HURREVAC Modernization

An overview of enhancements for the 2015 hurricane season

MEMA Hurricane Preparedness Conference May 28, 2015

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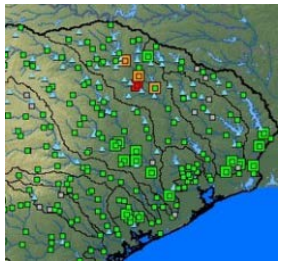
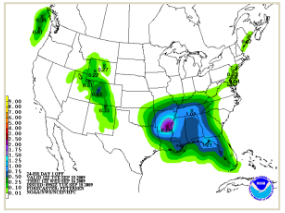
What is HURREVAC?

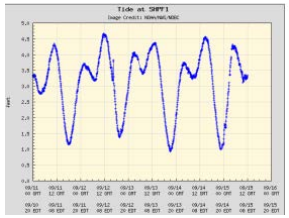
HURREVAC is the National Hurricane Program's decision support tool for emergency management

- Tracks storms worldwide using forecasts from the National Hurricane Center and other weather forecast offices
- Couples these real-time forecasts with results of FEMA/USACE Hurricane Evacuation Studies to **assist the local emergency manager in determining evacuation timing**

Forecast Data Sources

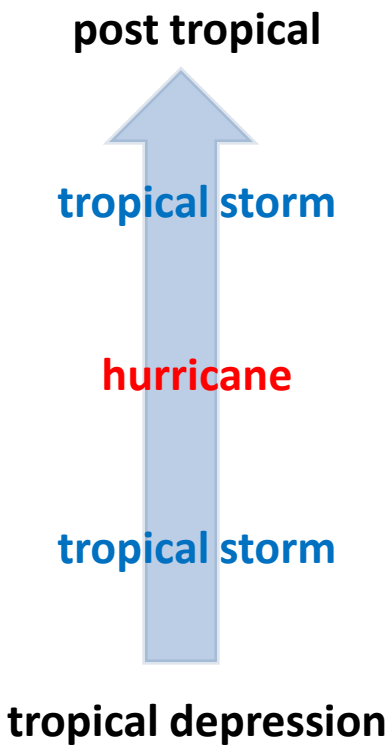






- NOAA's National Hurricane Center (NHC) and various National Weather Service offices
- River Forecast Centers
- Weather Prediction Center
- NOAA – tide gages
- Central Pacific Hurricane Center (CPHC)
- US Navy's Joint Typhoon Warning Center (JTWC)

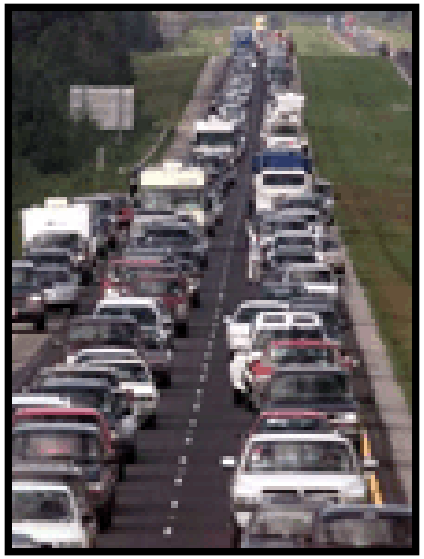
National Hurricane Center



- forecast advisory packages at 6-hour intervals for the duration of a tropical cyclone
- 2 or 3-hourly intermediate advisories when storm is near land with watches and warnings issued

Hurricane Evacuation Study Clearance Times

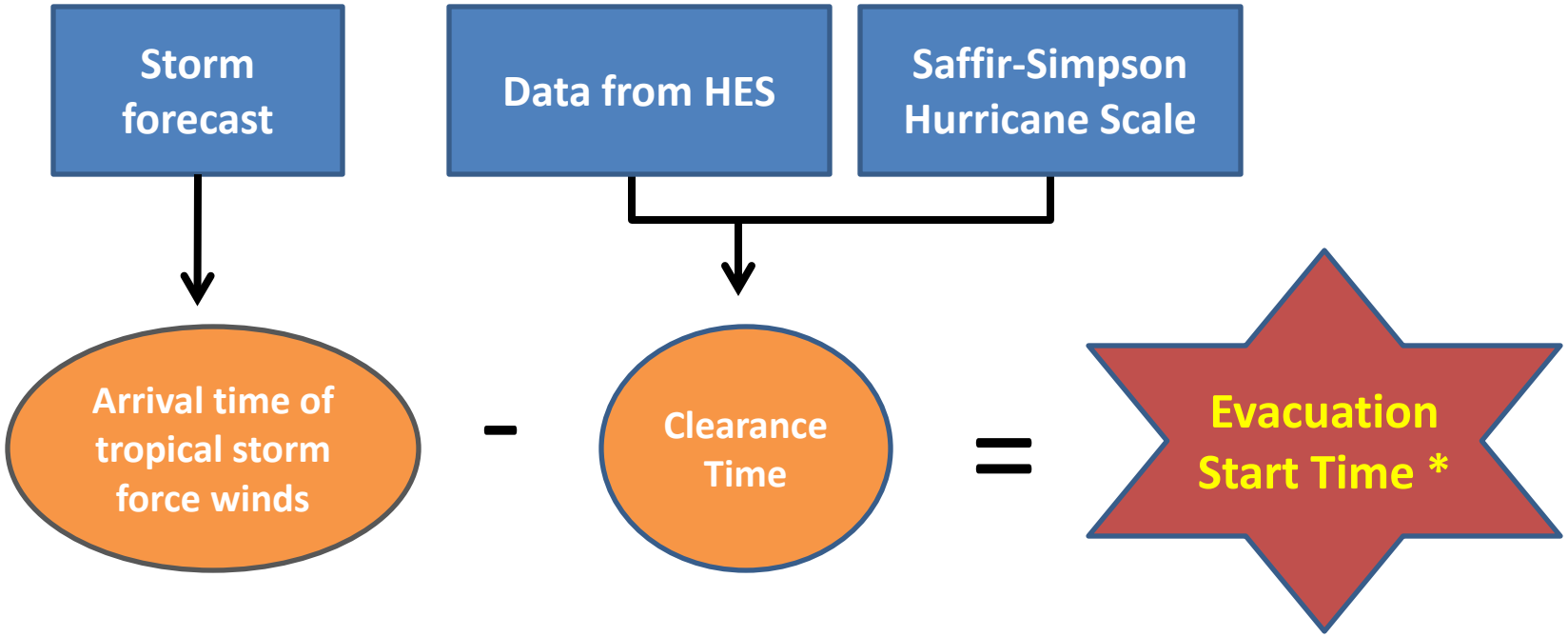
The amount of time it will take to evacuate an area, from the time the first vehicle leaves until the last vehicle reaches an assumed point of safety.



Clearance times vary depending on:

- Scenarios
- Storm intensity
- Tourist Occupancy
- Response

Evacuation Timing in HURREVAC

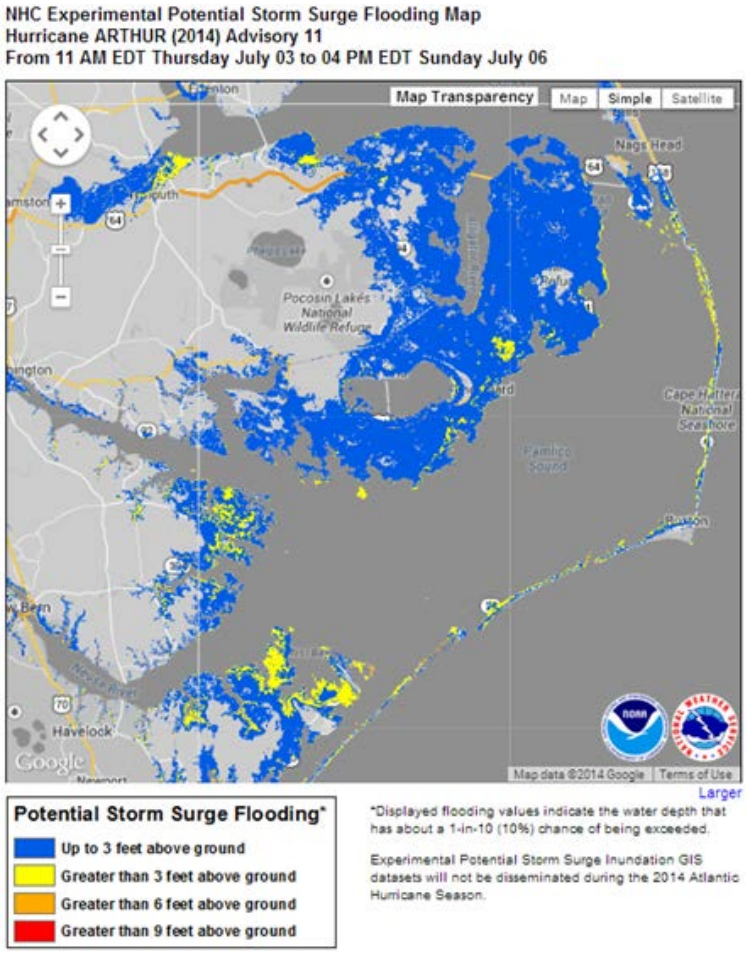


* Necessity of evacuation should not be inferred by this calculation. HURREVAC only provides timing guidance on how soon an evacuation must start IF A DECISION TO EVACUATE IS MADE. Evacuation decisions are complex and require consultation with emergency management and NWS officials.

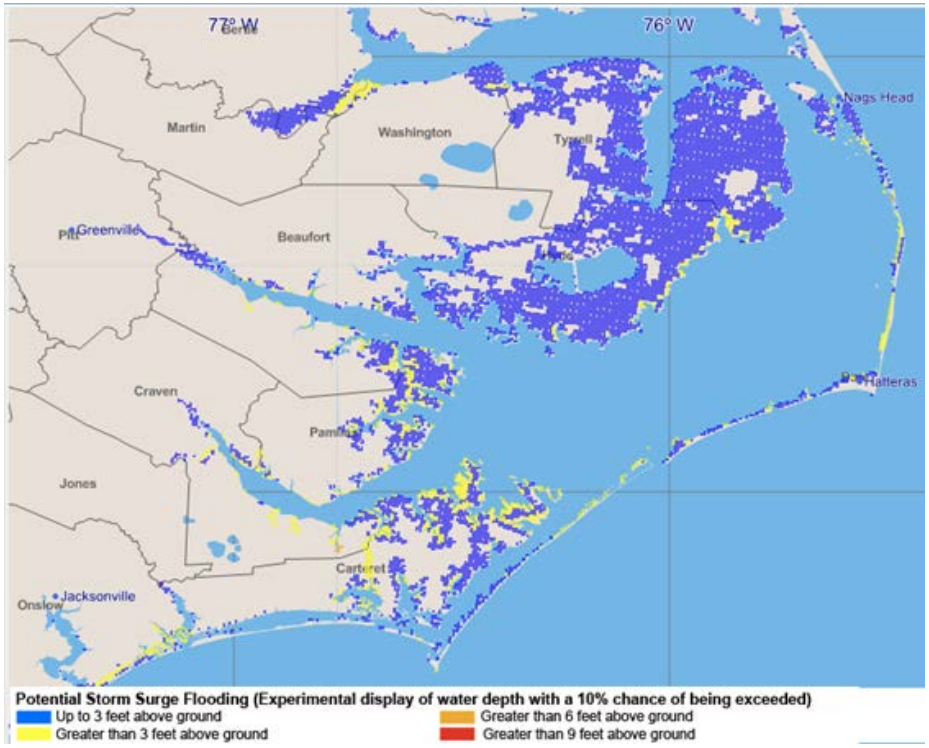
HURREVAC Enhancements for 2015

- **P-Surge** with identical color scheme as NHC Potential Storm Surge Flooding Map
- Expansion of **POINTS OF INTEREST** reporting
- New **SYSTEM MESSAGING CAPABILITY** to notify users about special situations
- Restoration of the “error ellipse” or **POTENTIAL LOCATION TOOL** for visualizing timing uncertainty
- Inclusion of **GRAPHICAL TROPICAL WEATHER OUTLOOKS**
- Ability to assign and use **GROUPS OF TIMELINE ITEMS**
- New **RADAR** layer with live updates every 10 minutes
- Much speedier graphics for wind probability and storm features

Storm Surge Probabilities

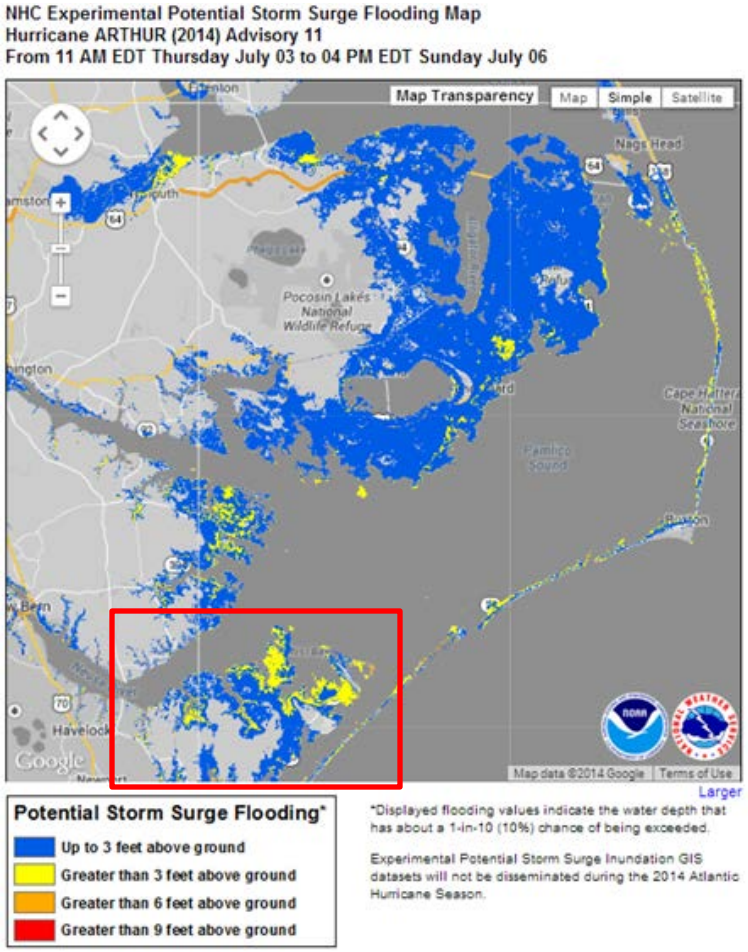


NHC Potential Storm Surge Flooding Map

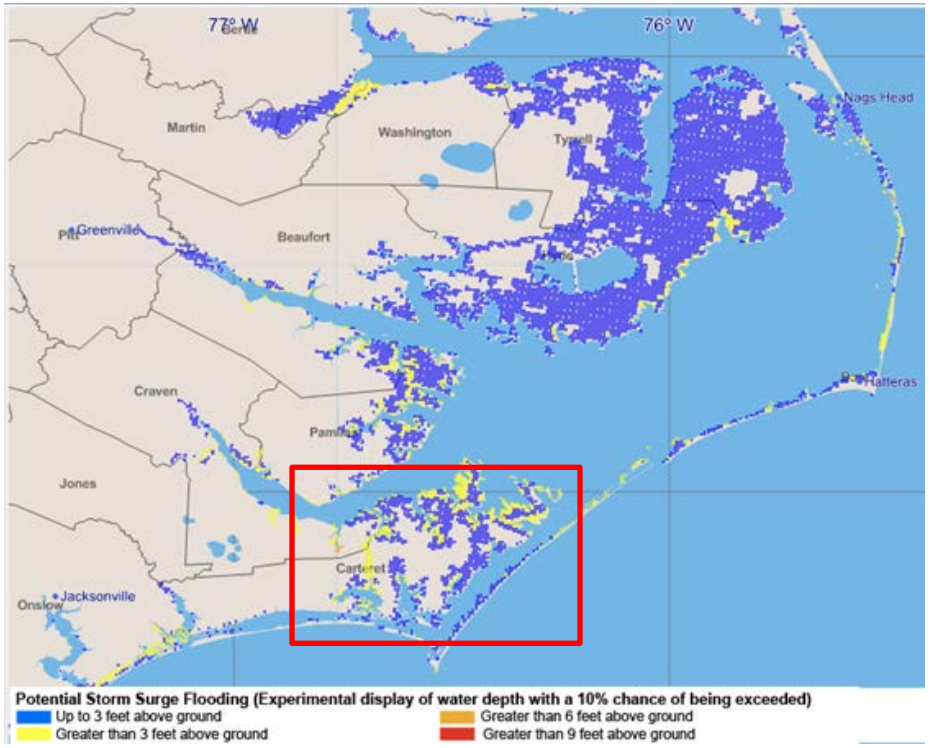


P-Surge in HURREVAC with identical color scheme for comparison purposes

Storm Surge Probabilities



NHC Potential Storm Surge Flooding Map



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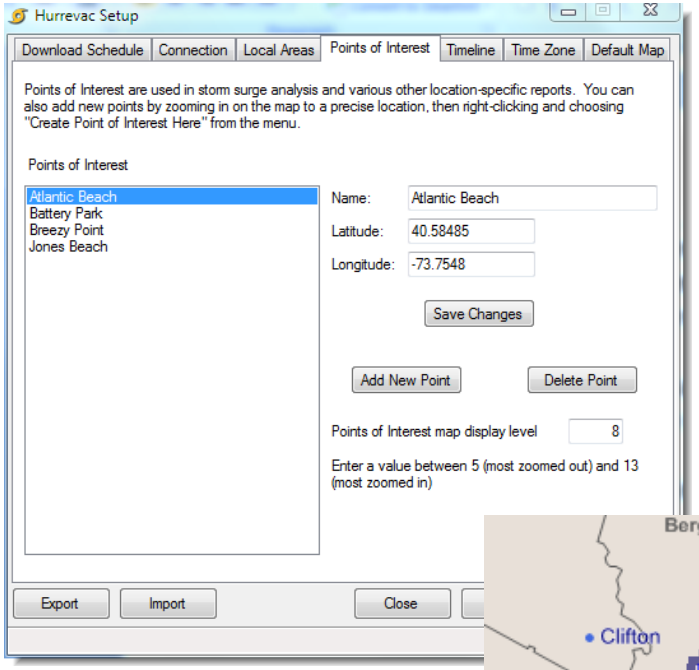
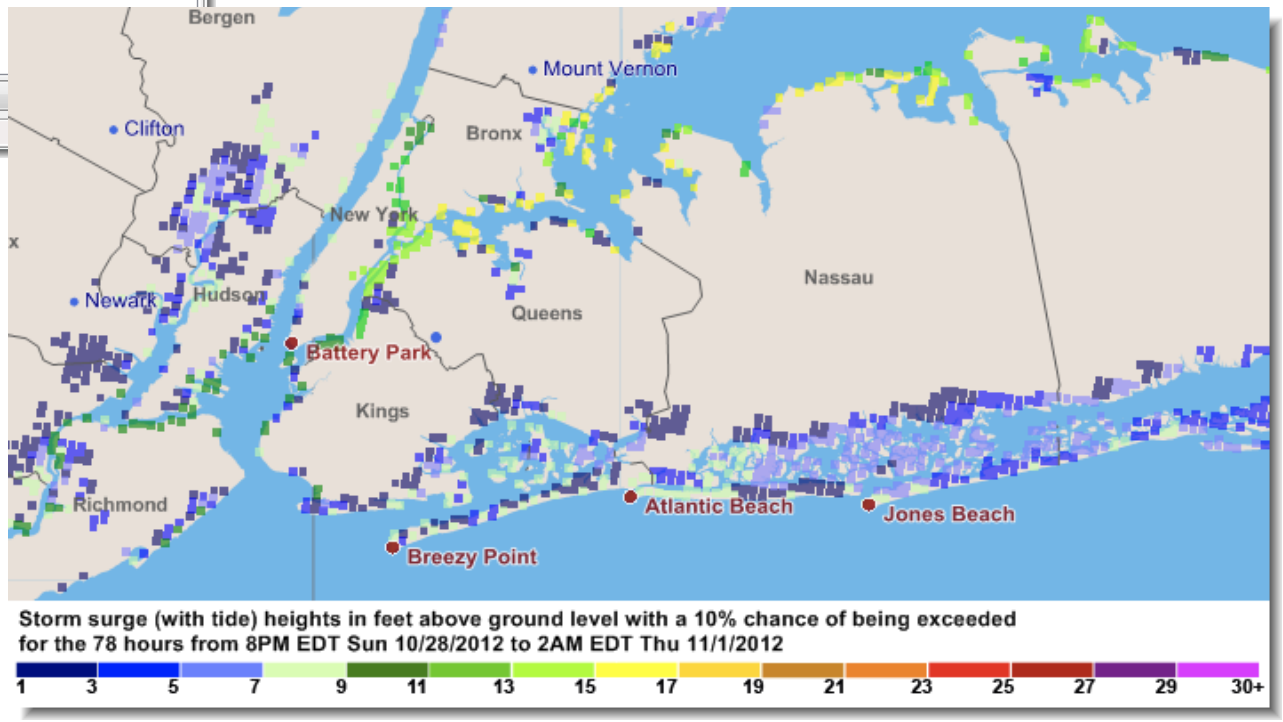


Surge reporting handled through user-input Points of Interest



Storm Surge (With Tide) in Feet Above Ground Level with a 10% Chance of Exceedance for the 78 hours from 8 PM 10/28/2012 to 2 AM 11/1/2012

Storm Surge Details for All Affected Points of Interest

Meaning Of Report

P-Surge 2.0 from NHC shows water depth in height above ground level that has at least a 1 in 10 chance of being exceeded. Tidal fluctuation is considered as well in this modeling.

Cautionary Note:

This data is probabilistic. Water depths shown are on the high end of the range of possible scenarios for this storm and are unlikely to be exceeded.

Point of Interest	Peak Depth	Peak Time Period	Report	Graph
Breezy Point	9 ft	From 4 PM Mon to 10 PM Mon	Individual Report	Individual Graph
Jones Beach	8 ft	From 4 PM Mon to 10 PM Mon	Individual Report	Individual Graph
Atlantic Beach	8 ft	From 4 PM Mon to 10 PM Mon	Individual Report	Individual Graph

Storm Surge (With Tide) in Feet Above Ground Level with a 10% Chance of Exceedance for the 78 hours from 8 PM 10/28/2012 to 2 AM 11/1/2012

Storm Surge Details for Breezy Point (Lat: 40.546 Lon: -73.938)

Date/Time (hr)	Incremental Depth	Cumulative Depth	Incremental Time Period	Cumulative Time Period
10/28/2012 20EDT	2 ft	2 ft	From 8 PM Sun to 2 AM Mon	From 8 PM Sun to 2 AM Mon (6 hrs)
10/29/2012 02EDT	3 ft	3 ft	From 2 AM Mon to 8 AM Mon	From 8 PM Sun to 8 AM Mon (12 hrs)
10/29/2012 08EDT	3 ft	3 ft	From 8 AM Mon to 2 PM Mon	From 8 PM Sun to 2 PM Mon (18 hrs)
10/29/2012 14EDT	8 ft	8 ft	From 2 PM Mon to 8 PM Mon	From 8 PM Sun to 8 PM Mon (24 hrs)
10/29/2012 20EDT	9 ft	9 ft	From 8 PM Mon to 2 AM Tue	From 8 PM Sun to 2 AM Tue (30 hrs)
10/30/2012 02EDT	8 ft	9 ft	From 2 AM Tue to 8 AM Tue	From 8 PM Sun to 8 AM Tue (36 hrs)
10/30/2012 08EDT	7 ft	9 ft	From 8 AM Tue to 2 PM Tue	From 8 PM Sun to 2 PM Tue (42 hrs)
10/30/2012 14EDT	2 ft	9 ft	From 2 PM Tue to 8 PM Tue	From 8 PM Sun to 8 PM Tue (48 hrs)
10/30/2012 20EDT	2 ft	9 ft	From 8 PM Tue to 2 AM Wed	From 8 PM Sun to 2 AM Wed (54 hrs)
10/31/2012 02EDT	2 ft	9 ft	From 2 AM Wed to 8 AM Wed	From 8 PM Sun to 8 AM Wed (60 hrs)
10/31/2012 08EDT	2 ft	9 ft	From 8 AM Wed to 2 PM Wed	From 8 PM Sun to 2 PM Wed (66 hrs)
10/31/2012 14EDT	0 ft	9 ft	From 2 PM Wed to 8 PM Wed	From 8 PM Sun to 8 PM Wed (72 hrs)
10/31/2012 20EDT	0 ft	9 ft	From 8 PM Wed to 2 AM Thu	From 8 PM Sun to 2 AM Thu (78 hrs)

Storm Surge (With Tide) in Feet Above Ground Level with a 10% Chance of Exceedance for the 78 hours from 8 PM 10/28/2012 to 2 AM 11/1/2012

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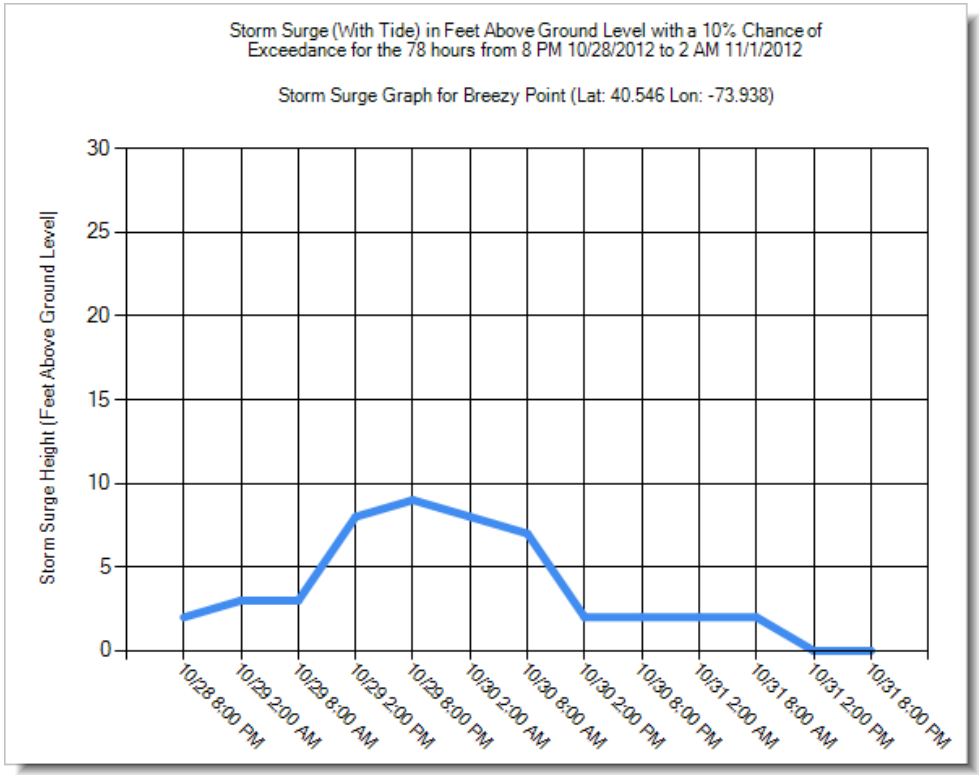
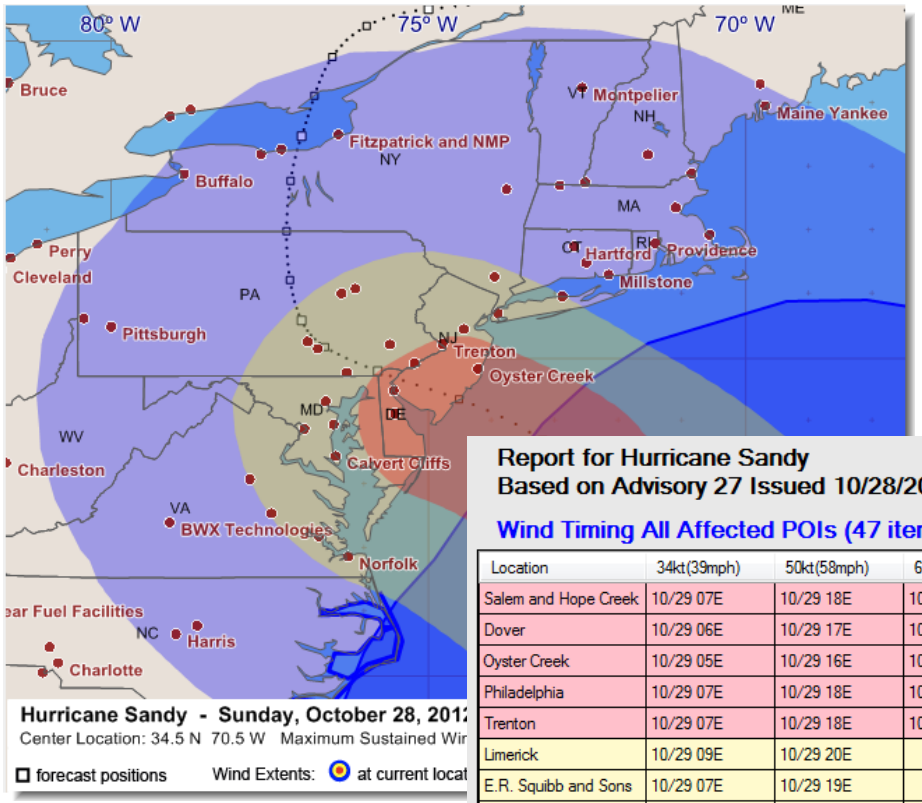


Points of Interest



ALL report types can now be run on the basis of either polygons (counties) or point locations

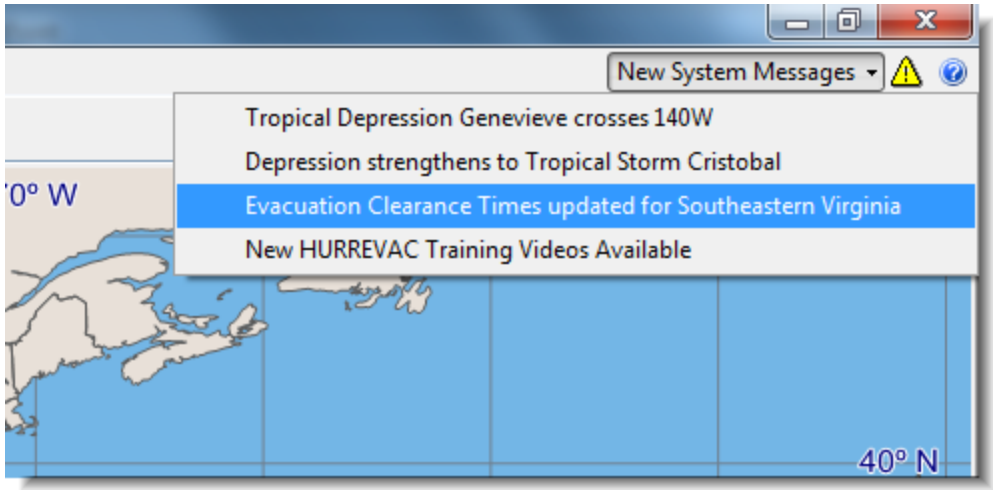
Report for Hurricane Sandy
Based on Advisory 27 Issued 10/28/2012 11 PM EDT (Old Advisory)

Wind Timing All Affected POIs (47 items)

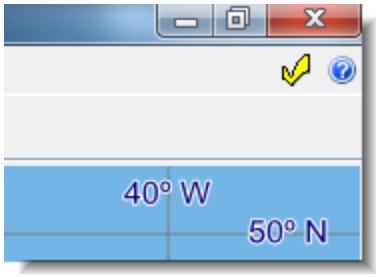
Location	34kt(39mph)	50kt(58mph)	64kt(74mph)	64kt END (dur)	50kt END (dur)	34kt END (dur)	Peak Wind
Salem and Hope Creek	10/29 07E	10/29 18E	10/30 01E	10/30 07E (6)	10/30 14E (20)	10/31 08E (49)	66kt (76mph) 10/30 03E
Dover	10/29 06E	10/29 17E	10/30 00E	10/30 07E (7)	10/30 13E (20)	10/31 07E (49)	66kt (76mph) 10/30 02E
Oyster Creek	10/29 05E	10/29 16E	10/29 23E	10/30 05E (6)	10/30 11E (19)	10/31 07E (50)	66kt (76mph) 10/30 01E
Philadelphia	10/29 07E	10/29 18E	10/30 02E	10/30 07E (5)	10/30 14E (20)	10/31 09E (50)	65kt (75mph) 10/30 02E
Trenton	10/29 07E	10/29 18E	10/30 02E	10/30 04E (2)	10/30 13E (19)	10/31 09E (50)	64kt (74mph) 10/30 02E
Limerick	10/29 09E	10/29 20E			10/30 15E (19)	Continuing	62kt (71mph) 10/30 02E
E.R. Squibb and Sons	10/29 07E	10/29 19E			10/30 11E (16)	Continuing	62kt (71mph) 10/30 02E
Annapolis	10/29 08E	10/29 20E			10/30 09E (13)	Continuing	61kt (70mph) 10/30 02E
Peach Bottom	10/29 11E	10/29 21E			10/30 16E (19)	Continuing	61kt (70mph) 10/30 02E
Baltimore	10/29 10E	10/29 21E			10/30 13E (16)	Continuing	60kt (69mph) 10/30 02E
Calvert Cliffs	10/29 07E	10/29 19E			10/30 08E (13)	Continuing	60kt (69mph) 10/30 02E
Washington D.C.	10/29 10E	10/29 21E			10/30 07E (10)	Continuing	58kt (67mph) 10/30 02E
New York	10/29 06E	10/29 19E			10/30 09E (14)	Continuing	58kt (67mph) 10/30 01E
Three Mile Island	10/29 14E	10/29 23E			10/30 18E (19)	Continuing	56kt (64mph) 10/30 02E
Harrisburg	10/29 15E	10/30 00E			10/30 08E (8)	Continuing	55kt (63mph) 10/30 02E
Safety Light Corp.	10/29 15E	10/30 01E			10/30 06E (5)	Continuing	54kt (62mph) 10/30 02E
Susquehanna	10/29 15E	10/30 01E			10/30 08E (7)	Continuing	53kt (61mph) 10/30 02E
Surry	10/29 05E	10/29 23E			10/30 04E (5)	Continuing	53kt (61mph) 10/30 01E

System Messaging Capability

- Intended to communicate information when special situations arise
- A short text-formatted message, sometimes accompanied by a hyperlink for further information
- Messages will be authored by HURREVAC support personnel or program administrators in the National Hurricane Program



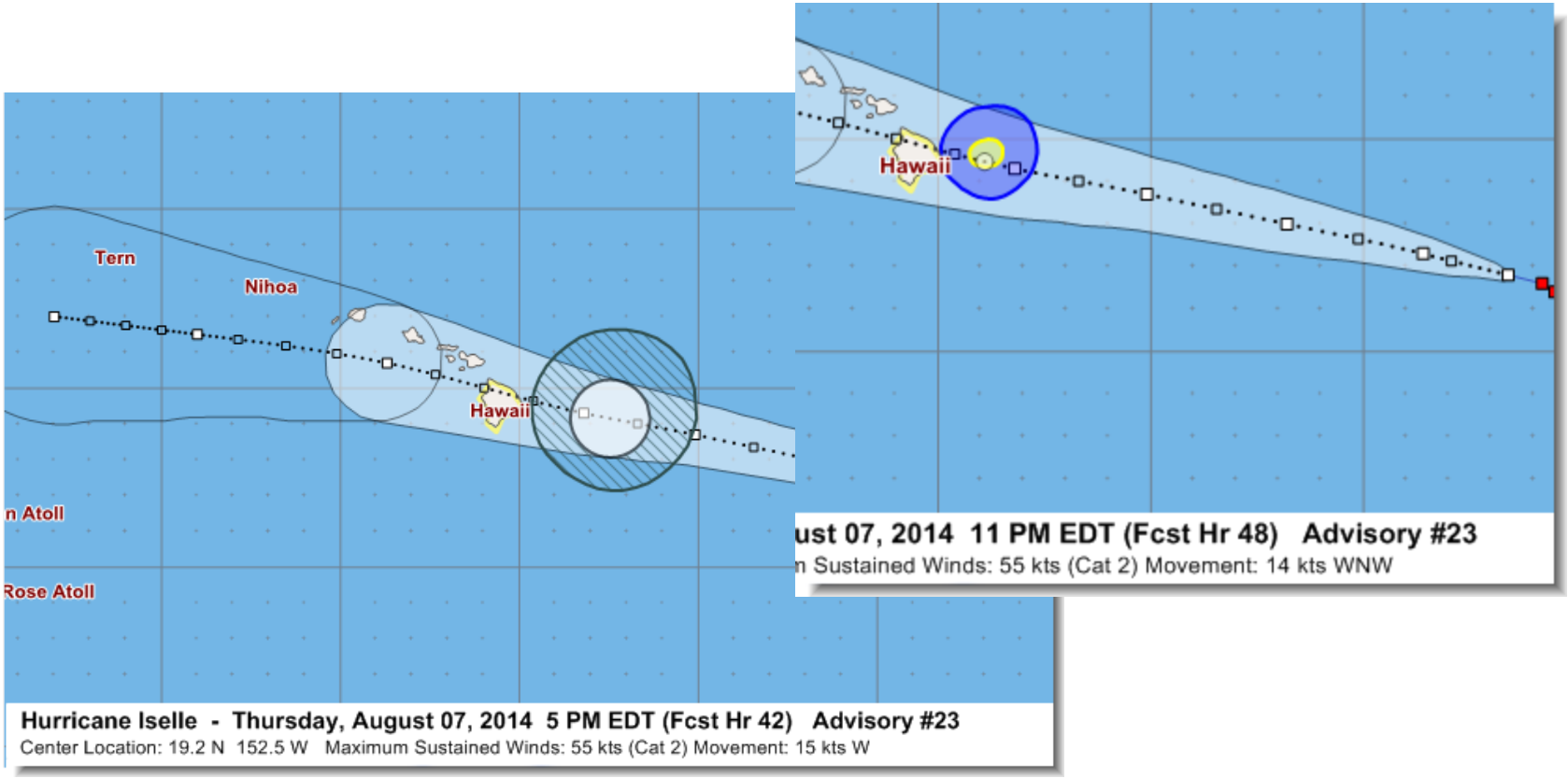
New messages waiting to be read



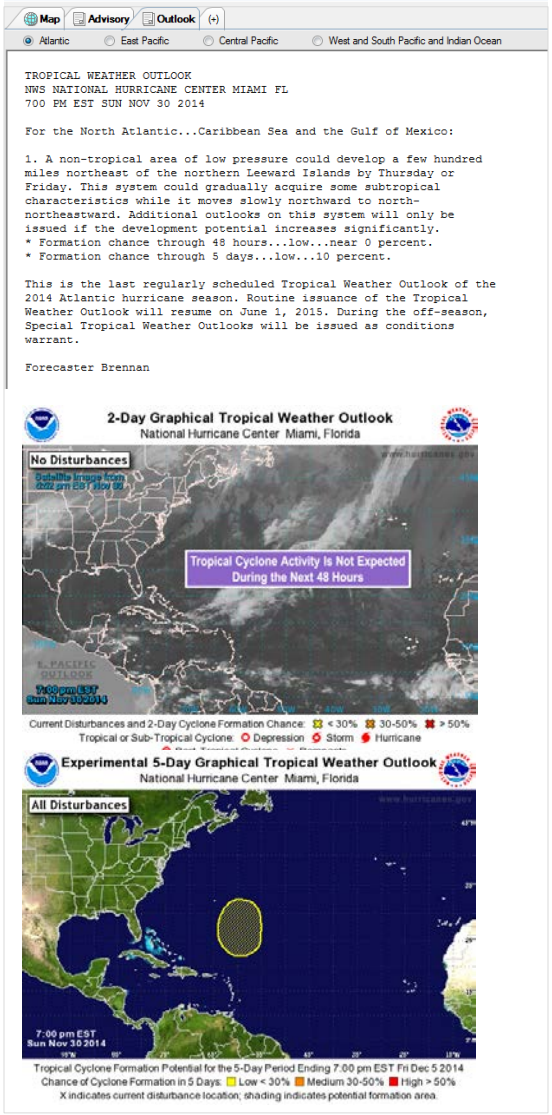
No new messages

Potential Location Tool

- Formerly in HURREVAC as the “Error Ellipse”
- Allows timing with a measure of forecast uncertainty

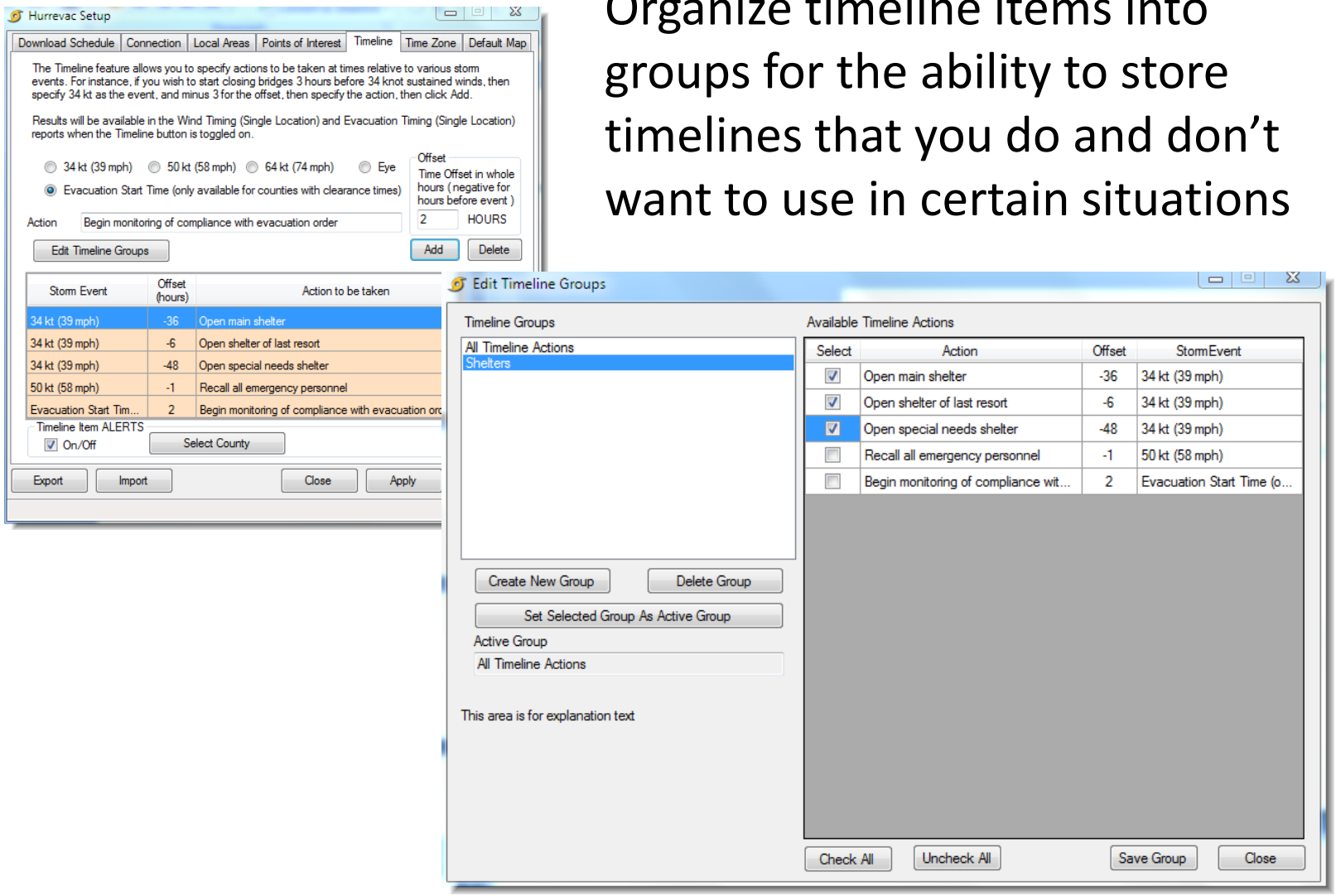


Graphical Tropical Weather Outlooks



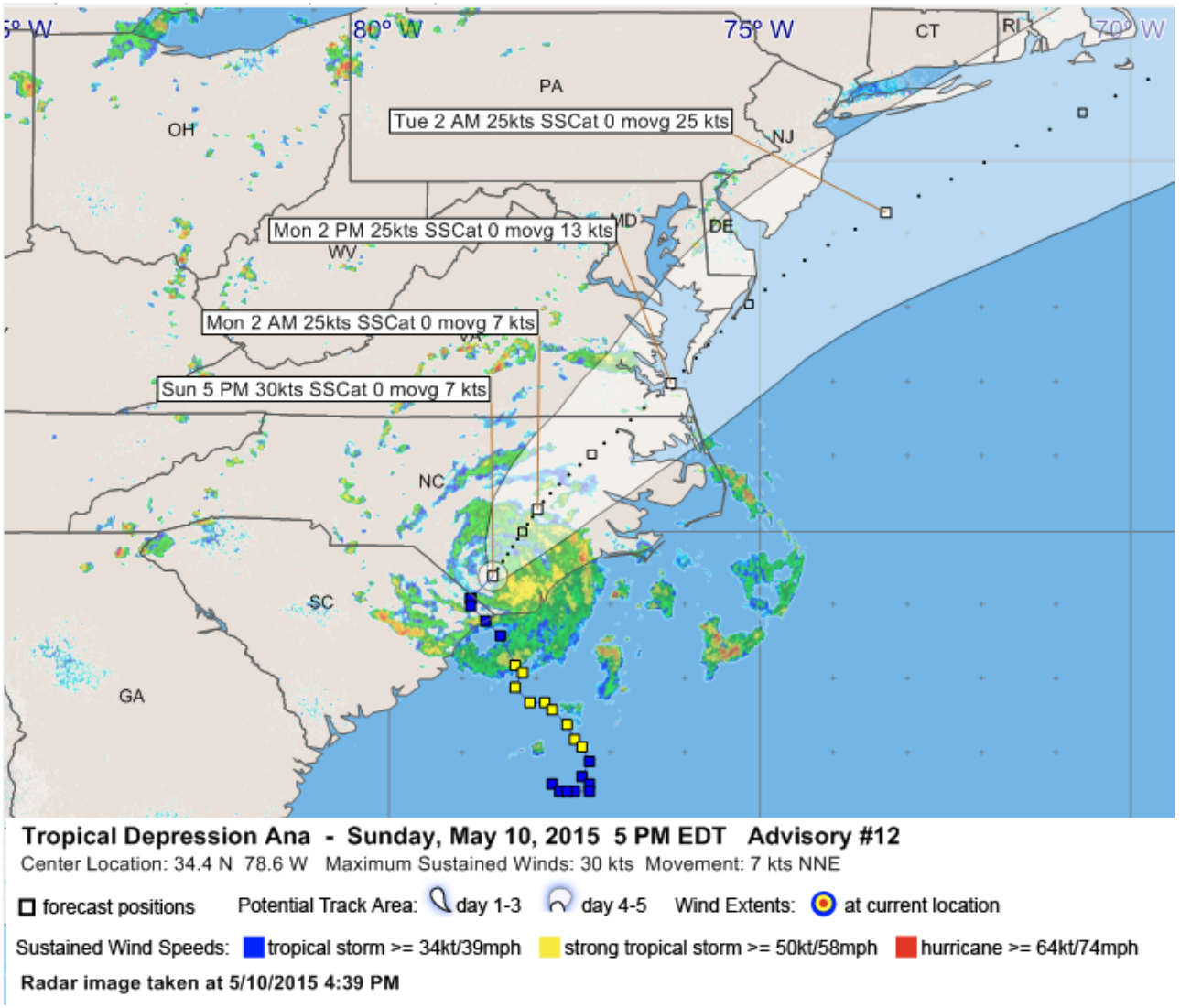
- Graphics for 2 and 5 day outlooks included along with the text discussion for a basin
- Radio buttons for switching basins

Timeline Groups



Organize timeline items into groups for the ability to store timelines that you do and don't want to use in certain situations

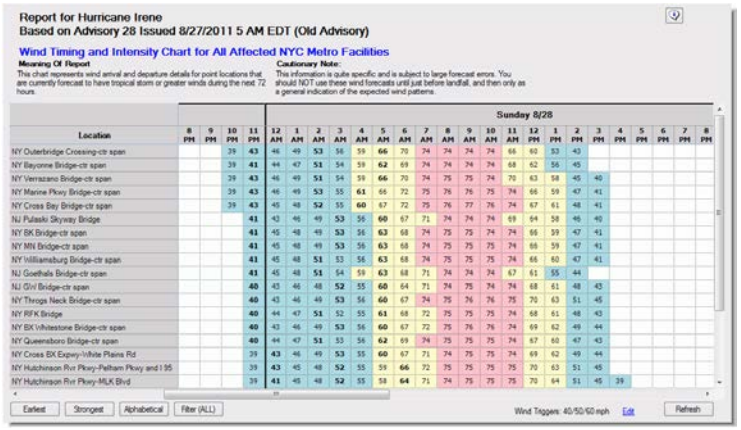
Weather Radar



HURREVAC Enhancements for 2015

To address Metro New York City needs

- A revised New York/Northern New Jersey Risk Profile
- Export of risk profile elements into the Hurricane Forecast Summary-- an NYC OEM executive briefing document in Excel format
- Expanded reporting capabilities for transportation facilities


Report for Hurricane Irene
Based on Advisory 28 Issued 8/27/2011 5 AM EDT (Old Advisory)

Wind Timing and Intensity Chart for All Affected NYC Metro Facilities

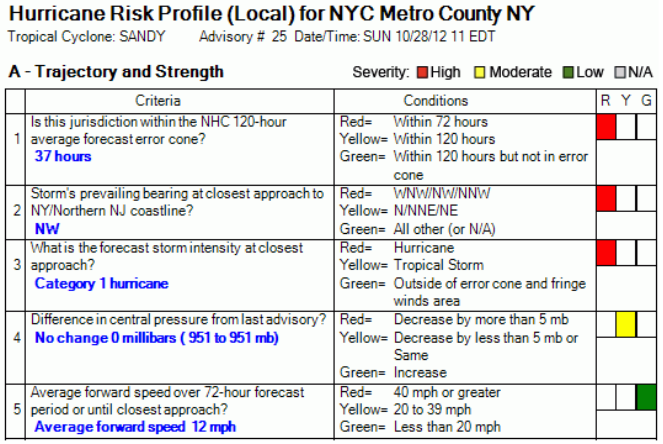
Meaning Of Report
This chart represents wind arrival and departure details for point locations that are currently forecast to have tropical storm or greater winds during the next 72 hours.

Cautionary Note:
This information is quite specific and is subject to large forecast errors. You should NOT use these wind forecasts until just before landfall, and then only as a general indication of the expected wind patterns.

Sunday 8/28

Location	8 PM	9 PM	10 PM	11 PM	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM
NY Outerbridge Crossing-ctr span			39	43	46	49	53	56	59	66	70	74	74	74	74	66	60	53	43						
NY Bayonne Bridge-ctr span			39	41	44	47	51	54	59	62	69	74	74	74	74	68	62	56	45						
NY Verrazano Bridge-ctr span			39	43	46	49	51	54	59	66	70	74	75	75	74	70	63	58	45	40					
NY Marine Pkwy Bridge-ctr span			39	43	46	49	53	55	61	66	72	75	76	76	75	74	66	59	47	41					
NY Cross Bay Bridge-ctr span			39	43	45	48	52	55	60	67	72	75	76	77	76	74	67	61	48	41					
NJ Pulaski Skyway Bridge				41	43	46	49	53	56	60	67	71	74	74	74	69	64	58	46	40					
NY BK Bridge-ctr span				41	45	48	49	53	56	63	68	74	75	75	74	74	66	59	47	41					
NY MN Bridge-ctr span				41	45	48	49	53	56	63	68	74	75	75	75	74	66	59	47	41					
NY Williamsburg Bridge-ctr span				41	45	48	51	53	56	63	68	74	75	75	75	74	66	60	47	41					
NJ Goethals Bridge-ctr span				41	45	48	51	54	59	63	68	71	74	74	74	67	61	55	44						
NJ GW Bridge-ctr span				40	43	46	48	52	55	60	64	71	74	75	74	74	68	61	48	43					
NY Throgs Neck Bridge-ctr span				40	43	46	49	53	56	60	67	74	75	76	76	75	70	63	51	45					
NY RFK Bridge				40	44	47	51	52	55	61	68	72	75	75	75	74	68	61	48	43					
NY BX Whitestone Bridge-ctr span				40	43	46	49	53	56	60	67	72	75	76	76	74	69	62	49	44					
NY Queensboro Bridge-ctr span				40	44	47	51	53	56	62	69	74	75	75	75	74	67	60	47	43					
NY Cross BX Expwy-White Plains Rd				39	43	46	49	53	55	60	67	71	74	75	75	74	69	62	49	44					
NY Hutchinson Rvr Pkwy-Pelham Pkwy and I 95				39	43	45	48	52	55	59	66	72	75	75	75	75	70	63	51	45					
NY Hutchinson Rvr Pkwy-MLK Blvd				39	41	45	48	52	55	58	64	71	74	75	75	75	70	64	51	45	39				

Earliest | Strongest | Alphabetical | Filter (ALL) | Wind Triggers: 40/50/60 mph | Edit | Refresh


Hurricane Risk Profile (Local) for NYC Metro County NY

Tropical Cyclone: SANDY Advisory # 25 Date/Time: SUN 10/28/12 11 EDT

A - Trajectory and Strength Severity: High Moderate Low N/A

	Criteria	Conditions	R	Y	G
1	Is this jurisdiction within the NHC 120-hour average forecast error cone? **37 hours**	Red= Within 72 hours Yellow= Within 120 hours Green= Within 120 hours but not in error cone			
2	Storm's prevailing bearing at closest approach to NY/Northern NJ coastline? **NW**	Red= WNW/NW/NNW Yellow= N/NNE/NE Green= All other (or N/A)			
3	What is the forecast storm intensity at closest approach? **Category 1 hurricane**	Red= Hurricane Yellow= Tropical Storm Green= Outside of error cone and fringe winds area			
4	Difference in central pressure from last advisory? **No change 0 millibars (951 to 951 mb)**	Red= Decrease by more than 5 mb Yellow= Decrease by less than 5 mb or Same Green= Increase			
5	Average forward speed over 72-hour forecast period or until closest approach? **Average forward speed 12 mph**	Red= 40 mph or greater Yellow= 20 to 39 mph Green= Less than 20 mph			

Schedule

HURREVAC 2015 Season Release

- June 1, 2015 is the target distribution date for version 1.5.1
- When ready, an email announcement will be send to all 12,000 registered users
- Training sessions coordinated by the State
- Live and recorded webinars – basic through advanced
- Reference guide and user manual
- www.hurrevac.com

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