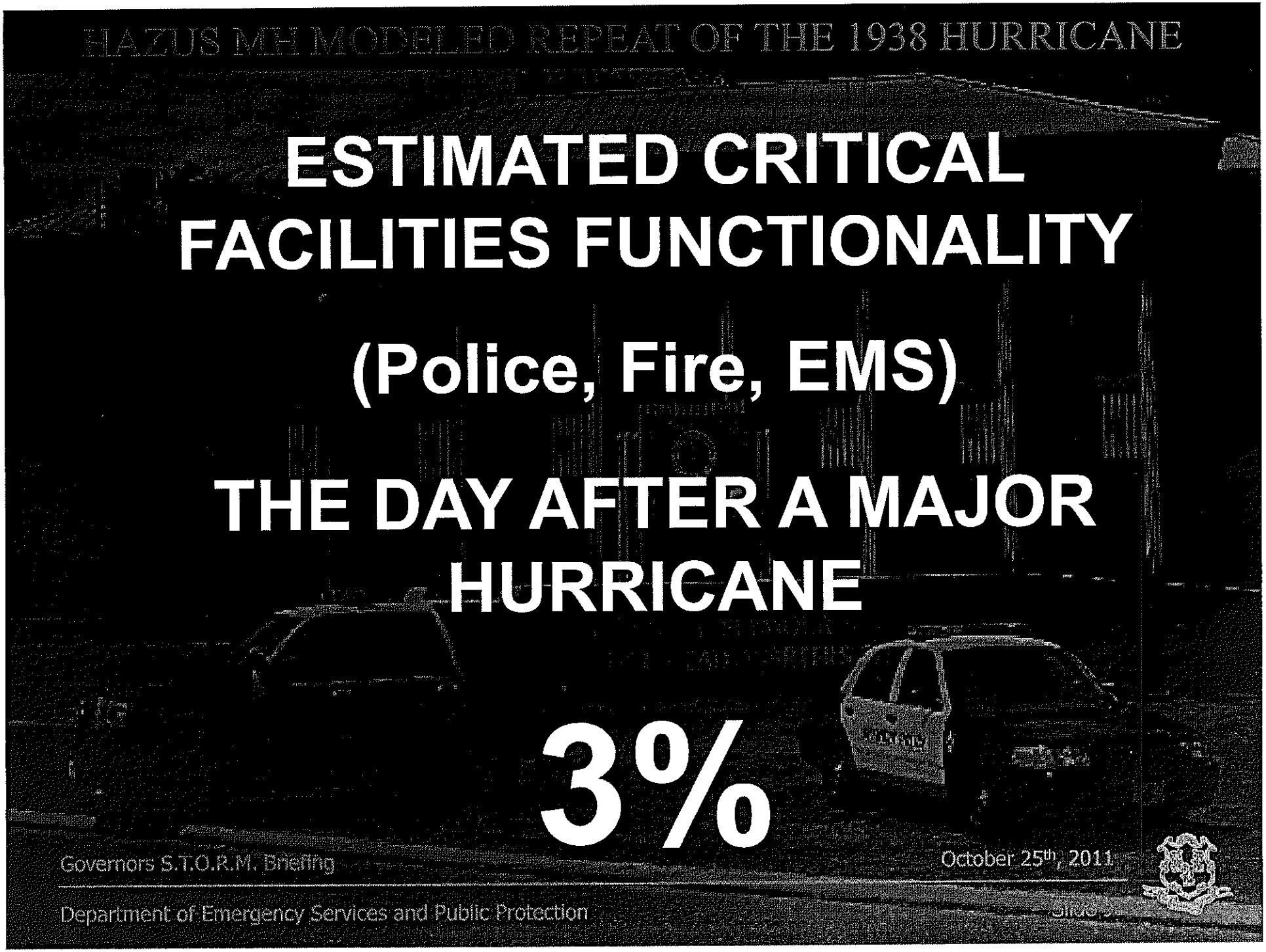
54.2 Billion Dollars

Estimated Sheltering of Storm Victims

(HAZUS MH)

144,131 Displaced Households

364,651 Displaced Individuals


HAZUS MH MODELED REPEAT OF THE 1938 HURRICANE
ESTIMATED CRITICAL FACILITIES FUNCTIONALITY
(Police, Fire, EMS)
THE DAY AFTER A MAJOR HURRICANE
3%
Governors S.T.O.R.M. Briefing
October 25th, 2011
Department of Emergency Services and Public Protection

ESTIMATED HOSPITAL FUNCTIONALITY

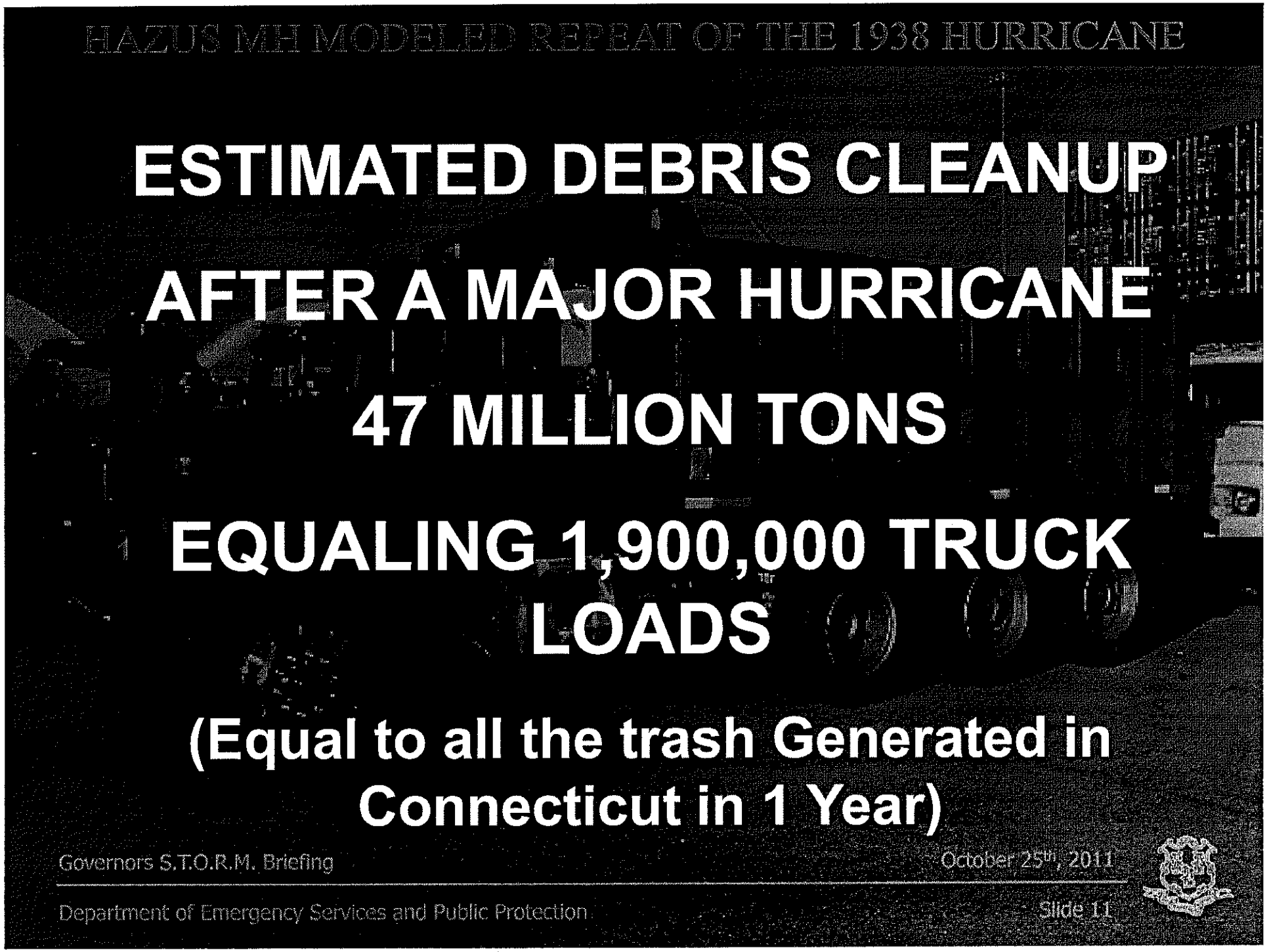
AFTER A MAJOR HURRICANE

DAY 1 - 3%

DAY 3 - 12%

DAY 7 - 15%

DAY 30 – 40%

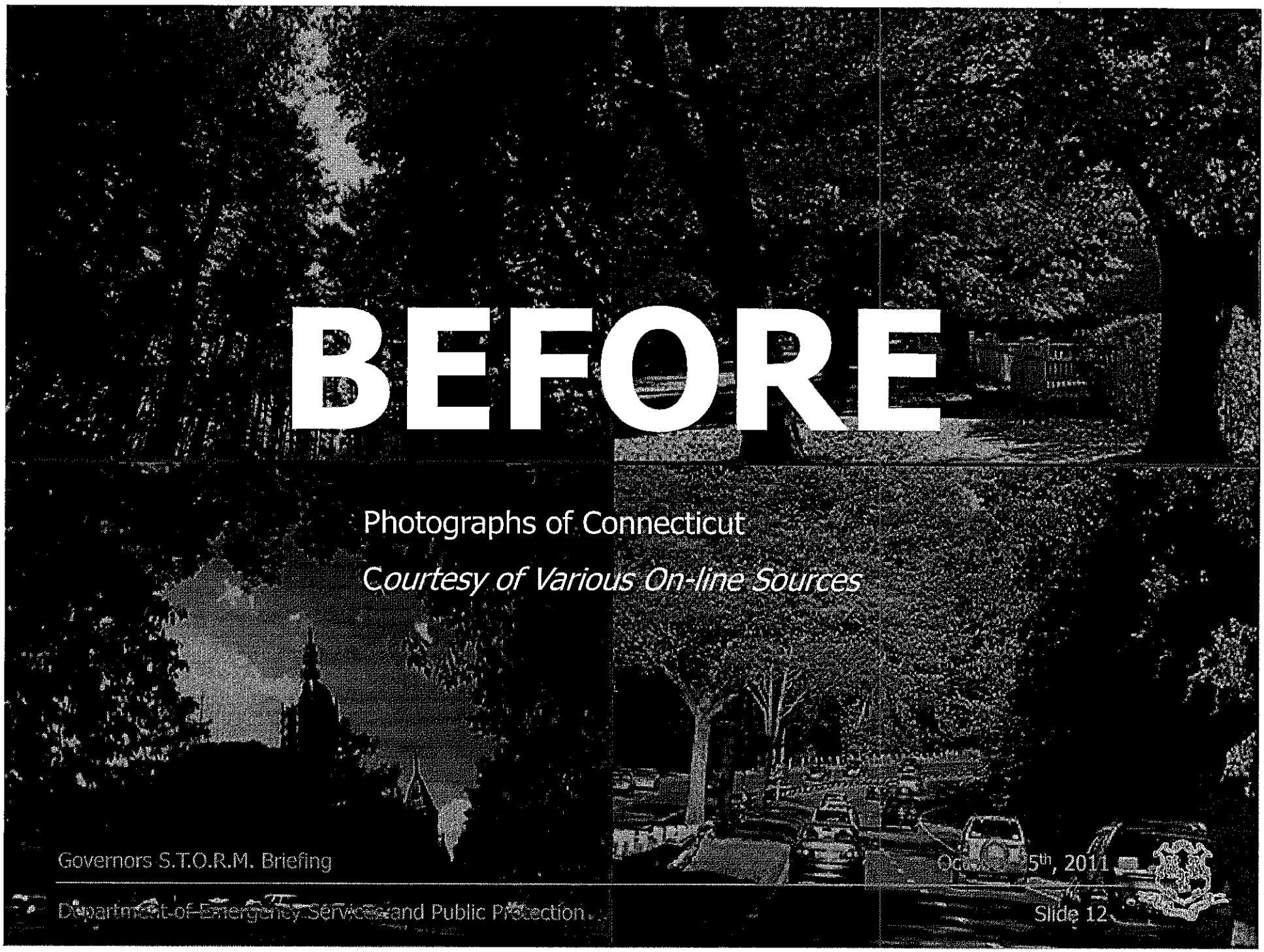


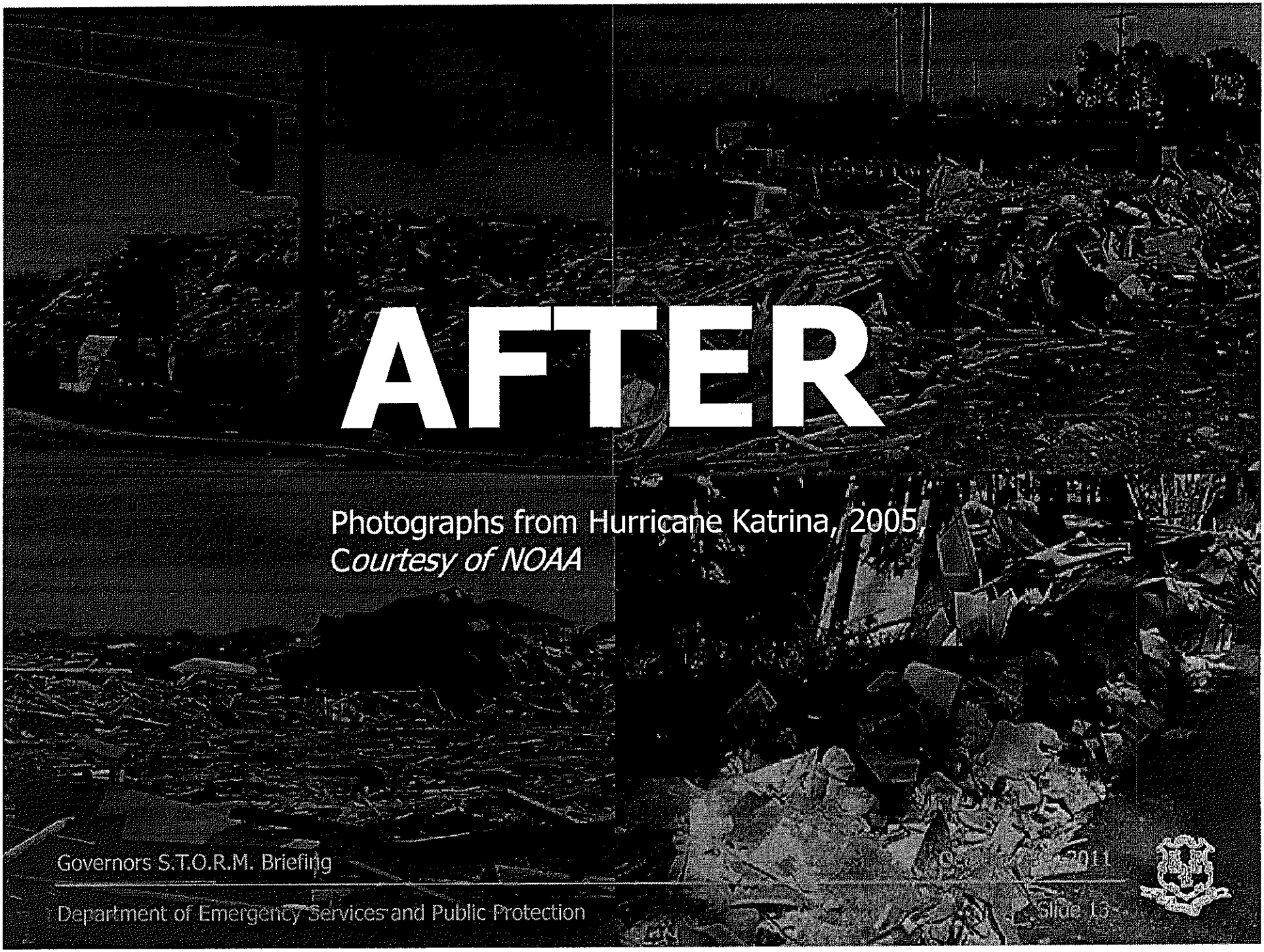
ESTIMATED DEBRIS CLEANUP AFTER A MAJOR HURRICANE

47 MILLION TONS

EQUALING 1,900,000 TRUCK LOADS

(Equal to all the trash Generated in Connecticut in 1 Year)


BEFORE
Photographs of Connecticut
Courtesy of Various On-line Sources


AFTER
Photographs from Hurricane Katrina, 2005,
Courtesy of NOAA

QUESTIONS

(D)

The Nature Conservancy
Protecting nature. Preserving life.

The Nature Conservancy in Connecticut
55 Church Street, Floor 3
New Haven, CT 06510

Tel: [203] 568-6296
Fax [203] 568-6271
nature.org/ct

S.T.O.R.M. IRENE Panel Meeting **October 25, 2011**

Adam Whelchel, Ph.D., Director of Science, The Nature Conservancy
"Computerized Storm Projections for Coastal Resiliency along Connecticut's Coast"

In 2007, The Nature Conservancy initiated the Coastal Resilience Program whose principal objective is to help people and nature adapt to hazards and impacts of coastal change in coastal New York and Connecticut. To do this the Conservancy developed a visualization tool (www.coastalresilience.org) to enable local, regional, and state decision makers progressively plan and develop best management practices that identify, prioritize and reduce socio-economic and ecological risks from hazards. The underlining premise is that with better access to more complete information more informed decisions can be reached that benefit people and nature. *Coastal Resilience* is a framework driven by extensive community engagement and uses spatial information on storm surge, sea level rise, ecological, and socio-economic variables to identify choices for reducing the vulnerability of human and natural communities to coastal hazards.

In partnership with NOAA, NASA Goddard Institute of Space Studies, and Columbia University among others, the Conservancy is now conducting a comprehensive assessment of impacts from CAT-2 and CAT-3 Hurricane events along the Connecticut coast. Presented at this Task Force meeting were some initial results from this analysis specific to critical infrastructure (roads, rail, airports, schools, etc...) that sustains our way of life and economy. A full analysis is in the process of being finalized and will be released in November 2011 by The Nature Conservancy.

In preparation for the Conservancy's presentation, several key messages were developed that provide points for consideration by this Task Force including:

- Assessment of risk should not only address existing development and transit but also the implications to future economic growth and redevelopment plans;
- Pre-disaster planning and mitigation efforts should be considered as post-storm prevention efforts;
- Coastal natural resources should be a cost effective part of the a risk management and reduction plan due to their ability to dissipate, deflect and absorb storm energy at relatively low costs;
- Proactive planning and response increases our flexibility and ultimately will avoid future costs;

Although the magnitude and comprehensive nature of risk as presented by hazards may appear overwhelming even for a smaller state like Connecticut, the importance of a Task Force such as this cannot be understated. Thank you for the opportunity to comment.

Best regards,

Adam W. Whelchel, Ph.D., Director of Science

awhelchel@tnc.org; (860) 970-8442

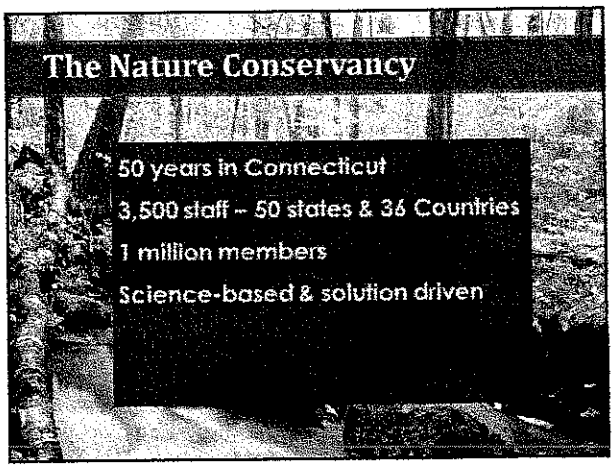
Coastal Resilience (coastalresilience.org)

adapting communities to storms and sea level rise

Adam Wheichel, Ph.D.
Director of Science
The Nature Conservancy

55 Church Street, Floor 3
New Haven, CT 06510

The Nature Conservancy



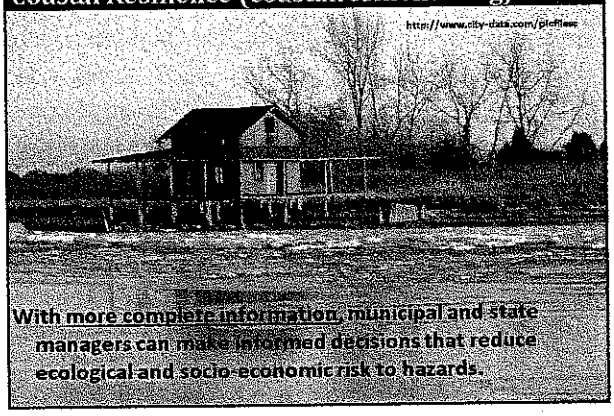
Coastal Resilience Program

Objective: To help People and Nature adapt to hazards and impacts of coastal change.

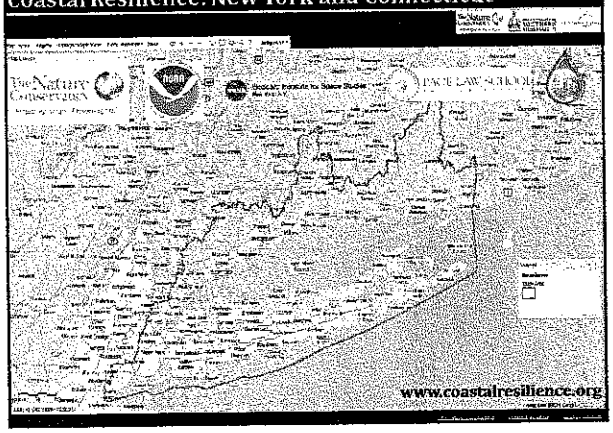
Goals:

- Visualize Impacts and Risk
- Develop Science, Tools, Demonstrations to inform today's best practices that avoid future costs
- Progressive Planning vs. Crisis Management

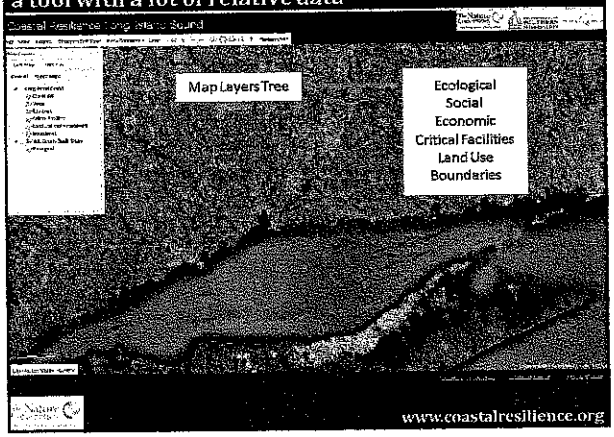
Coastal Resilience (coastalresilience.org)

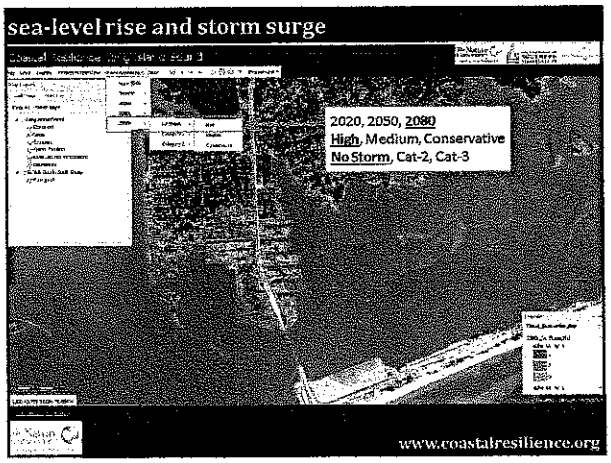


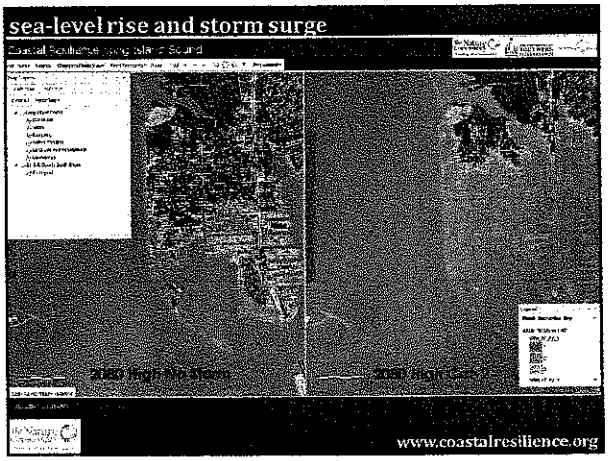
Coastal Resilience: New York and Connecticut



a tool with a lot of relative data




sea-level rise and storm surge
2020, 2050, 2080
High, Medium, Conservative
No Storm, Cat-2, Cat-3
www.coastalresilience.org


sea-level rise and storm surge
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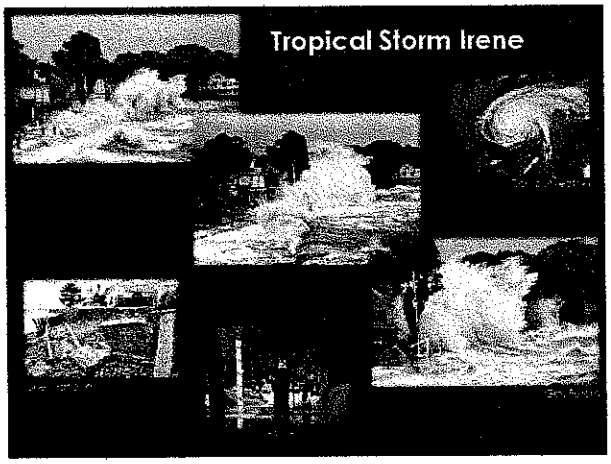
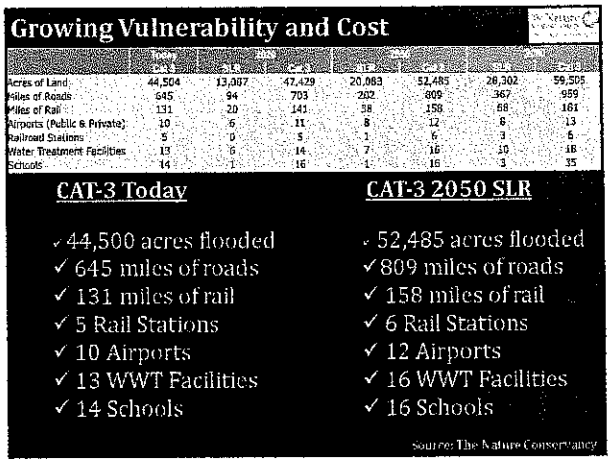
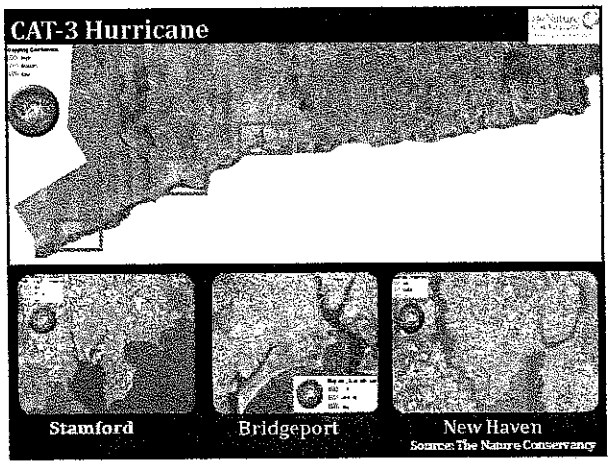
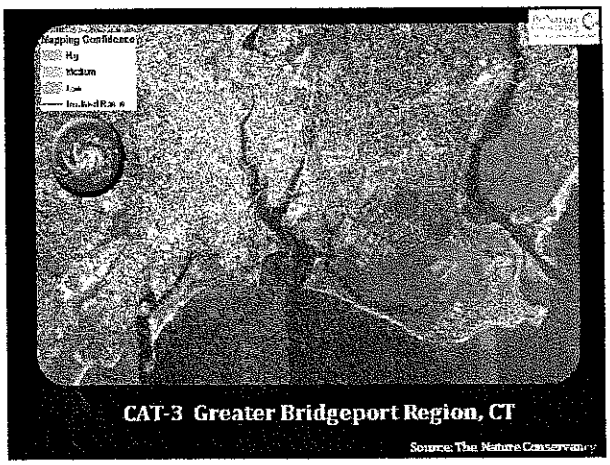
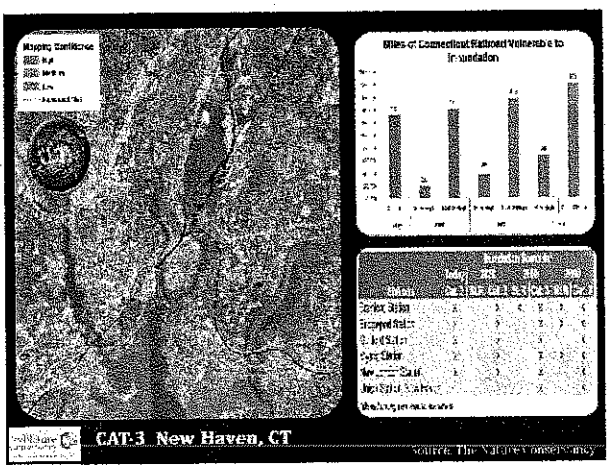
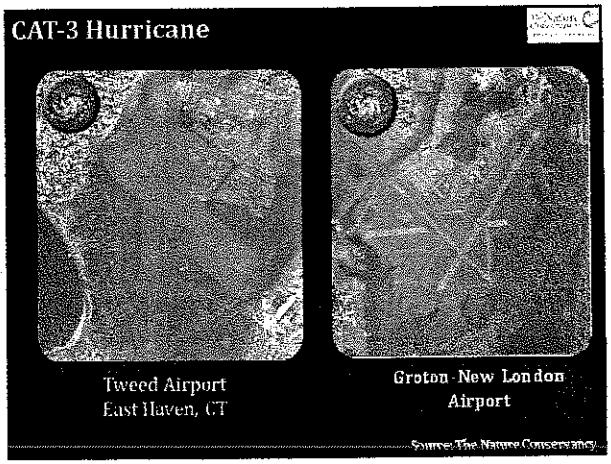

Tropical Storm Irene

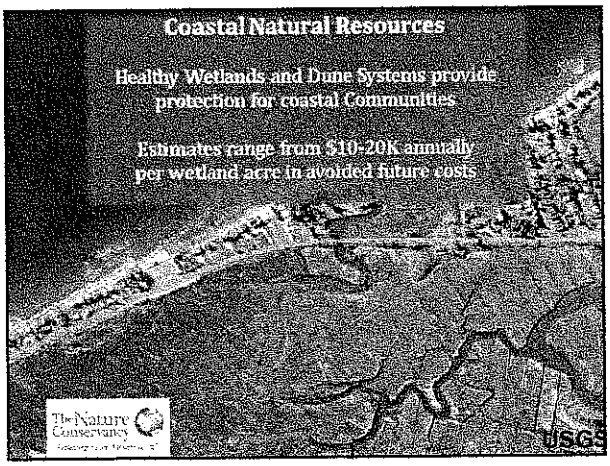

Growing Vulnerability and Cost
Acres of Land 44,504 13,007 47,429 20,063 52,485 28,302 59,505
Miles of Roads 645 94 703 202 809 367 959
Miles of Rail 131 20 141 58 158 88 161
Airports (Public & Private) 10 6 11 8 12 8 13
Railroad Stations 5 0 5 1 6 3 6
Water Treatment Facilities 13 6 14 7 16 10 16
Schools 14 1 16 1 16 3 35
CAT-3 Today
✓ 44,500 acres flooded
✓ 645 miles of roads
✓ 131 miles of rail
✓ 5 Rail Stations
✓ 10 Airports
✓ 13 WWT Facilities
✓ 14 Schools
CAT-3 2050 SLR
✓ 52,485 acres flooded
✓ 809 miles of roads
✓ 158 miles of rail
✓ 6 Rail Stations
✓ 12 Airports
✓ 16 WWT Facilities
✓ 16 Schools
Source: The Nature Conservancy

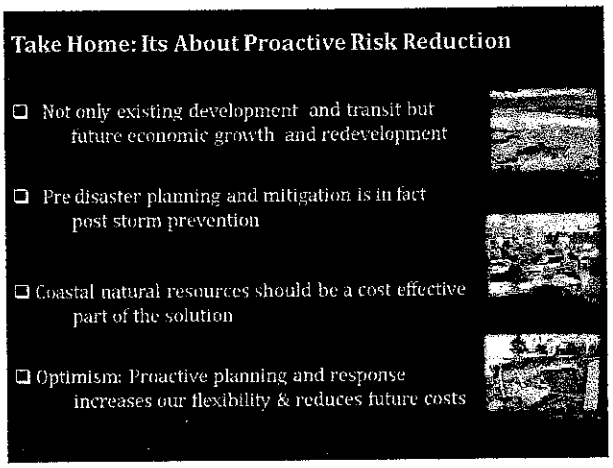

CAT-3 Hurricane
Stamford
Bridgeport
New Haven
Source: The Nature Conservancy

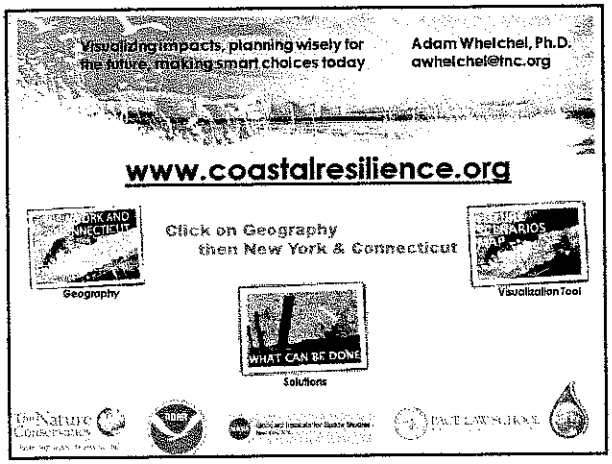

CAT-3 Greater Bridgeport Region, CT
Source: The Nature Conservancy


CAT-3 New Haven, CT


CAT-3 Hurricane
Tweed Airport
East Haven, CT
Groton-New London
Airport


Coastal Natural Resources
Healthy Wetlands and Dune Systems provide protection for coastal Communities
Estimates range from $10-20K annually per wetland acre in avoided future costs
The Nature Conservancy
USGS


Take Home: Its About Proactive Risk Reduction
Not only existing development and transit but future economic growth and redevelopment
Pre disaster planning and mitigation is in fact post storm prevention
Coastal natural resources should be a cost effective part of the solution
Optimism: Proactive planning and response increases our flexibility & reduces future costs


Visualizing impacts, planning wisely for the future, making smart choices today
Adam Whelchel, Ph.D.
awhelchel@tnc.org
www.coastalresilience.org
Click on Geography then New York & Connecticut
Geography
Visualization Tool
WHAT CAN BE DONE
Solutions
The Nature Conservancy

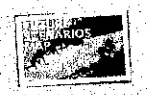
Coastal Resilience
New York and Connecticut

A Tool for Coastal Planning in a Changing World

The Nature Conservancy

Coastal Resilience Quick Start Guide

1. Go to www.coastalresilience.org
2. Click on "Geographies"
3. Click on "New York and Connecticut"
4. Click on "Future Scenario Map"
5. "Agree" to the Disclosure and Use policies



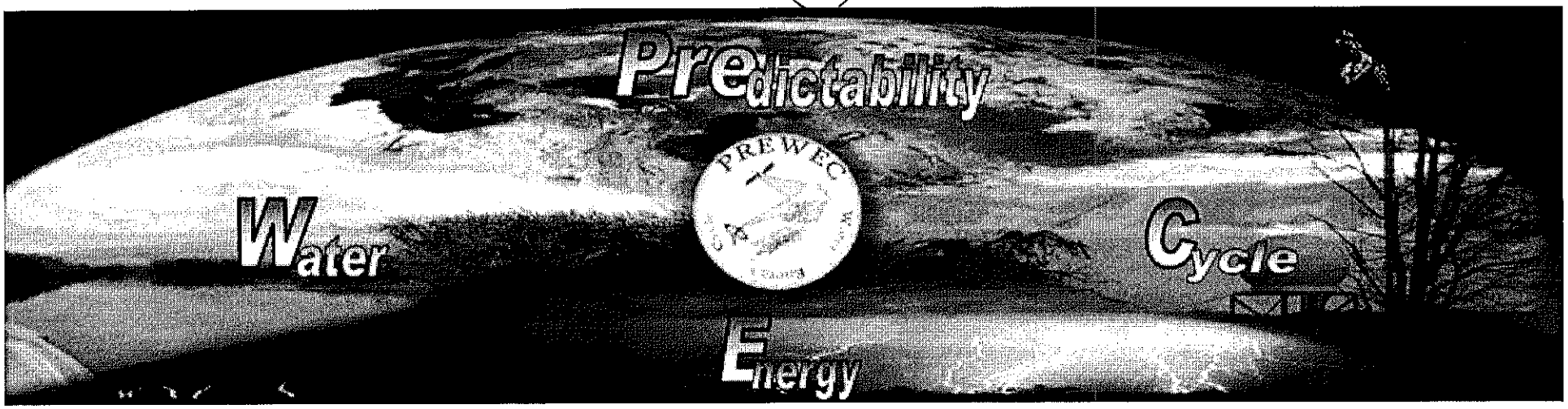
In navigation bar (top of map) click on "Zoom Button" (magnifying glass) to draw rectangle around area of interest.

Go to "Flood Scenarios" dropdown menu & select your projection.

Go to "Location Search Button" -type in your address & look for the red dot.

Create a map & share hyperlink by clicking on "Bookmark Link"

Visualizing coastal change, planning wisely for the future, making smart choices today



Improving the Resilience to Weather Hazards through Risk Management Partnerships: The case of Storm Irene over Connecticut

Emmanouil N. Anagnostou

University of Connecticut
Northeast Utilities Endowed Chair in Environmental Engineering

S.T.O.R.M. Irene panel meeting, 25 October 2011, Hartford, CT

Collaborations

Northeast Utilities

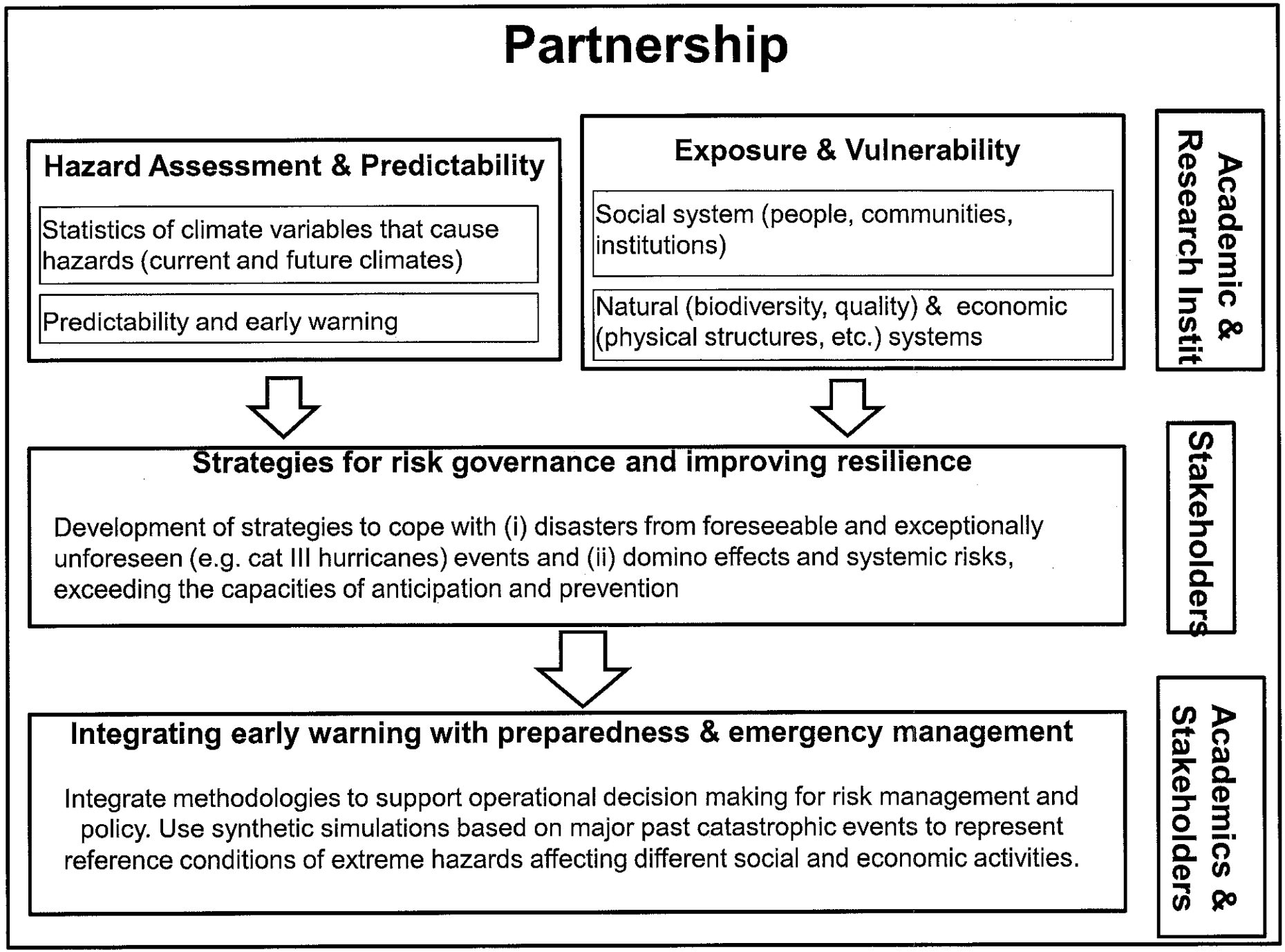
- Mike Ahern, VP-Utility Services
- Mike Zappone, Manager Emergency Preparedness and System Restoration
- David Wanik, Environmental Audit and Remediation & MSc Environmental Engineering, UCONN

UCONN - SoE

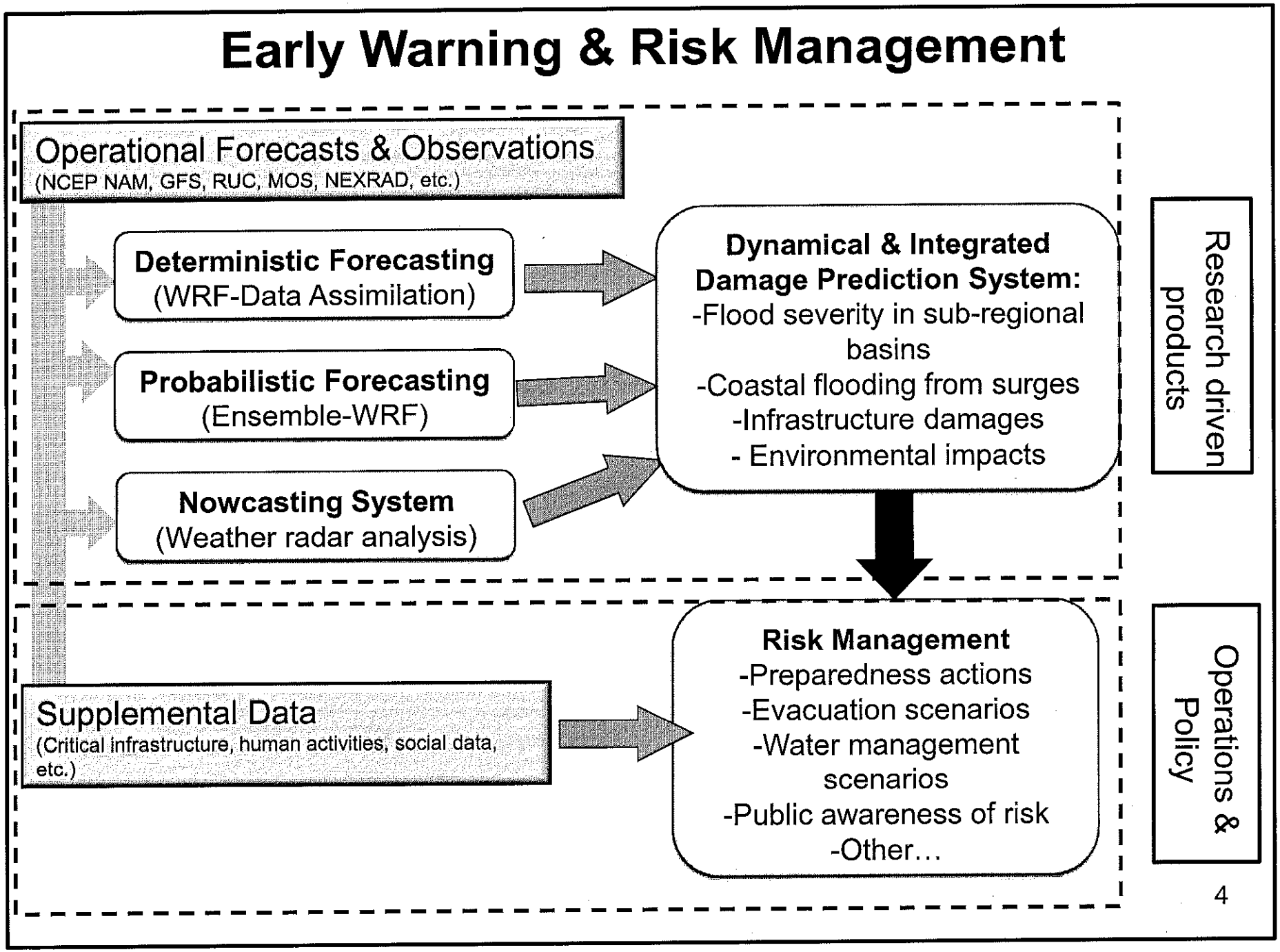
- Maria Frediani, PhD student, CEE program
- Eric Buckley, MSc student, ENVE program

NOAA / National Severe Storms Laboratory

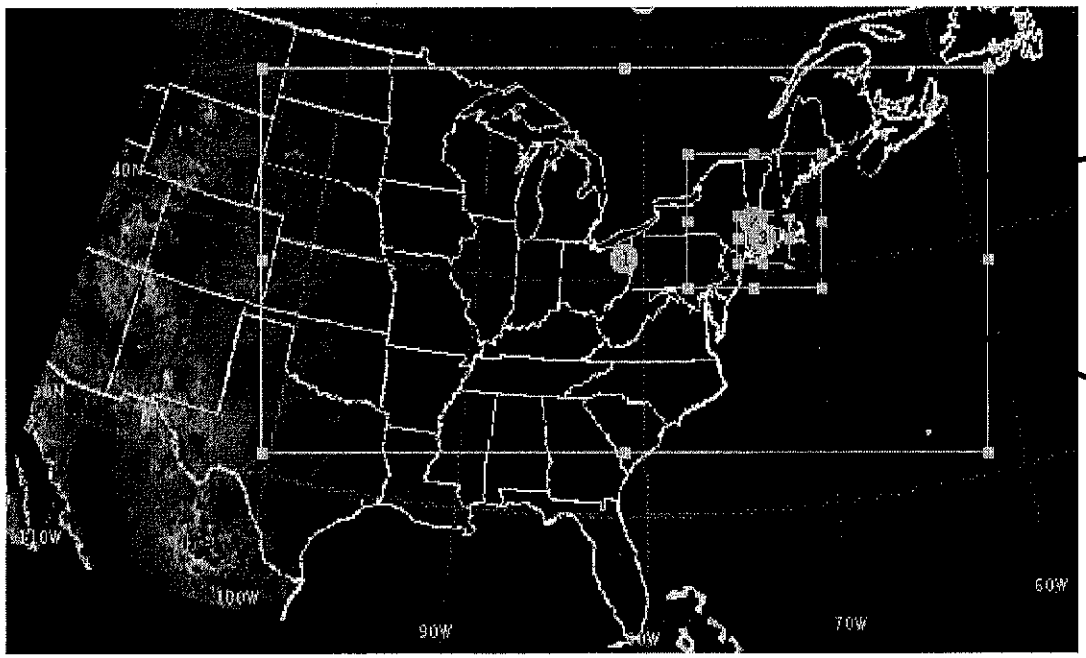
- JJ Gourley, Research Hydrologist
- Zac Flamig, PhD student

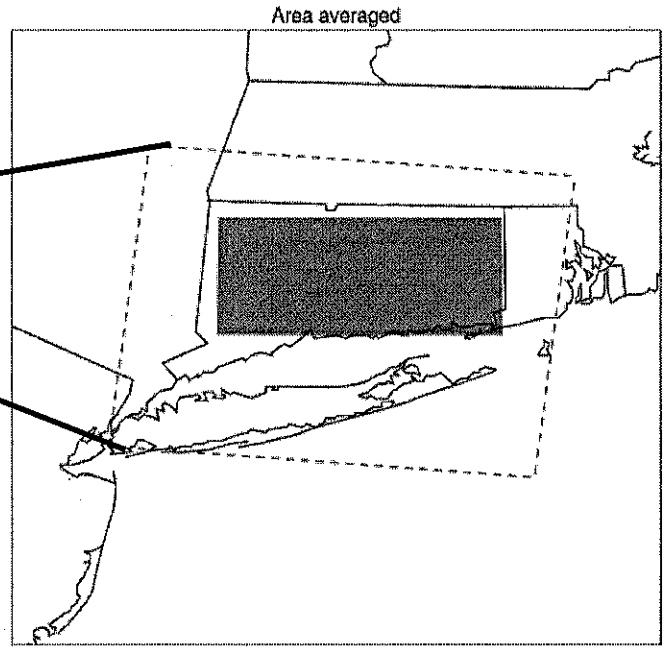

Partnership
Hazard Assessment & Predictability
Statistics of climate variables that cause hazards (current and future climates)
Predictability and early warning
Exposure & Vulnerability
Social system (people, communities, institutions)
Natural (biodiversity, quality) & economic (physical structures, etc.) systems
Academic & Research Instit
Strategies for risk governance and improving resilience
Development of strategies to cope with (i) disasters from foreseeable and exceptionally unforeseen (e.g. cat III hurricanes) events and (ii) domino effects and systemic risks, exceeding the capacities of anticipation and prevention
Stakeholders
Integrating early warning with preparedness & emergency management
Integrate methodologies to support operational decision making for risk management and policy. Use synthetic simulations based on major past catastrophic events to represent reference conditions of extreme hazards affecting different social and economic activities.
Academics & Stakeholders

Early Warning & Risk Management



The weather forecasting framework





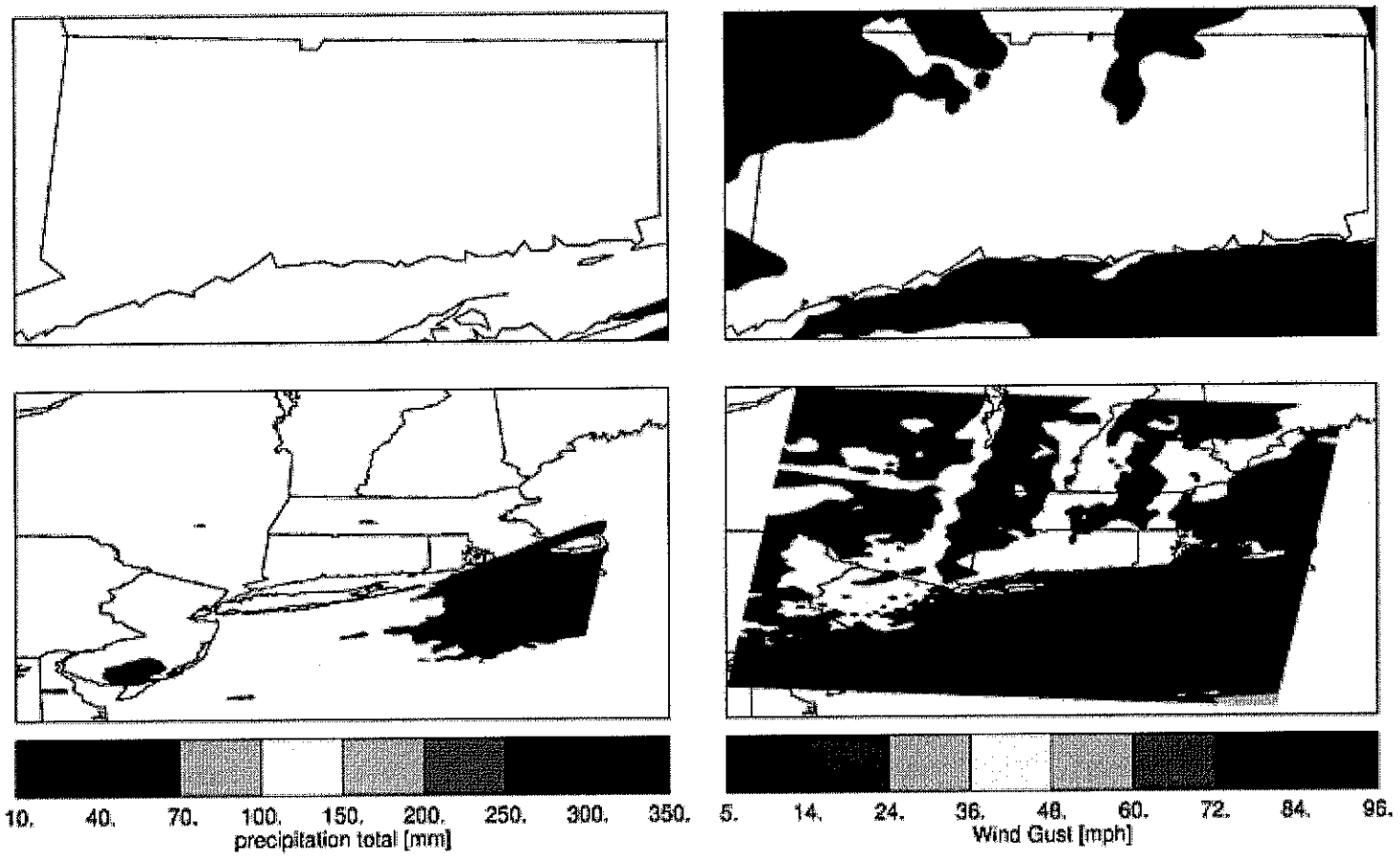
Domain 1: 18 km **Domain 2:** 6 km **Domain 3:** 2 km

Model initialization (ensembles):
- GFS, NAM, ECMWF, etc.
- Satellite rainfall data over oceans
- Soundings and other in situ obs
- Weather radar observations

Forecasted model parameters(2-4 days):
- precipitation (solid and liquid)
- soil moisture at different depths
- winds, gust wind
- temperature, humidity, etc.

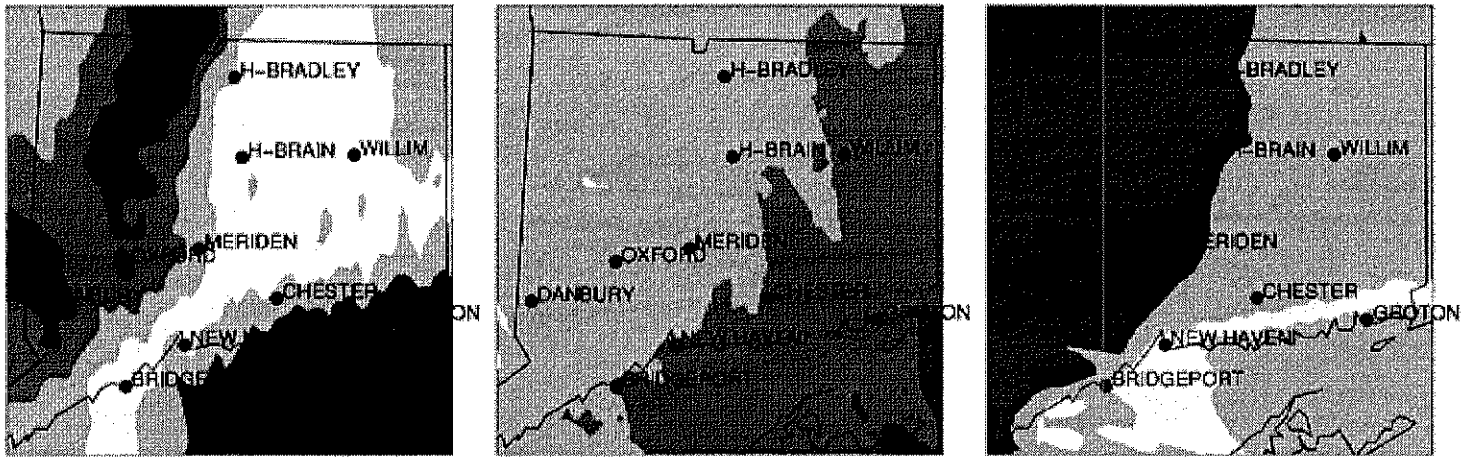
Storm Irene

08/27/2011 02h local – Model Init 08/26/2011 00Z

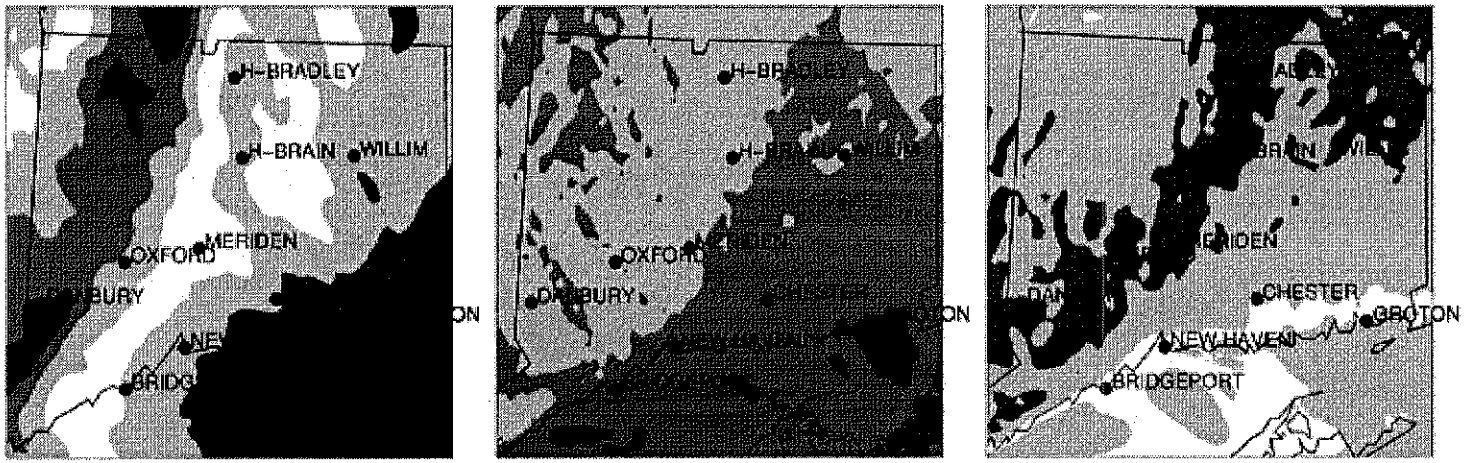


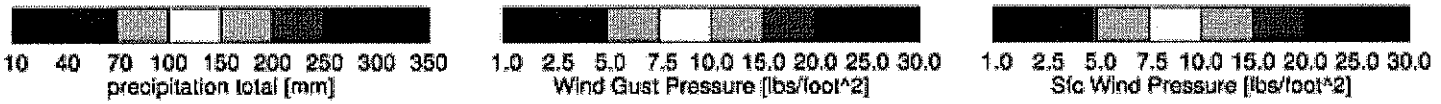
Max wind and rainfall forecasts

Max Values – Analysis Init 08/26/2011 00Z



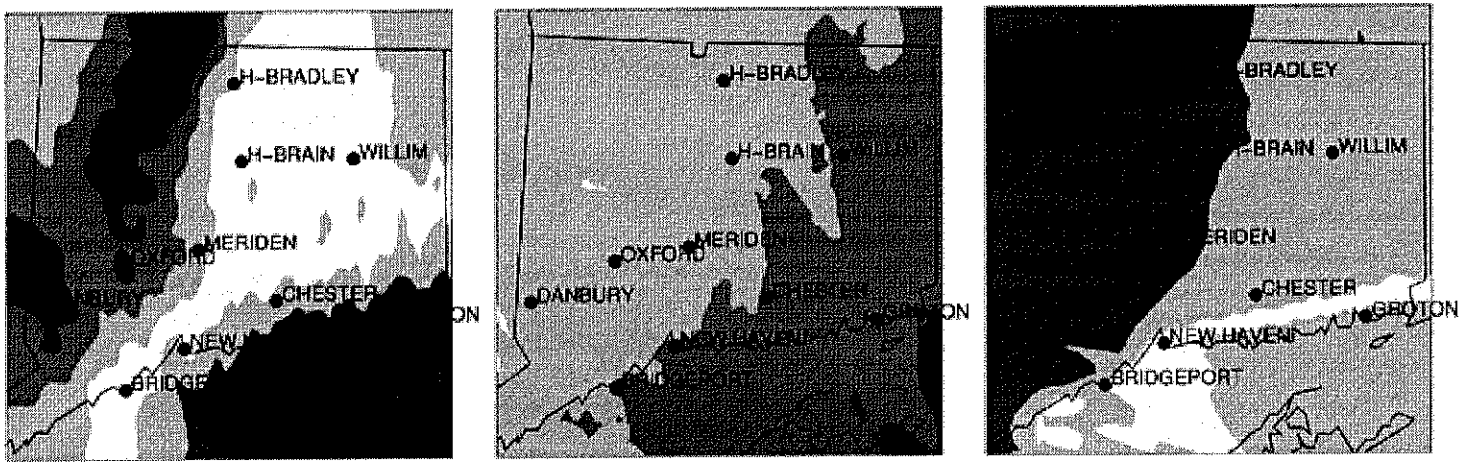
Max Values – GFS Init 08/27/2011 00Z



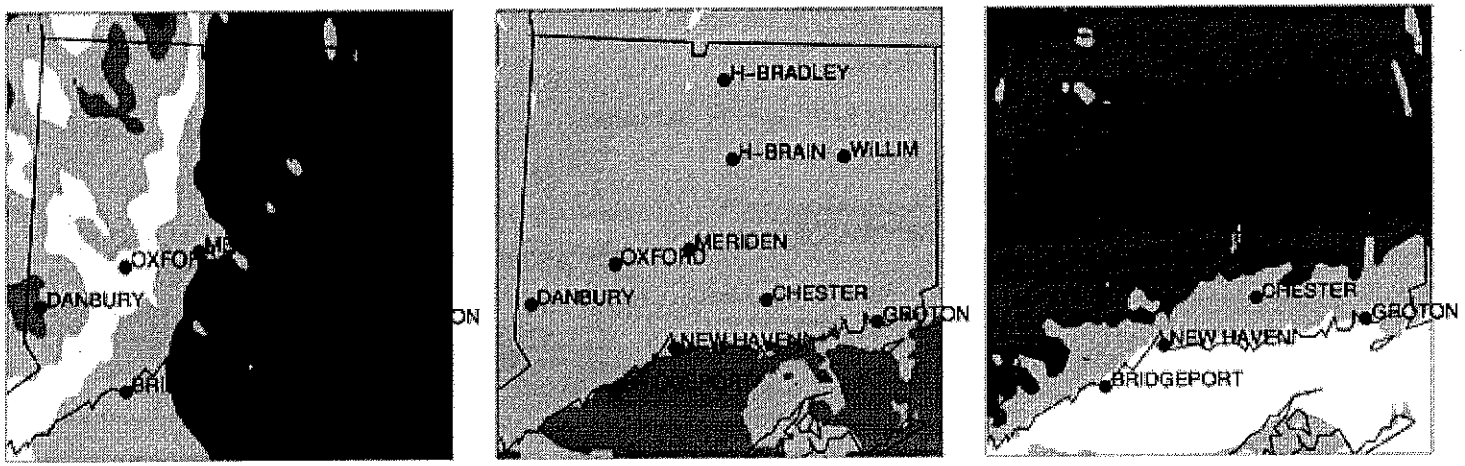


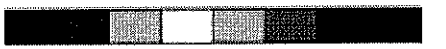
Max wind and rainfall forecasts

Max Values – Analysis Init 08/26/2011 00Z

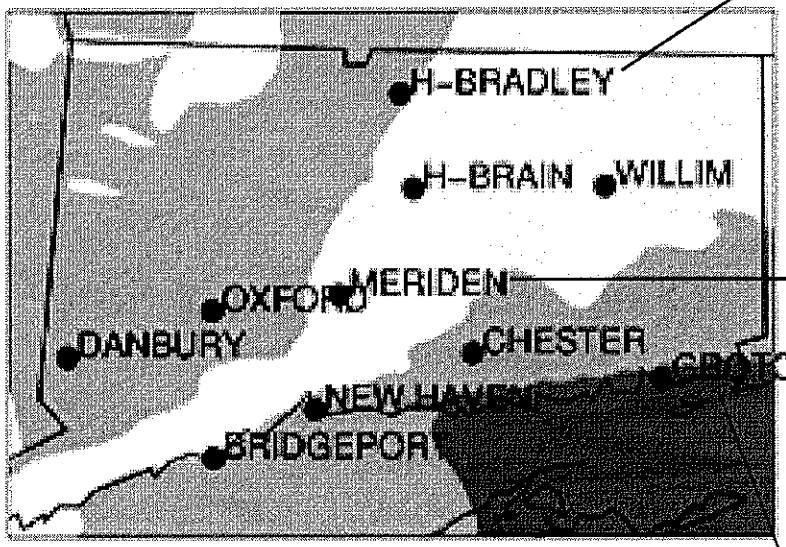


Max Values – NAM Init 08/27/2011 00Z





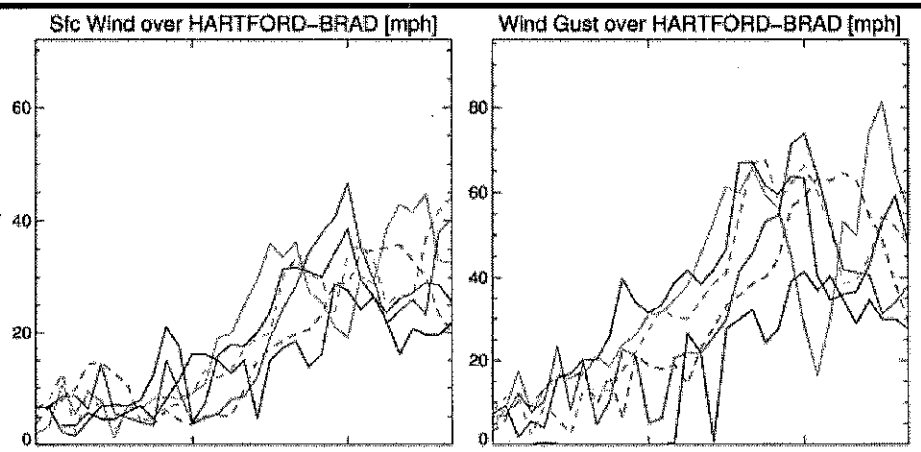
Forecast verification

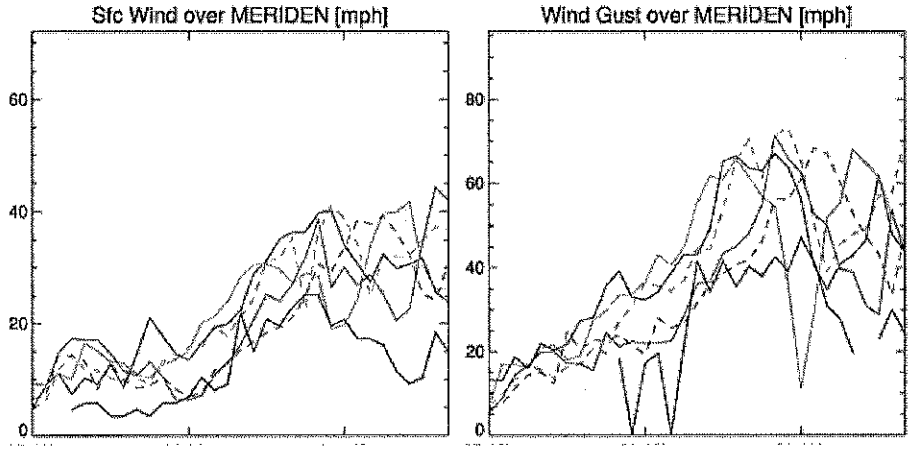


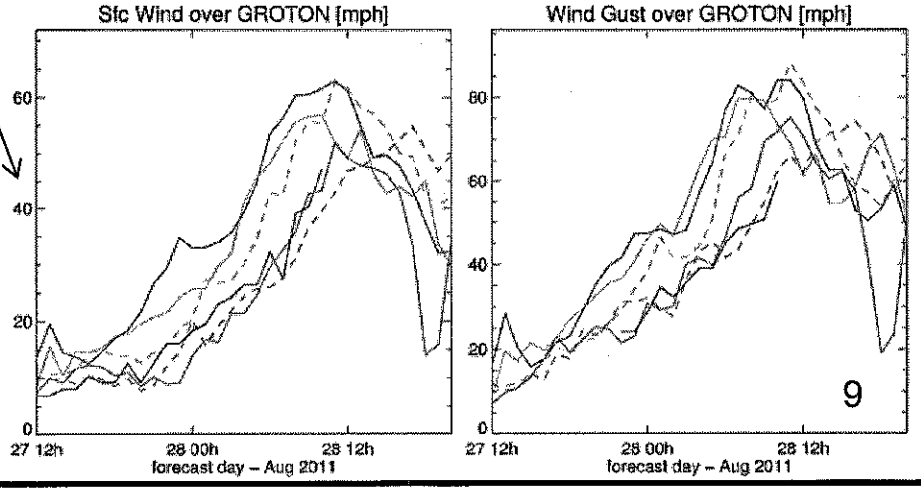
4.8 14.4 24.0 36.0 48.0 60.0 72.0 84.0 96.0

Sfc Wind [mph]

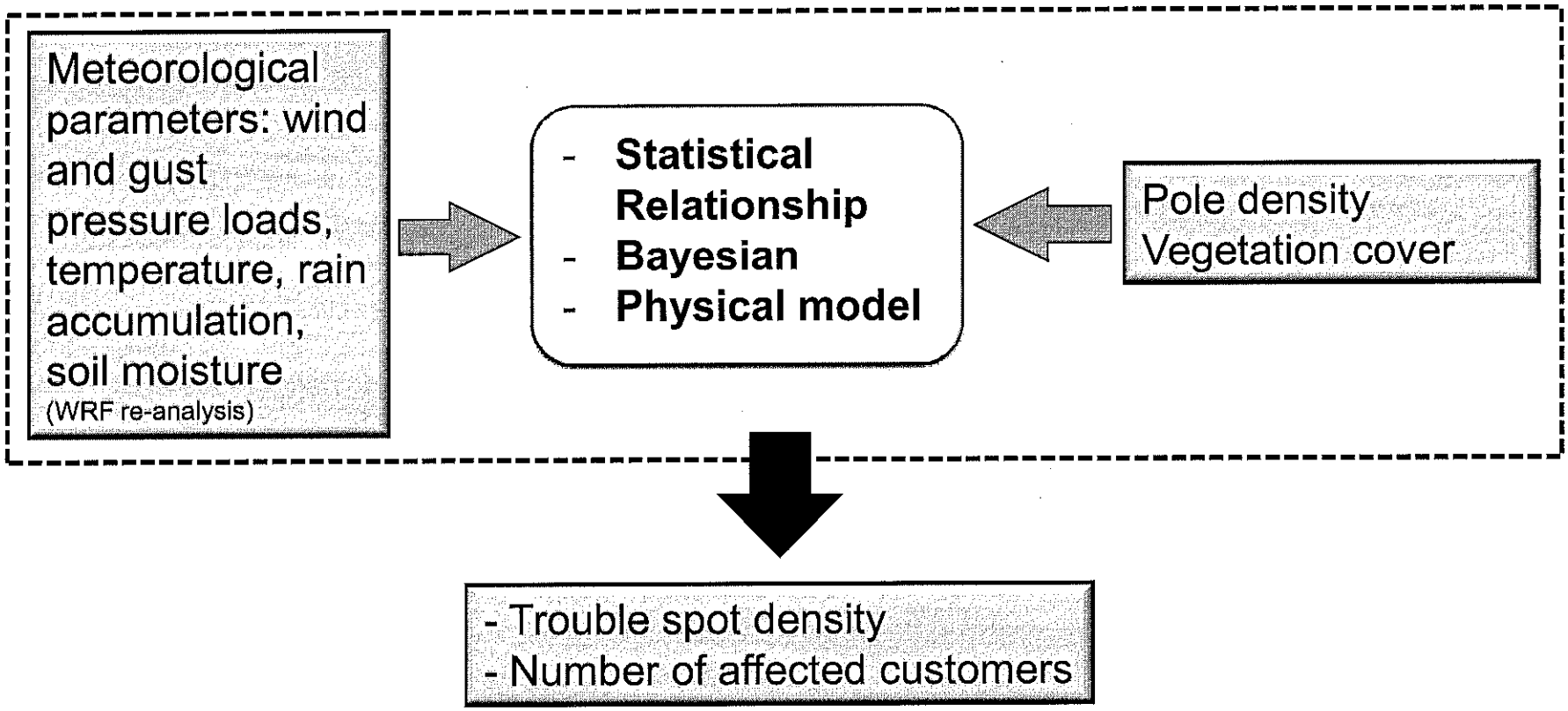
Metar
Analysis
GFS 08/26
GFS 08/27
NAM 08/26
NAM 08/27



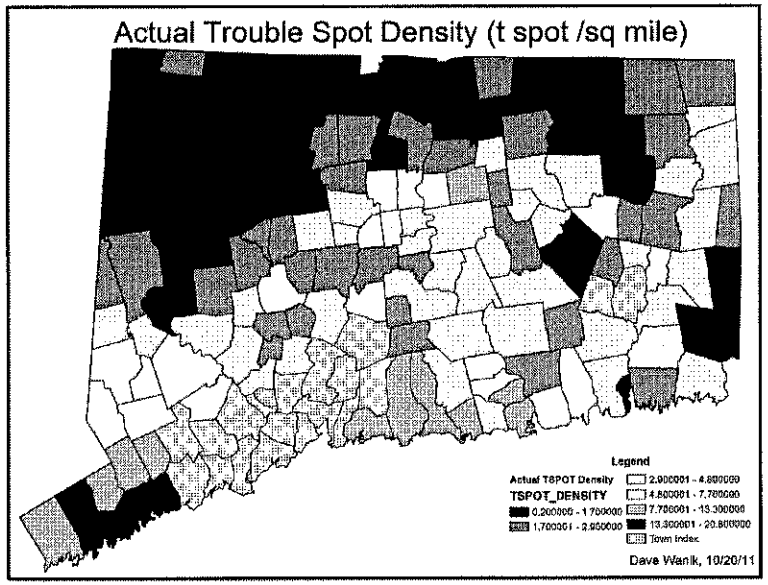


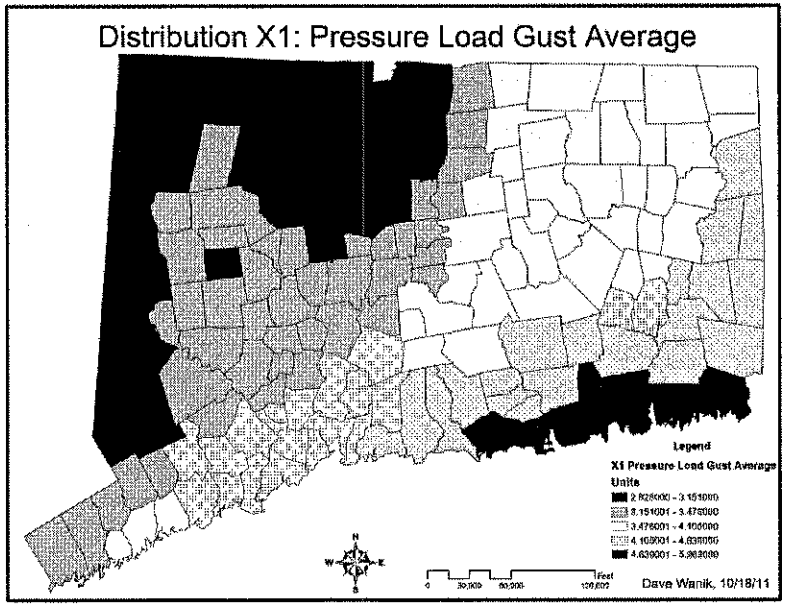


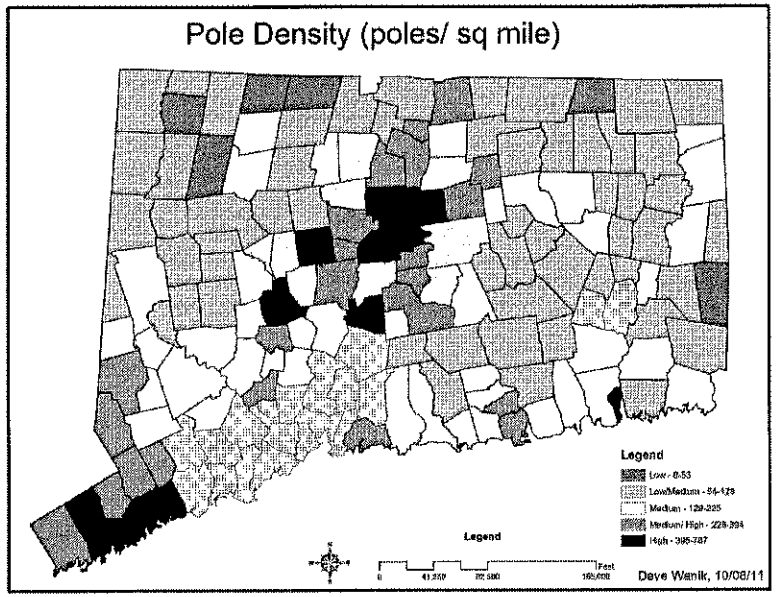
Distribution Network Damage Prediction Model

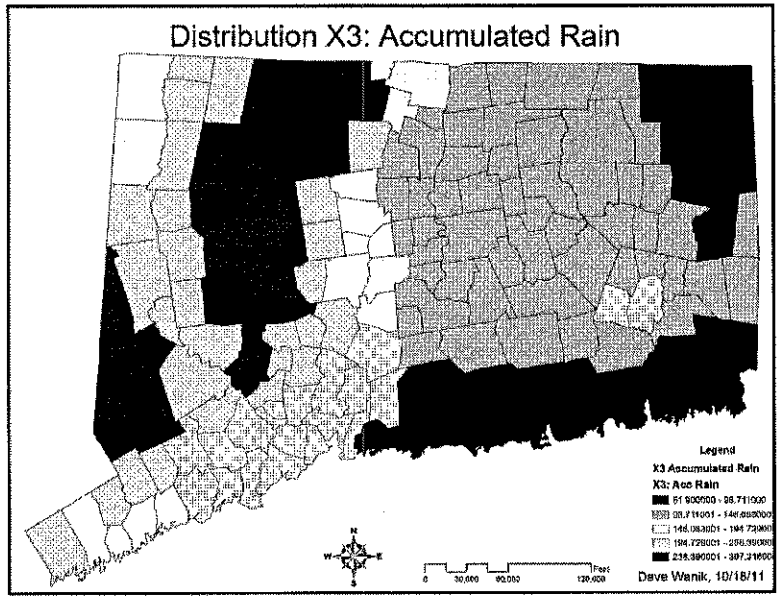


Statistical model parameters

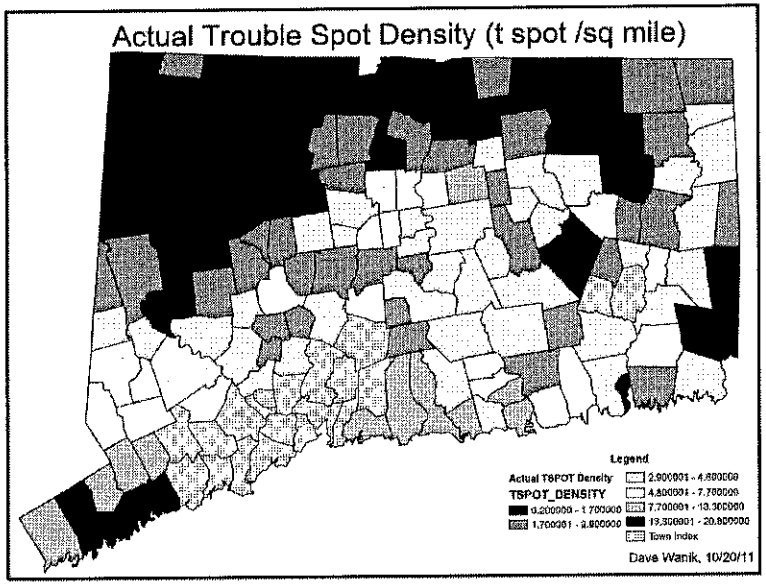


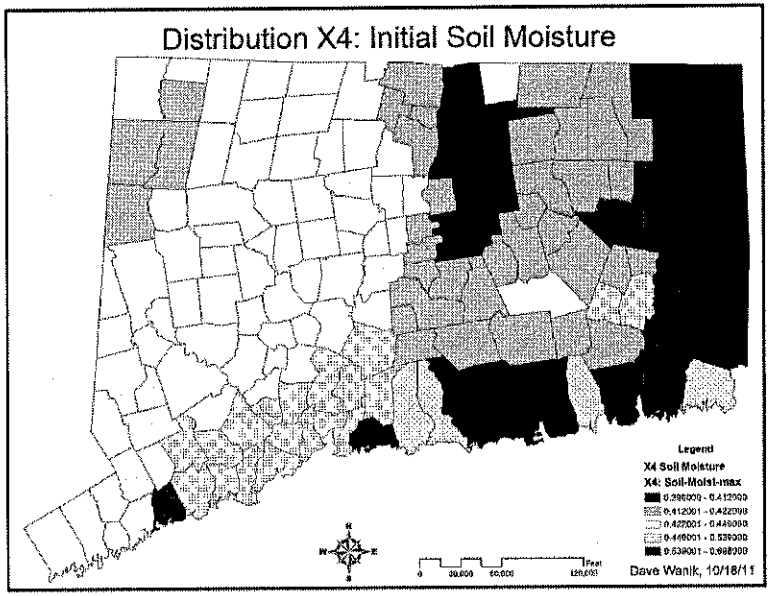


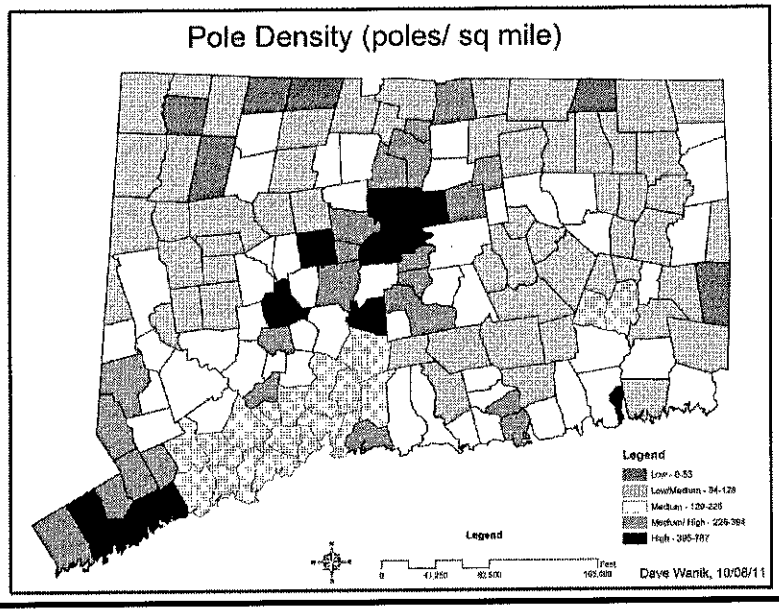


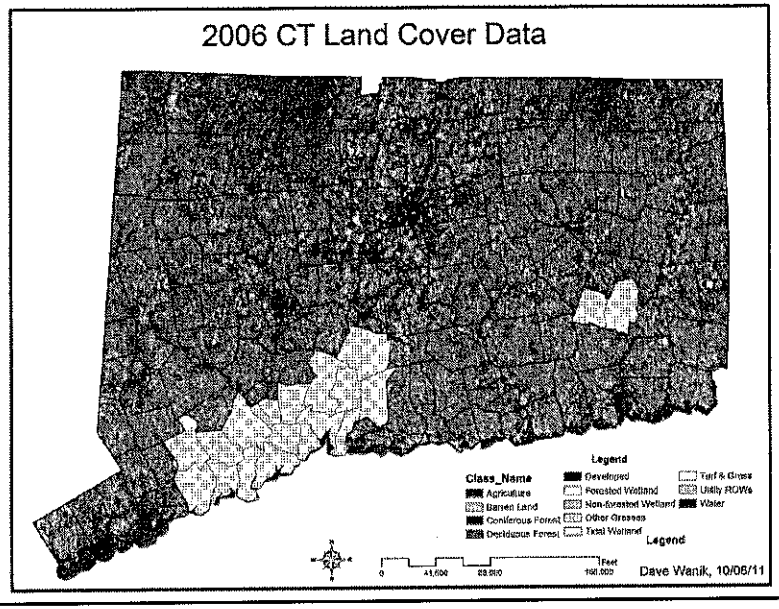


Statistical model parameters









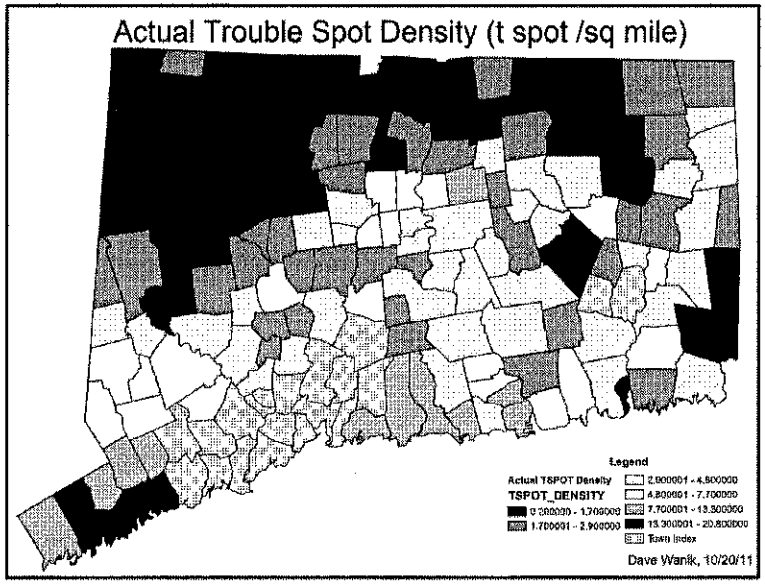
Actual vs. Predicted damages

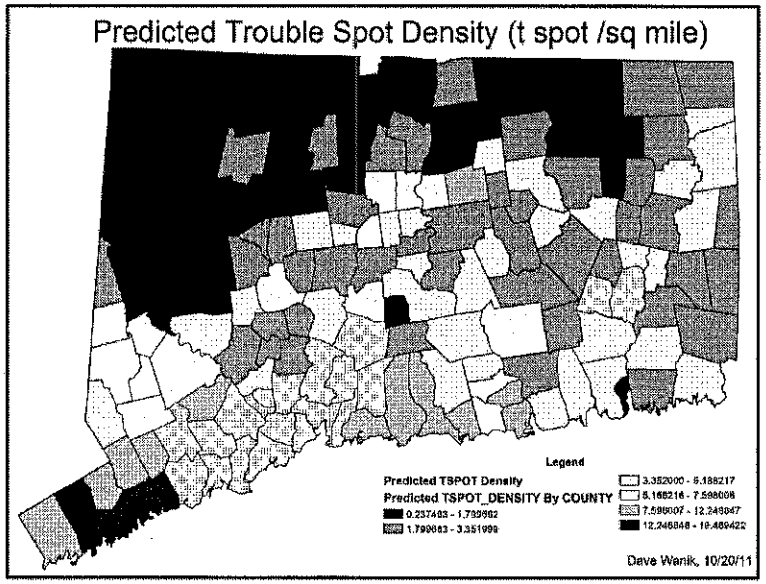
Actual Tspot density

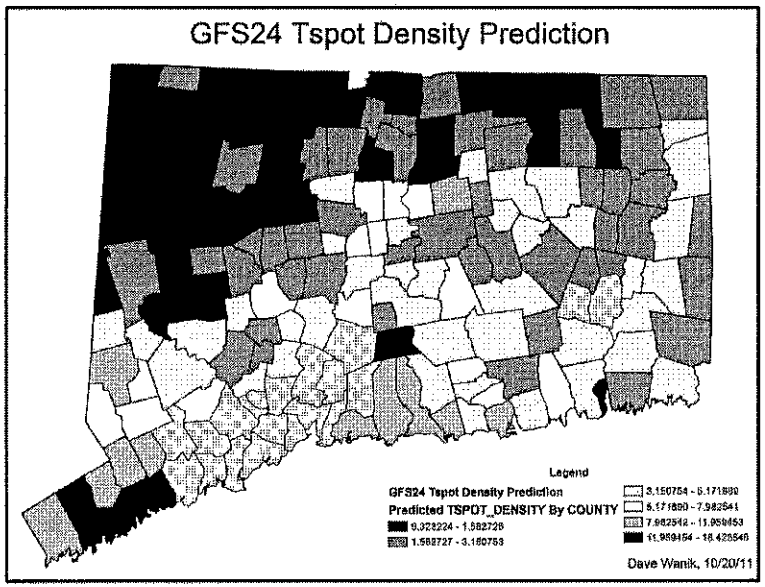
24-hr prediction (GFS)

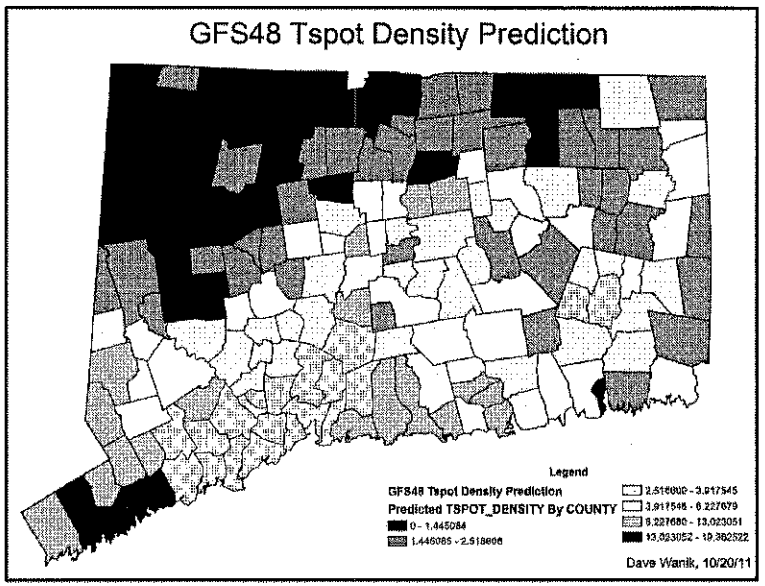
Model predicted (Analysis)

48-hr prediction (GFS)

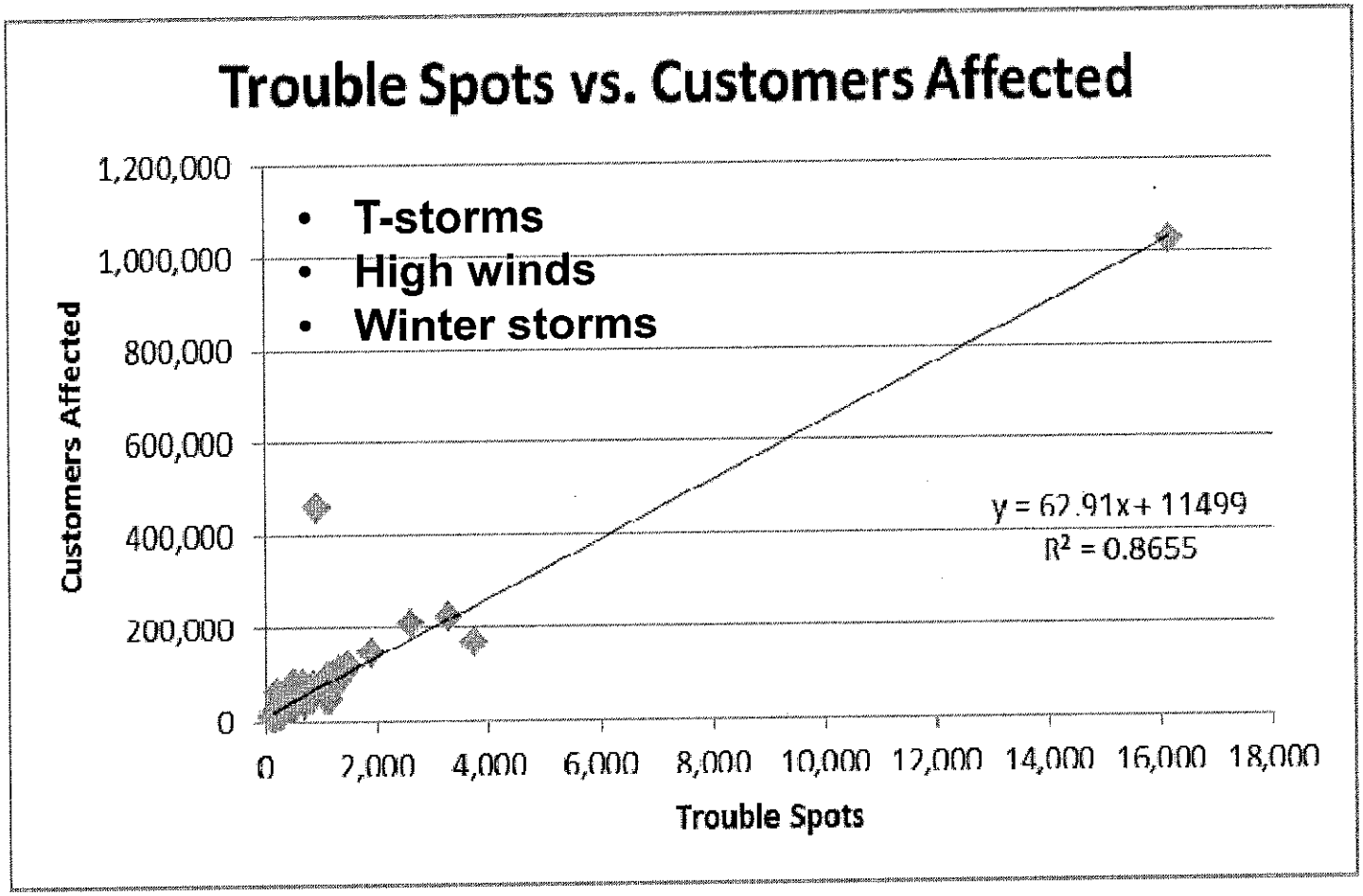








Calibration based on past storms (2003-2011)



Physical model to facilitate prediction of C-III hurricane wind damages

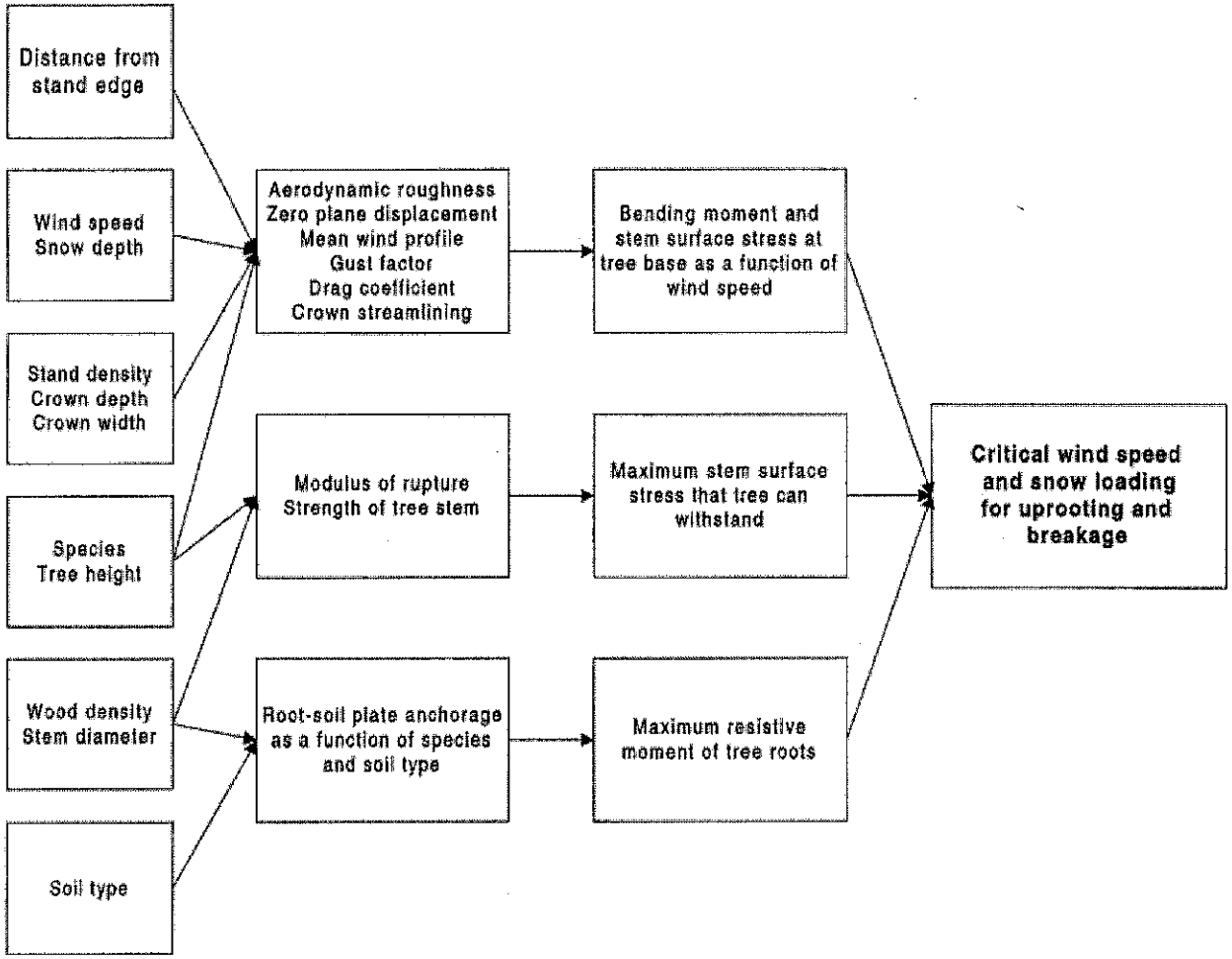


Fig. 1. Schematic diagram of GALES and HWIND models.

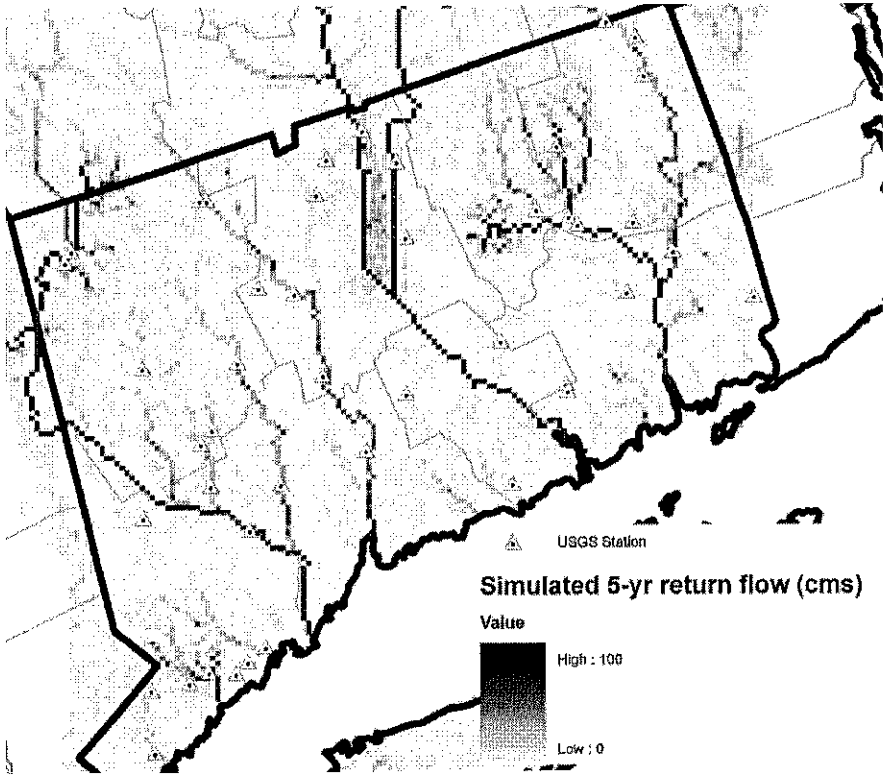
Source: Gardiner et al. 2000

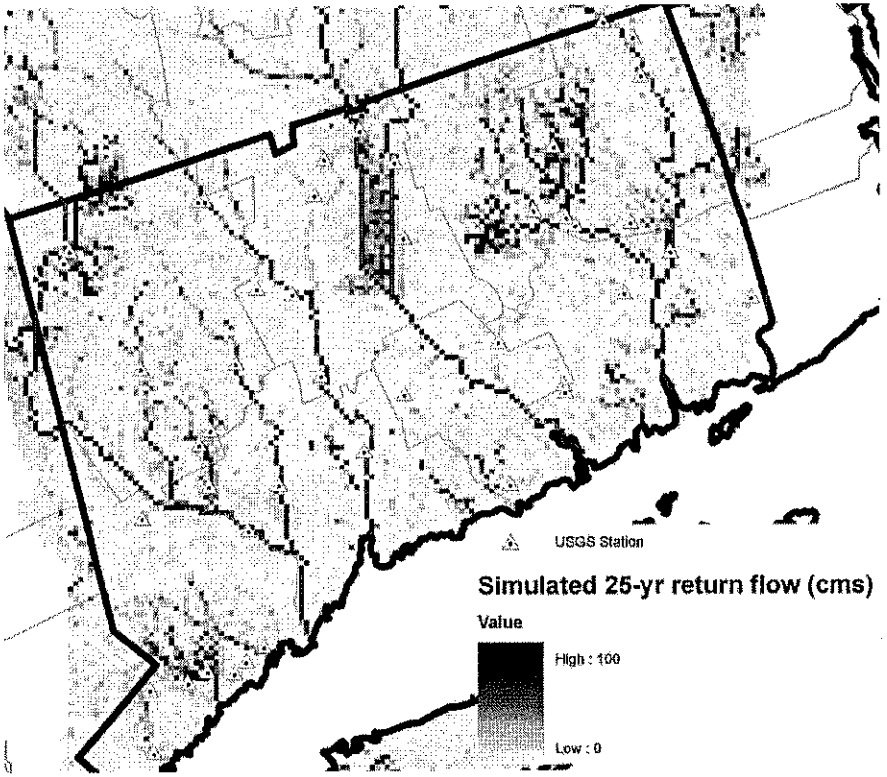
Distributed Flood Severity

20-30 year of observations
(NEXRAD, high-resolution re-analysis, satellites)

Distributed Hydrologic Model

Climatology of flows at sub-regional drainage basin scales



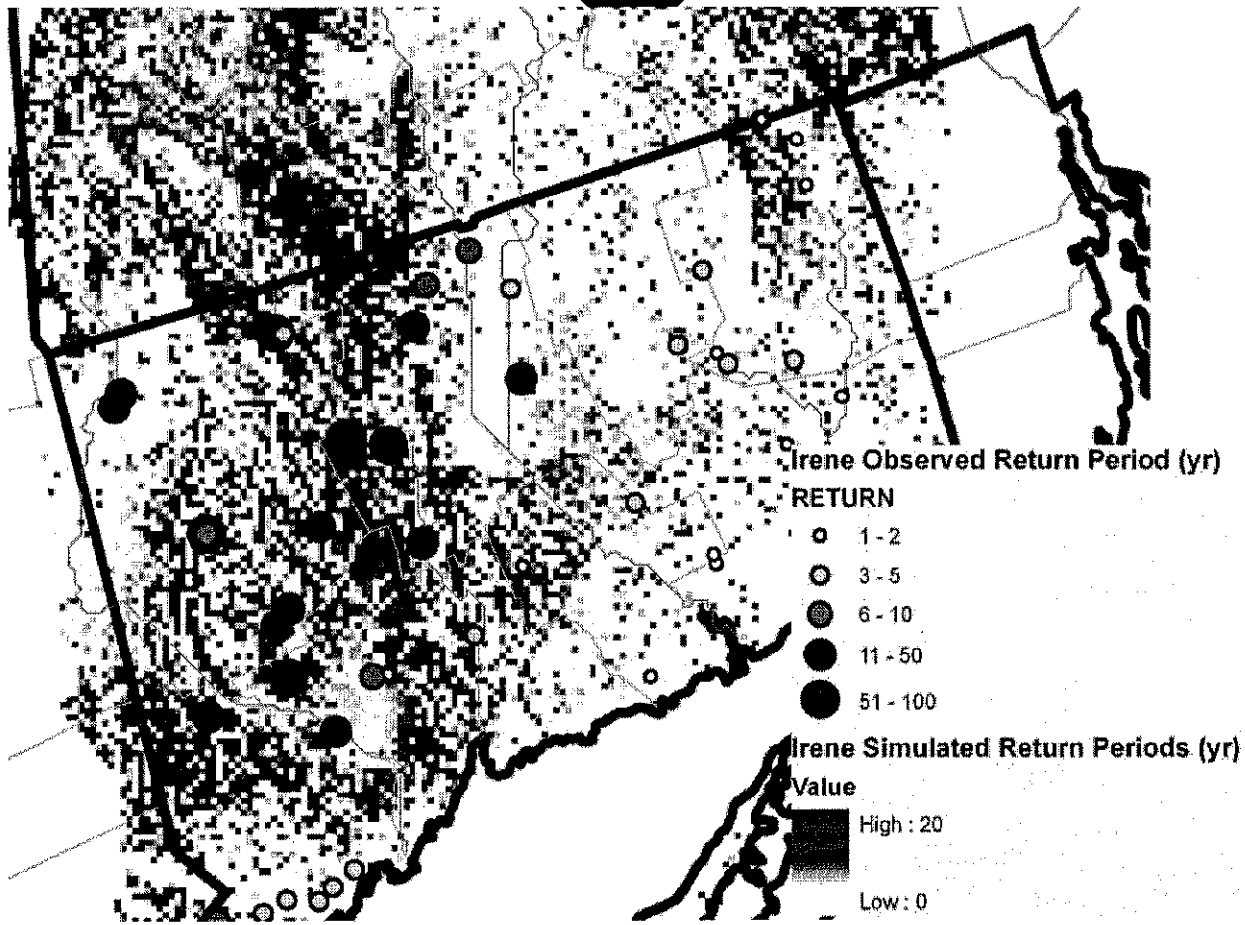


Prediction of flood returns

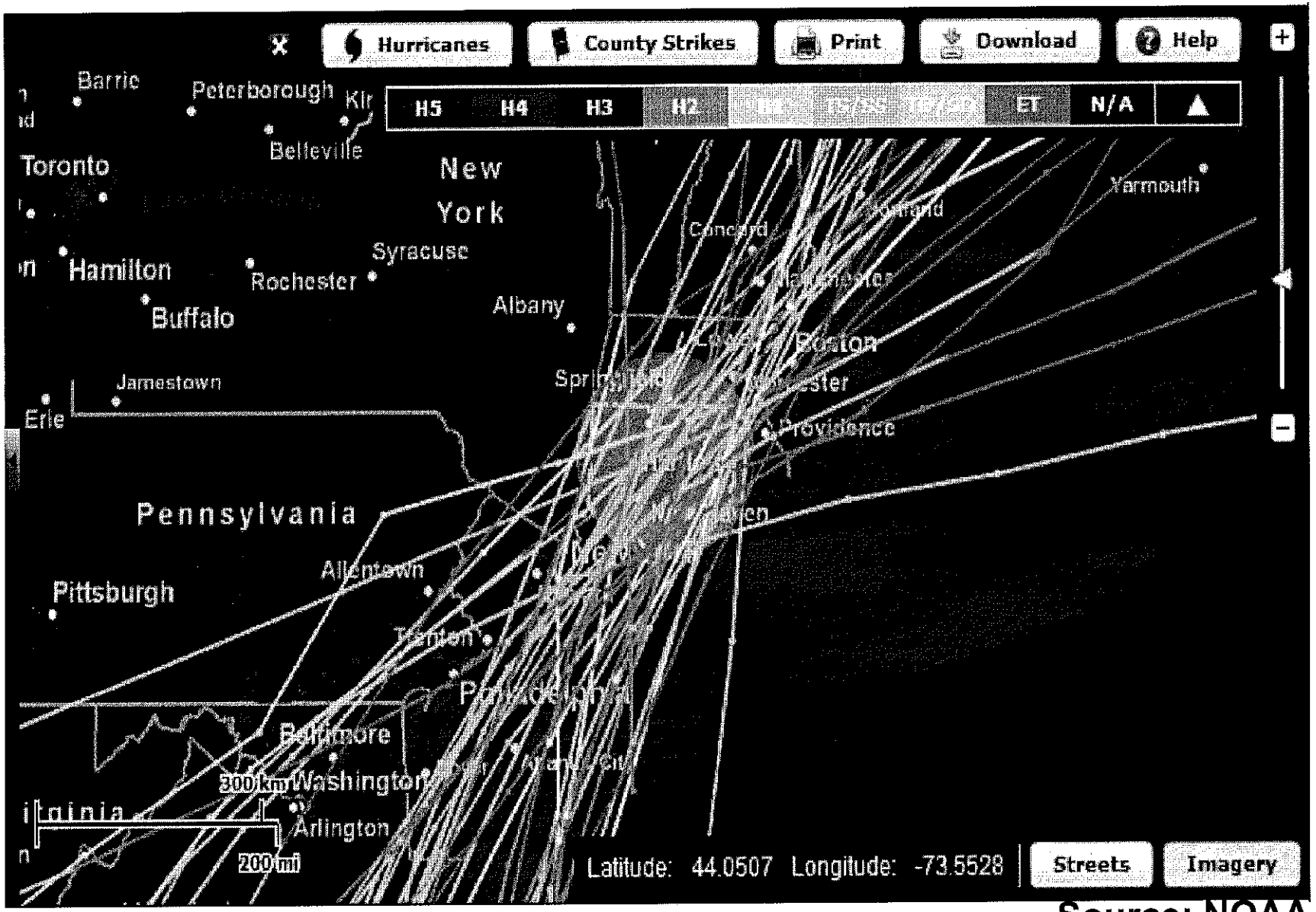
Real-time rainfall estimates & forecasts
(NEXRAD, high-resolution WRF, satellites)

Distributed Hydrologic Model

CDFs of flows at sub-regional drainage basin scales

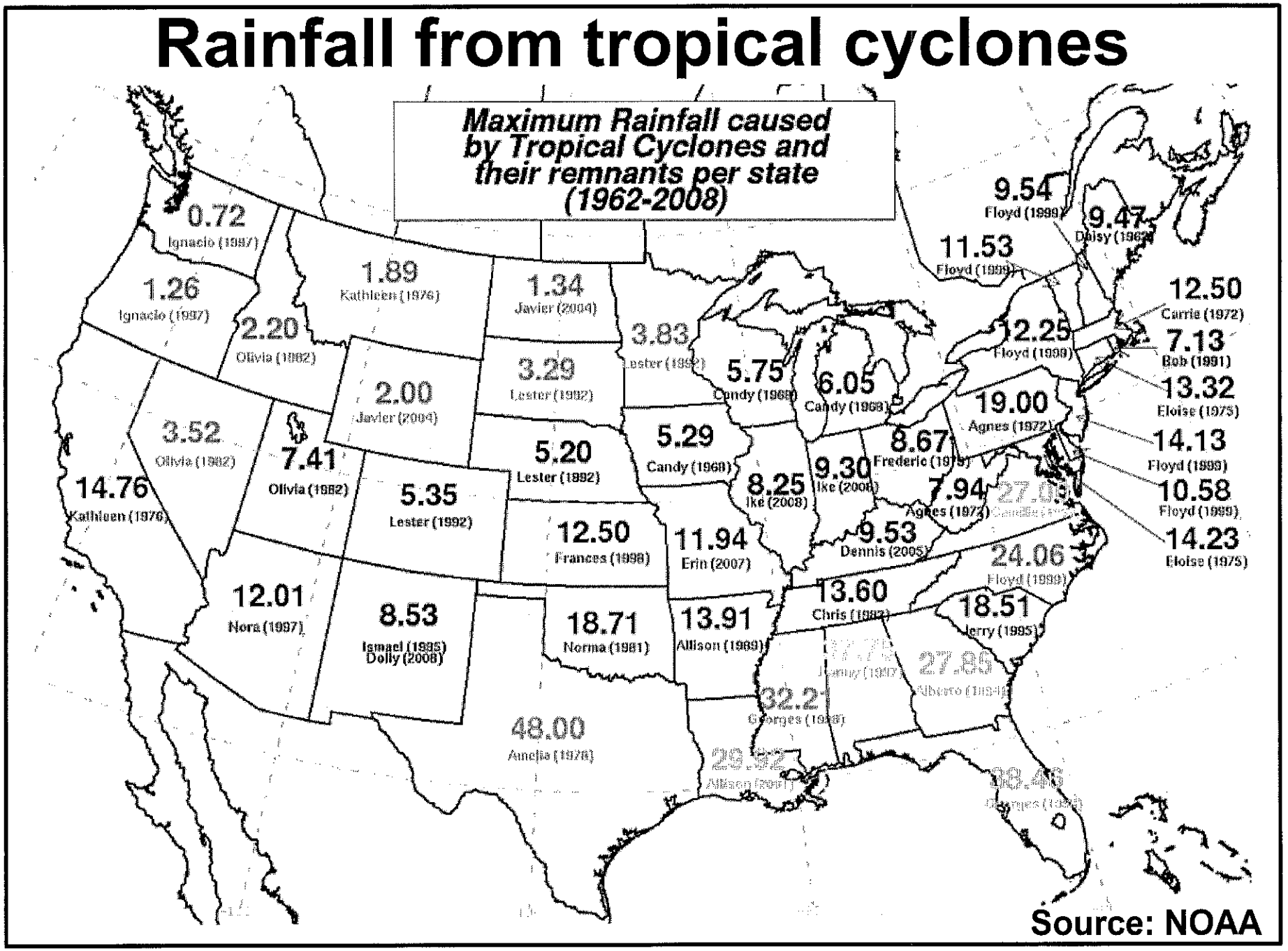


Does this all matter?



Source: NOAA

Rainfall from tropical cyclones



Long-term Goals

- Analyze past hydro-meteorological hazards and assess the exposure and vulnerability of the human-natural-economic system to those hazards.
- Develop early warning systems that will base on NOAA/NWS forecasts and the detailed hazard and vulnerability analysis to support decision making for preparedness and risk policy
- Public-private-academic partnerships and participatory processes (inclusion of all relevant societal groups) is essential for both spheres of risk governance: risk assessment and risk management

UIL HOLDINGS CORPORATION

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UIL Holdings Corporation

Enterprise and Operational Risk Management

October 25, 2011

UIL Enterprise Risk Management

- Manage Risk is a top level process on the corporate process map and incorporates Business Continuity Planning and Enterprise Risk Management (ERM)
- ERM methodology is aligned with accepted industry methodologies
- Risk Management is integrated into our core business processes for all operating companies
- ERM focus is on three levels of risk:
  - Strategic
  - Compliance
  - Operational

Overview of UIL Enterprise Risk Management for Electric and Gas Companies

- Strategic
  - Sector Trends, Financial, Business development, Long term planning
- Compliance
  - SEC, SOX, FERC/NERC, PURA
- Operational
  - Design, Reliability, Maintenance, Replacement and Restoration

Resources are assigned responsibility for each of these levels of risk. Operational risk is assigned at the operating company level.

Reliability Risk is Preemptively Mitigated via the Transmission Planning Process

- Connecticut transmission system is part of a much larger, integrated, and redundant system
- As a true network, it has the ability to re-route power around components that are out of service
- In addition, the system is designed for both single and multiple contingencies (N-1 and N-1-1 respectively)
- System is designed to national, regional and local reliability criteria
- System is subject to an annual reliability assessment
- In addition, UI's substations are connected to the grid via a minimum of two transmission lines

As a result, the transmission system is highly reliable across a wide range of extreme conditions. Outages are infrequent and of relatively short duration.

Reliability Risk is further Mitigated by Transmission Asset Design Criteria

- Structures and lines are designed for 100 mph sustained winds
- Structures and lines are designed for thick ice build-up on wires
- In addition, numerous circuits have devices that prevent conductor galloping (caused by both wind and ice on the conductors)
- Substation design accounts for the 100 year flood level

Monitoring and O&M also Contribute to Mitigation

- UI's SCADA provides Operators with control and continuous status information
- Transmission lines are generally located in wide ROWs and/or located underground
- These ROWs and an effective vegetation management program minimize the potential for damage and disruption

The Electric System is Designed to Reduce the Frequency and Minimize Impact of Outages

- **Equip. & Const. Standards Meet or Exceed Industry Standards**
  - NESC Grade B Construction for Critical Transportation Crossings
  - Forensic Analysis Performed on Failed & Proposed New Equipment
  - Like-for-Unlike Equipment Replacement (Tree Wire, Insulators, Wire Ties, etc)
- **Design**
  - The Distribution system is designed for single contingencies (Circuit Backup)
  - Loading Analysis for Pole Attachments (Electric & Other)
  - Isolation Devices are used to Minimize the Effect of Outages
  - Strengthen Critical Poles
  - Street Accessible Construction (Minimal Distribution ROW's)
- **Proactive Equipment Inspection/Maintenance Programs**
  - Pole Inspection, Treatment and Replacement Programs
  - Infrared Heat Detection Inspection for Wire & Equipment Connections
  - Circuit Backbone Isolating Device Inspection Program
  - Other Equipment Condition Assessment (Ground Level, Underground, etc.)

Vegetation Management - Conforms to Industry Standards

- Transmission & Distribution Vegetation Management
- Cycle Based
- Aerial Transmission Line Inspection
- Annual inspections to identify and address mid-cycle issues
- Supplemented with Reliability (off cycle) Line Clearance
- Hazard Tree Removal Program
- Vine Removal Program
- Brush Removal

Additional Distribution Hardening Practices

Standards

- Continuously evaluating new equipment and materials
  - Distribution automation equipment, etc

Current Initiative Alternatives

- Accelerate replacement of aging infrastructure
  - 4KV Substations & Overhead Construction
  - Replacement of non-tree wire (Primary and Secondary)
- Deploy Distribution Automation and increased sectionalizing

Future Considerations

- Implement a program for hardening circuits serving critical loads
- Increase Underground vs. Overhead Construction

UI's Electric System is built and maintained to robust industry standards. Major storms will continue to impact our system due to tree related damage.

- **Recommendations for increased mitigation:**
  - Changes to Vegetation Management Practices:
    - Increase Trim Zone
    - Reduce the Trim Cycle
    - Evaluate the use of herbicides or growth retardants
    - Increase Hazard Tree Removals
    - Conduct Survey to Quantitatively Assess Tree Risk
    - Expand Public Outreach Programs (Right Tree / Right Place)
  - Develop state wide vegetation standard for all utilities and municipalities that addresses:
    - Trees That Cause Customer Outages and/or Extend Outage Duration
    - Trees not in Conflict with Electric Infrastructure but Impact Public Safety or Restoration Effort

Operational – Current Restoration Planning and Response

- Dedicated Organization
  - Restoration Manager
  - Restoration Engineer and OMS Business System Analyst
- Strategy of Continuous Preparation and Improvement
  - Post Event Analysis, training and simulations
  - Best Practice identification and implementation
    - Industry Networking (EEI, Mutual Assistance groups, other Utilities)
  - Leveraging technology
  - Predictive Modeling and Resource Forecasting methodology

Current Response Plans

- Implementing scalable Emergency Response Plan based on NIMS and the Incident Command Structure
  - Temporary organization dedicated to Restoration
  - Utilization of UIL employees
- Implementing and integrating technology improvements to support restoration and communication efforts
  - Increasing the storm team management capacity
  - Providing near real time communications to customers, regulators, government/legislative, municipal EOCs and media.
  - Technology examples - Outage Management, Advanced Metering Infrastructure, Mobile Workforce Management, Distribution Automation and Call Center Technology
- Utilize Mutual Assistance and Contractors
- Utilize Logistical Alliance for Materials
- Maintain backup Operations Centers

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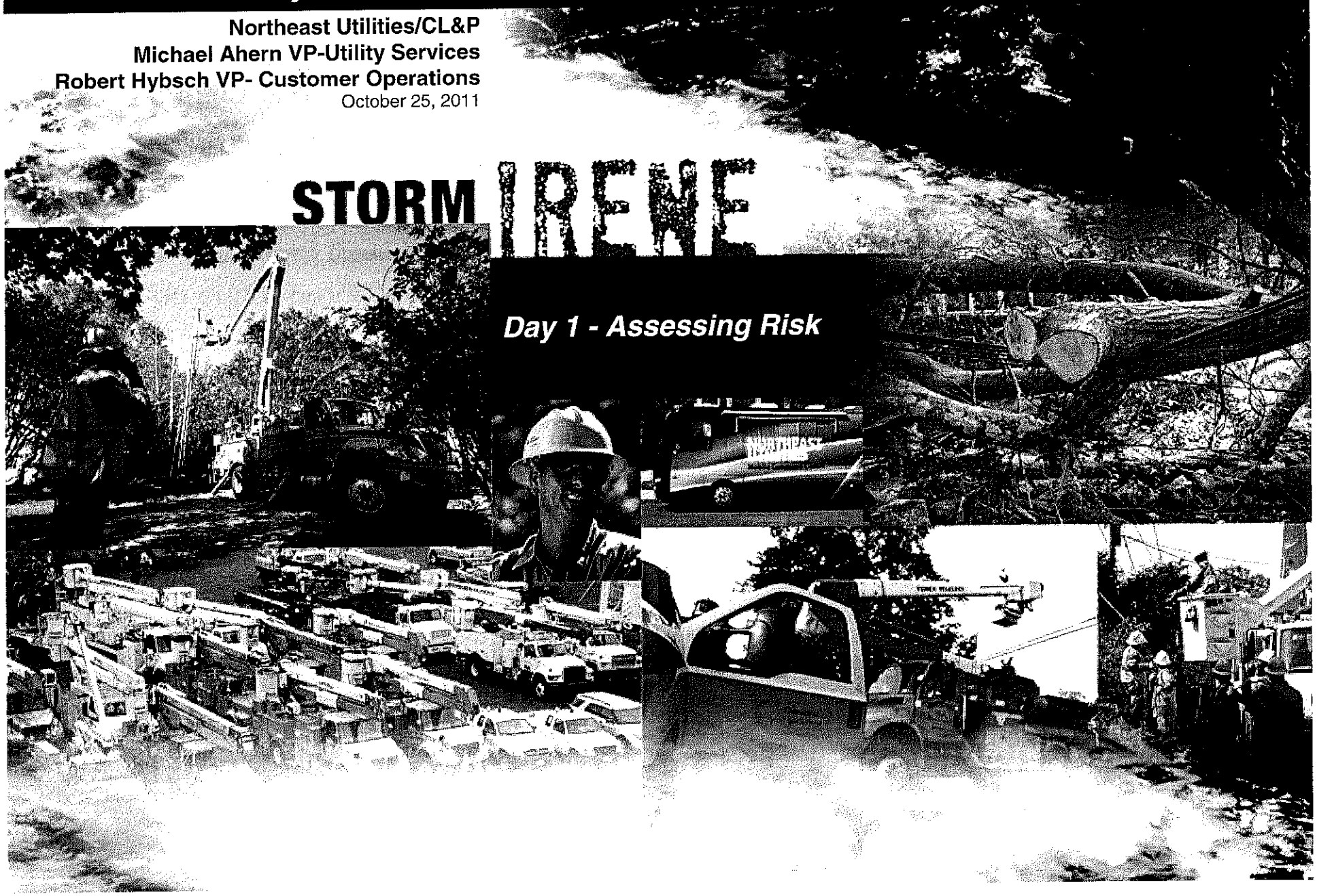
Governor Malloy – State of Connecticut Storm Irene Assessment

Northeast Utilities/CL&P
Michael Ahern VP-Utility Services
Robert Hybsch VP- Customer Operations
October 25, 2011



Connecticut Risk Assessment - Enterprise Risk

NU employs a rigorous Enterprise Risk Management process

- The process is based on guidelines from the nation's Committee of Sponsoring Organizations (COSO)
- Risks are identified and assessed:
  - with broad, cross functional input as part of the annual business planning cycle
  - prioritized/scored based on likelihood, consequences and expected timing
- For each major risk:
  - risk owners are identified
  - mitigation plans are developed
  - formally tracked to implementation
- The entire process is overseen by:
  - a dedicated organization
  - third party reviewers
  - senior management's Risk and Capital Committee (RaCC)
  - NU's Board of Trustees
- Leading operational risks include incident response for:
  - Safety events
  - Widespread outages caused by weather, cyber and physical security

Connecticut Risk Assessment - Incident Response

NU uses a well developed corporate-level Incident Response Plan

- The Plan includes:
  - concepts from the National Incident Management System (NIMS)
  - a listing of possible incident scenarios
  - response procedures, including communications protocols and reporting
  - a hurricane preparedness plan (five day countdown, with day-by-day actions)
  - a clearly defined incident command structure
  - a 24/7 assigned Duty Officer to assure appropriate incident response
- It is revised annually to include:
  - lessons learned
  - insights from annual business continuity exercises and Enterprise Risk Management workshops
  - best practices adopted from industry benchmarking
- The Plan is supplemented by specific emergency and business continuity plans/procedures

Connecticut Risk Assessment - Extreme Weather Events

Extreme weather events cause extensive damage, resulting in lengthy power restorations

Year	Storm	# of customers out	Duration of restoration
Wind Storms:			
2011	Irene	CL&P - 1,024,032 total (671,000 at peak)	9 days
2011	Irene	LIPA - 500,000 at peak	9 days
2011	Irene	JCP&L - 670,000 at peak	9 days
2011	Irene	BG&E - 750,000 at peak	9 days
2008	Ike	Entergy - 705,400	3 weeks
2008	Gustav	Entergy - 829,000	1.5 weeks
2006	Rita	Entergy - 766,000	4.5 weeks
2005	Katrina	Louisiana - 890,000	Vast majority within 4 weeks, remainder took months
2005	Katrina	Mississippi Power 195,000	1.5 weeks
2005	Wilma	Florida - 2.7M	2.5 weeks
Ice Storms:			
2009	Mid Atlantic Ice Storm	Kentucky - 700,000	17 days
2008	NH Ice Storm	PSNH - 322,000	13 days
2007	Oklahoma Ice Storm	PSO/OGE - 640,000	83% within 8 days

Connecticut Risk Assessment - Electric Infrastructure

The CL&P electric system is primarily an overhead system

- The Transmission system – 1,638 miles of overhead lines, 135 miles of underground lines and 19 substations
- The Distribution system - 16,974 miles of overhead lines, 6,290 miles of underground lines and 225 substations
- The system is constructed to applicable national standards
  - Federal Energy Regulatory Commission (FERC) - reliability standards
  - North American Electric Reliability Council (NERC) - reliability standards
  - National Electrical Safety Code (NESC) - construction standards
  - Occupational Safety and Health Administration (OSHA) - safety standards

The electric system is vulnerable to a variety of weather-related risks

- Wind – Hurricanes, tropical storms, tornados and thunderstorms
- Snow & Ice – Snow storms, ice storms, nor'easters
- Other events – Heat waves, floods

Trees cause the vast majority of the damage from weather-related risks

- CL&P experiences tree-related outages at wind speeds above 30 mph
- Trees begin to sustain damage with a ¼ inch of radial ice
- Extensive system damage with ½ - 1 inch of radial ice

Fallen trees also create public safety issues

- Downed wires
- Blocked roads
- Damage to homes and vehicles

Connecticut Risk Assessment - Mitigating Tree Risk

➢ The electrical system remains vulnerable to tree failures

- A more robust vegetation management program will add significant value for storms with wind speeds less than 60 mph
- Even with a robust vegetation management program, the electric system will sustain significant tree damage from storms with wind speeds greater than 60 mph

➢ Vegetation in Connecticut

- "Combined with age, neglect, mismanagement and a wide array of adverse environmental conditions, our trees are in an alarming state of decline. Nowhere is this more apparent than in those areas where people and trees are in frequent contact: along highways and country roads, in city parks, along city streets and lots, and in unmanaged rural forests and municipal woodlands." - *Connecticut Urban Forest Council - 1996*
- The US electric utility industry average tree density is 85 trees/mile. CL&P's average tree density is 186 trees/mile. Southeastern CT averages 223 trees/mile. - *Environmental Consultants Inc.*
- "Our state will remain highly vulnerable to tropical storms and hurricanes until a major hurricane fells a significant percentage of our overgrown tree stock". - *State of Connecticut DEMHS Storm Irene report, Sept. 2011*

CL&P recommends the appointment of a state wide task force to develop a comprehensive plan to better manage vegetation adjacent to public ways and utility infrastructure. Recommended participants include:

- *State of Connecticut*
- *Towns/Cities/Municipalities*
- *Subject Matter Experts*
- *Utilities*

(6)

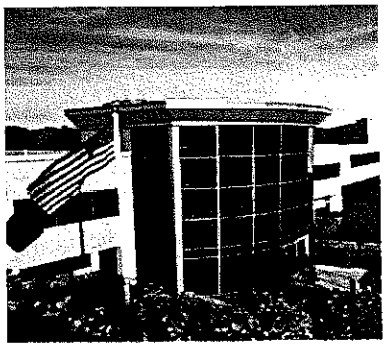
ISO New England Briefing for CT S.T.O.R.M. Irene Assessment Panel

Legislative Office Building, Hartford, CT
October 25, 2011

Pete Brandien, VP System Operations
ISO New England

About ISO New England

- **Not-for-profit corporation created in 1997 to oversee New England's restructured electric power system**
  - Regulated by the Federal Energy Regulatory Commission (FERC)
- **Regional Transmission Organization**
  - Independent of companies doing business in the market
  - No financial interest in companies participating in the market
- **Major responsibilities:**
  - Reliable operation of the electric grid
  - Administer wholesale electricity markets
  - Plan for future system needs



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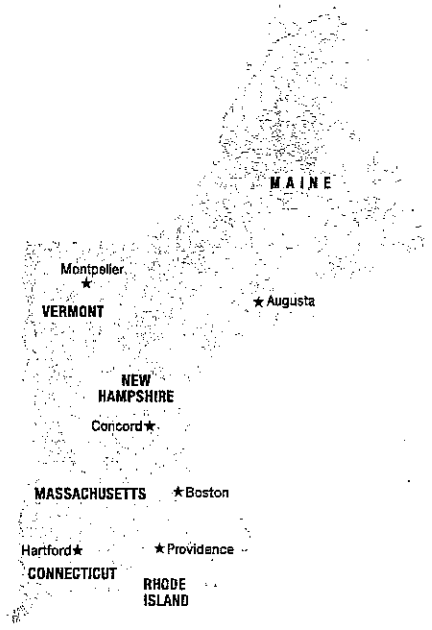
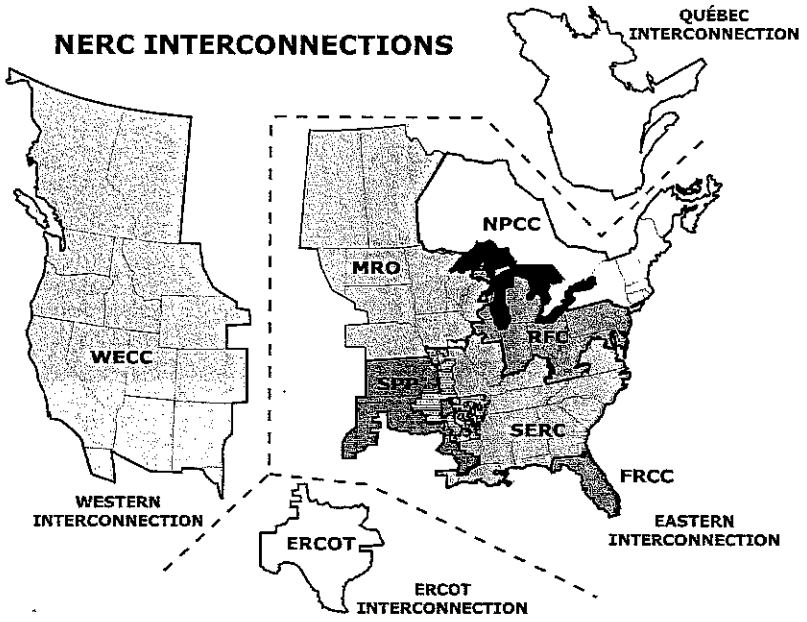
New England's Electric Power Grid at a Glance

- 6.5 million households and businesses; population 14 million
- More than 300 generators
- Over 8,000 miles of high-voltage transmission lines (115 kV, 345 kV)
- 13 interconnections to electricity systems in New York and Canada
- Approx. 32,000 megawatts of total supply and 2,750 megawatts of demand resources
- All-time peak demand of 28,130 megawatts, set on August 2, 2006
- More than 450 participants in the marketplace
- $5-11 billion annual energy market value



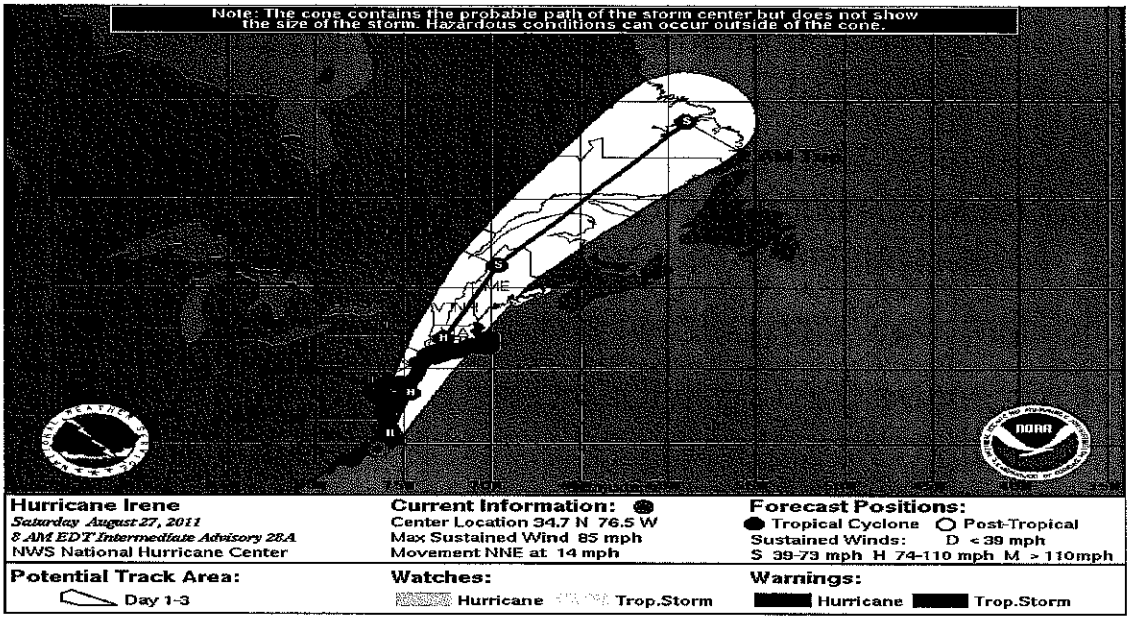
Part of the Eastern Interconnection



Forecast of Storm Track for New England

Hurricane and Tropical Storm Warnings

Issued early Saturday, August 27



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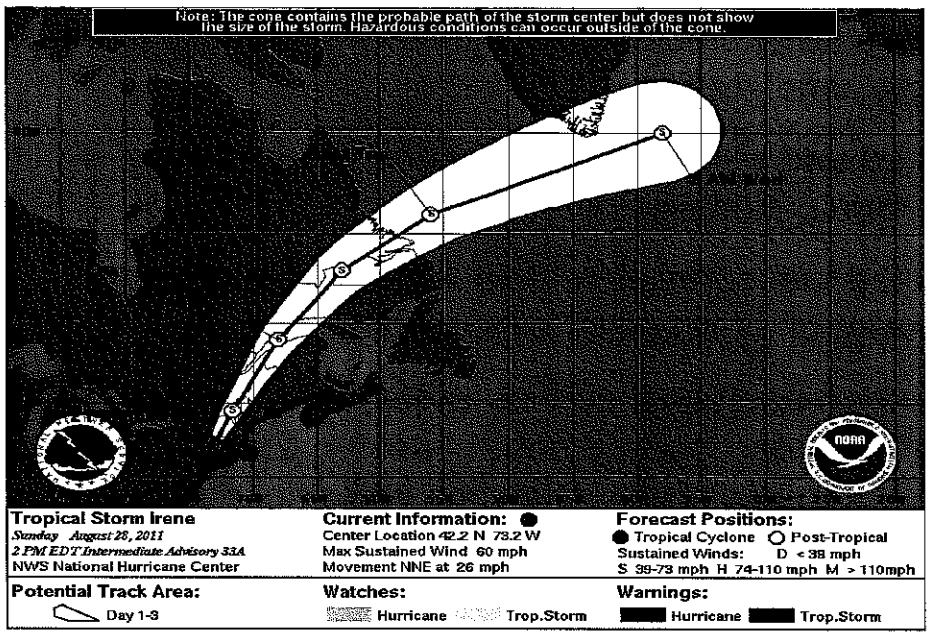
Storm Tracked West of Forecast

Tropical Storm

Sunday, August 28



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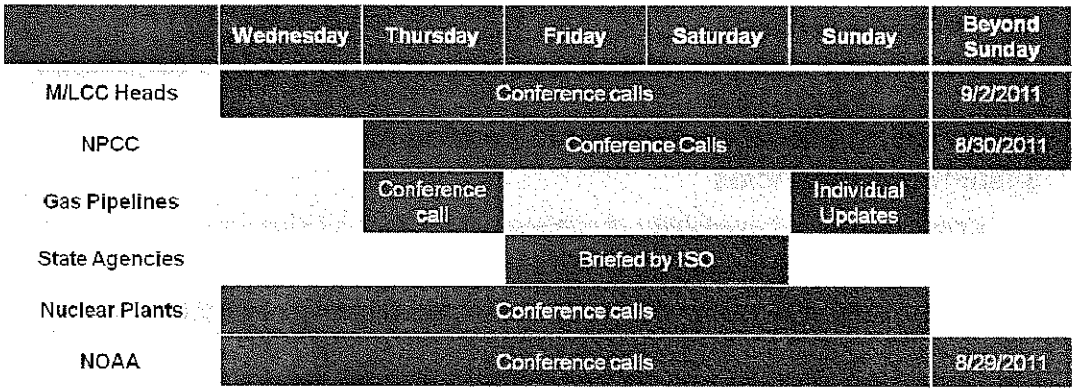
Weather Conditions in New England

- Early forecasts indicated potential Category 3 hurricane in Connecticut
- Storm hit as a high-end tropical storm and the track crossed through Connecticut and Western Massachusetts on Sunday afternoon
- Hurricane force gusts in areas of New England
- Extensive flooding in the region

Preparations for Irene

- Contacted all generators regarding operating plans, fuel supply, and staffing
- Tested and verified operation of voice and data communication equipment
- Verified fuel supplies for Black Start generators in anticipation of potential extended operation
- Arranged additional staffing at ISO New England's main control center, backup control center, and Local Control Centers to assist with real-time operations and communication

Conference Calls and Briefings to Coordinate Action Plans



M/LCC Heads: Master/Local Control Center Heads; ISO is the Master Control Center, LCCs are owned/operated by Transmission Owners.
NPCC: Northeast Power Coordinating Council
NOAA: National Oceanic and Atmospheric Administration

Communications with Government Officials

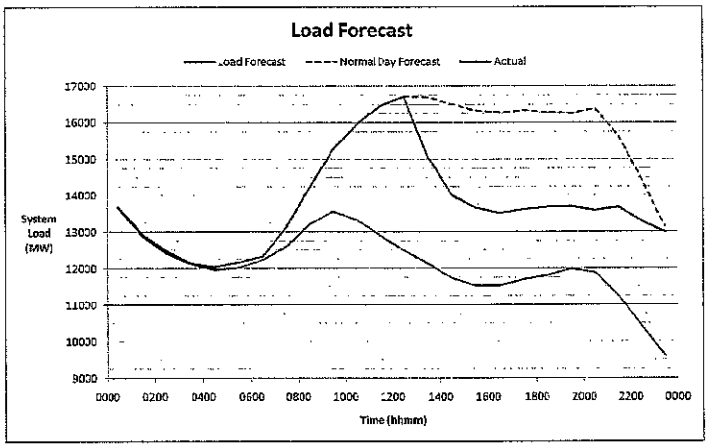
- Conducted conference calls Friday and Saturday to brief government officials on power system conditions and ISO storm preparations
  - Governors' offices
  - State public utility commissions
  - State emergency management agencies
  - Federal Emergency Management Agency (FEMA)
  - North American Electric Reliability Corporation (NERC)
  - Federal Energy Regulatory Commission (FERC)
  - U.S. Department of Energy (DOE)
- ISO communications staff were available throughout the weekend to answer questions from government officials and sent updates via email on Sunday and Monday

Actions Taken by ISO Operators

- Implemented *Abnormal Conditions Alert* to cancel generation and transmission outages
  - In effect from 12:00 p.m., Friday, August 26, to 3:30 p.m., Friday, September 2
- Called on additional generation to provide storm support in event of system contingencies
  - Uncertainty about availability of nuclear units in case of high winds
  - Uncertainty about precise track and intensity of the storm
  - Thermal and voltage support needed for multiple contingency scenarios
- Implemented procedures to back-down excess generation (Minimum Generation Emergency); wholesale electricity prices set to zero
  - Sunday: 12:15 p.m., to 8:20 p.m.
  - Sunday/Monday: 11 p.m., to 9:00 a.m.
  - Tuesday: 2:30 a.m., to 6:00 a.m.

Actual Load was Lower than Forecast

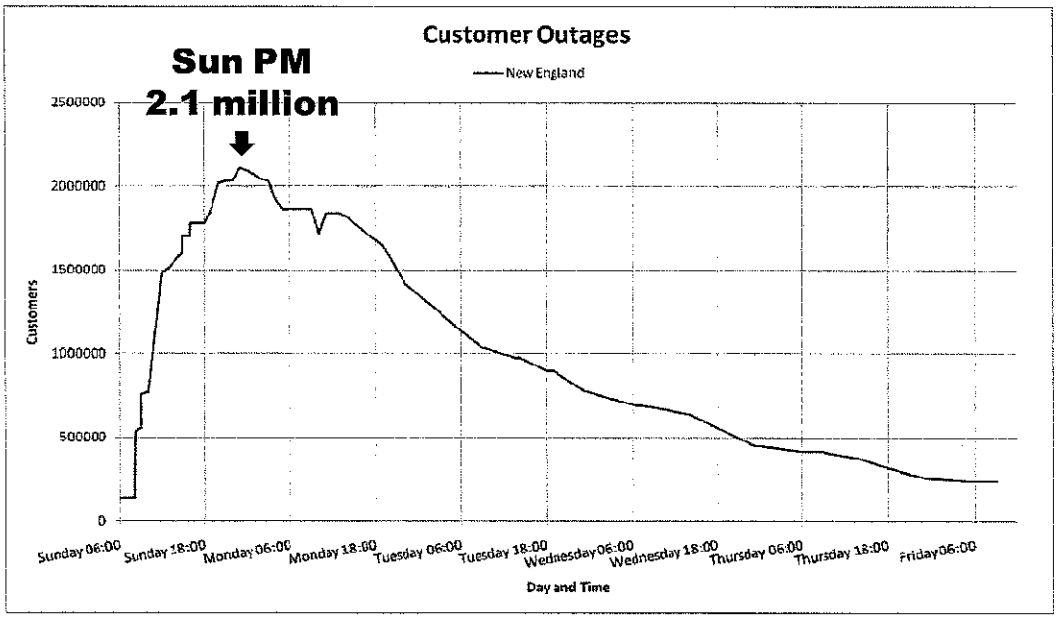
- ISO forecasted significant outages
  - Produced "Normal Day" forecast for comparison
- Actual system load was lower than the forecast
  - Storm accelerated Sunday morning and arrived sooner than expected
  - More load lost than forecast



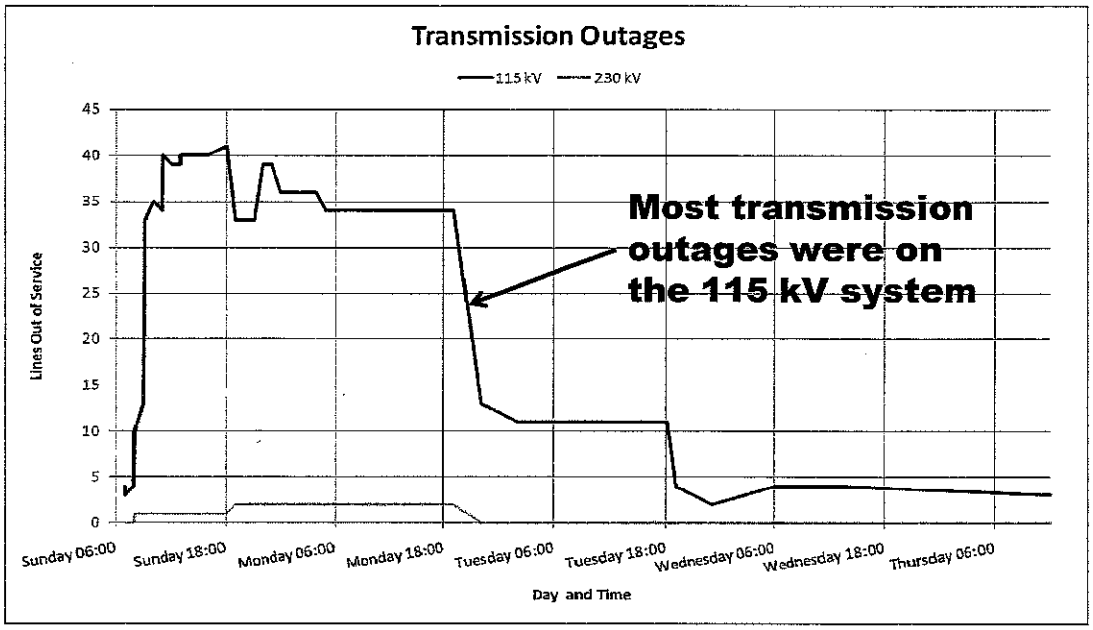
Event Overview

- Number of customers reported without power increased from 130,000 early Sunday morning to more than two million customers on Sunday night
- Storm did cause some transmission outages, but this did not result in a loss of power on the bulk system
  - Forty-one 115 kV lines out of service
  - Two 230 kV lines out of service
  - No 345 kV lines out of service
- System operators maintained the required levels of reserves (supply) before, during, and after the storm to cover contingency events on the system

Customer Outages (all estimates)

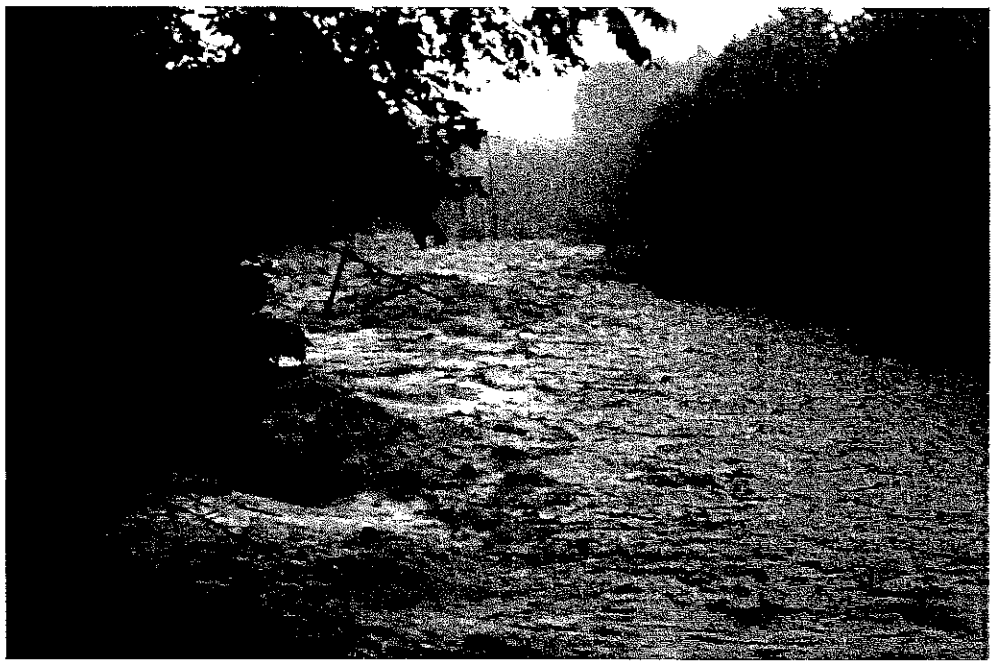


Transmission Outages

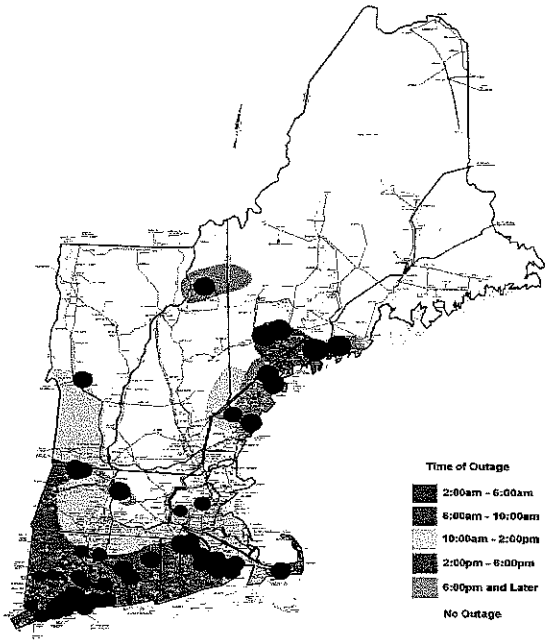


Transmission Outages

Damage to a 115 kV transmission line during Storm Irene



Transmission Outages: Time and Location



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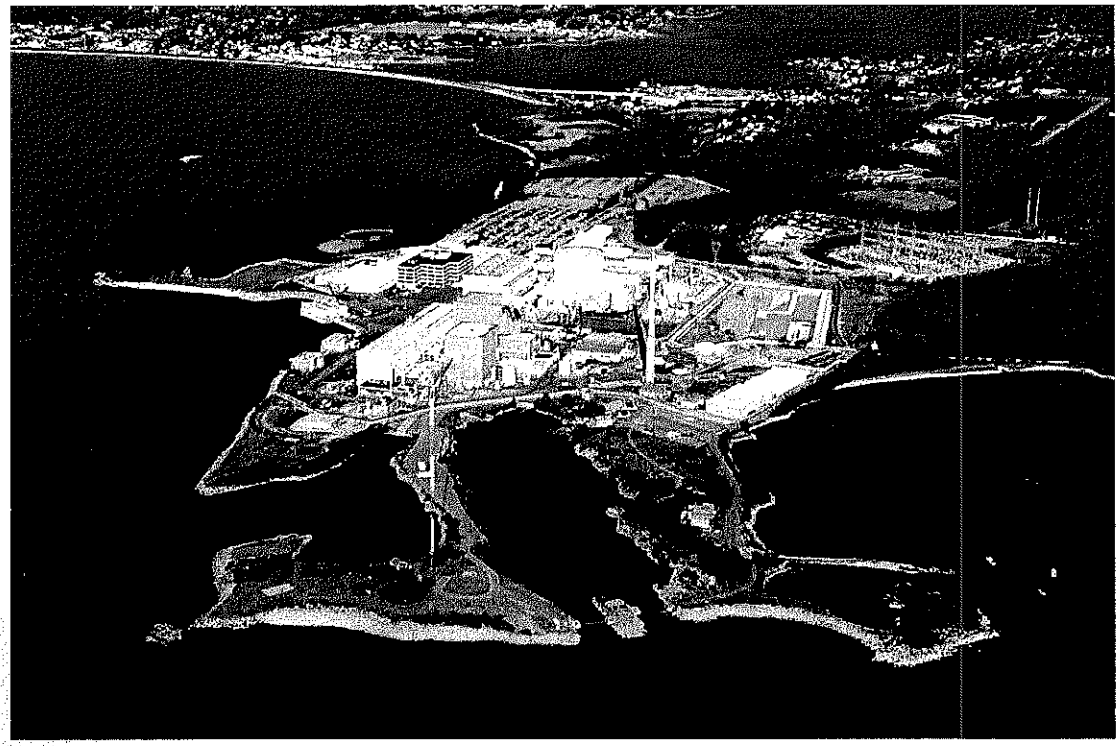
Dominion®

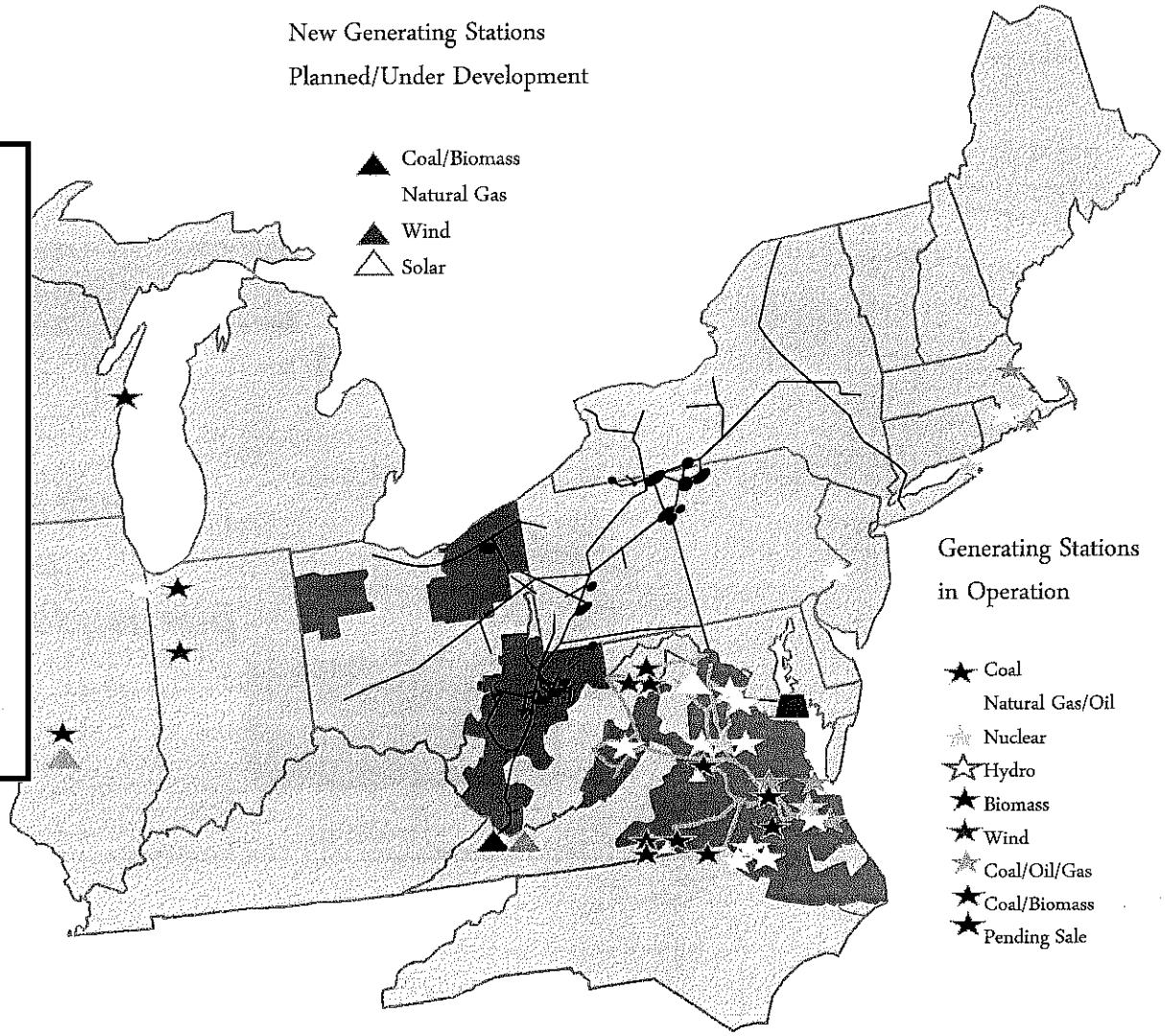


Millstone Presentation to S.T.O.R.M. Irene

October 25, 2011

Dominion's Footprint

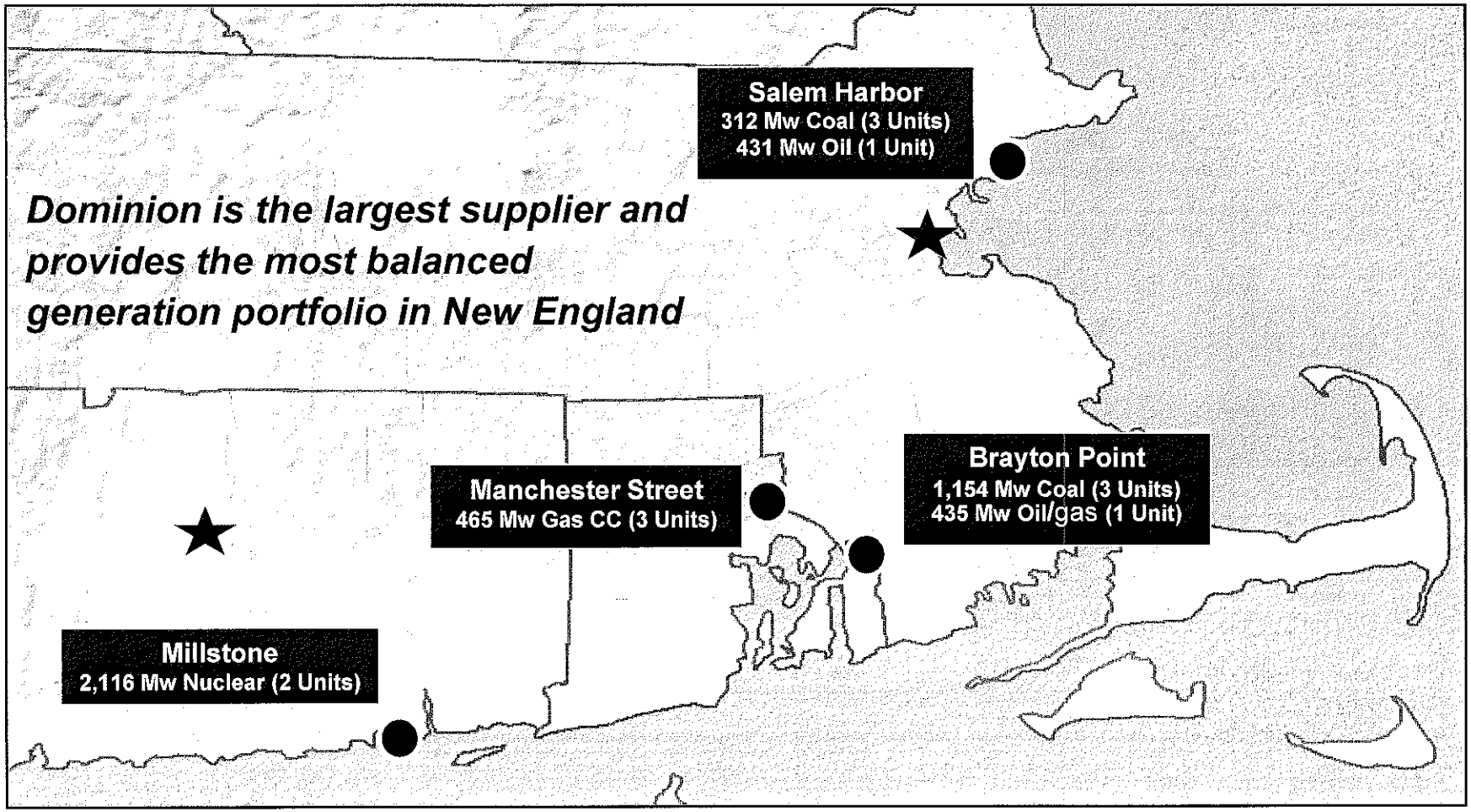
- ~27,600 MW of electric generation
- 6,200 miles of electric transmission
- 11,000 miles of natural gas transmission, gathering and storage pipeline
- 947 billion cubic feet of natural gas storage operated
- Cove Point LNG Facility
- 2.4 million electric customers in VA and NC
- 1.3 million natural gas customers in OH & WV
- 2.1 million non-regulated retail customers in 15 states



Dominion

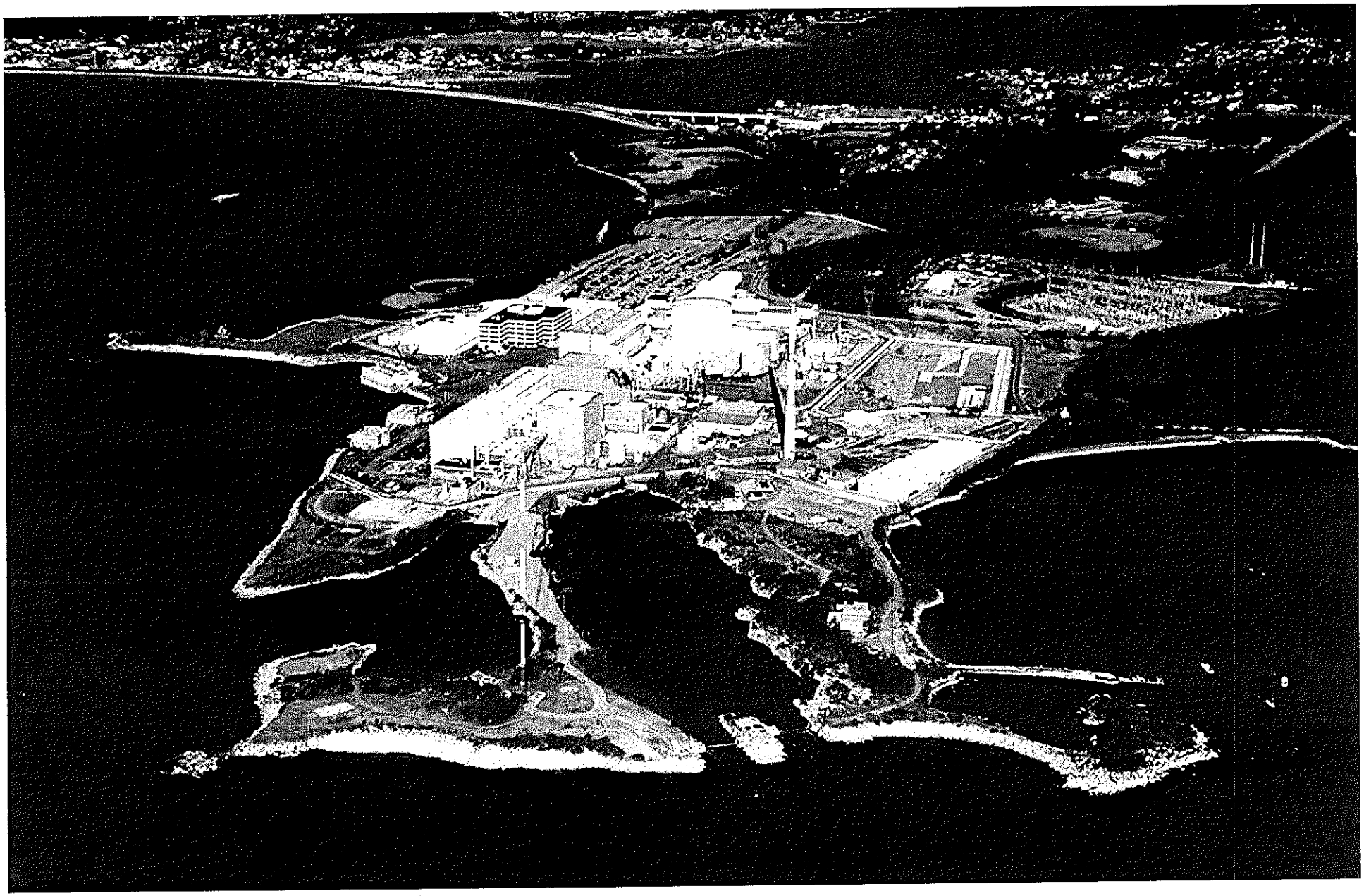
Dominion New England

Generation Assets: 4,913 MW



Dominion

Aerial View of Millstone



Millstone Overview

- Largest and most important generating facility in New England
- Located in Waterford - 535 acre site. Power station utilizes only 50 acres ±
- 3 separate units
  - Unit 1 - 660 Mw (1971) Permanently retired 1998
  - Unit 2 - 877 Mw (1975)
  - Unit 3 - 1218 Mw (1986)
- Dominion purchased Millstone via DPUC auction in '01 for $1.3 bil. (largest single transaction in state's history)

Dominion

Natural Disaster Preparation and Response

- Robust Design and Comprehensive Training:
  - Our units are designed to withstand and safely operate or shutdown in a wide range of emergency situations, including earthquakes, flooding, extended loss of power and more
  - Stations maintain high levels of readiness to respond to all events
  - Worst-case accidents and acts of nature have been analyzed and procedures are in place to respond
  - Operators spend 20 percent of their time in training to respond to potential events

Natural Disaster Preparation and Response

- Multiple, redundant sources of electrical power and safety equipment
  - Diesel generators (equivalent to a locomotive engine)
- Robust barriers
  - Steel gates
  - Submarine doors
  - Tornado doors
- NRC resident inspectors assigned to Millstone and onsite providing oversight

Natural Disaster Preparation and Response

- Multiple ways to access site
  - Barge
  - Rail
- Natural grade of facility slopes down to Long Island Sound, draining water away
- Millstone has its own meteorological tower and staff meteorologists employed by Dominion

Multi-Agency Coordination

Emergency Planning Zone Towns
- *10 towns in CT and NY*

Host Community Towns
- *5 Towns/Cities in CT*

State of Connecticut
- *DEMHS*
- *DEEP*
- *DPH*
- *DOT*
- *DOC*
- *CSP*
- *211 Center*
- *DDS*
- *Military*
- *Agriculture*
- *Consumer Prot.*

State of New York
- *SEMO*
- *Suffolk County*
- *Town of Southold*

State of Rhode Island
- *DPH*
- *DEQ*
- *RISP*
- *RIDEM*

Federal Agencies
- *FEMA*
- *NRC*
- *DOE*
- *FBI*
- *DHS*
- *AMTRAK*
- *Others*

Hospitals
- *L&M*
- *Middlesex*

Natural Disaster Preparation and Response

- Millstone and Tropical Storm Irene:
  - Staffed our emergency response facilities but did not activate them
  - Worked closely with local, state and federal officials
  - Reduced power at both of the units at request of ISO New England for grid stability
  - Weathered the storm with no damage to the station
  - Power to administrative buildings/Unit 1 Spent Fuel Pool was lost and restored within 15 hours

Natural Disaster Preparation and Response

- Millstone would declare Unusual Event if wind speeds were 75 miles an hour sustained at site
- Millstone would declare Alert if wind speeds were 90 miles an hour sustained at site
- Millstone would shut down in advance of a storm if projected wind speeds were 90 miles an hour sustained

Points of Contact

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  Site Vice President
  (860) 444-4292 Skip.J.Jordan@dom.com

- Kevin Hennessy
  Director – Government Affairs
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Dominion

For additional information, visit us at
www.dom.com

(I)

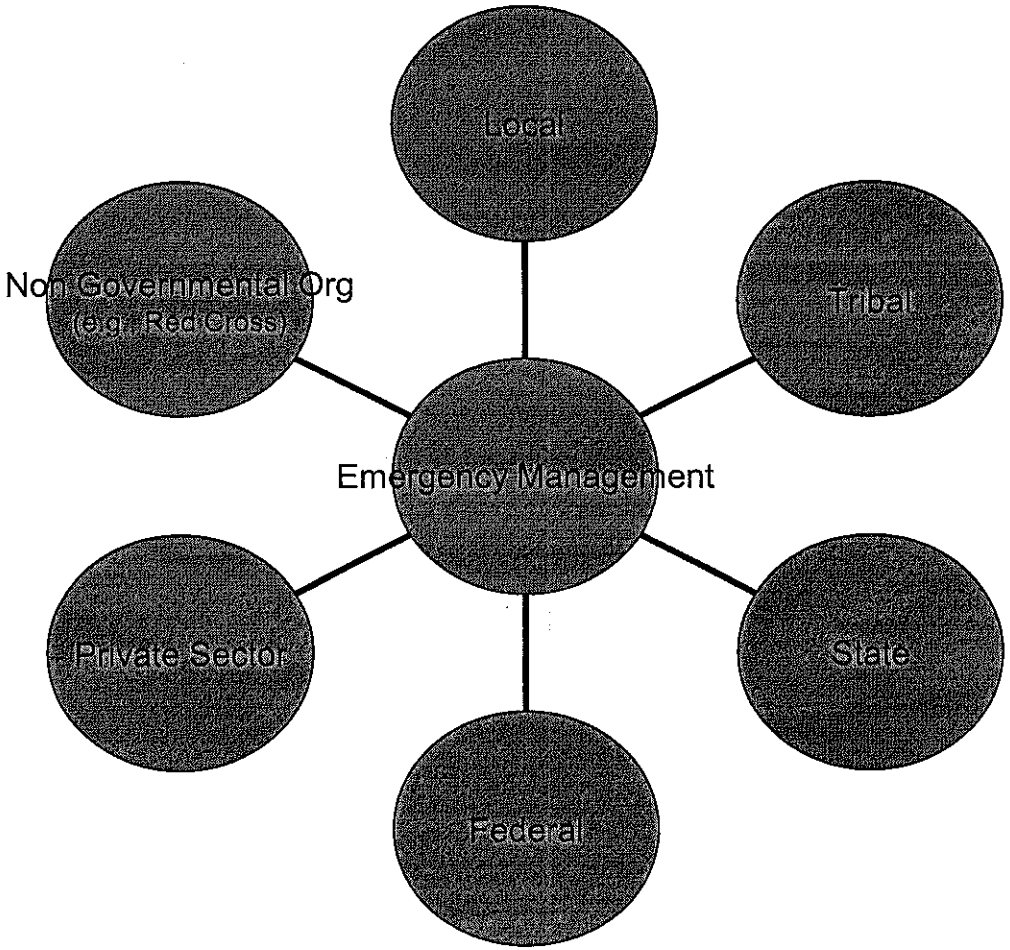
State of Connecticut

Division of Emergency Management and Homeland Security
Department of Emergency Services and Public Protection

S.T.O.R.M. Irene Panel Presentation
October 25, 2011

Emergency Management is a Team Effort

- National Response Framework
- National Incident Management System (NIMS)
- State Response Framework
  - Natural Disaster Plan and many other plans, guides and resources



Strategies for Success

- Collaboration
- Coordination
- Integration
- Decision-making

Creation of Department of Emergency Services and Public Protection

- As of July 1, 2011, four agencies became one, with six divisions:
  - Emergency Management and Homeland Security
  - Connecticut State Police
    - Seat at the EOC
  - Fire Investigation and Emergency Telecommunications
  - Fire Prevention and Control
    - Seat at the EOC
    - Statewide Fire Disaster Response Plan
    - Model Procedures for Response of Emergency Vehicles during Hurricanes and Tropical Storms August 2010
  - Police Officer Standards and Training
  - Scientific Services

CT DEMHS Mission Statement

The mission of the Division of Emergency Management and Homeland Security is to direct and coordinate all available resources to protect the life and property of the citizens of Connecticut in the event of a disaster or crisis, through a collaborative program of prevention, planning, preparedness, response, recovery, and public education.

DEMHS Units

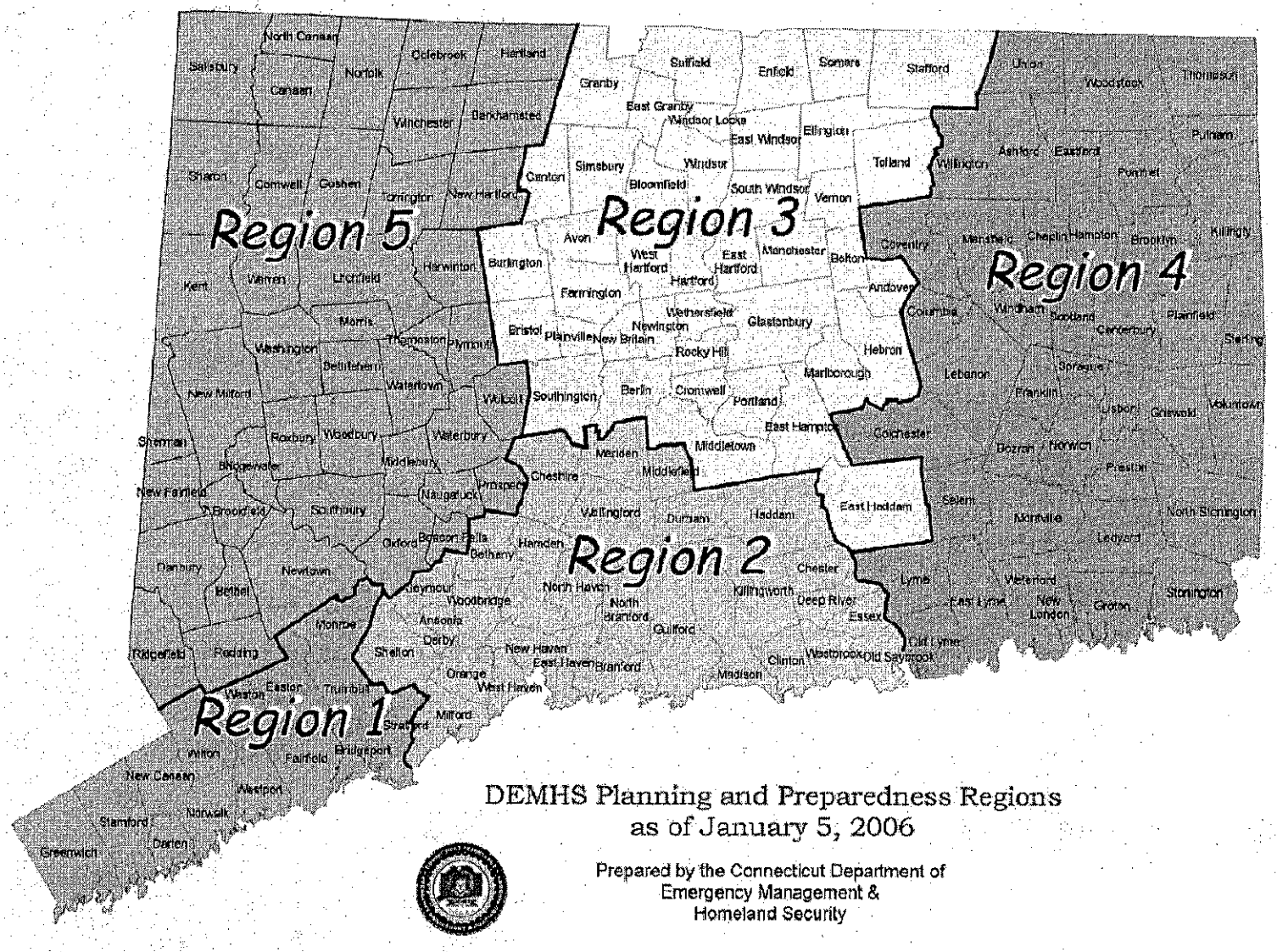
- Emergency Management
  - Regional and EOC Operations
  - Operational Planning and Radiological Preparedness (ex. State Response Framework)
  - Field Support Coordination
    - Training and Exercise
- Strategic Planning and Grants
- Homeland Security

Statewide DEMHS Advisory Council

- Continues the work of the DEMHS Coordinating Council
- Includes representatives from local, state, federal, and private partners
- Organized in accordance with Emergency Support Functions (ESF) and Critical Sectors

- Working Groups also following ESF structure, including
  - Interoperable Communications
  - Regional Collaboration
  - Citizen Corps Council (Community Emergency Response Teams)
  - Long term Recovery
  - Child Safety and Crisis Response

DEMHS Regions: Collaborative Preparedness



DEMHS Planning and Preparedness Regions
as of January 5, 2006

Prepared by the Connecticut Department of
Emergency Management &
Homeland Security

Regional Emergency Planning Teams

- One for each of the DEMHS Regions
- Representatives from each municipality (Chief Executive Officer/Chief Elected Official)
- Representatives from diverse emergency support functions within the Region
- "Governance"—Bylaws
- Planning role—Use of Federal grant funds determined on a regional basis
- Each region has a ***Regional Emergency Support Plan***

Municipal Role in Community Preparedness

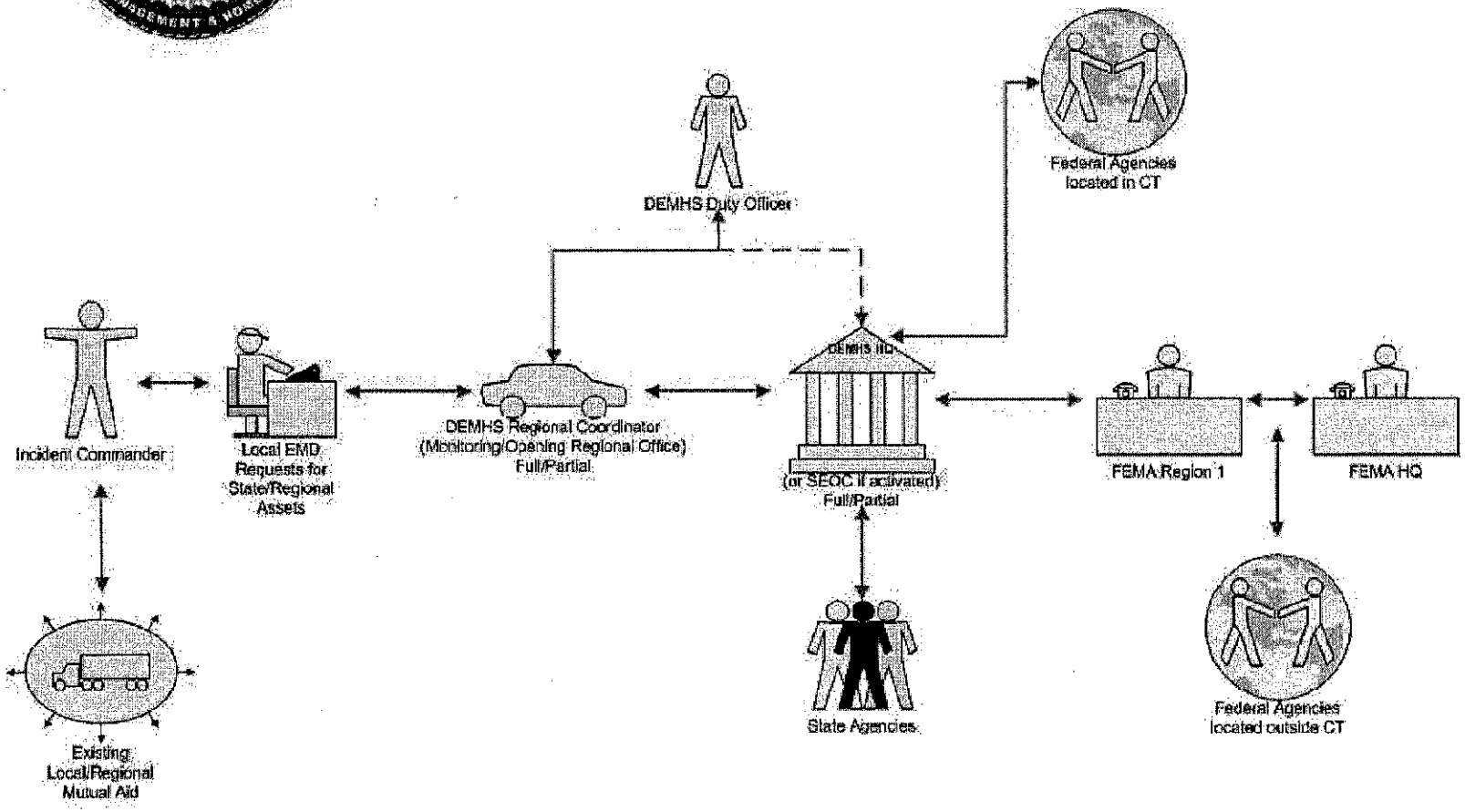
- ***Local Emergency Operations Plans reviewed and approved annually by DEMHS***
- Chief Executive Officer
- Emergency Management Director
- Service Chiefs, including Public Works
- Public Health
- Other Public and Private Local leaders, including Superintendent of Schools
- Mutual Aid
- Volunteer Organizations

Hurricane Preparedness Activities

[Full List in After Action Report]

- Governor's Unified Command Hurricane Preparation Briefing, June 23, 2011
- Connecticut Conference of Municipalities DEMHS/DPH Emergency Management Symposium and Hurricane Conference-- May 3, 2011
  --415 Participants
- National Hurricane Conference, May 2011, Atlanta, Georgia/DEMHS Region 1 Regional Coordinator and Emergency Support Function Chairs
- SLOSH Map/ Evacuation Clearance Review Meetings in DEMHS Regions 1, 2, and 4
- Completion of Local Emergency Operation Plan Updates
- Logistics Meeting with FEMA Region 1 (Fall, 2010)
- Hurricane Center Training, February 2011, Miami Florida (Operations and Training staff)
- CERT, Web EOC, and Incident Command System Training in various locations across the state

DEMHS Significant Incident Flow (Current)



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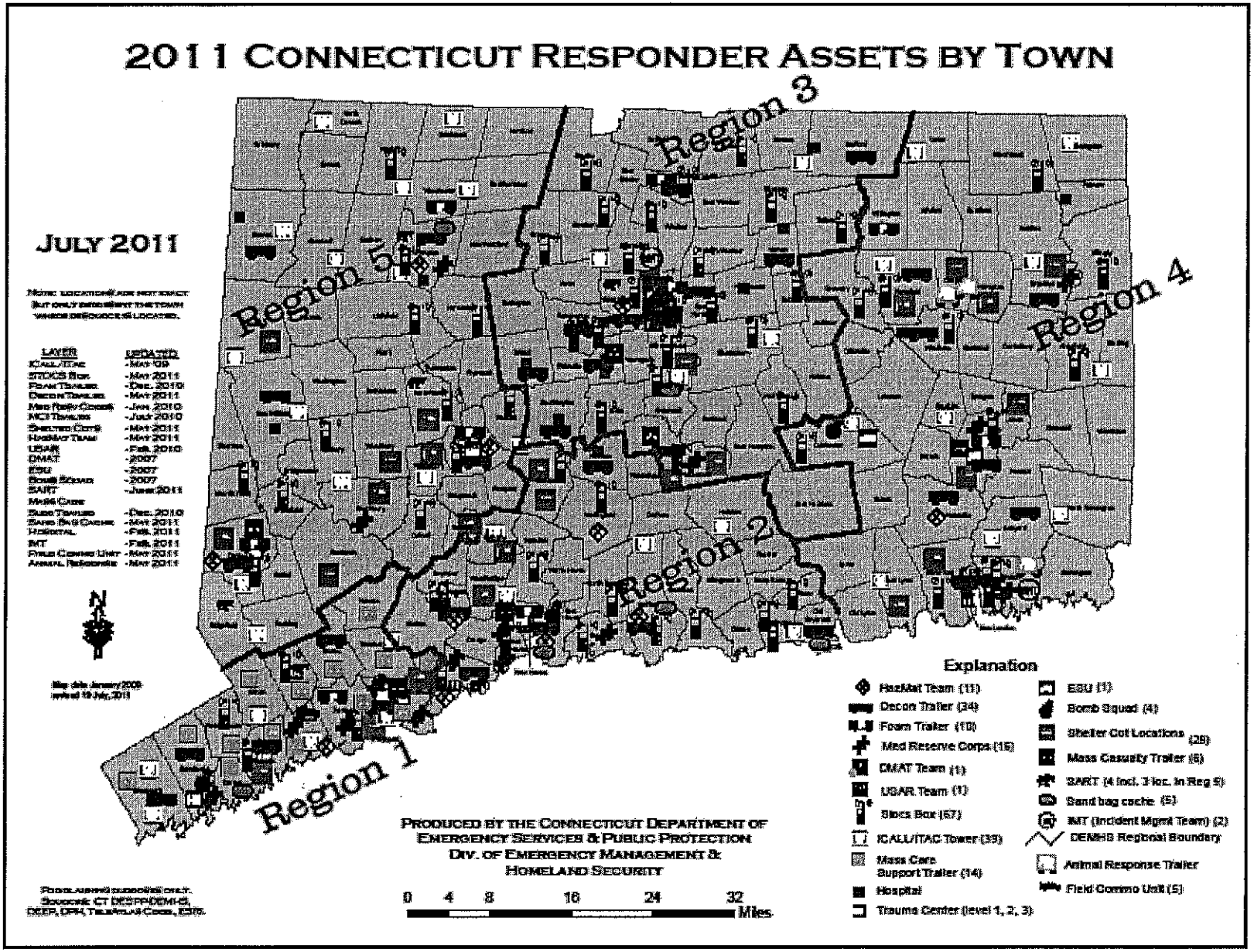
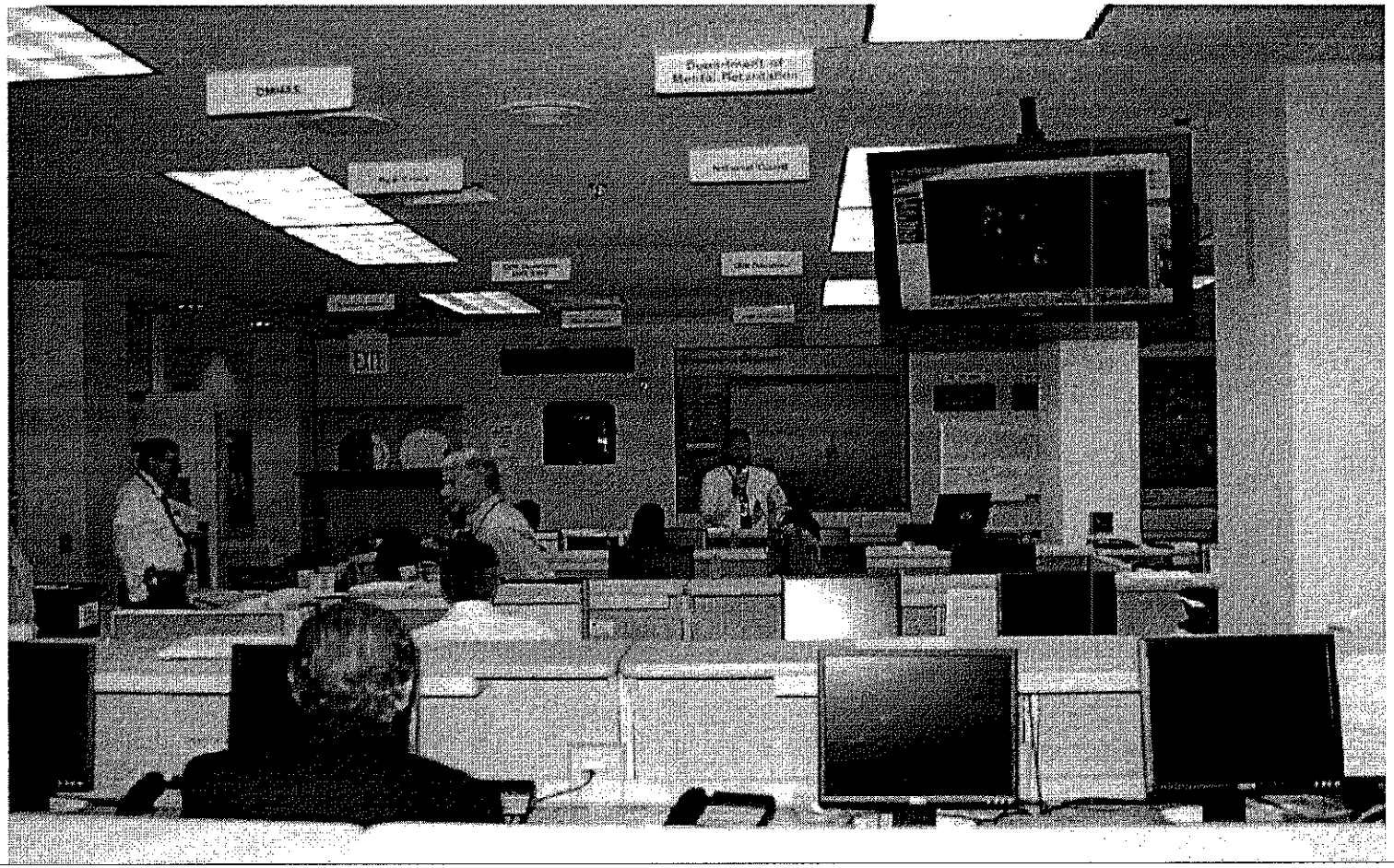
State Resources by Town



State Emergency Operations Center



State EOC Support Agencies

- Office of the Governor
- DESPP Division of Emergency Management and Homeland Security
- Other DESPP Divisions
  - State Police
  - Fire Prevention and Control
  - Emergency Telecommunications
- Department of Transportation
- Department of Administrative Services
- Department of Energy and Environmental Protection
- Department of Public Health
- Military Department

Non governmental organizations vary depending on nature and extent of emergency, and usually include:

- Volunteer Organizations Active in Disaster(VOAD)
- Red Cross
- United Way 211
- Electric Utilities

Timeline and Summary of State Operations in Response to Storm Irene

[Remember every incident begins and ends locally.]

- Preparations began early in the week of August 22nd
- Governor Malloy declared State of Emergency at 5 pm August 25, 2011
- Governor requested and received Presidential Pre-landfall Emergency Declaration on August 27, 2011
- Full Activation of State EOC August 26, 2011 through September 6, 2011
- Governor's Press Briefings before, during and after the storm, along with other public outreach, and use of social media by DEMHS
- Numerous statewide or regional conference calls with municipalities
- 29 agencies represented at the State EOC—500 participants at or supporting the EOC
- At least 36 local declarations of emergency reported
- 5 DEMHS Regional Offices staffed 24/7 to support 169 towns and two tribal nations
- 30 towns and 1 state facility evacuated certain threatened areas

Timeline and Summary of State Operations in Response to Storm Irene (cont'd)

- 3000 roads blocked; 1100 cell sites out
- 64,500 sandbags, 11,246 cots deployed
- State commodities staging area led by Military Dept. provided at least 87 towns and 1 tribal nation with 237,000 MREs; 907,000 bottles of waters 17 pallets of ice; generators; cases of infant formula and baby food;
- At least 48 CERT teams, 9 Medical Reserve Corps teams, 2 State Animal Response Teams, state Disaster Behavioral Response Team, and the state Urban Search and Rescue team, were activated;
- National Guard performed 207 missions, including rescue, logistics, commodities distribution, road clearance, and power generation, with at least 90 towns assisted

(J)

Michael Varney, Deputy Incident Commander
State Emergency Operations Center Tropical Storm Irene Activities
Department of Emergency Services and Public Protection
October 25, 2011

Good afternoon, my name is Mike Varney, and I served as the Deputy Incident Commander at the State Emergency Operations Center for Tropical Storm Irene. I am going to speak to you today about a number of Task Forces that were set up in order to manage the response to Irene. These Task Forces represent the collaboration, coordination, and integration that are the keys to effective emergency management and which is the statutory responsibility of DEMHS, and now DESPP.

First, over the past several years, the Department of Energy and Environmental Protection (DEEP), working in partnership with DEMHS, DOT, OPM, and the Department of Administrative Services (DAS), among others, developed a Debris Management Plan that included pre-incident contracts with debris removal and monitoring companies as well as an Interagency Debris Management Task Force. This Task Force had planned and trained together for many months prior to Irene, and it showed. The Task Force convened, took requests from state and local jurisdictions, and provided timely assistance as requested on a number of debris removal issues. As with every plan, the actual event threw some curveballs, so the Task Force, working with DAS, amended the contracts to meet the needs of the storm. A second pre-existing working group addressed Donations Management issues, under the guidance of DESPP/DEMHS fiscal staff working under a pre-existing agreement with the Adventist Community Services, a non-governmental organization that specializes in donations management nationally.

In addition to these pre-existing Task Forces, crucial issues developed and were addressed through a number of ad hoc Task Forces, including Urban Evacuation (mission to provide a quick response asset to meet immediate needs evacuation needs of urban cities particularly along the shoreline); Communications Restoration (mission to restore commercial communications such as phone and cable to the public); Commodities Distribution (mission to coordinate the purchasing, receiving, unloading, reapportionment, and distribution of commodities); and Fuel Management (mission to ensure availability of fuel for maintenance and emergency vehicles, and generators to support critical infrastructure). Each task force was led by subject matter experts in the area, and brought together other state, local, federal, and private partners to establish a management and communications system to address issues as they arose.

We intend to make these Task Forces a part of the State Response Framework (SRF), and to continue to have them meet and plan on an ongoing basis, to prepare for the next event. Thank you.

Statement of Bob Kenny
Division of Emergency Management and Homeland Security (DEMHS)
DEMHS Region 1 Coordinator
Department of Emergency Services and Public Protection
October 25, 2011

(K)

Good afternoon, my name is Bob Kenny, and I am the Region 1 Coordinator for the Division of Emergency Management and Homeland Security, Department of Emergency Services and Public Protection. Our Region 2 Coordinator retired recently, so I am also covering that region until a new Coordinator is hired. The following is a summary of some of the key points raised in the after action meetings that DEMHS has held with local emergency management and other public officials in these two regions.

First, there were a number of things that went very well within Region 1. The towns have been meeting as a Regional Emergency Planning Team for a number of years now, and the preparations paid off. Bridgeport, for example, sheltered close to 800 people, and conducted a mandatory evacuation of 13,000 households. Towns that had Community Emergency Response Teams (CERT) used them in a variety of ways, including to staff shelters. In Fairfield, pet shelters were co-located successfully with people shelters. Towns also used creative ways to keep their residents informed, including a phone-in hot line that was updated regularly. Most towns used their emergency notifications systems to notify citizens of preparedness activities, potential hazards, etc… New Canaan developed and posted a map showing real time road closures and hazards on their Facebook page. The town shared this tool with other towns in Region 1 and across the state through the DEMHS Regional Office. In Stratford, volunteers who had taken a "psychological first aid course" put to use what they had learned. Local emergency management directors who conducted planning meetings with town agencies before the storm, and worked well with their Chief Executive Officers, reported few problems. Towns consistently found that having the DEMHS Regional Office staffed and operational within the region was critical to the success of the response.

Areas of improvement were also identified, however. A major issue, particularly for smaller towns, was the "burn out" factor of the people staffing the local Emergency Operations Centers and shelters. Several key sheltering issues emerged, including: the need for behavioral health services; the need for a clear line between who needs to be sent to a hospital and who can stay in the shelter; the issue of home health care providers leaving their clients at a shelter, and; the need

for timely oxygen deliveries. Many of the towns expressed frustration with regard to the electric utilities or with phone service providers. There was also a request that the State evaluate the Web EOC process, in order to make that system more user-friendly and interactive in providing situational awareness. The towns in Region 1 also expressed the need for more staffing at the DEMHS Regional Office, although the assistance of FEMA and the Department of Correction staffers was much appreciated.

Turning to Region 2, some of the towns in this region were especially hard hit. Many of the towns, including East Haven, said that the DEMHS Regional Coordinator was the best asset they had. One town said that all of the training and planning that had taken place over the years really paid off. Overall, the towns felt that the conference calls, weather reports, and other communications to and from DEMHS were helpful. The volunteer state Urban Search and Rescue Team was deployed to help search homes that had been destroyed. Many of the towns enjoyed a good working relationship with the electric utility representative stationed in their Emergency Operations Center, but over and over again, towns said that it seemed that the Utility Rep in the EOC was unable to influence the priorities that the line crews were following. The CEOs of several towns declared states of emergency early, which among other things allowed towns to order staff in after hours, and also made it clear to the public that the storm was a serious event.

Suggested areas of improvement in Region 2 included revising the use of Web EOC and the Commodities Distribution Plan. It was noted that the Emergency Notification System, although useful, needs to be advertised more fully, so that more people provide more of their contact numbers, including cell phone numbers. Also, there has been some planning in the region for the establishment of regional shelters, but more work needs to be done in this area. The loss of power created a vulnerable population in need of electricity to run medical equipment. Communicating with residents when the power is out remains a challenge, but some towns used Boy Scouts or CERT teams to distribute information. For some towns, the role of the Red Cross could be more clearly defined.

Among the next steps that were suggested, one is to amend the CERT Standard Operating Procedure to make it clear that CERT can be used for mutual aid from town to town across the state, and another is to amend the State Commodities Distribution Plan to reflect a system that can be utilized realistically in the next storm. Thank you.

Statement of Anthony Scalora
Division of Emergency Management and Homeland Security (DEMHS)
DEMHS Region 4 Coordinator
Department of Emergency Services and Public Protection
October 25, 2011

(L)

The towns in DEMHS Region 4 showed a particularly strong ability to adapt and be resilient in responding to Tropical Storm Irene. Prior relationships developed at least in part through the Regional Emergency Planning Team, and the planning work that has been done ahead of time, paid off. As with other regions, communications with residents was difficult while the power was out. Some towns used signs located at strategic road intersections to tell people where showers, food, and water were available: others used Facebook. The local AM radio station out of Putnam broadcast updates and information. Again, town officials who met in advance were better prepared for the storm. Regional shelters were set up in various locations, allowing towns to conserve valuable staffing resources. In Pomfret, the local shelter and EOC had installed a generator received under a DEMHS grants program the week before the storm. The DEMHS Regional Office supported response across the region, but towns expressed a need for greater staffing, both before a disaster, to support planning, training and exercise, as well as during and after the disaster to support response and recovery. Because of the location of the State's nuclear power plant, Millstone, in Region 4, at least nine of the towns have functional needs cards that are filled out by residents who may need extra assistance in the Millstone Emergency Planning Zone..

Areas of improvement include sheltering for those residents who need electricity to meet their medical needs. As with many towns in other regions, DEMHS Region 4 towns set up charging stations to allow residents to re-charge electrical medical or communications equipment. Towns also set up places to take a shower or get a meal. Plainfield called their facility "Supper and Shower" and provided 1300 meals and showers in three days.

The high band radios that are kept in each town by DEMHS can serve as the only means of communication when other systems are down, but one or two towns experienced some difficulty in using the radios, and that is being addressed by DEMHS. At least one town had some difficulty in getting cots, and we need to review our statewide cot inventory and the process for distributing state-owned cots. Issues were raised with regard to the utilities—for example, local public works staff had to wait hours before lines were identified as live or not, and in some cases, disputes among the utilities as to which company owned a pole delayed work.

One possible next step identified by Region 4 was to create a federal Emergency Management Performance Grant (EMPG) program to support small projects, including small, possibly portable, generators. A tiered program has been done before and was very successful, because in smaller towns, a little bit of funding can really make a big difference in preparedness. This program would be in addition to the funding that most towns get annually to support the work of the local Emergency Management Director. Region 4 is also looking to engage the utilities more actively in the Regional Emergency Planning Team. An educational presentation on emergency management for local Chief Elected Officials and other key local officials will help to identify legal authorities and responsibilities among the town leaders. Thank you.

Division of Emergency Management and Homeland Security (DEMHS)
Department of Emergency Services and Public Protection
Statement Re: DEMHS Region 3 Tropical Storm Irene After Action Findings
Anthony Scalora -- October 25, 2011

A number of best practices were identified in the Region 3 after action meetings. First, Region 3's Regional Emergency Support Plan (which every region was required by DEMHS to create) includes a Regional Coordination Center (RCC), which helped to organize mutual aid among the towns. In particular, towns that were unable to travel easily to Rentschler Field to get commodities such as water and food were assisted by tractor trailer loads that were received and distributed by West Hartford. 46,000 bottles of water and 22,000 meals ready to eat (MREs) were distributed this way. The towns of Vernon, Tolland and Ellington have a mutual aid agreement for sheltering, which was used. East Haddam had a pre-existing agreement with local restaurants to buy food at cost in the event of power outages, which was implemented to help feed residents. In East Hartford, local public works crews went out with utility crews, which helped the clean- up work go faster. Again, planning meetings held with town officials ahead of the storm helped in managing the emergency, as did coordination between the local Emergency Management Director and the town's Chief Executive Officer. In an extraordinary effort, Johnson Memorial Hospital also used regional mutual aid, especially from the ESF 8 Public Health group, to evacuate 48 patients from the hospital after a power outage. As in the other regions, volunteer CERT teams were used for a variety of purposes, but if the disaster had been bigger, the need would have been greater and volunteer resources would likely have been insufficient.

Some of the areas for improvement identified by Region 3 include identifying resources to assist with residents with functional needs. The public must continue to be encouraged to take warnings seriously and to properly prepare in advance. Web EOC can be a good tool, but only if people are monitoring and inputting information in a timely manner at all levels of government. More education on both Web EOC and the use of the state Emergency Notification System is needed. More CERT training and recruitment of volunteers will help to increase staffing.

Next steps identified by Region 3 include working with the utilities to increase the involvement of the towns in determining priorities. Also, collaborative planning between state, local and non- governmental organizations with regard to shelters must continue. Thank you.

Statement of Thomas Vannini
Division of Emergency Management and Homeland Security (DEMHS)
DEMHS Region 5 Coordinator
Department of Emergency Services and Public Protection
October 25, 2011

As with the other regions, Region 5 towns that pre-planned, and met as a team before the storm, were able to respond well to Irene. Wolcott, for example, reviewed their Local Emergency Operations Plan with all key town officials in advance of the storm. Each town in the state is required to submit its Local Emergency Operations Plan annually to DEMHS for review. For Ridgefield, the Everbridge Emergency Notification System became the Number 1 means of communication with residents. The Woodbury EMD printed a one-page daily newsletter and left copies at businesses in the community as they re-opened and became a draw to the townspeople. Goshen maintains a list of self-identified people with functional needs, and provided them with a phone number to call if they needed help. As in other regions, town-to-town mutual aid was key. New Fairfield ran the commodities operations for 7 towns. Plymouth had all municipal departments listen in on the state-wide conference calls, so that everyone had the same situational awareness. Again, across the region, volunteers were critical.

Also as with other regions, the towns expressed their appreciation for the DEMHS Regional Office and Coordinator, and the continued need to support our work. The towns also identified the need to continue to educate Chief Elected Officials on their role, the role of the local EMD, and the importance of a coordinated response. Issues were raised with regard to the Commodities Distribution Plan, such as delays and the need to close the communications loop. Frustration was expressed with regard to the interaction with the utilities, particularly a lack of communication between the CLP EOC liaison and the crews in the field. There was a sense that the utilities were not listening to the towns' priorities. Finally, communications between the Regional Office and the State EOC could be improved with better feedback to the region on responses to requests.

Some of the next steps from Region 5 include enhancing public messaging to be ready to be on your own for more than 72 hours, at least with regard to power outages. The public expectation must be realistic. Web EOC can be made more interactive and accessible. The relationship between shelters, nursing homes, and hospitals needs to be more clearly defined in order to better address the needs of residents who need electricity for medical needs, but little or no medical care. Thank you.

Brenda Bergeron, Principal Attorney
Division of Emergency Management and Homeland Security
Department of Emergency Services and Public Protection
Recovery Activities Post Tropical Storm Irene
October 25, 2011

Good afternoon, my name is Brenda Bergeron and I am the attorney for DEMHS within the Department of Emergency Services and Public Protection. I am going to speak on the transition from response efforts to recovery efforts in connection with Tropical Storm Irene. As the storm subsides, a great deal of work is just beginning.

Within DEMHS, we have established a Declarations Team or Task Force to address issues related to a possible request by the Governor for a Presidential Disaster Declaration. The group is made up of DEMHS planners, fiscal and legal staff, and other employees who are subject matter experts in dealing with federal disaster assistance. In the case of Irene, the State received two Presidential disaster declarations. The first was a pre-landfall emergency declaration based on the potential severity of the storm, which gave the state access to direct federal assistance and also federal financial assistance for certain emergency protective measures. The second declaration request successfully filed by the Governor was for an expedited Presidential major disaster declaration. The Governor requested and received a declaration for all 8 counties to receive FEMA's Public Assistance (PA) for local, tribal, and state agencies and eligible private non -profit organizations, as well as Individual Assistance and Small Business Administration loans for the state's residents and businesses. Working with the state community colleges and towns, DEMHS and FEMA set up dozens of Disaster Recovery Centers for residents. To date, over 7600 residents have applied for Individual Assistance, and we anticipate 300 PA applications.

In addition, the State will receive Hazard Mitigation Program funds that will allow for mitigation projects to prevent future damages. Requests for Presidential declarations require a concerted effort at the state and local level, working with FEMA, to collect and prepare preliminary damage assessments that are supported and verified by documentation required by FEMA. The IA program has already disbursed almost $6.3 million in individual assistance, and SBA loans are at over $4 million. Conservative estimates for the PA or Public Assistance program are in the range of $40 to $70 million dollars reimbursement back to state and local government and private non-profits. The Hazard Mitigation program is a percentage of the total PA program, and may be in the range of $7 to 9 million.

As part of the recovery process, and to continue to plan for the next big event, DEMHS has organized a Recovery Task Force, made up of representatives of state and local government, as well as non-governmental organizations and the private sector. The goal of this group is twofold. The first short term goal is to try to address any gaps in basic assistance that may be experienced by Connecticut residents as a result of Irene. The Recovery Task Force will operate as an email subject matter expert group on possible assistance outside of the FEMA disaster funds. The second longer term goal is to provide a forum for state, local, and private sector leaders to discuss the planning and policy issues that arise as an area recovers from a major catastrophe. These issues are best considered well ahead of the disaster, and this group will help to achieve that goal. Thank you.

William J. Hackett, State Emergency Management Director
Division of Emergency Management and Homeland Security
Department of Emergency Services and Public Protection
Action Steps
October 25, 2011

You have just heard a sampling of the best practices and lessons learned that we collected when we met with the local Emergency Management Directors and Officials from across the state. You heard that regional emergency support plans that are in place in each DEMHS region successfully led to increased mutual aid, including the establishment of several regional shelters. Over and over again, we heard that the pre-planning that took place before the storm helped in the management of the response. The DEMHS Regional Coordinator and the Regional Office are critical links between the state and the municipalities and the local officials were loud and clear across the state that the DEMHS regional office system must be maintained and enhanced. The DEMHS Regional Offices also support the Regional Emergency Planning Teams, which have been empowered to plan and prepare on a multi-town basis, including providing efficient and effective use of federal grant money to meet the unique needs of each DEMHS Region.

It is the nature of emergency management that all plans need to be adjusted as the incident unfolds, and we will be forming working groups with local, state and federal partners to review the State's real-time WebEOC or other interactive platform capabilities, as well as the State Commodities Plan, Cots Distribution, and Sheltering. The DEMHS Advisory Council has formed a Mass Care Working Group to help identify issues and provide guidance to municipalities. The state Emergency Notification System was used by many towns to keep the public informed of road closures and where to find food and water. The state ENS system was used by municipalities over 250 times, and reached almost 2 million people. There are ways to make this system even better, and the ENS work group will be meeting to consider improvements. The Task Forces that Mike Varney has described should continue to meet and to work with municipalities and other partners to address issues raised in Irene. We will continue to develop private sector partnerships as well.

At the State EOC, we will work to enhance communications between the EOC and regional offices, particularly with regard to the status of requests for assistance.

At the municipal level, one of the best practices used almost everywhere in the state were volunteers such as the Community Emergency Response Teams

(CERTs), Medical Reserve Corps (MRC), and State Animal Response Teams. DEMHS helps to train and/or fund these teams through federal grants, and that work must continue. DEMHS is also working to continue to professionalize and recognize the role of the local Emergency Management Director in Connecticut. DEMHS will continue to provide guidance to local EMDs and municipal Chief Executive Officers on the legal responsibilities during an emergency, and to encourage collaboration.

We must continue to train and exercise for all hazards. Over the past six years, state and local officials have received National Incident Management System (NIMS) training, which creates a standardized incident command structure across the state. We conducted hurricane preparedness activities all year long, all through the state, and these will continue. In effect, Tropical Storm Irene was a comprehensive full scale exercise for the whole state. We will build on these lessons learned to be ready for the inevitable next time. State and local government officials cannot prepare alone. The public must take preparedness education seriously, and heed the warnings and advice that now reaches them in so many creative ways.