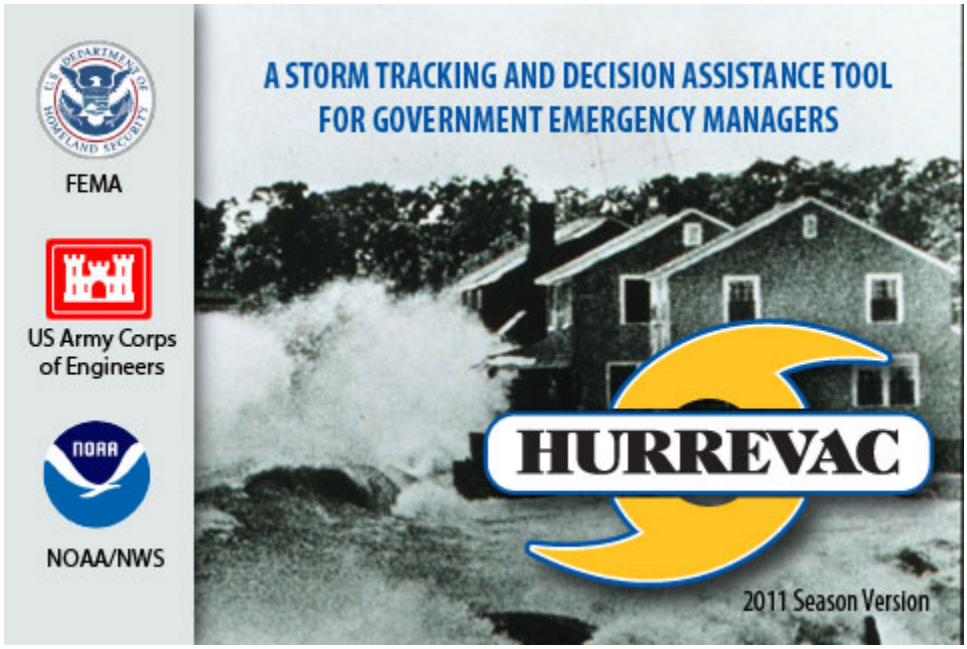
Hurrevac2010 User's Manual

(Updated May 23, 2011)



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Welcome to HURREVAC

HURREVAC (short for Hurricane Evacuation) is a storm tracking and decision assistance computer software tool for government emergency managers. The program tracks hurricanes, using the National Weather Service's National Hurricane Center Forecast/Advisory product, and combines this information with data from the various state Hurricane Evacuation Studies (HES) to assist local emergency managers in determining a proper evacuation *decision time* and the arrival time of various storm effects such as wind and storm surge.

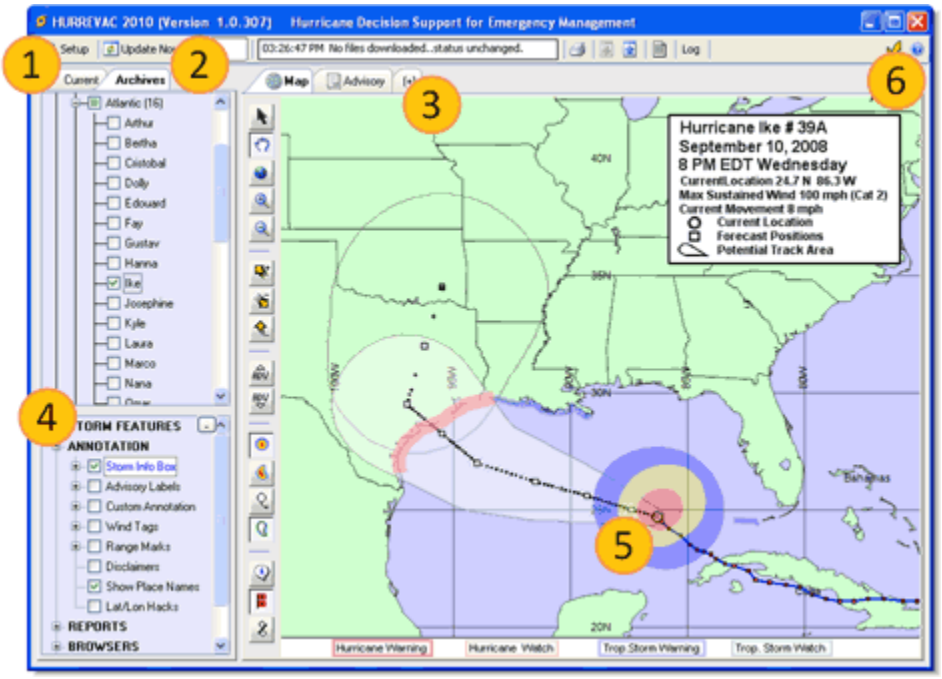
HURREVAC is a joint program of the Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers (USACE). Sea Island Software is the private contractor tasked with development, operation, and maintenance of the HURREVAC program. The USACE Baltimore District office (Hurricane Program Office under the National Center of Expertise for Coastal Storm Damage Reduction) administers the contract with funding and guidance from FEMA.

Hurrevac2010 is the latest platform for HURREVAC, so named for its initial release in the year 2010.

What's New in Hurrevac2010

Hurrevac2010 is a major new release of HURREVAC. The software has been rewritten several times since the program's beginning in 1988 in order to stay current with Windows operating systems and standards in information technology. Along the way, the annual 'Season Versions' have also presented numerous enhancements and new features.

Hurrevac2010 duplicates the functionality of Hurrevac2000, the most recent version of the program, and is intended as a complete replacement for the older Hurrevac2000 software.



Hurrevac2010's advantages over Hurrevac2000 are as follows:

1. **State specific data is easier to install and keep up to date.** State-specific HES clearance times, river gage maps, and other customizations are installed from within the program.
2. **Automatic polling and download of new forecast data via web-standard http protocol.** Hurrevac2010 receives new data from the Internet just as your web browser does, using standard http communication. Network administrators will no longer be required to open ports and firewalls in order to give users access to live data from hurrevac.com as was sometimes necessary with Hurrevac2000's FTP protocol. Hurrevac2010 will monitor for new storms/storm advisory updates and alert you when new data has been downloaded from the hurrevac.com web site.
3. **Tabbed browsing for switching between the tracking map, advisory text, and reports.** This is similar to modern Internet browsers that present web pages on multiple tabs. Hurrevac2010 now employs View Tabs for switching back and forth between the map view, a text viewer, and any number of reports you have generated.
4. **Tree-view style presentation of available data layers.** As seen in Windows File Explorer and in many map programs, Hurrevac2010 employs hierarchical lists as a more intuitive way to scan and view available data layers. The 'Current' tree-view maintains a complete list of live

storms and other forecast information (current rainfall, flood outlook, gage data, etc) with check boxes beside each one to control its display on the map. A tree-view is also employed in the Toolbox, replacing the drop down menu system. Operations previously located in Hurrevac2000's menus now appear under the following expandable headings of the Toolbox: STORM FEATURES, ANNOTATION, REPORTS, BROWSERS, and UTILITIES.

5. **Improved graphics with transparency and GIS capabilities.** Items such as wind swaths, error swaths, and rainfall isopleths which obscure the underlying map in Hurrevac2000 are now displayed with partial transparency. Thanks to the transparency, it's now possible to effectively display multiple storm features (i.e wind ranges and error swath together). Base map resolution has been improved as well. Hurrevac2010's mapping functions are now handled by a Geographic Information System (GIS) engine with data layers in shapefile format. With this new GIS platform, HURREVAC should eventually have the capability to display highly-detailed local maps of features such as surge zones, evacuation routes, shelter locations, etc.
6. **Better Help system.** Help menu is easier to navigate and the help documentation is more robust.

Getting Started

Resources

Hurrevac2010 includes a comprehensive help system that is installed along with the program. The help system's 'Using HURREVAC' walk-through of program basics is a good place for new users to begin. Searchable topics are available for in-depth research. A print-formatted PDF version is located on the support site at http://www.hurrevac.com/guides.htm.

Technical Support

HURREVAC users have year-round access to 24/7 technical support from Sea Island Software, developer of the program.

Users should register for the program and submit questions through the support site at www.hurrevac.com. Routine website contacts and e-mails to support@hurrevac.com are answered within one business day. Issues related to developing storms and other time-critical user needs are addressed immediately even if outside of normal business hours.

Sea Island Software maintains a toll-free support phone line at (888) 840-4089. Support calls are answered 24/7 during storm events.

Program Distribution

HURREVAC has been widely adopted in federal, state, and local government emergency management. The program has more than 9,500 registered users; however, in actual practice there are likely two or three times as many users, since registration is only required of one contact person per site. HURREVAC is generally regarded as an indispensable tool for monitoring hurricane threats and determining evacuation and other operational decision deadlines.

As a federally-funded program, the software, datafeed, and technical support are provided free-of-charge to all individuals in government emergency management who request access. HURREVAC is not distributed beyond the government emergency management community.

For program access, please visit the registration page at http://www.hurrevac.com/register.php. Successful registrants receive an e-mail reply with instructions on how to download the program installation file.

Installation and Configuration

Detailed installation instructions are e-mailed to new users who apply for program access through the registration page at http://www.hurrevac.com/register.php. If you are already registered but need to have the installation instructions resent, please visit http://www.hurrevac.com/resend.php.

Program Requirements

Hurrevac2010 is a stand-alone desktop application for computers running Microsoft Windows. An Internet connection is required in order for the program to retrieve live forecast data. The only other program requirement is Microsoft .NET Framework 2.0. This modern application framework is included with Windows VISTA and Windows 7 and may be obtained for older operating systems such as Windows XP if not already present on your computer. Hurrevac2010's installation wizard will alert you if the prerequisite .NET Framework is missing and needs to be downloaded from Microsoft.com

Installation

Basic steps for installation and configuration (as detailed in the registration e-mail) include:

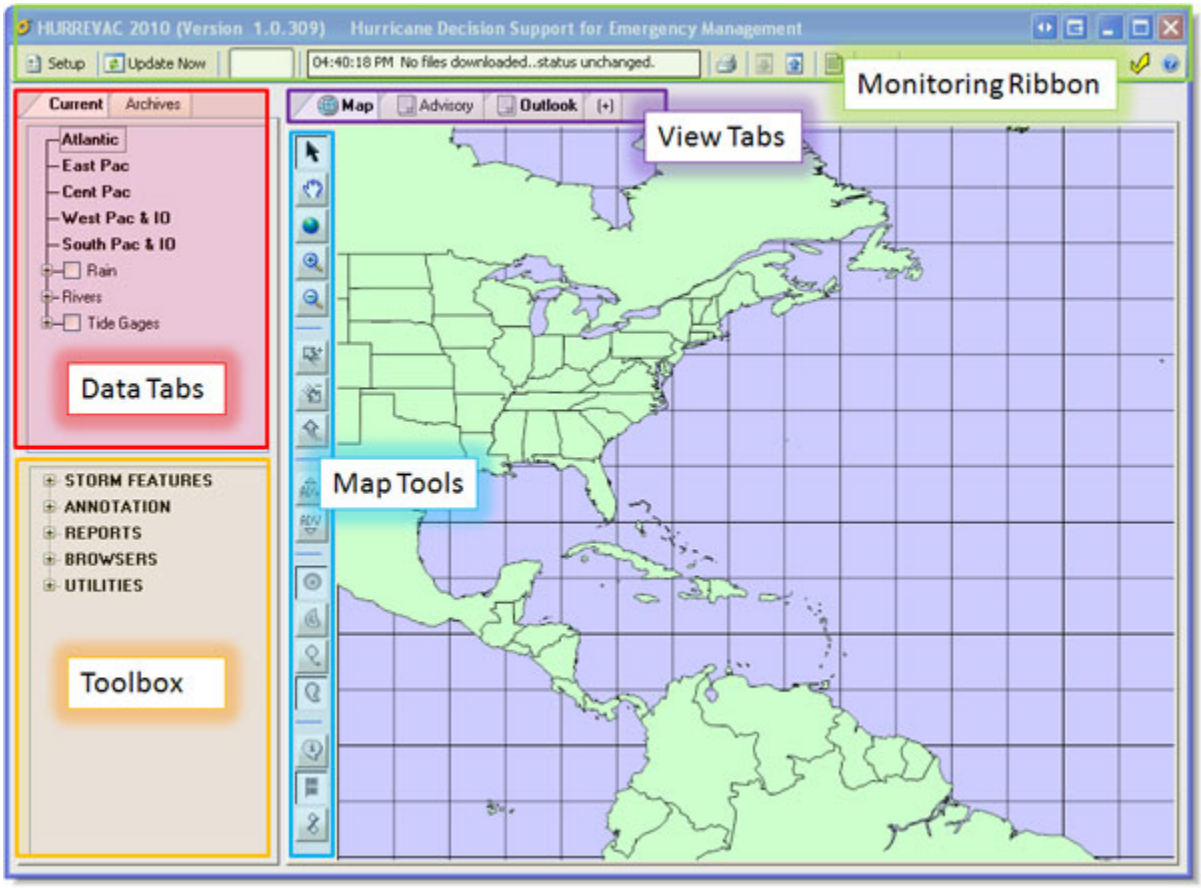
1. Download and run the program install file.
2. Launch the program and go to the 'HURREVAC Setup Form' to make selections for State Plug-ins, Connection Settings, the Download Schedule, and Local Defaults.

Using HURREVAC

The following is a short walk-through of Hurrevac2010 intended for users who are new to HURREVAC and for those who wish to refresh their skills.

Topics in This Tour

Exploring the Workspace



Hurrevac2010's default view is dominated by a large tracking map. Additional **View Tabs** are available for displaying other items:

- text of the currently displayed storm *advisory* ;
- text of the Tropical Weather Outlook; and
- various reports generated upon request.

The program's **Monitoring Ribbon** indicates the status of recent forecast data downloads.

Map Tools for commonly-used functions are located on the left edge of the tracking map display and are grouped as follows:

- map manipulation (zoom and pan functions)
- forecast hour buttons - HURREVAC's display defaults to the initial position of the very latest advisory. Use these buttons to view forecast information from some portion of the forecast (from 0 to 120-hours)
- storm advisory buttons - HURREVAC's display defaults to the very latest advisory. In order to view storm status and forecast information from a previous advisory use these buttons
- storm forecast features - Display wind ranges (for a discrete hour), winds swath (for forecast hours 0-72), error ellipse, and error swath (region where the storm in most likely to track)

- storm annotations - Forecast and past track position labels, *watch* and *warning* locations along the coastline, wind probabilities

Data Tabs

Live storms and other forecast data appear in the list at top left on the **Current Tab**. You can expand list headings and check list items on and off to control their display on the map. Right-clicking on a list item will bring up additional options for that particular layer.

The **Archives Tab** is used to view ended storms, including a database of historical tracks dating back to 1865.

Toolbox

Additional operations of the program appear at the bottom left of the workspace.

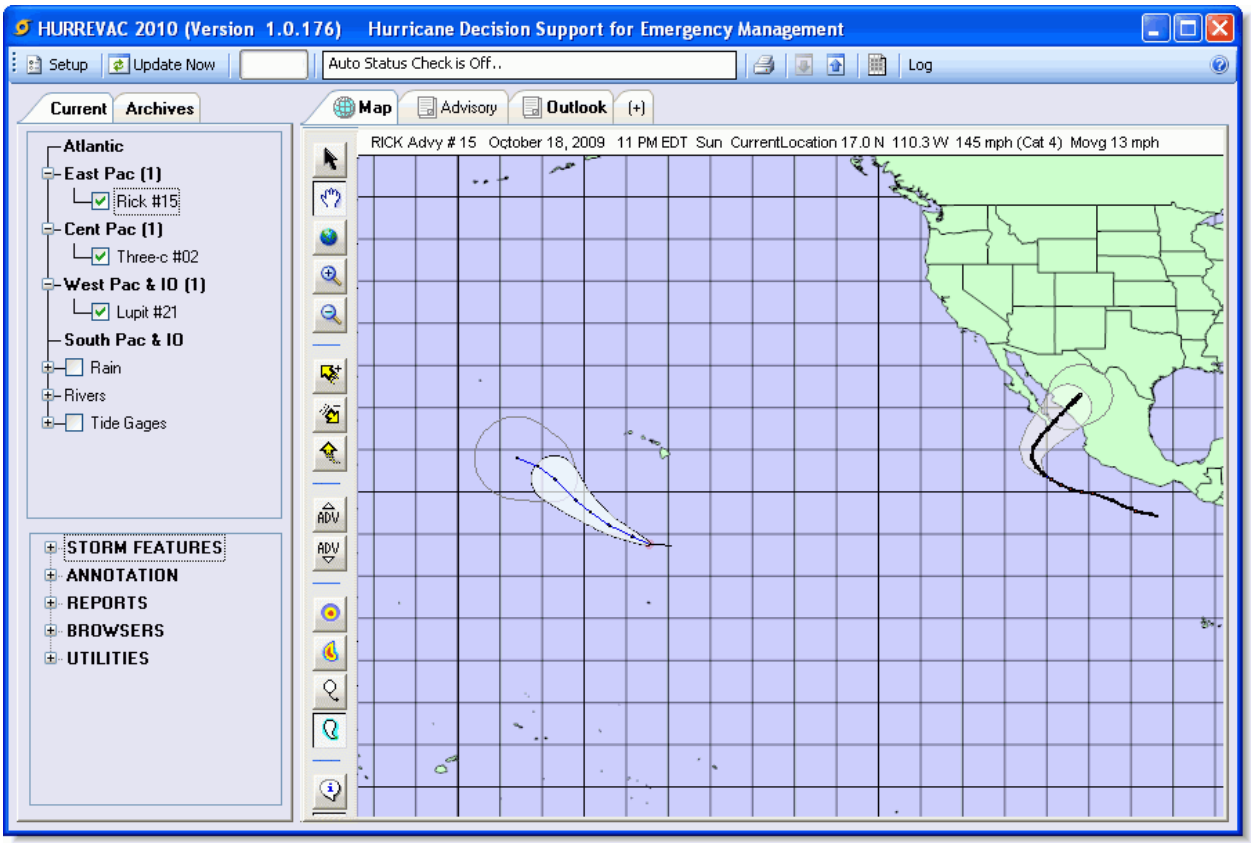
- **Storm Features** displayed on the map for the current advisory
- **Annotation** options for additional map labeling
- Various **Reports** to be generated on potential storm impacts
- Various **Browsers** to be used to examine mapped features such as river and tide gages
- **Utilities**

Tracking Current Storms

Real-time monitoring and storm tracking are central to Hurrevac2010. The program's primary data sources are the three US government-based forecast centers which together cover *tropical cyclone* activity worldwide:

1. The **National Hurricane Center (NHC)** - responsible for the Atlantic basin (including the Caribbean and Gulf of Mexico) and the East Pacific basin that extends westward to 140 degrees longitude.
2. The **Central Pacific Hurricane Center (CPHC)** - responsible for the Central Pacific basin from 140 to 180 degrees west.
3. The **Joint Typhoon Warning Center (JTWC)** - with a large area of responsibility that includes the West Pacific and North Indian Ocean, plus the South Pacific and South Indian Ocean.

Whenever there is an active tropical cyclone, the responsible forecast center produces sequentially numbered advisories at 6-hour intervals. Issuance times are 03, 09, 15, and 21 Zulu (which translates to 11pm, 5am, 11am, and 5pm Eastern Daylight Time).



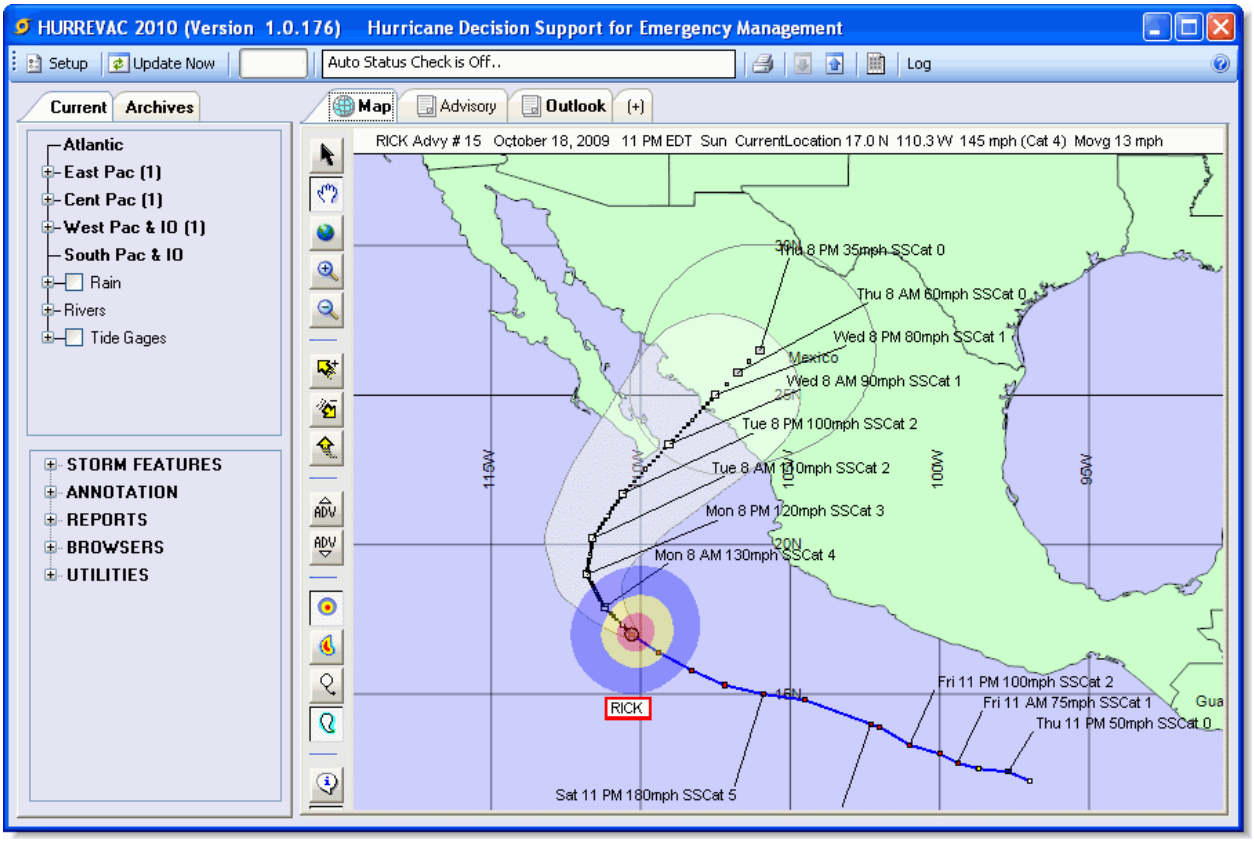
At startup, Hurrevac2010 immediately checks the web to see if there are any active storms and downloads them for presentation on the tracking map. As long as the program is left in auto-download mode (the default download schedule), you will receive notice of new forecast advisories.

Hurrevac2010's Current Data Tab, at top left of the program interface, organizes activity by the forecast *basins* . Numbers appear after the name of any basin containing one or more active storms. Clicking the + symbol next to an active basin will expand the listing to include the active storm

name(s) and latest advisory number(s). To see a preview of all storm activity in a basin, simply click on the basin name in the Current Data Tab. Storms in this preview mode are indicated with small red circles (marking the location of the storm at the time of the most recent advisory) and white cones (marking the potential tracking area or error swath).The Tropical Weather Outlook (accessed from the **Outlook** View Tab) contains a text summary of activity in each basin.

When you find a storm you wish to investigate further, left-click on the storm's name in the Current Data Tab. This will load this storm's STM file (HURREVAC's native file format for storing all the forecast advisories from a single storm) into memory. With a storm activated, you can begin to manipulate it using the Map Toolbar or Storm Features, Annotation, and Reports of the Functions window. You can also view the text of its *advisory* package (accessed from the **Advisory** View Tab).

Storm Presentation



The storm's *past track* appears as a solid blue line, with colored squares representing the locations of all previous (old) advisories. These are color-coded according to the maximum wind speeds observed at the time of each advisory. The colors indicate:

- Blue - tropical storm-force winds of at least 34kt or 39mph;
- Yellow - winds of at least 50kt or 58mph; and
- Red - hurricane-force winds of at least 64kts or 74mph.

Wind ranges illustrate the *initial position* and size of the storm. The Error Swath illustrates the area in which the center of the storm is most likely to track. Forecast positions at 12, 24, 36, 48, and 72 hours

are indicated by large white-filled squares. Extended forecast positions (96 and 120 hours) are indicated by large gray-filled squares.

Analyzing Distant Threats

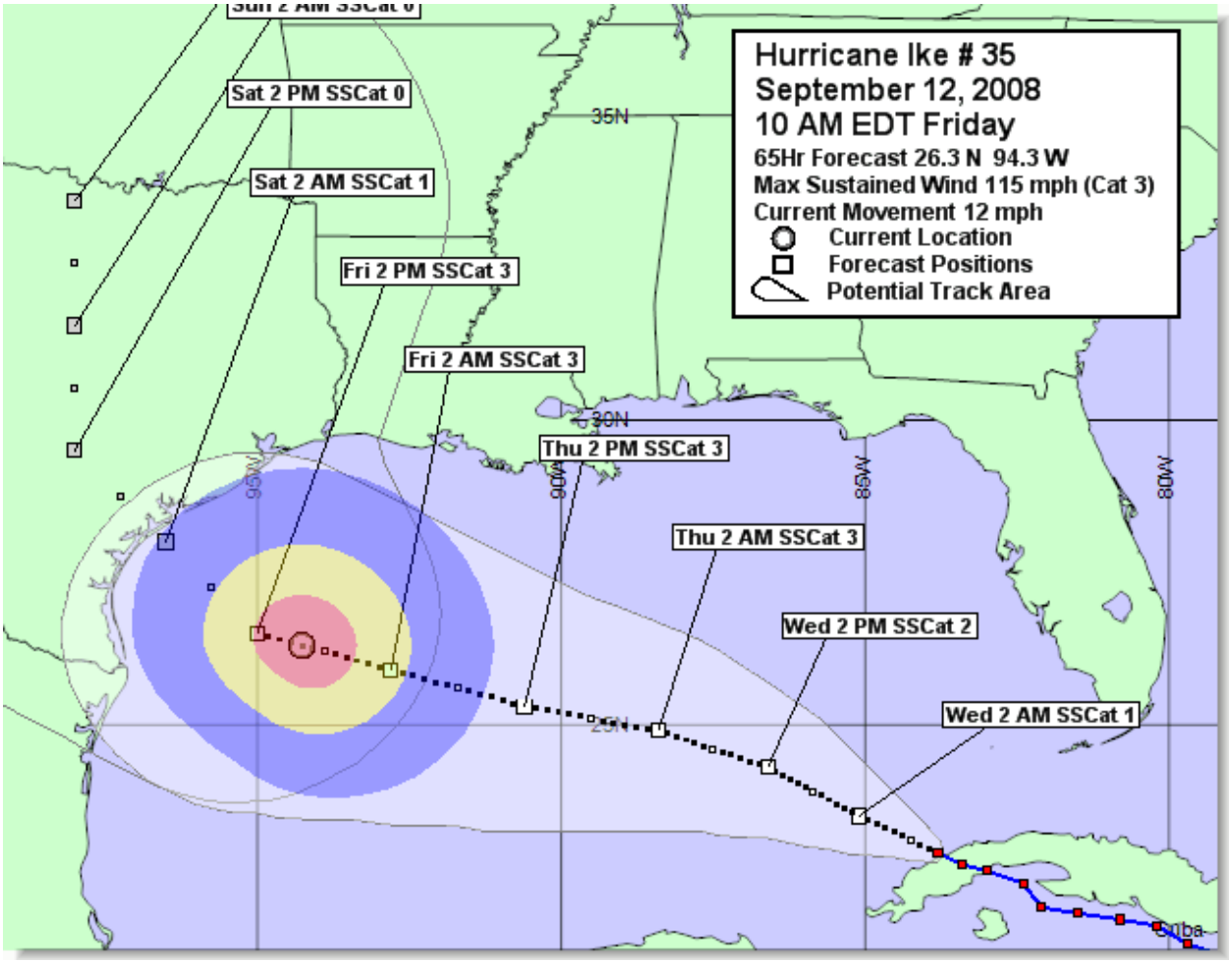
When tracking a still distant hurricane, HURREVAC enables you to answer basic questions about the threat such as:

- Where is the hurricane currently located and how big is it?
- Where is the hurricane expected to make landfall and at what *intensity* ?
- What is the likelihood that the hurricane will impact my location and how soon could that happen?

Storm status is indicated by the Storm Info Box that initially appears as a white banner across the top of the tracking map. For a more prominent and detailed version, change the box type under ANNOTATION...Storm Info Box. To find out how the storm is forecasted to develop over the five-day period, use the (yellow) Move Storm AHEAD and BACK buttons of the Map Toolbar. The Storm Info Box will update as you advance the storm along its *forecast track* .

An alternate way to gather statistics about the storm is through the Storm Statistics Graph or Report.

You can determine when *tropical storm* force winds are projected to reach the coast by advancing the storm along its forecast track until the blue ring of the Hourly Wind Ranges touches the coast. Adding Advisory Labels to the forecast track can also be helpful in illustrating when the storm center is forecasted to be over an area.



You should not focus solely on the forecast track or precise wind timing, however, when a storm is still distant (36 to 120 hours away). Direction of the storm track, movement speed, and storm size is uncertain and one should be focused on *probabilistic forecast* , rather than *deterministic forecast* information. If you are in the Error Swath or Fringe Winds area surrounding the error swath, you should be concerned and following the storm closely. The Error Swath Report will list all counties/parishes within this swath and indicate how soon the storm might arrive. This calculation will report an earlier time than the deterministic method (advancing the Hourly Wind Ranges) because it adds a margin of error.

You can also use Wind Probabilities to gage the threat. Has the probability of hurricane-force winds at the coastal location nearest you increased or decreased from previous advisories?

If you are an inland county or parish, the *MEOW (wind)* decay models will tell you a lot about how much wind can be expected to penetrate inland to your area if the storm center comes very near or over you.

Regional planners may wish to use the Closest Approach Report to determine which locations are under the greatest threat.

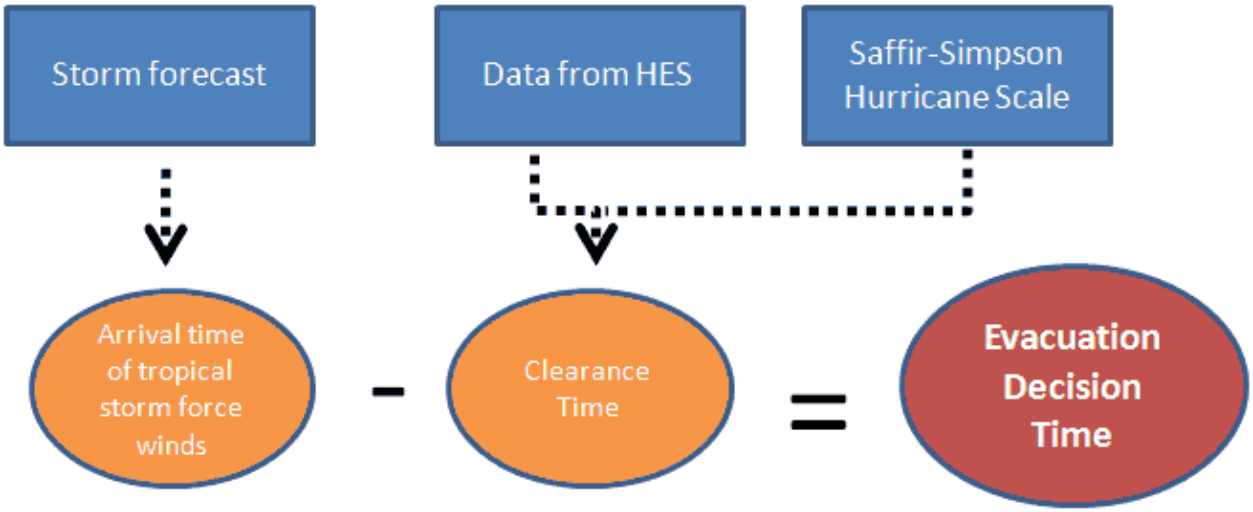
Evacuation Decision Timing

If a hurricane is determined to be close and threatening, you should begin to focus more specifically on the official *forecast track* and precise timing calculations derived from it.

The 'close and threatening' time frame is determined to a certain extent by the lead time that your community needs to make its evacuation preparations. In *USACE* Hurricane Evacuation Studies, this is referred to as the **Evacuation Clearance Time, the number of hours needed to move the vulnerable population to safety**. Clearance times vary according to both storm and local conditions. In HURREVAC, you can use the Evacuation Clearance Time Browser to review all available scenarios for your county or parish.

Timing Calculations

HURREVAC arrives at an evacuation decision time using input from the official hurricane forecast (from *NHC* , *CPHC* , or *JTWC*) and the Hurricane Evacuation Study for the county or parish of interest.



To determine the arrival time of tropical storm force winds, the program takes an Alternate Track, worst-case scenario of a direct hit in which the *forward speed* and *wind ranges* of the official forecast are retained, but the track is straightened and redirected to the county of interest. Typically, the alternate track adjustment for counties in or near the error swath will result in a slightly earlier arrival time for tropical storm force winds than the official track.

Note that because of the alternate track adjustment, it possible to run timing calculations on counties well outside of the error swath where a storm strike is unlikely. HURREVAC cannot tell you whether or not an evacuation is justified...only when the last possible moment is for making that decision. The advantage of waiting as long as possible is that you have the most accurate forecast information and are therefore in a position to make the best decision.

The precise *evacuation clearance time* (number of hours) used in the calculation will be based upon your selection of Evacuation Options.

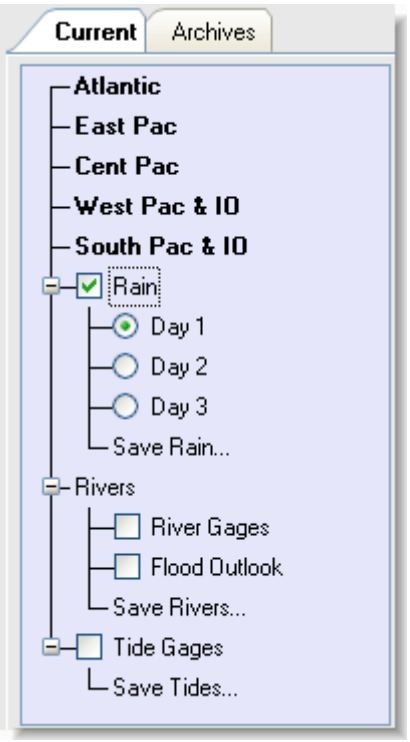
Finally to run the evacuation *decision time* calculations, you generate a tabbed Evacuation Timing Report. These calculations should be updated each time a new forecast advisory is received. This is

easily accomplished either with the Refresh button at the bottom of original report or by generating an additional tabbed report.

If configured, the Decision Time Alert will appear when your county or parish is within 12 hours of needing to make a decision.

Those familiar with the pre-computer methods for evacuation decision timing may also wish to use the graphical Decision Arc Tool.

Other Forecast Data



In addition to wind effects, storm surge and inland flooding are two critical hazards that also need to be considered when preparing for a hurricane strike. HURREVAC incorporates a number of *NOAA* / *NWS* products to assist with the assessment of these threats through the Rain, Rivers, and Tide Gages headings of the Current data tab. This information is available year-round, even when there are no active tropical cyclones, but is of special interest in the 24-48 hours prior to storm landfall.

Inland Flood Tools

The River Flood Outlook (located under the Rain heading of the Current data tab and as a Rain List under the Reports heading) and 3-day Quantitative Rainfall Forecast (located under the Rivers...Flood Outlook heading of the Current data tab) provide generalized guidance on possible inland flooding threats.

In order to display the latest rainfall and flood information in Hurrevac2010, you must have the program's Download Schedule set to 'Automatic Status Check' or have clicked 'Update Now' on the Monitoring Ribbon. You can confirm the date and time of the currently displayed forecast by checking the contents of the white banner that appears across the bottom of the tracking map.

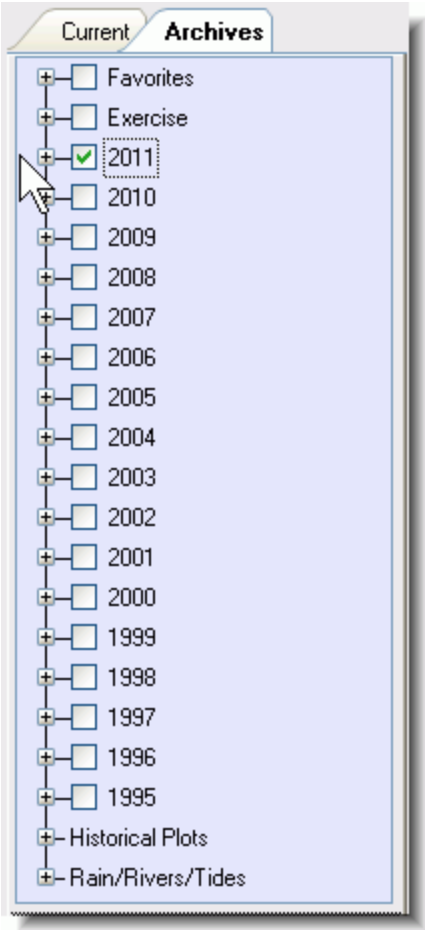
The River Gage Browser should be used to consider potential flood scenarios surrounding specific rivers gage locations. To display inland river gages, select the Rivers...River Gages heading of the Current data tab. The latest gage information will be downloaded from the Internet as you turn this on for the first time. With the gage locations displayed on the map, zoom in and click on a single gage of interest to view a chart of water levels over time. In addition to observed and forecasted river levels, charts for many gages contain helpful static information on defined flood levels, historical crests, flood impact statements, and inundation maps.

Coastal Tide and Storm Surge Tools

The Tide Gage Browser should be used to consider tidal fluctuations and storm surge potential. To access coastal tide stations, select the Tide Gages heading of the Current data tab. The latest gage information will be downloaded from the Internet as you turn this on for the first time. Click on a station on the map to display the tide chart of predicted (astronomical) and observed tide levels. Depending on the storm size, location, and other factors, differences between the two tide values can begin to show up well in advance of the approaching storm.

The Tide Gage Browser also contains several SLOSH Display tools for determining potential storm surge under various *direct hit* scenarios.

Working with Archive Storms



Want to simulate live hurricane tracking or review a storm that impacted your area in the past? In addition to its live tracking capabilities, Hurrevac2010 is a useful tool for evaluating historical and hypothetical storms. When viewing and analyzing storms from the Archives Tab, you will have access to all of the same STORM FEATURES, ANNOTATION, and REPORTS functions employed when tracking a live storm.

Your installation of Hurrevac2010 is accompanied by an extensive database of STM files (HURREVAC's native file format for storing all the forecast advisories from a single storm). Complete seasons of STM records extend back to 1995 for the Atlantic basin, 1999 for the East and Central Pacific basins, 2001 for the West Pacific basin, and 2006 for the South Pacific basin.

For earlier years, HURREVAC's data source is the *NHC* 's Historical Track Database. This database extends back to 1851 for the Atlantic basin and 1949 for the East Pacific Basin.

Archive Organization

STM files of the Archives Tab are cataloged under headings for sequential years (2010,2009, 2008, etc). Within each year, STM files are further cataloged by *basins* - Atlantic, East Pacific, Central Pacific, West Pacific and North IO, and South Pacific and South IO. The check boxes by each heading can be used to turn on a preview of all storm tracks from an entire year or basin within a single year. Left-clicking on the name of a single storm in the list will load the relevant STM file, at which point you can begin to manipulate and analyze the forecasts from that particular storm.

The **Favorites** heading at top of the Archives Tab is intended as a placeholder for frequently accessed storms. To add a storm to Favorites, browse the year/basin headings and right-click on the desired storm name. Select 'Copy to Favorites Storms Folder' from the options that appear next to your cursor. Favorites should also be employed if you wish to show storms from different years on the tracking map simultaneously. Your Favorites selections will be retained upon exit of the program. To remove a storm, simply right-click on its name under the Favorites heading and choose 'Remove from Favorites Folder.'

The **Exercise** heading is populated with STM files that are located in a special *ExerciseSTMFiles* data directory. Most often, these are hypothetical storms created using the Exercise Track Wizard. You can also use UTILITIES...Export/Import > Import Plot (.stm) to place a copy of an actual STM file in this directory and then manually alter the parameters of this storm using the Storm Data Entry Utility to create a slightly different storm scenario.

The **Historical Plots** heading is for viewing storms prior to 1994 from the NHC's Historical Track Database. Storms from this database are simply plotted by 6-hourly center locations. These historical tracks do not contain the wind extent or forecast information as the STM files do and therefore cannot

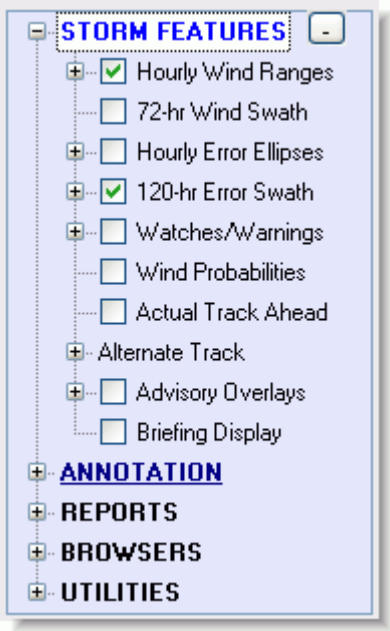
be manipulated and analyzed to the extent that the STM file-based storms can. Instead, use the Historical Scan Utility to query this database.

Storm Features

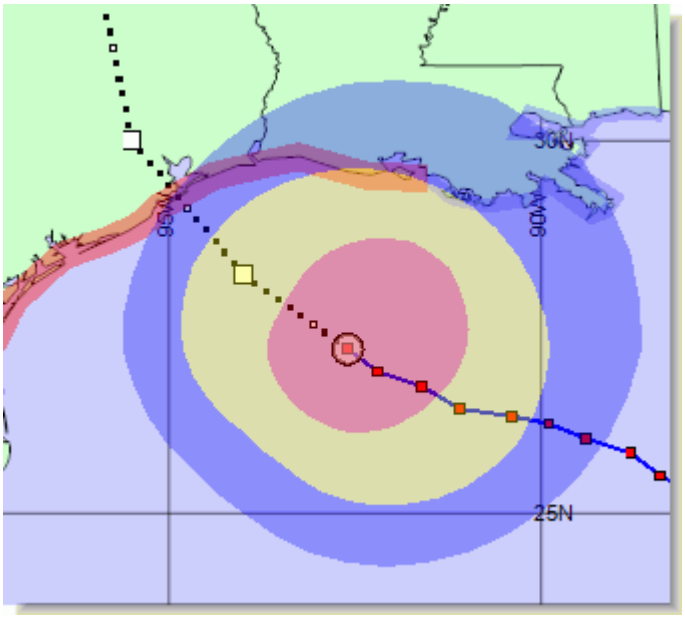
Storm Features are options for how forecast information associated with a particular storm advisory is displayed on the map. Wind ranges, wind swath, and error swath, formerly discrete 'display modes' in Hurrevac2000, can now be shown in combination as storm features. Additional forecast attributes such as watches and warnings and wind probabilities also appear under the STORM FEATURES heading of the Toolbox.

Available Storm Features

- Hourly Wind Ranges
- 72-Hour Wind Swath
- Hourly Error Ellipses
- 120-hr Error Swath
- Watches/Warnings
- Wind Probabilities
- Actual Track Ahead
- Alternate Track
- Advisory Overlays
- Briefing Display



Hourly Wind Ranges



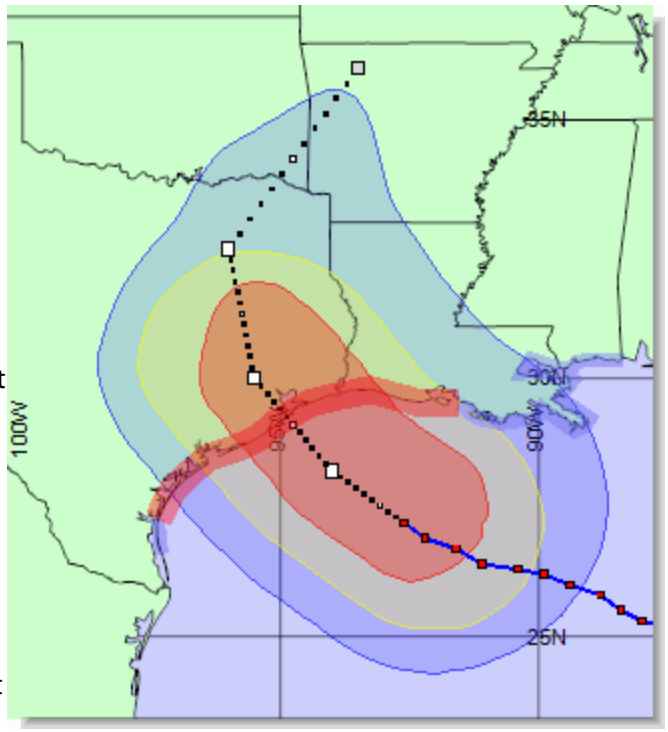
This display shows storm position and size at a certain hour of the forecast. Concentric rings represent the extent of tropical storm force winds (34kt or 39mph) in blue, 50kt or 58mph winds in yellow, and hurricane force (64kt or 74mph) winds in red.

The Hourly Wind Ranges display defaults to the initial position (Hour 0) of the latest advisory.

Use the Time+ button at the edge of the map view to advance the storm along its forecast track and the Time- button to return to earlier hours. Wind ranges disappear from the display once a storm is advanced beyond forecast hour 72. This occurs because the Hurricane Centers do not make wind extent forecast data available beyond the 72-hour point.

The Hourly Wind Ranges button at the edge of the map view toggles the view between open circles (rings), filled circles (colors), and no display. Left-click to turn the display on and off. Right-click to change the display type. These operations are also duplicated in the Toolbox under the 'STORM FEATURES... Hourly Wind Ranges' heading.

72-Hr Wind Swath



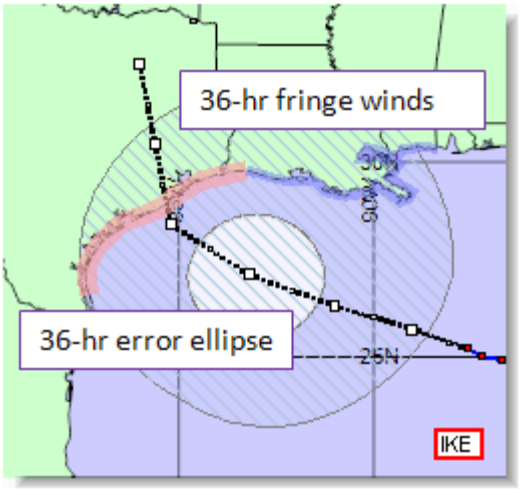
The 72-Hr Wind Swath is a composite of wind ranges along the 72-hour forecast period. The fill colors represent the extent of tropical storm force winds (34kt or 39mph) in blue, 50kt or 58mph winds in yellow, and hurricane force (64kt or 74mph) winds in red.

This storm feature should be utilized only when the storm is close. It is a specific forecast subject to error, and should be given credence only with the last few advisories before landfall. On the mainland US, the *NHC* will use a specific version of the *MEOW (wind)* Decay Model to prepare this forecast when the storm is forecast to landfall.

See the Wind Overforecasting Disclaimer help topic for discussion of another important caveat of this display.

You can use the companion "Wind Timing...All Locations" Report for finding out which counties are affected and by how much.

Hourly Error Ellipse



The white circle surrounding the 36-hour forecast position in this display represents the Average Forecast Error, or region in which the storm center is most likely to be located at that discrete hour of the forecast period. Winds of tropical storm force or greater (fringe winds) could be occurring within the hatched area if the storm tracked at the outer edge of the error ellipse.

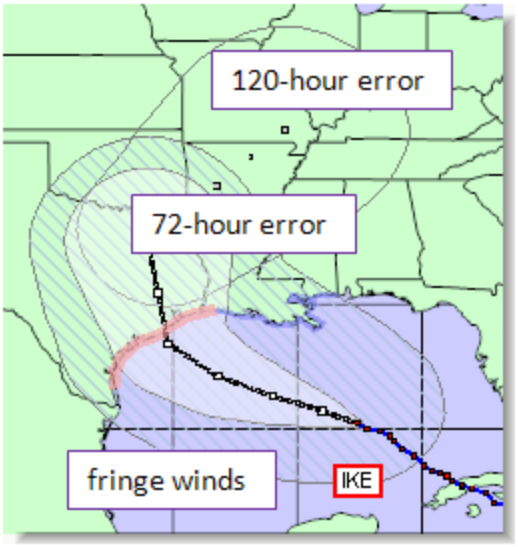

The Error Ellipse button at the edge of the map view toggles the view between error ellipse only, error ellipse + *fringe winds* , and no display. Left-click to turn the display on and off. Right-click to change the display type. These operations are also duplicated in the Toolbox under the 'Storm Features...Hourly Error Ellipse heading.


Error ellipses are shown for discrete hours and when you turn the display on, the first hour shown is the 12-hour forecast position (9 hours from the advisory issuance time). Use the Time+ button at the edge of the map view to advance the storm along its forecast track and the Time- button to return to earlier hours. The fringe wind ellipse disappears from the display once a storm is advanced beyond forecast hour 72. This occurs because the hurricane centers do not make wind extent forecast data available beyond the 72-hour point.

Background Information

The error ellipse reflects the uncertainty in the hurricane forecast process. The ellipse means that even though the *NHC* , *CPHC*, or *JTWC* has forecast a specific position, the storm center could end up anywhere within the ellipse at that time...with a 66% level of confidence. Error ellipses can be useful for timing functions when a storm is distant and the uncertainty great.

Error Swath



The large white swath surrounding the forecast track in this display represents the Average Forecast Error, or region in which the storm center is most likely track within the next 72 hours(3 days). Winds of tropical storm force or greater (fringe winds) might occur in the hatched area if the storm tracked at the outer edge of the error swath. Extending beyond the 72-hour swath, the transparent area bordered by a gray ellipse represents the Average Error Swath for 73 to 120 hours (5 days).

The Error Swath button at the edge of the map view toggles the view between error swath only, error swath + *fringe winds* , and no display. Left-click to turn the display on and off. Right-click to change the display type. These operations are also duplicated in the Toolbox under the 'Storm Features...Error Swath' heading.

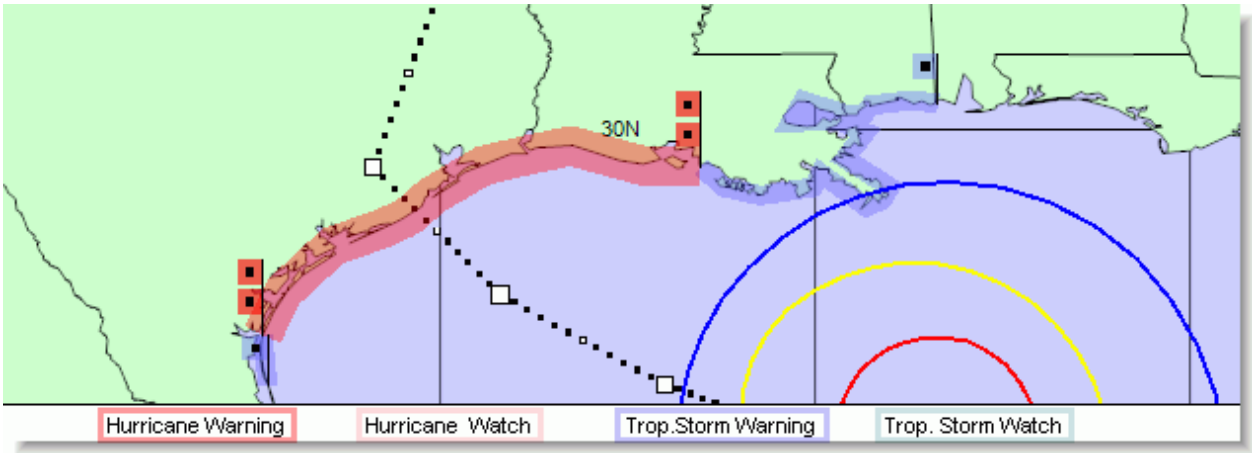
You can use the companion Error Swath Report for finding out which counties are affected and by how much.

Background Information

The error swath is a composite of the error ellipses published by the *NHC* , *CPHC* , and *JTWC* each year for forecast hours 12, 24, 36, 48, 72, 96, and 120. The swath means that even though the has forecast a specific track, the storm could end up anywhere within the swath within the next 72 hours...with around a 66% confidence level. Indeed, the storm could end up outside the swath, but the swath is based on a 5-year average of forecast errors and recent developments in forecast models such as the GFDL model have improved forecast skill. Nevertheless, if your area is in or near to this swath, you should be concerned and begin at least some preliminary planning for possible action.

Watches/Warnings

Watches and warnings appear as lines along the coast or as flags marking segment starting and ending locations. Watches and warnings are only visible when you are working with a particular advisory in which they were issued.




The Watch/Warn button at the edge of the map view toggles the view between lines, flags, lines+flags, and no display. Left-click to turn the display on and off. Right-click to change the display type. These operations are also duplicated in the Toolbox under the 'STORM FEATURES...Watches/Warnings' heading.

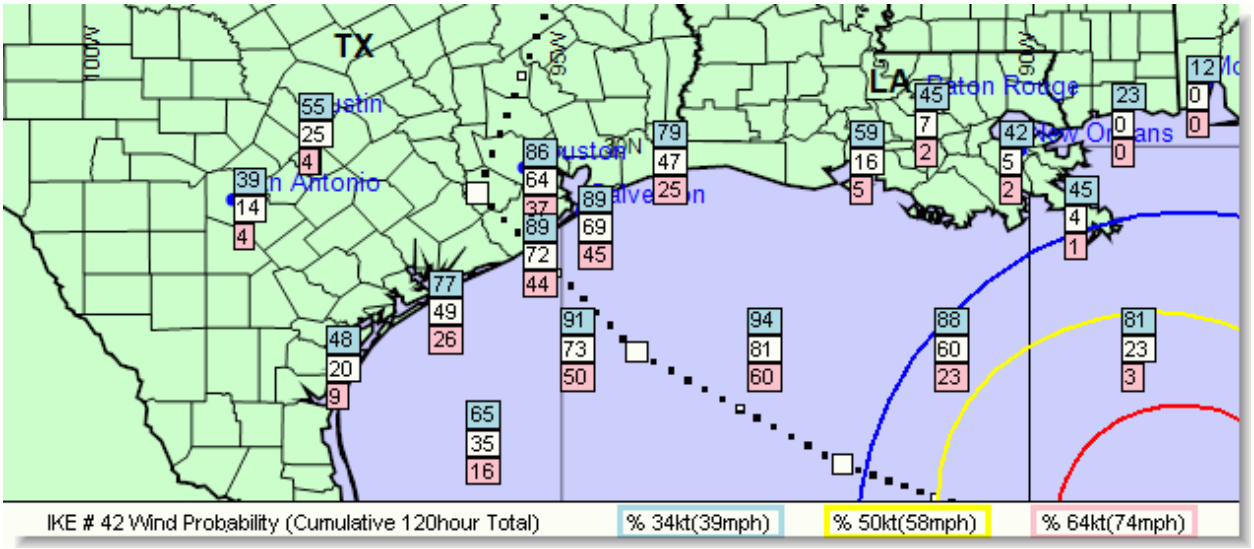
Background Information

Prior to 2010, the *NHC* and *CPHC* issued hurricane warnings (red) when hurricane conditions were expected within 24 hours and hurricane watches (pink) when *hurricane* conditions were possible within 36 hours. Tropical storm warnings (blue) were issued where *tropical storm* conditions were expected within 24 hours and tropical storm watches (green) when that threat was possible within 36 hours.

Since the start of the 2010 hurricane season, watches and warning are issued 12 hours earlier than in previous years....so 48 hours for watches and 36 hours for warnings.

Wind Probabilities

This display indicates the probability of hurricane, 50kt, and tropical storm-force within a 120-hour period. Wind Probabilities appear as numbered boxes along the coast and are only visible when you are working with the particular advisory in which they were issued.



Three numbers are given at each location. The red box is probability of 64 knot (74mph) winds; yellow boxes contain probability of 50 knot (58mph) winds; and blue boxes contain probability of 34 knot (39mph) winds.

The Wind Probabilities button at the edge of the map view toggles this display on and off with a left-click.

Background Information

The Surface Wind Speed Probabilities text product, which is attached to the bottom of the Forecast Advisory Text product in HURREVAC, provides probabilities, in percent, of sustained wind speeds equal to or exceeding 34-, 50-, and 64-knot wind speed thresholds. These wind speed probabilities are based on the track, intensity, and wind structure forecasts and uncertainties from the National Hurricane Center and Central Pacific Hurricane Center, and are computed for coastal and inland cities as well as offshore locations (e.g., buoys).

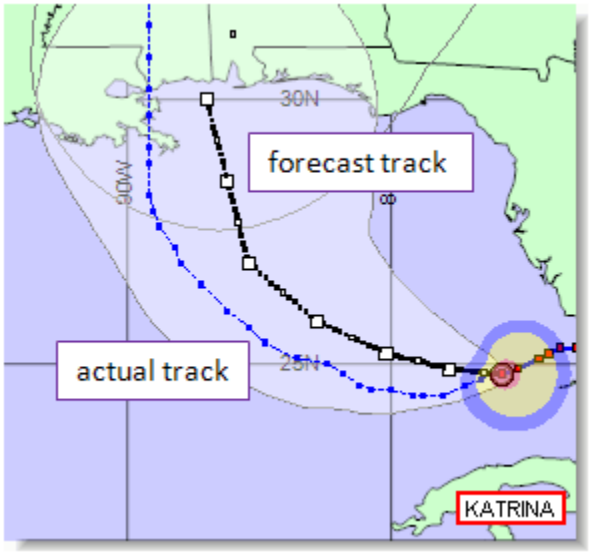
For each probability value, the event in question is a sustained (one-minute average) surface (10 meter) wind speed of at least a particular threshold value (34, 50, or 64 kt) at a specific location.

The numbers shown on HURREVAC's map are the cumulative 120 hour probabilities – These values tell you the overall probability the event will occur sometime during the specified cumulative forecast period (0-120 hours) at each specific point.

Actual Track Ahead

Two storm tracks appear ahead of the storm location whenever you are viewing an earlier advisory. The black-dotted line is the *forecast track* from the particular advisory you are viewing and the blue-dotted line is the 'Actual Track Ahead' This *actual track* is comprised of initial positions from all later advisories.

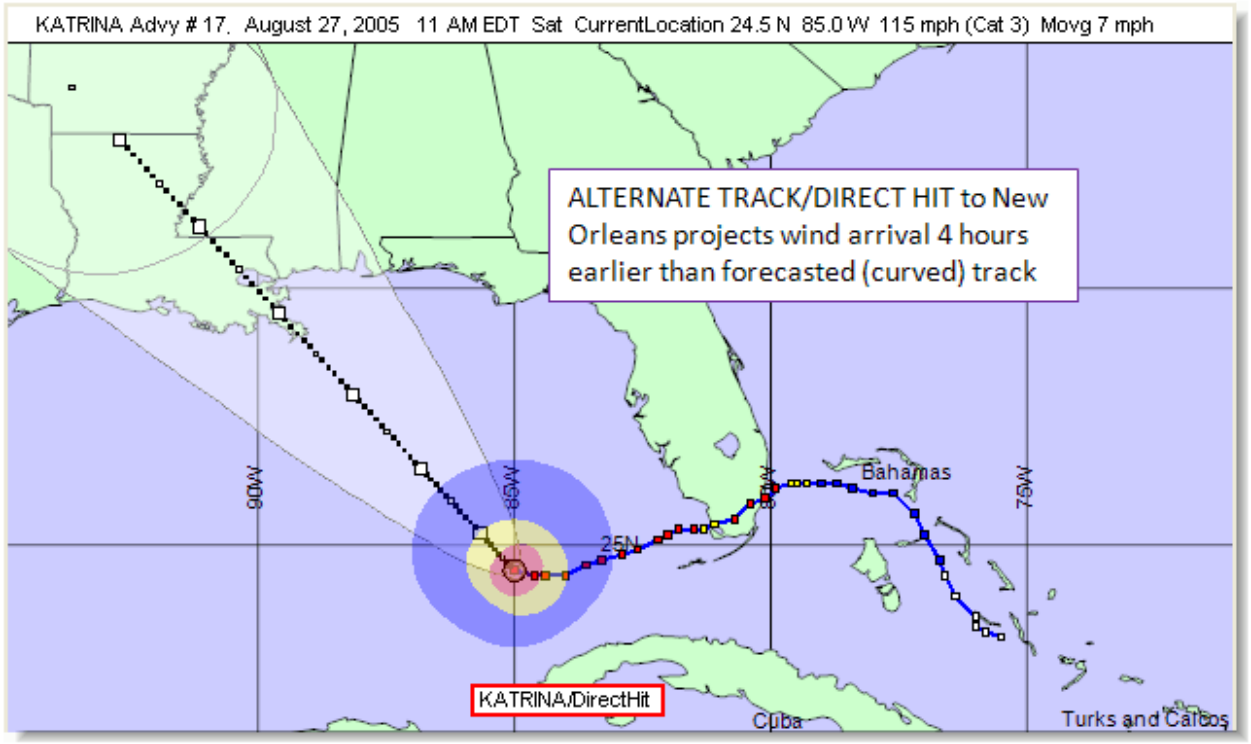
You may wish to turn off the 'Actual Track Ahead' if you are working with forecasts from HURREVAC's archive storms and find it distracting.



Alternate Track

Alternate track displays are a useful tool for exploring What-If scenarios. After changing the tracking map to display one of the three alternate track options, you can run reports on the new scenario and manipulate the storm features on the tracking map in the usual manner. If you change advisories or receive a live advisory update, this mode is canceled and the original track restored.

Direct Hit - This option allows one to see the effects/timing when the storm is moved along a direct hit track to a specified county. The track is then laid out in the direction of the specified county, using the forecast *forward speed* for the 120 hours ahead. This is the track used by HURREVAC to make Evacuation Decision Timing calculations.



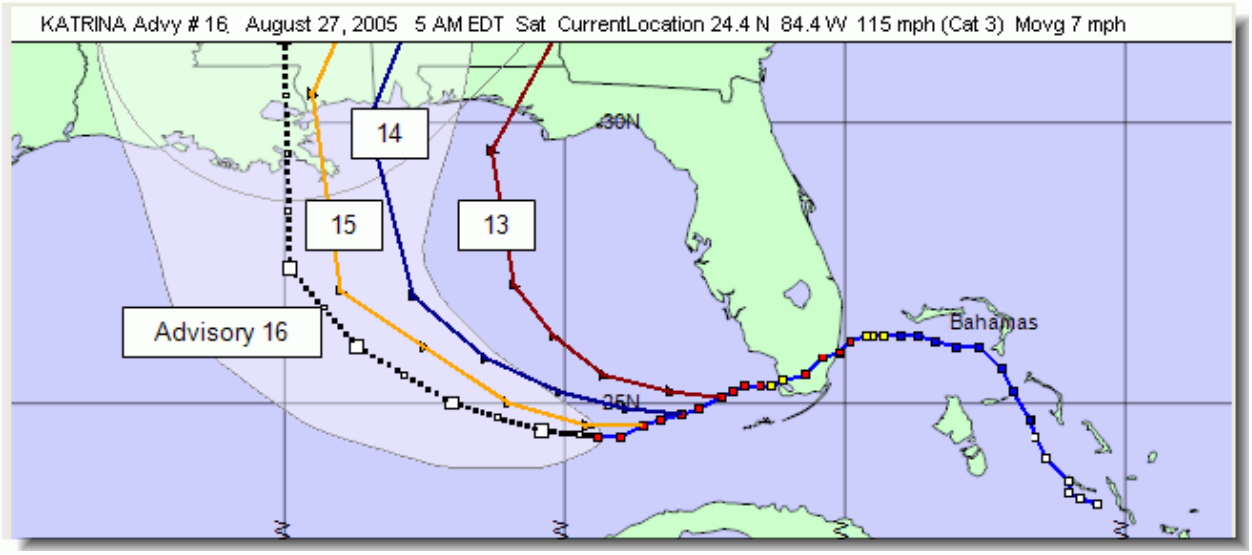
Average Error RIGHT - This option allows one to see the effects/timing when the storm is moved at an angle to the RIGHT equivalent to average error. Note - this does not necessarily coincide with the average error swath right edge. That could not be used because average error occasionally is circular when the storm is moving slow and the size of the error simply enlarges in place.

Average Error LEFT - This option allows one to see the effects/timing when the storm is moved at an angle to the LEFT equivalent to average error. Note - This does not necessarily coincide with the average error swath left edge. That could not be used because average error occasionally is circular when the storm is moving slow and the size of the error simply enlarges in place.

Original Track - This option restores the original, official advisory and erases the alternate track. You must use this option, or change advisories or storm file, to be able to do computations using the official *advisory* track.

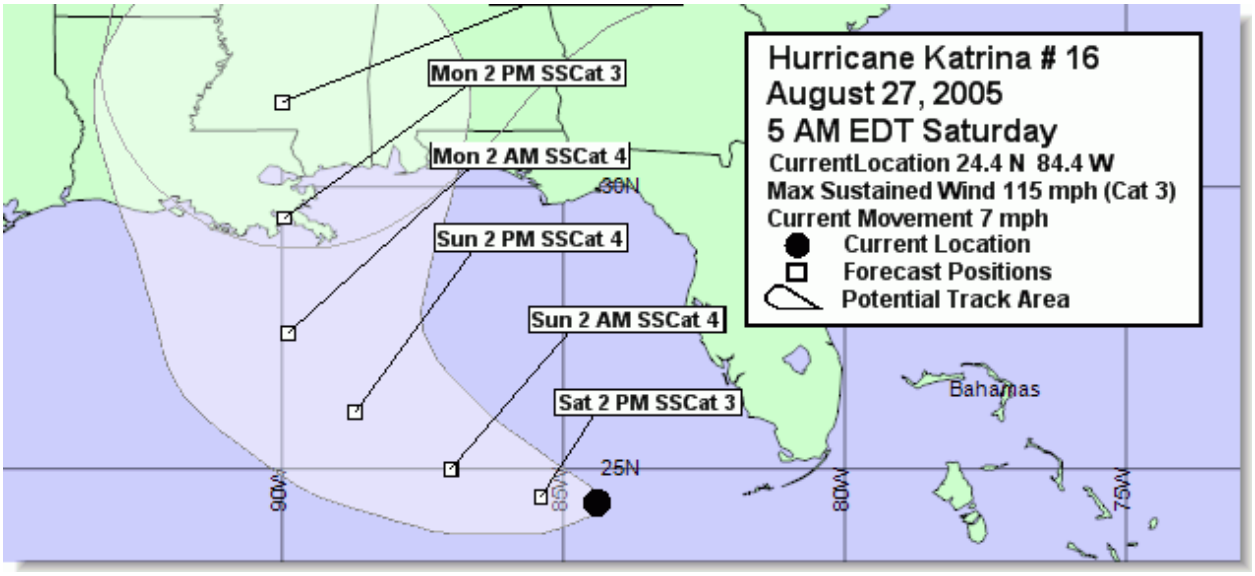
Advisory Overlays

Advisory overlays are useful for illustrating forecast track shifts from one advisory to the next. Under the STORM FEATURES menu, you have the option of turning on either 3 or 6 of the most recent advisories. Intermediate A and B advisories are not included in this display since they maintain the same track as the full advisory before them.



Briefing Display

Briefing Display is a simplified view of a storm's forecast to be used for briefings where you need to communicate the essential facts in an easy-to-understand format. This display emphasizes the current location of the storm and its potential track area (error swath). Advisory Labels and watches/warnings may be toggled on and off in this display, but many of the other STORM FEATURES are not available.

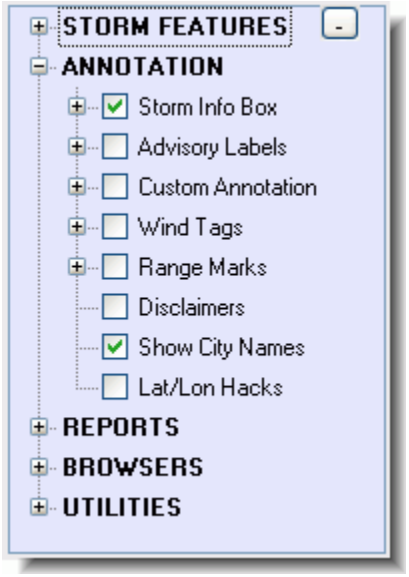


Annotation

ANNOTATION is a heading within Hurrevac2010's Toolbox. It is comprised of various map labeling options.

Certain annotation options can also be accessed with a right-click on the map.

Available Annotations



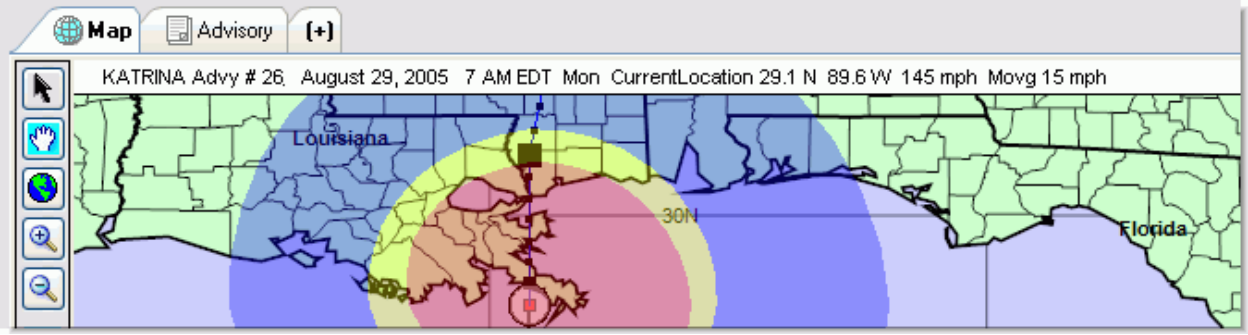
- Storm Info Box
- Advisory Labels
- Custom Annotation
- Wind Tags
- Range Marks
- Disclaimers
- City Names
- Lat/Lon Hacks

Storm Info Box

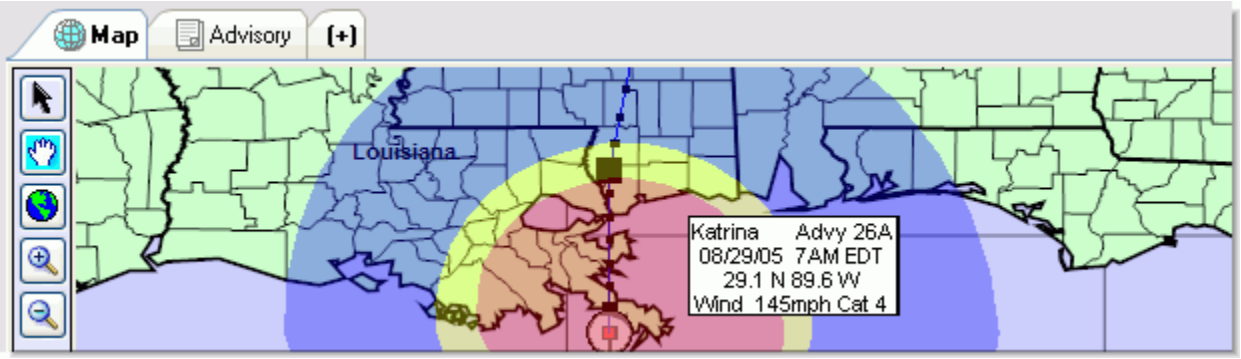
The Storm Information Box is an ANNOTATION item.

By default, storm information is displayed in the form of a banner across the top of the tracking map. Information included in this banner is

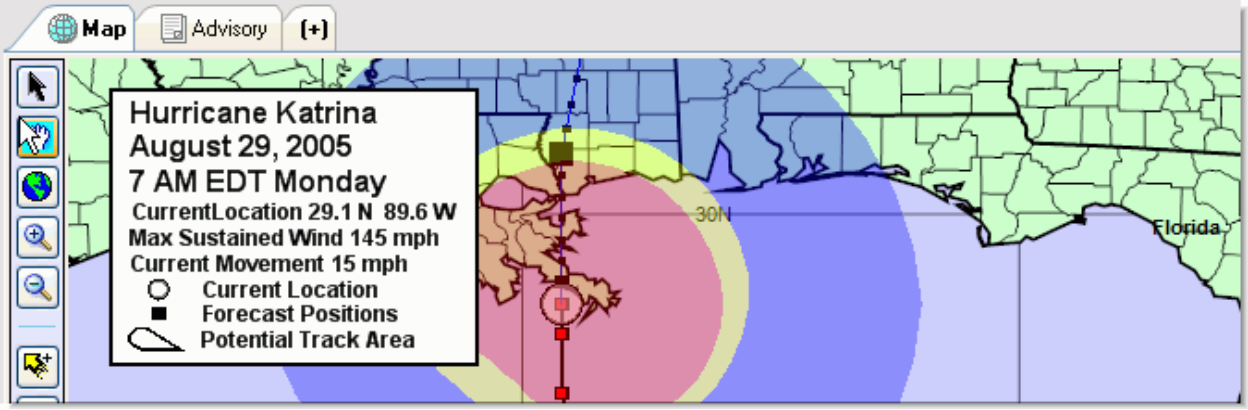
- storm name and *advisory* number;
- date and time of the storm's currently displayed position;
- latitude and longitude of the storm's currently displayed position;
- maximum winds; and
- *forward speed* .



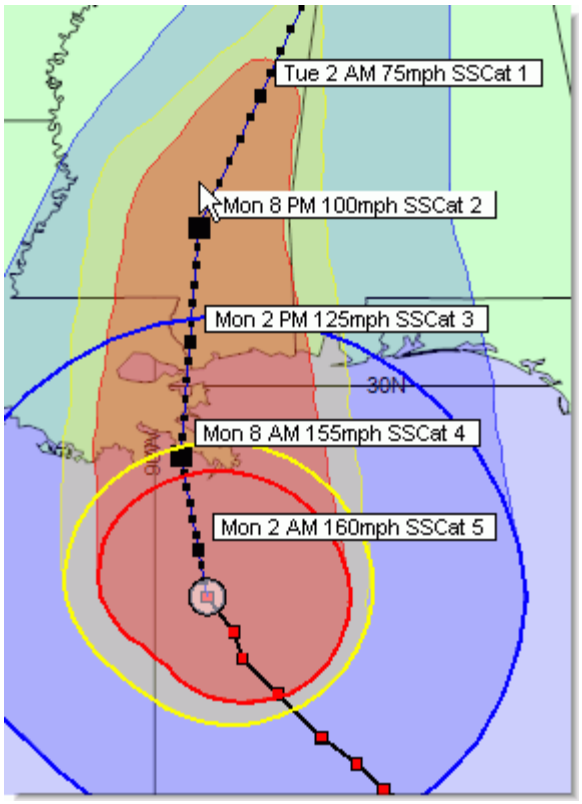
One alternative to this display is to place a small information box next to the storm center.



Another option is to place a larger information box with legend included, on the map at either upper left, upper right, lower right, or lower left of the screen. This is the type of display recommended for briefing purposes since it is visible from a distance.


Map
Advisory
(+)
Hurricane Katrina
August 29, 2005
7 AM EDT Monday
CurrentLocation 29.1 N 89.6 W
Max Sustained Wind 145 mph
Current Movement 15 mph
Current Location
Forecast Positions
Potential Track Area
30N
Florida

Advisory Labels



Advisory Labels are an ANNOTATION item.

Advisory labels appear as text tags along the track of a single storm and can be toggled on and off using the 'Advisory Labels' check box under the ANNOTATION heading of the Toolbox. Look just below this check box for access to the 'Storm Labels Setup' form. Options on the setup form include:

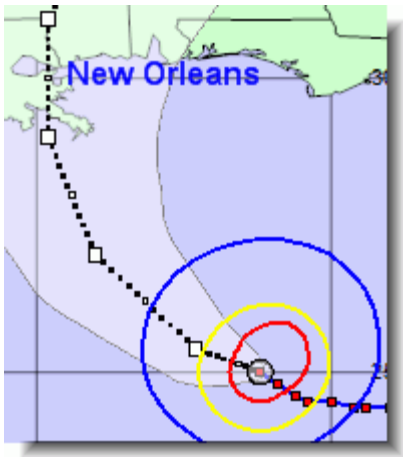
- Label Text (Advisory Number, Day of Week, Date, Time, Max Wind, S/S Category, Pressure, Forward Speed)
- Label Which Points? (Forecast Points, Past Advisories)
- Plot Interval (from 6 - 72 Hours)
- Font Type (Regular or Bold)
- Speed In (MPH or Knots)


A Label Button on the Map Toolbar will also toggle labels on/off with a left-click. Right-click for Label Setup.

Working with Advisory Labels

HURREVAC attempts to place as many labels on the storm track as possible without overcrowding. At distant zoom levels, some of your labels may disappear because the interval you've selected is too high to fit them all within the view. Try using a larger interval (36 hours or greater) and be selective with the number of items you include in the label text.

Custom Annotation

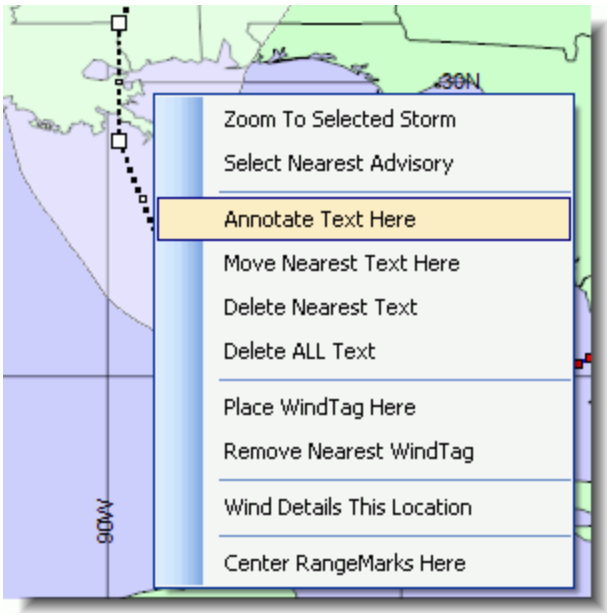


Custom Annotation is an ANNOTATION item, accessed in the Toolbox and through right-clicking on the map.

Custom Annotations are snippets of text you add to the map display independent of labels that HURREVAC automatically generates. Possible uses of this include:

- Labeling a place on the map and fixing to a map position
- Adding an explanatory text to the map and fixing to a screen position

Working with Custom Text Annotation

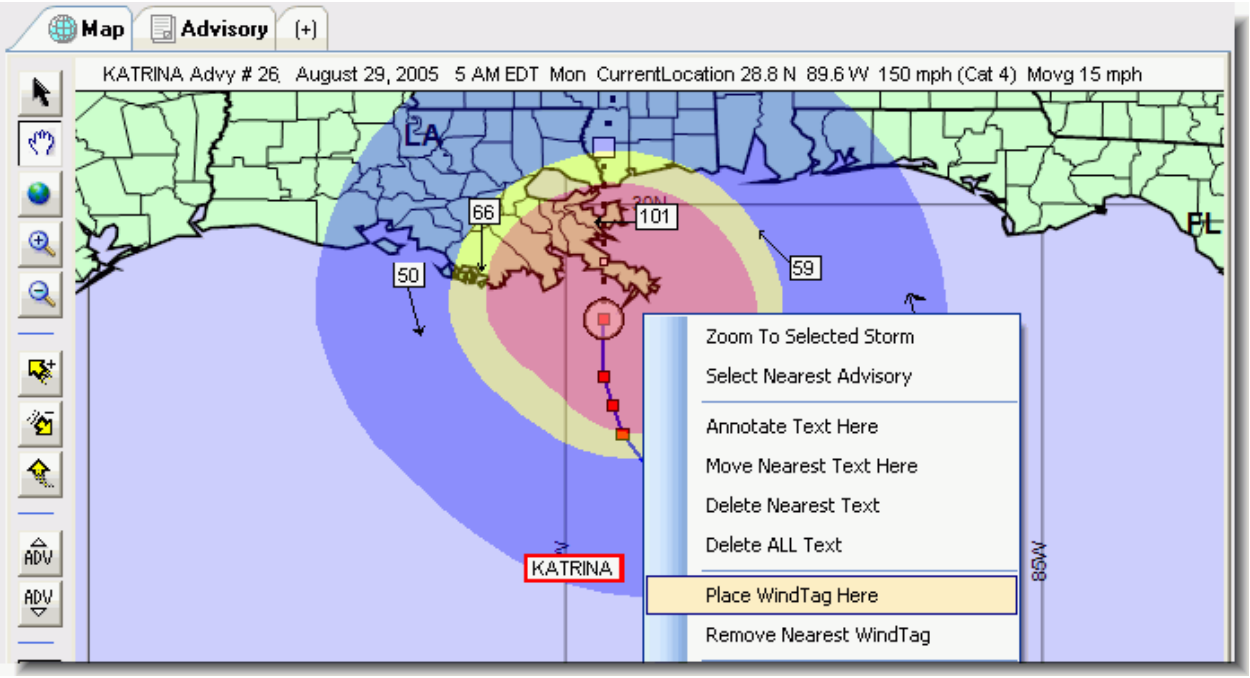


1. Right-click on the map in a location where you wish to add a text label and select 'Annotate Text Here' from the pop-up menu.
2. In the Text Annotation setup form, select a text size, location relative to Lat/Lon or Screen Position, text color, and bold/regular font. Enter your text in the box and press Annotate.
3. Text can be toggled on and off with the 'Custom Annotation' check box under the ANNOTATION heading of the Toolbox. The text will remain in memory for as long as the program is open.
4. Text may be cleared from memory by right-clicking on the map and selecting 'Delete Nearest Text' or 'Delete ALL Text.'

Wind Tags

Wind Tags are an ANNOTATION item, accessed in the Toolbox and through right-clicking on the map.

Wind tags are interactive displays of wind on the tracking map, which change as the storm is moved, or an advisory is changed. They "stick" where they are placed, regardless of panning or zooming actions by the user.



They are useful to display the *NHC* , *CPHC* , or *JTWC* forecast implied winds at any point, and to show whether winds in an area will be blowing onshore, and thus subjecting the area to storm surge, or blowing offshore, which should lessen and even eliminate storm surge.

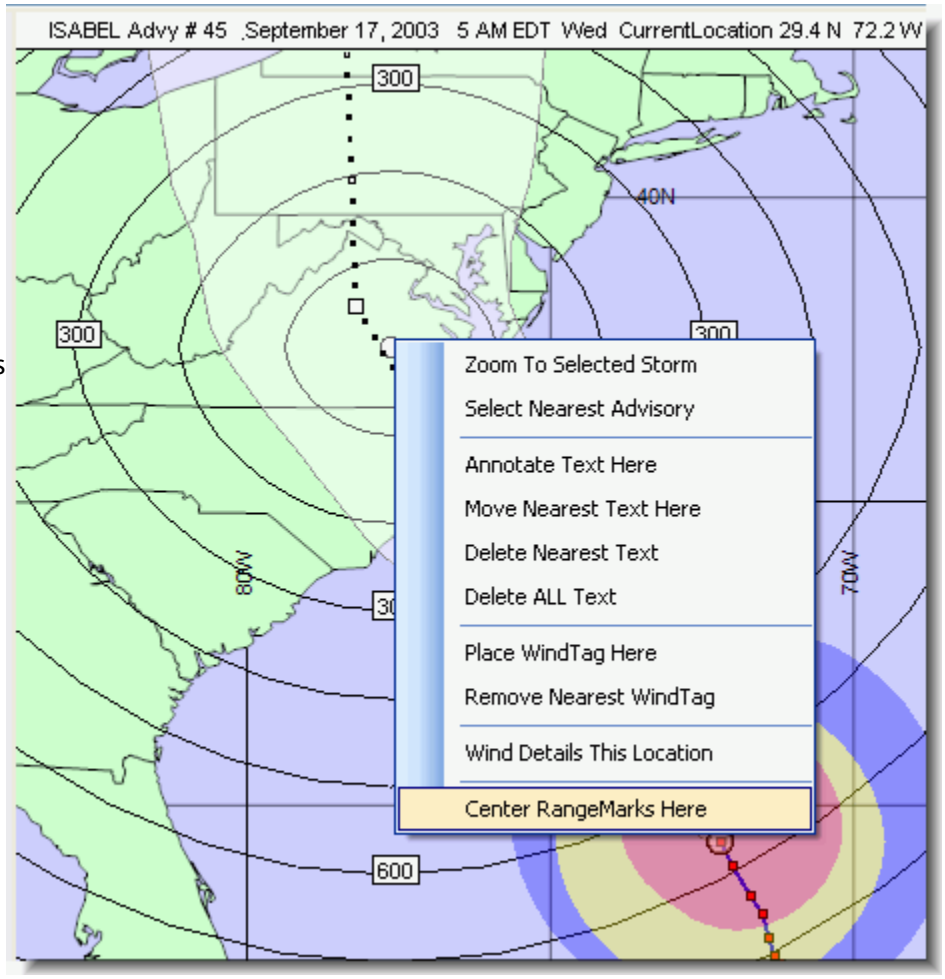
Wind Tag locations are saved on disk between sessions, so you can set them up for an area of concern, and they will be available when you next use the program.

The exact location of the wind speed and direction computed with the wind tags is at the upper left corner of the wind tag box.

How to Use Wind Tags Ahead of a Land-falling Storm

1. Hurrevac2010 is pre-configured with a few wind tags already on the map, so the first action you may want to take is to completely clear the map display of wind tags. To do this, go to ANNOTATION...Wind Tags...Delete All.
2. Next, right-click on the map at a coastal location within the projected path of the storm. Repeat this step in other areas within the projected path to add a number of wind tags to the left and right of the forecast track. If needed, you can delete select tags with ANNOTATION...Wind Tags...Delete Tag.
3. Advance the storm along its forecast track (or actual track, if viewing an old advisory). Wind tag direction is influenced even when the storm is still distant. However wind tag speed only displays when the storm is directly over head.

Range Marks



Range Marks are an ANNOTATION item, accessed in the Toolbox and through right-clicking on the map.

Range marks can be a useful way of illustrating how far away the storm is from a location of interest.

Working with range marks

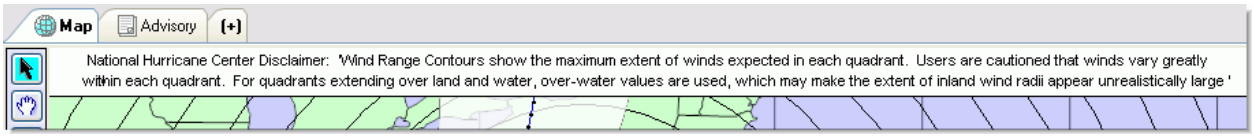
Range marks are toggled on and off with the 'Range Marks' check box under the ANNOTATION heading of the Toolbox. Look just below this check box for access to the setup form. Options on the setup form include:

- Mileage Type (Statute or Nautical miles)
- Interval or miles or knots
- Centered At (a specified Lat/Lon or a point clicked on the map)

Another method of quickly configuring range marks is to right-click on the map and select 'Center Range Marks Here' from the pop-up menu.

Disclaimers

Disclaimers are an ANNOTATION item.



The following disclaimer from the *NHC* will appear as a banner across the top of the map when 'Disclaimers' is checked under the ANNOTATION heading of the Toolbox.

"National Hurricane Center Disclaimer: 'Wind Range Contours show the maximum extent of winds expected in each quadrant. Users are cautioned that winds vary greatly within each quadrant. For quadrants extending over land and water, over-water values are used, which may make the extent of inland winds radii appear unrealistically large"

About Wind Over-Forecasting

Over-forecasting of wind occurs in certain situations with land-falling and closely paralleling storms due to limitations in the level of detail provided on *wind ranges* in the forecast advisory. Hurrevac strictly uses the wind ranges specified by *NHC* , *CPHC* , or *JTWC* in its *advisory* . These are given only in 4 quadrants: Northeast (NE in advisory), Southeast (SE), Southwest (SW) and Northwest (NW).

With only these wind ranges as input, and even with smoothing of the range changes between quadrants, the wind forecast must show that most or all of the quadrant has the specified wind range from the advisory. Therefore as stated in the NHC Disclaimer, in certain situations a small area of stronger winds at the edge of a quadrant may exist and the advisory must reflect that wind range for the quadrant as a whole.

This situation most frequently occurs on the left side of storms that are moving forward at a decent pace. It is also noted frequently in closely paralleling storm situations. In these situations, it is normal for there to be a marked decrease in wind ranges on the left side (west side for northward moving storms), especially if the storm is moving forward at a significant speed.

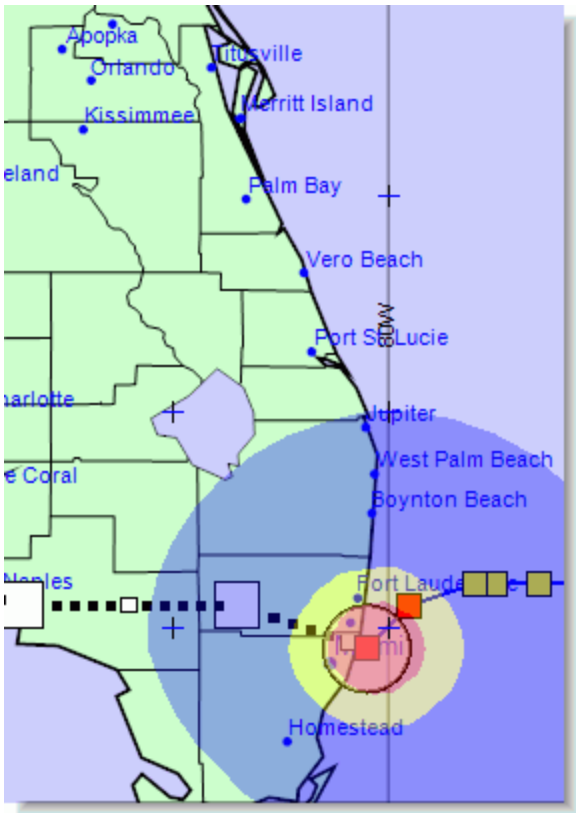
But, since there is usually a pronounced drop-off in wind ranges from the right side to left side of the storm in these situations, stronger winds in a small area just inside the left (weaker) quadrant can result in a greater wind range in the advisory for the entire quadrant than actually exists.

Also, there are certain situations where a small area of stronger winds are located well within a quadrant (perhaps in a small area of heavy showers) but are not reflected in the rest of the quadrant.

Place Names

Place Names are an ANNOTATION item.

Place names can be toggled on and off under the ANNOTATION heading.



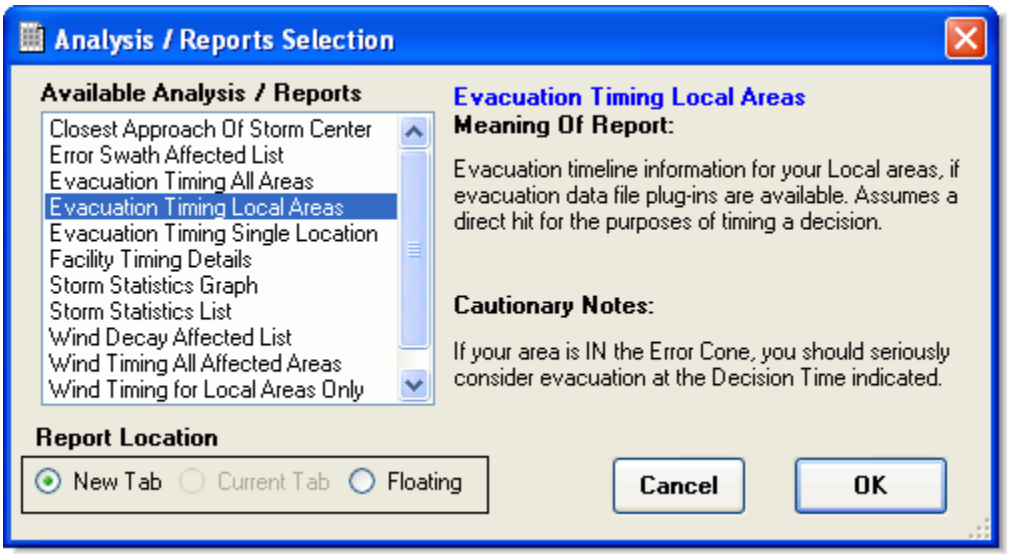
Reports

REPORTS is a heading within Hurrevac2010's Toolbox. When you request an item under this heading, analysis is made on a particular forecast *advisory* and presented in the form of a report tab.

To generate a report, you must first highlight the desired storm on the map by clicking on its name in the list.

The 'Analysis/Reports Selection' form is called when you click on the Analysis/Reports button on the Monitoring Ribbon at top of the program or when you click on a report within the Toolbox.

To guide your selection, each report is accompanied by a description (or 'Meaning of Report') and 'Cautionary Notes.'



Standard Available Reports

- Storm Statistics
- Error Swath
- Wind Decay
- Wind Timing
- Evacuation Timing
- Closest Approach
- Rainfall
- River Flood Outlook

Special Reports

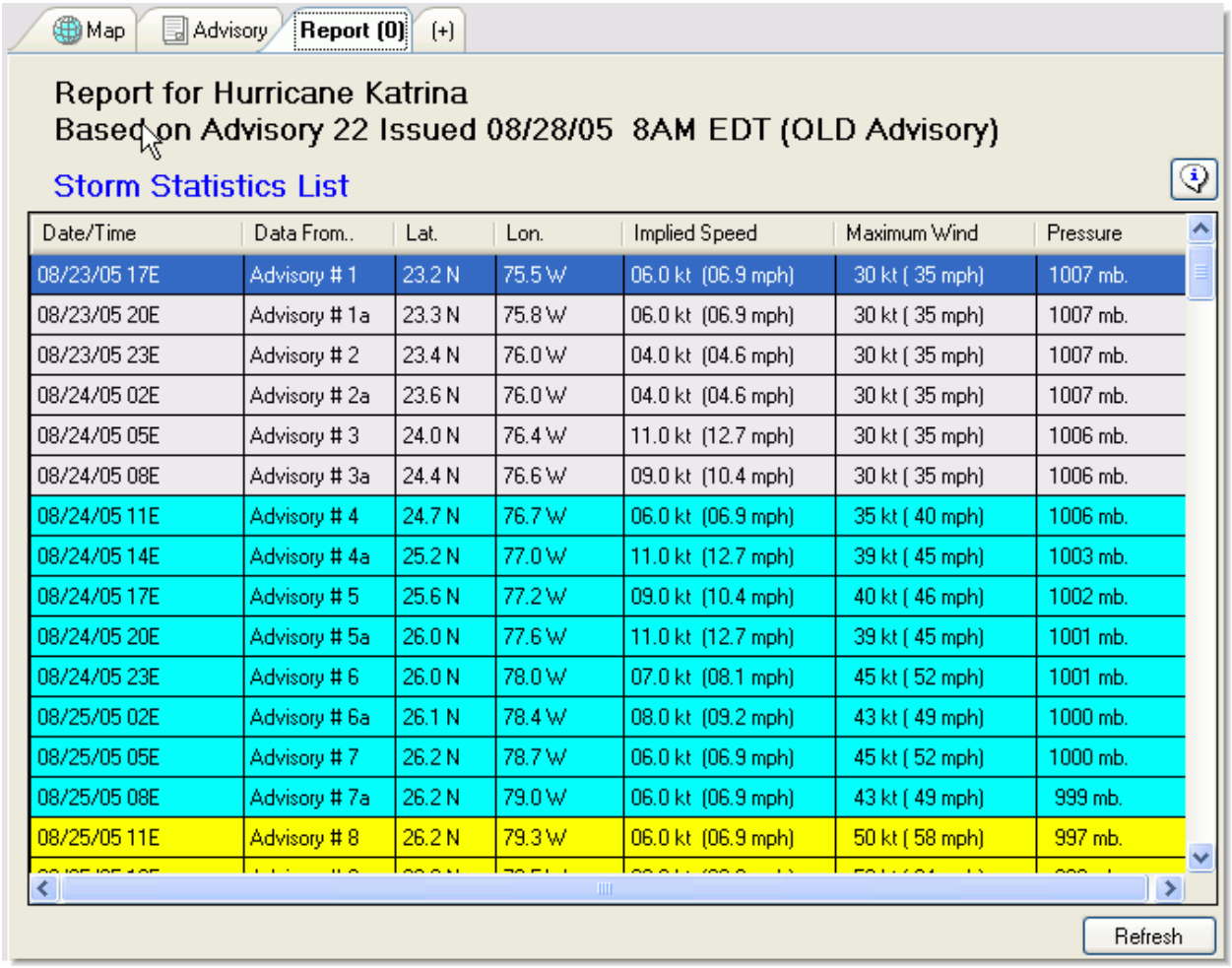
The following reports will appear in the list only if special state-specific tools are installed.

- Risk Profile
- Facility Timing Details

Storm Statistics Report

The Storm Statistics Report is accessed from the REPORTS heading of Hurrevac2010's Toolbox.

This report consists of past wind speed, pressure, and *forward speed* during the life of the storm to date, and then forecast of wind speed and *forward speed* out to 120 hours. Each row of the tabular report is colored according to the intensity of the storm at the time of that forecast hour or old advisory - blue if tropical storm force (34kt or 39mph), yellow if 50kt or 58mph, and red if hurricane force (64kt or 74mph).



Date/Time	Data From..	Lat.	Lon.	Implied Speed	Maximum Wind	Pressure
08/23/05 17E	Advisory # 1	23.2 N	75.5 W	06.0 kt (06.9 mph)	30 kt (35 mph)	1007 mb.
08/23/05 20E	Advisory # 1a	23.3 N	75.8 W	06.0 kt (06.9 mph)	30 kt (35 mph)	1007 mb.
08/23/05 23E	Advisory # 2	23.4 N	76.0 W	04.0 kt (04.6 mph)	30 kt (35 mph)	1007 mb.
08/24/05 02E	Advisory # 2a	23.6 N	76.0 W	04.0 kt (04.6 mph)	30 kt (35 mph)	1007 mb.
08/24/05 05E	Advisory # 3	24.0 N	76.4 W	11.0 kt (12.7 mph)	30 kt (35 mph)	1006 mb.
08/24/05 08E	Advisory # 3a	24.4 N	76.6 W	09.0 kt (10.4 mph)	30 kt (35 mph)	1006 mb.
08/24/05 11E	Advisory # 4	24.7 N	76.7 W	06.0 kt (06.9 mph)	35 kt (40 mph)	1006 mb.
08/24/05 14E	Advisory # 4a	25.2 N	77.0 W	11.0 kt (12.7 mph)	39 kt (45 mph)	1003 mb.
08/24/05 17E	Advisory # 5	25.6 N	77.2 W	09.0 kt (10.4 mph)	40 kt (46 mph)	1002 mb.
08/24/05 20E	Advisory # 5a	26.0 N	77.6 W	11.0 kt (12.7 mph)	39 kt (45 mph)	1001 mb.
08/24/05 23E	Advisory # 6	26.0 N	78.0 W	07.0 kt (08.1 mph)	45 kt (52 mph)	1001 mb.
08/25/05 02E	Advisory # 6a	26.1 N	78.4 W	08.0 kt (09.2 mph)	43 kt (49 mph)	1000 mb.
08/25/05 05E	Advisory # 7	26.2 N	78.7 W	06.0 kt (06.9 mph)	45 kt (52 mph)	1000 mb.
08/25/05 08E	Advisory # 7a	26.2 N	79.0 W	06.0 kt (06.9 mph)	43 kt (49 mph)	999 mb.
08/25/05 11E	Advisory # 8	26.2 N	79.3 W	06.0 kt (06.9 mph)	50 kt (58 mph)	997 mb.

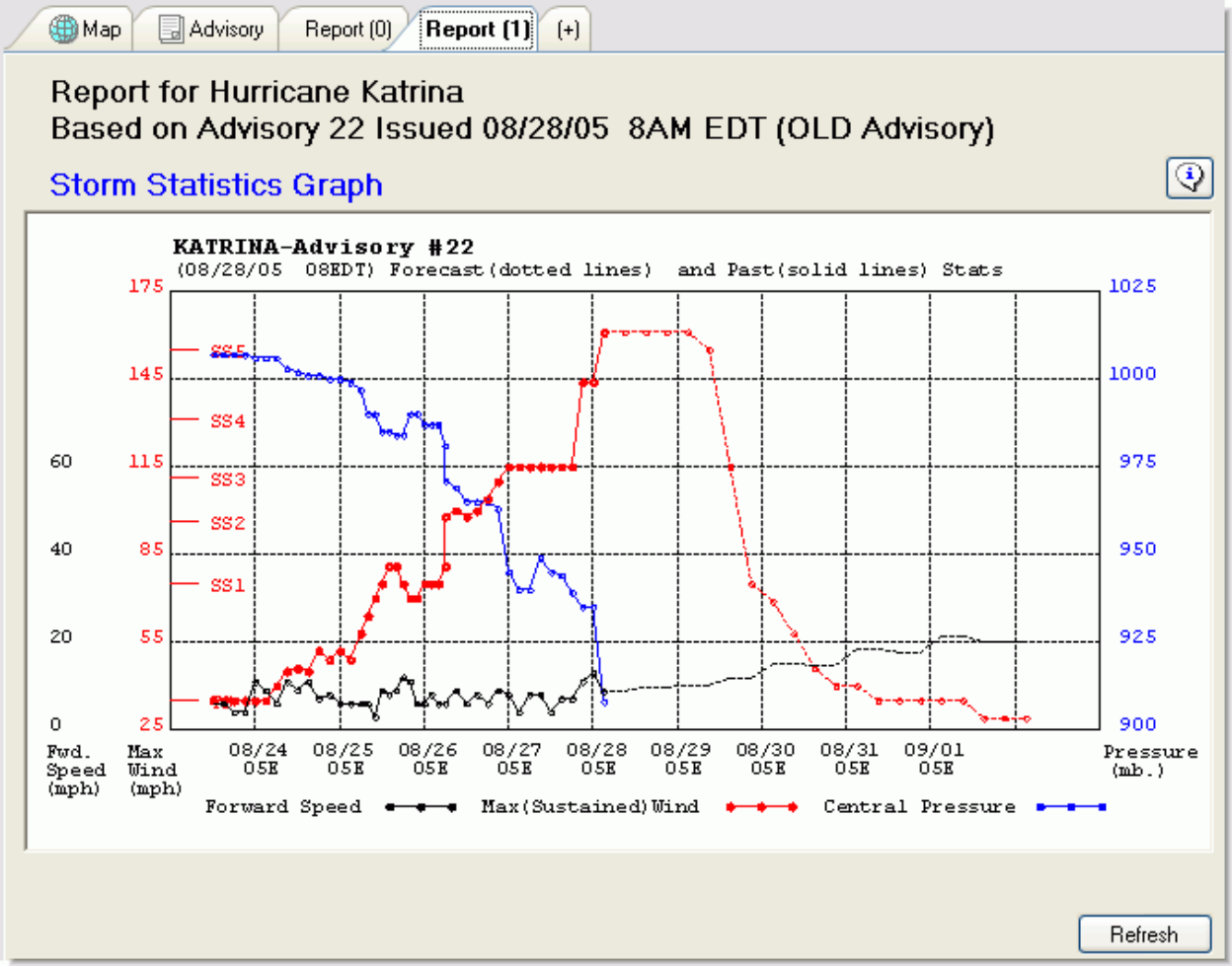
The report's data is initially sorted by Date/Time. To sort by any other item, click on its heading once for ascending order, twice for descending order.

If you have downloaded an advisory update or switched the map display to a different advisory, use the 'Refresh' button to rerun the analysis based upon the changed forecast information.

To print or export the report's data to a file, click the Print button on the Monitoring Ribbon at the top of the program.

Storm Statistics Graph

An additional option is available within the 'Analysis/Reports' selection to display storm statistics in graph form.

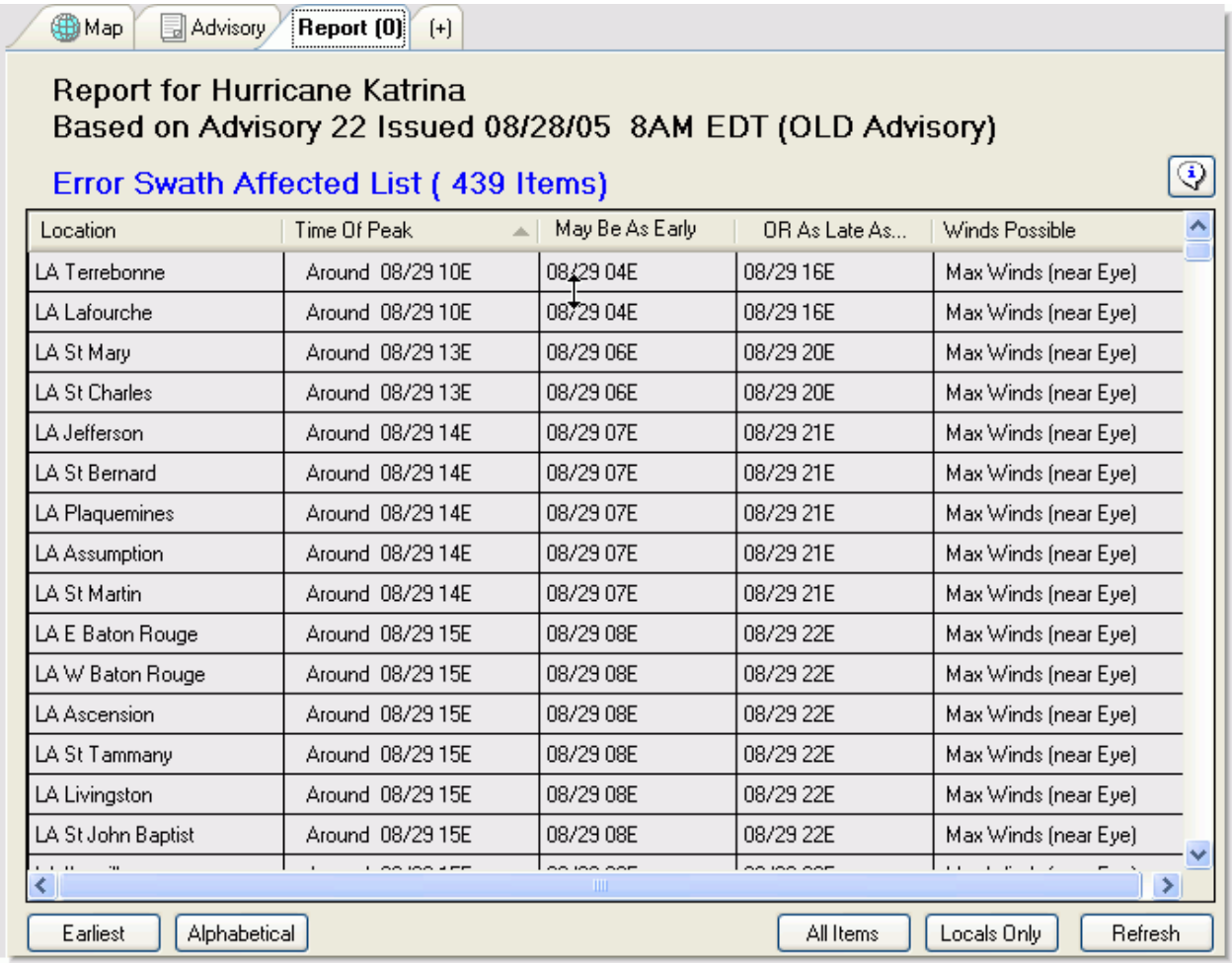


The *forward speed* is plotted in black with its scale bar at far left. Maximum sustained winds is plotted in red with a scale bar at near left. Central pressure is plotted in blue with a scale bar on the right edge of the graph. Statistics from old advisories are connected by a solid line. Statistics from the forecast period are connected by a dashed line. The NHC does not provide forecasts of barometric pressure, so the blue line is not plotted for the forecast period.

Error Swath Report

The Error Swath Report is accessed from the REPORTS heading of Hurrevac2010's Toolbox.

This report is an analysis of counties or parishes located within the Error Swath, or white cone surrounding a storm's *forecast track* . Counties within the error swath or *fringe winds* area bordering the error swath have a chance of eventually being affected by the storm.



For each reported county, an indication is given of how early or how late the center could cross the area, assuming average error late and average error early, as well as the time implied by the *advisory* as the median arrival time. The 'Winds Possible' heading indicates whether the county is within the actual error cone (making Max Winds from the storm's core possible) or within only the tropical storm-force (fringe wind) area .

The report's data is initially sorted by counties affected first ('Time of Peak' heading). To sort by any other item, click on its heading once for ascending order, twice for descending order. Additionally, the list may be filtered for 'Locals Only'.

If you have downloaded an advisory update or switched the map display to a different advisory, use the 'Refresh' button to rerun the analysis based upon the changed forecast information.

To print or export the report's data to a file, click the Print button on the Monitoring Ribbon at the top of the program.

Wind Decay Report

The Wind Decay Report is accessed from the REPORTS heading of Hurrevac2010's Toolbox.

This report, formerly referred to as the MEOW or Maximum Envelope of Winds, describes the maximum distance certain categories of wind can penetrate inland, given the storm strength and forward speed. These wind decay models are particularly important for determining winds over areas far inland from the coastline, and for planning purposes. In the last few hours before landfall, the specific *NHC* Wind Swath and Wind Timing Report should be used instead of the wind decay models.

If no decay model is currently selected, a selection panel will appear, asking you to choose one. The default model selected is one determined from the Max Wind forecast by the NHC for that advisory at any time out to 72 hours....and the forecast forward speed of the storm over the next 36 hours. You can choose any model you wish or leave the selection as is.

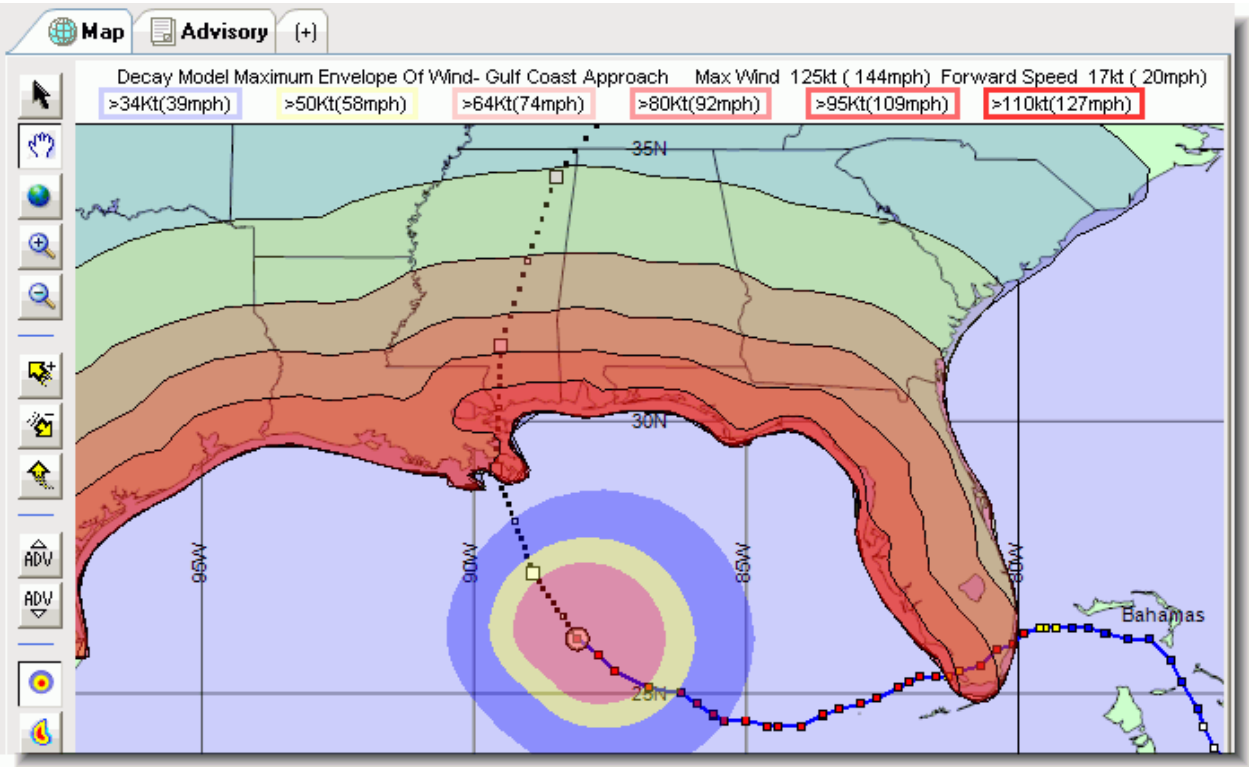
Hurrevac generates a report for an entire region (Northeast, Southeast, or Gulf Coast), so the list is very long and likely includes many counties that are well away from the forecast track. To limit the report length either choose 'Locals Only' or 'In Error Cone' which limits the list to those within the Average Error Swath.

The report's data is initially sorted alphabetically by state and county. To sort by the Category of Wind, click on its heading once for ascending order, twice for descending order. There is no timing involved with this report, just the strength of winds that could occur in an area, given a perfect strike on the area at a selected storm strength and selected *forward speed* . Each row of the tabular report is colored according to the wind intensity - blue if tropical storm force (34kt or 39mph), yellow if 50kt or 58mph, and red if hurricane force (64kt or 74mph).

To print or export the report's data to a file, click the Print button on the Monitoring Ribbon at the top of the program.

Map Display

Model information can also be displayed on the tracking map by selecting Wind Decay...Graphic from the REPORTS heading of the Toolbox. A legend appears across the top of the map identifying the wind categories.



Background Information

The NHC Wind Decay Model (DeMaria and Kaplan 1996) predicts how far inland certain categories of wind will penetrate, assuming a) a *direct hit* b) specified maximum sustained winds of the storm and c) specified *forward speed* of the storm.

There are 3 regions which were computed in the decay model, necessitated by the different behavior of storms in these 3 areas.

- Gulf Of Mexico land-falling storms (includes the west coast of Florida)
- Southeast Coast land-falling storms (from Key West to the NC/VA border

- Mid Atlantic and New England storms (north of NC/VA border) - this separate area necessitated by the faster forward speeds typical there.

The colors representing the wind categories are annotated on screen when this mode is in effect.

Wind Timing Report

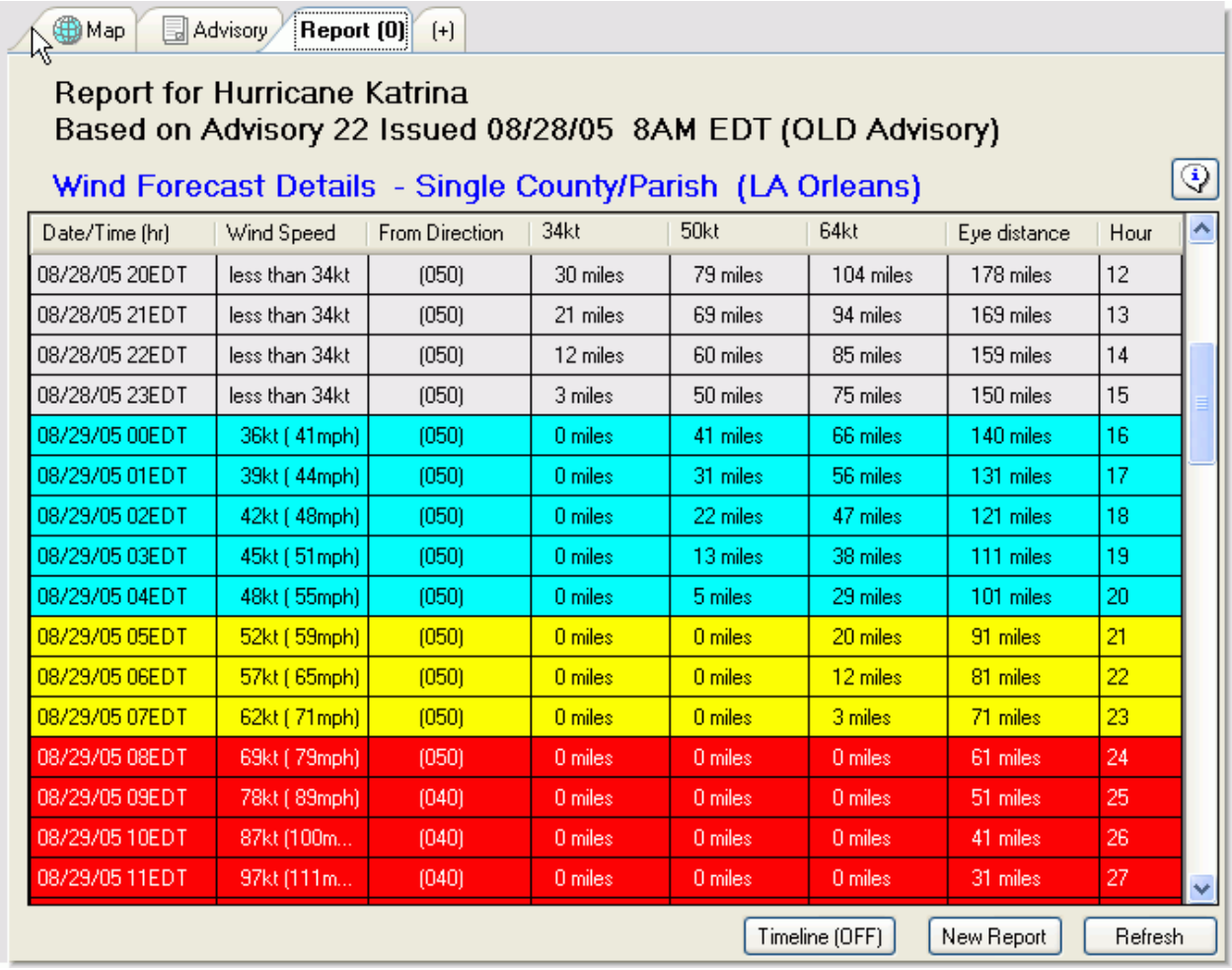
The Wind Timing Reports are accessed from the REPORTS heading of Hurrevac2010's Toolbox.

Note that all the computations done to arrive at the information here use the *advisory* forecast's wind swath as a basis. This is more specific information (subject to forecast error) which should not be utilized until the last few advisories before landfall.

To print or export the report's data to a file, click the Print button on the Monitoring Ribbon at the top of the program.

Single Location

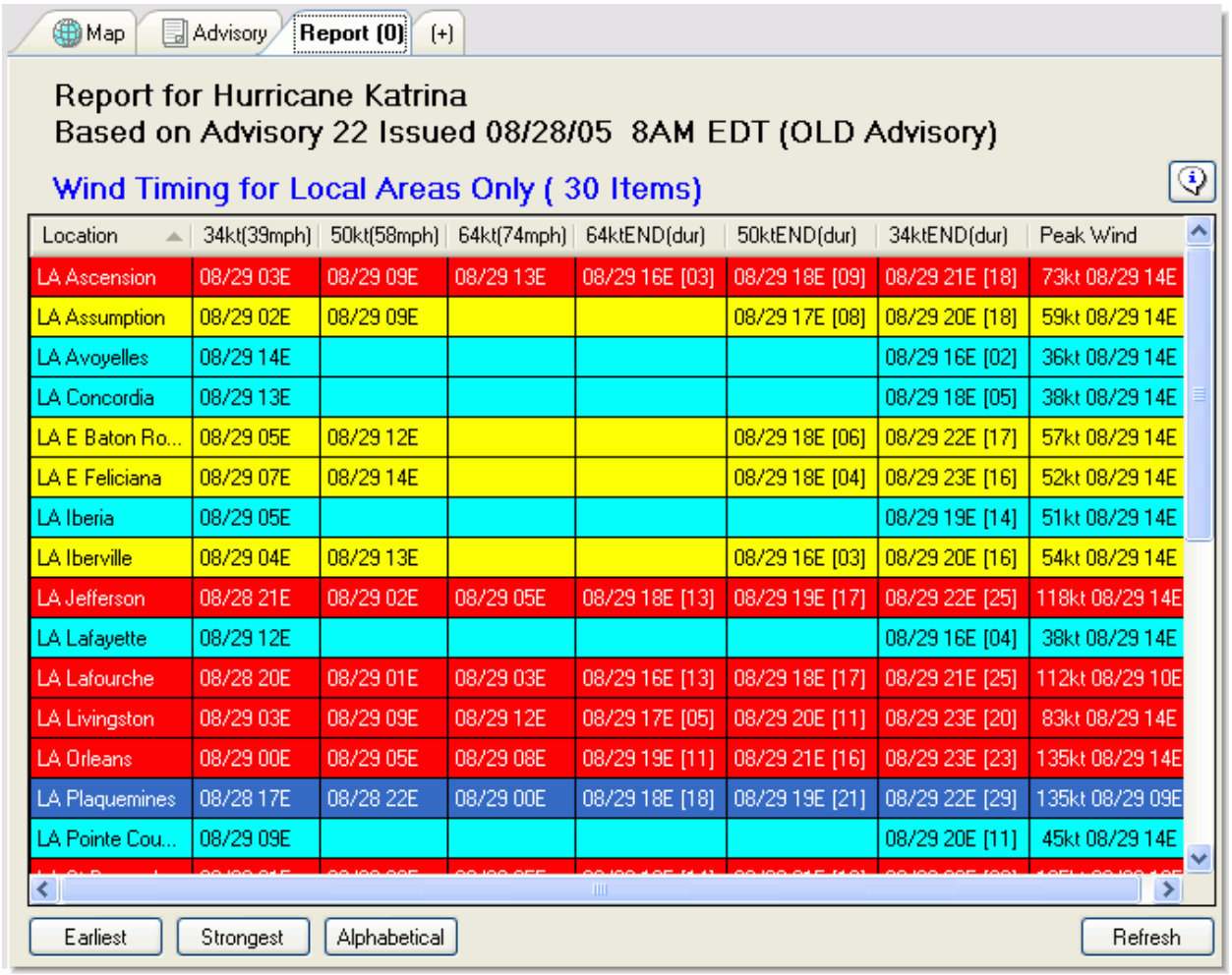
The Wind Timing...Single Location report consists of hour-by-hour wind detail information for a selected county. The time frame ranges from hour 0 (the hour of the forecast) to hour 72 (the limit of the wind swath). Each row of the tabular report is colored according to the wind intensity - gray if under threshold for tropical storm force winds, blue if tropical storm force (34kt or 39mph), yellow if 50kt or 58mph, and red if hurricane force (64kt or 74mph).



Date/Time (hr)	Wind Speed	From Direction	34kt	50kt	64kt	Eye distance	Hour
08/28/05 20EDT	less than 34kt	(050)	30 miles	79 miles	104 miles	178 miles	12
08/28/05 21EDT	less than 34kt	(050)	21 miles	69 miles	94 miles	169 miles	13
08/28/05 22EDT	less than 34kt	(050)	12 miles	60 miles	85 miles	159 miles	14
08/28/05 23EDT	less than 34kt	(050)	3 miles	50 miles	75 miles	150 miles	15
08/29/05 00EDT	36kt (41mph)	(050)	0 miles	41 miles	66 miles	140 miles	16
08/29/05 01EDT	39kt (44mph)	(050)	0 miles	31 miles	56 miles	131 miles	17
08/29/05 02EDT	42kt (48mph)	(050)	0 miles	22 miles	47 miles	121 miles	18
08/29/05 03EDT	45kt (51mph)	(050)	0 miles	13 miles	38 miles	111 miles	19
08/29/05 04EDT	48kt (55mph)	(050)	0 miles	5 miles	29 miles	101 miles	20
08/29/05 05EDT	52kt (59mph)	(050)	0 miles	0 miles	20 miles	91 miles	21
08/29/05 06EDT	57kt (65mph)	(050)	0 miles	0 miles	12 miles	81 miles	22
08/29/05 07EDT	62kt (71mph)	(050)	0 miles	0 miles	3 miles	71 miles	23
08/29/05 08EDT	69kt (79mph)	(050)	0 miles	0 miles	0 miles	61 miles	24
08/29/05 09EDT	78kt (89mph)	(040)	0 miles	0 miles	0 miles	51 miles	25
08/29/05 10EDT	87kt (100m...	(040)	0 miles	0 miles	0 miles	41 miles	26
08/29/05 11EDT	97kt (111m...	(040)	0 miles	0 miles	0 miles	31 miles	27

All Locations or Local Areas

The Wind Timing...All Locations report consists of information for all counties within the wind swath of the advisory forecast. The forecasted arrival time and ending time is given for each of the three categories of wind. Duration of winds equal to or greater than the category appear in parentheses after the ending times. Time of peak winds (storm's closest approach) is reported in the final column.



Location	34kt(39mph)	50kt(58mph)	64kt(74mph)	64ktEND(dur)	50ktEND(dur)	34ktEND(dur)	Peak Wind
LA Ascension	08/29 03E	08/29 09E	08/29 13E	08/29 16E [03]	08/29 18E [09]	08/29 21E [18]	73kt 08/29 14E
LA Assumption	08/29 02E	08/29 09E			08/29 17E [08]	08/29 20E [18]	59kt 08/29 14E
LA Avoyelles	08/29 14E					08/29 16E [02]	36kt 08/29 14E
LA Concordia	08/29 13E					08/29 18E [05]	38kt 08/29 14E
LA E Baton Ro...	08/29 05E	08/29 12E			08/29 18E [06]	08/29 22E [17]	57kt 08/29 14E
LA E Feliciana	08/29 07E	08/29 14E			08/29 18E [04]	08/29 23E [16]	52kt 08/29 14E
LA Iberia	08/29 05E					08/29 19E [14]	51kt 08/29 14E
LA Iberville	08/29 04E	08/29 13E			08/29 16E [03]	08/29 20E [16]	54kt 08/29 14E
LA Jefferson	08/28 21E	08/29 02E	08/29 05E	08/29 18E [13]	08/29 19E [17]	08/29 22E [25]	118kt 08/29 14E
LA Lafayette	08/29 12E					08/29 16E [04]	38kt 08/29 14E
LA Lafourche	08/28 20E	08/29 01E	08/29 03E	08/29 16E [13]	08/29 18E [17]	08/29 21E [25]	112kt 08/29 10E
LA Livingston	08/29 03E	08/29 09E	08/29 12E	08/29 17E [05]	08/29 20E [11]	08/29 23E [20]	83kt 08/29 14E
LA Orleans	08/29 00E	08/29 05E	08/29 08E	08/29 19E [11]	08/29 21E [16]	08/29 23E [23]	135kt 08/29 14E
LA Plaquemines	08/28 17E	08/28 22E	08/29 00E	08/29 18E [18]	08/29 19E [21]	08/29 22E [29]	135kt 08/29 09E
LA Pointe Cou...	08/29 09E					08/29 20E [11]	45kt 08/29 14E

The report's data is initially sorted alphabetically by state and county. To sort by a different item, click on its heading once for ascending order, twice for descending order. Each row of the tabular report is colored according to the maximum wind intensity forecast for that county - blue if tropical storm force (34kt or 39mph), yellow if 50kt or 58mph, and red if hurricane force (64kt or 74mph).

You can also run this Wind Timing analysis for Local Areas for a more selective report.

Evacuation Timing Report

The Evacuation Timing Reports are accessed from the REPORTS heading of Hurrevac2010's Toolbox. These reports are available for counties with Hurricane Evacuation Study clearance times installed as State Plug-Ins.

The purpose of Evacuation Timing is to determine how long you can afford to wait before beginning an evacuation. The advantage of delaying this evacuation start for as long as possible is so that your decisions are based on the most accurate storm forecast, while still allowing enough time for preparations to be completed if needed.

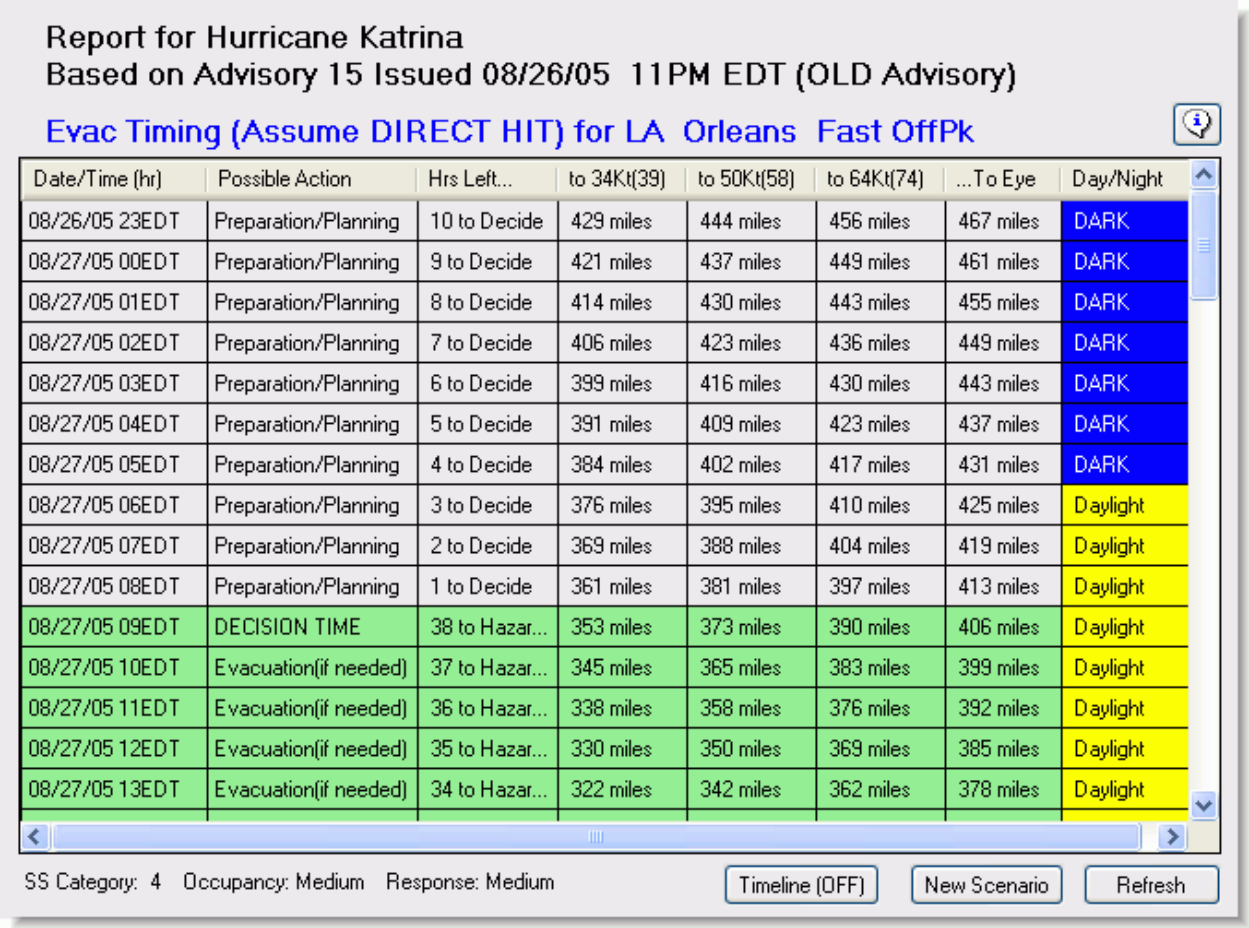
Note that all the computations done to arrive at the information here assume a direct hit on the area for the purposes of timing actions (a worst case scenario and one you must consider if in or near the threat area).

To print or export the reports data to a file, click the Print button on the Monitoring Ribbon at the top of the program.

Single Location

The Evacuation Timing...Single Location report consists of hour-by-hour timeline of actions for a selected county. The time frame ranges from hour 0 (the hour of the forecast) to hour 72 (the limit of the wind forecast). Rows of the tabular report are colored according to activity: gray if pre-decision or post-storm time, green if active evacuation time, blue if within tropical storm force (34kt or 39mph), yellow if within 50kt or 58mph, and red if within hurricane force (64kt or 74mph) conditions.

In the final column, the hours in daylight and dark are noted - an important consideration when deciding on the best time to begin an evacuation.



Report for Hurricane Katrina
Based on Advisory 15 Issued 08/26/05 11PM EDT (OLD Advisory)

Evac Timing (Assume DIRECT HIT) for LA Orleans Fast OffPk

Date/Time (hr)	Possible Action	Hrs Left...	to 34Kt(39)	to 50Kt(58)	to 64Kt(74)	...To Eye	Day/Night
08/26/05 23EDT	Preparation/Planning	10 to Decide	429 miles	444 miles	456 miles	467 miles	DARK
08/27/05 00EDT	Preparation/Planning	9 to Decide	421 miles	437 miles	449 miles	461 miles	DARK
08/27/05 01EDT	Preparation/Planning	8 to Decide	414 miles	430 miles	443 miles	455 miles	DARK
08/27/05 02EDT	Preparation/Planning	7 to Decide	406 miles	423 miles	436 miles	449 miles	DARK
08/27/05 03EDT	Preparation/Planning	6 to Decide	399 miles	416 miles	430 miles	443 miles	DARK
08/27/05 04EDT	Preparation/Planning	5 to Decide	391 miles	409 miles	423 miles	437 miles	DARK
08/27/05 05EDT	Preparation/Planning	4 to Decide	384 miles	402 miles	417 miles	431 miles	DARK
08/27/05 06EDT	Preparation/Planning	3 to Decide	376 miles	395 miles	410 miles	425 miles	Daylight
08/27/05 07EDT	Preparation/Planning	2 to Decide	369 miles	388 miles	404 miles	419 miles	Daylight
08/27/05 08EDT	Preparation/Planning	1 to Decide	361 miles	381 miles	397 miles	413 miles	Daylight
08/27/05 09EDT	DECISION TIME	38 to Hazar...	353 miles	373 miles	390 miles	406 miles	Daylight
08/27/05 10EDT	Evacuation(if needed)	37 to Hazar...	345 miles	365 miles	383 miles	399 miles	Daylight
08/27/05 11EDT	Evacuation(if needed)	36 to Hazar...	338 miles	358 miles	376 miles	392 miles	Daylight
08/27/05 12EDT	Evacuation(if needed)	35 to Hazar...	330 miles	350 miles	369 miles	385 miles	Daylight
08/27/05 13EDT	Evacuation(if needed)	34 to Hazar...	322 miles	342 miles	362 miles	378 miles	Daylight

SS Category: 4 Occupancy: Medium Response: Medium

Timeline (OFF) New Scenario Refresh

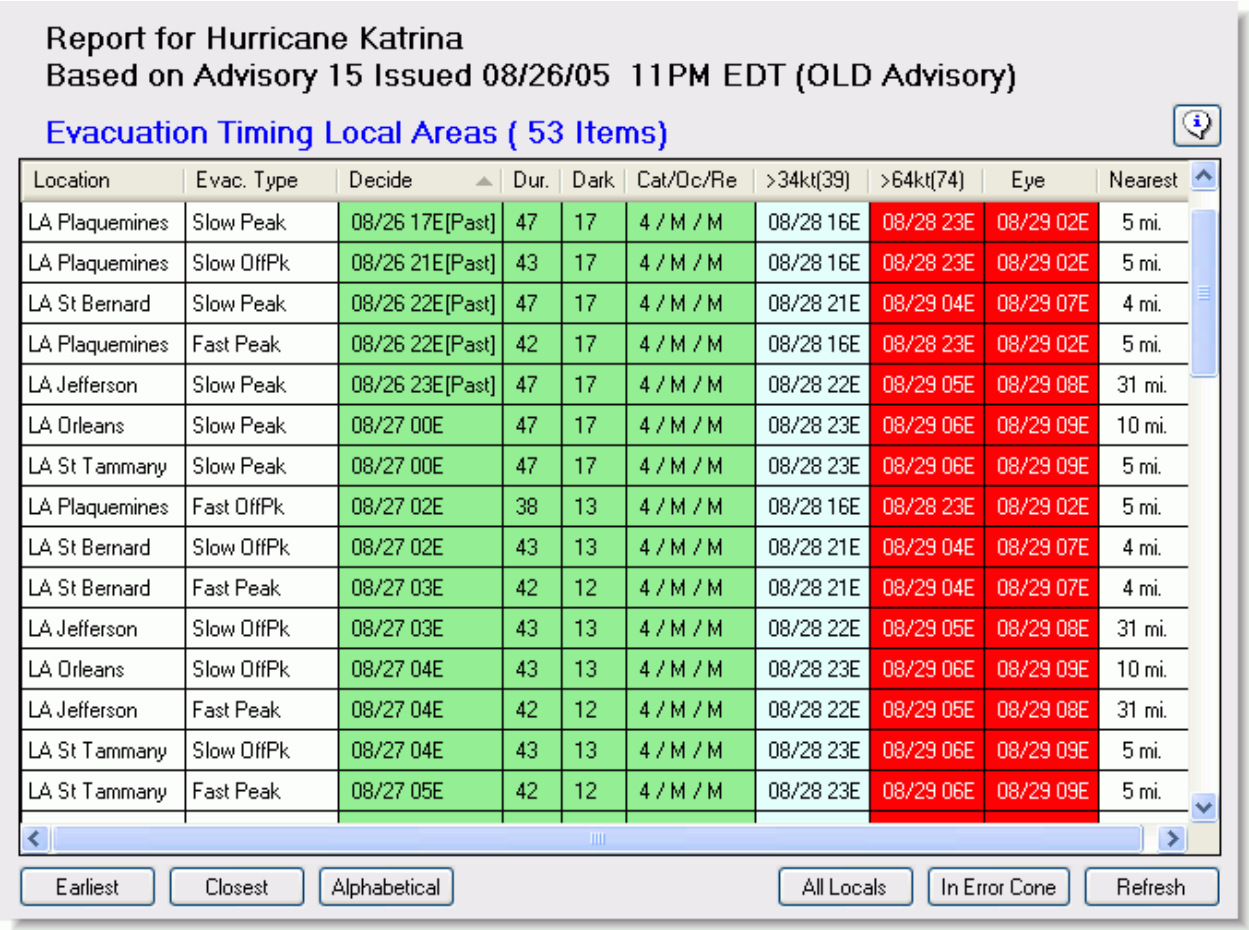
All Locations or Local Areas

The Evacuation Timing...All Locations report consists of evacuation timeline information for all locations with HES State Plug-Ins available.

The report's data is initially sorted by earliest decision time. To sort by a different item, click on its heading once for ascending order, twice for descending order. Items in the report are:

- Evacuation Type - as determined by the selected scenario in the Hurricane Evacuation Study
- Decide - Date/Time of decision time. [Past] indicates that the evacuation should already be underway if needed.
- Duration - the clearance time, or number of hours, needed to complete the evacuation

- Category/Occupancy/Response - Hurrevac defaults to medium occupancy, medium response, and the max storm category forecasted.
- Arrival times of 34kt (tropical storm-force) and 64kt (hurricane-force) winds,plus the eye of the storm
- 'Nearest' refers to how close the actual forecast comes to the county. This is the only data item that is based on the actual forecast rather than the worst-case, direct hit scenario.



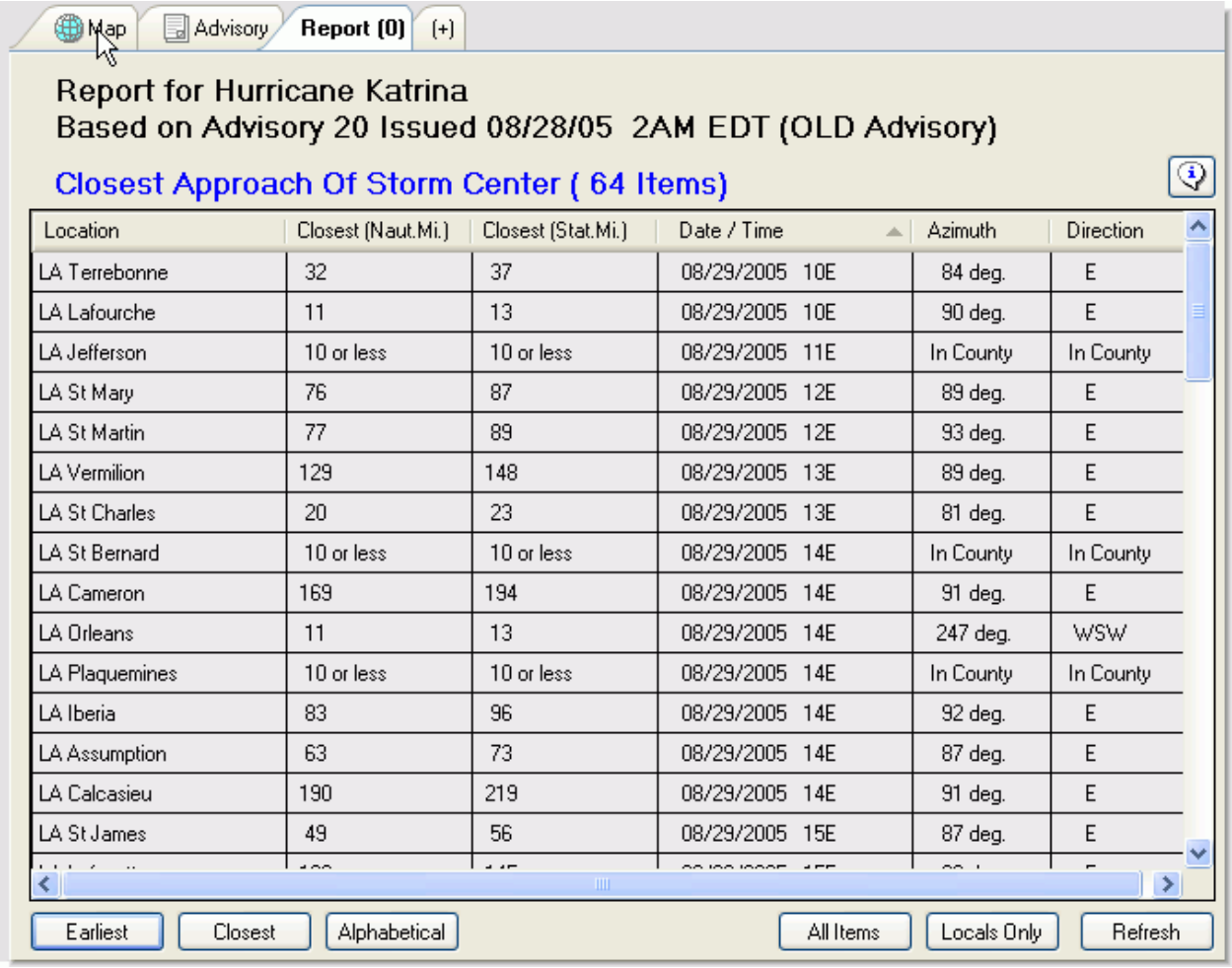
Location	Evac. Type	Decide	Dur.	Dark	Cat/Oc/Re	>34kt(39)	>64kt(74)	Eye	Nearest
LA Plaquemines	Slow Peak	08/26 17E[Past]	47	17	4 / M / M	08/28 16E	08/28 23E	08/29 02E	5 mi.
LA Plaquemines	Slow OffPk	08/26 21E[Past]	43	17	4 / M / M	08/28 16E	08/28 23E	08/29 02E	5 mi.
LA St Bernard	Slow Peak	08/26 22E[Past]	47	17	4 / M / M	08/28 21E	08/29 04E	08/29 07E	4 mi.
LA Plaquemines	Fast Peak	08/26 22E[Past]	42	17	4 / M / M	08/28 16E	08/28 23E	08/29 02E	5 mi.
LA Jefferson	Slow Peak	08/26 23E[Past]	47	17	4 / M / M	08/28 22E	08/29 05E	08/29 08E	31 mi.
LA Orleans	Slow Peak	08/27 00E	47	17	4 / M / M	08/28 23E	08/29 06E	08/29 09E	10 mi.
LA St Tammany	Slow Peak	08/27 00E	47	17	4 / M / M	08/28 23E	08/29 06E	08/29 09E	5 mi.
LA Plaquemines	Fast OffPk	08/27 02E	38	13	4 / M / M	08/28 16E	08/28 23E	08/29 02E	5 mi.
LA St Bernard	Slow OffPk	08/27 02E	43	13	4 / M / M	08/28 21E	08/29 04E	08/29 07E	4 mi.
LA St Bernard	Fast Peak	08/27 03E	42	12	4 / M / M	08/28 21E	08/29 04E	08/29 07E	4 mi.
LA Jefferson	Slow OffPk	08/27 03E	43	13	4 / M / M	08/28 22E	08/29 05E	08/29 08E	31 mi.
LA Orleans	Slow OffPk	08/27 04E	43	13	4 / M / M	08/28 23E	08/29 06E	08/29 09E	10 mi.
LA Jefferson	Fast Peak	08/27 04E	42	12	4 / M / M	08/28 22E	08/29 05E	08/29 08E	31 mi.
LA St Tammany	Slow OffPk	08/27 04E	43	13	4 / M / M	08/28 23E	08/29 06E	08/29 09E	5 mi.
LA St Tammany	Fast Peak	08/27 05E	42	12	4 / M / M	08/28 23E	08/29 06E	08/29 09E	5 mi.

To limit the report length either choose 'Locals Only' or 'In Error Cone' which limits the list to those within the Average Error Swath.

Closest Approach Report

The Closest Approach report is accessed from the REPORTS heading of Hurrevac2010's Toolbox.

This report shows the closest distance, point in time, and direction that a storm is forecasted to approach each county in the list. The predicted storm track of the current advisory is used to calculate this information.



Location	Closest (Naut.Mi.)	Closest (Stat.Mi.)	Date / Time	Azimuth	Direction
LA Terrebonne	32	37	08/29/2005 10E	84 deg.	E
LA Lafourche	11	13	08/29/2005 10E	90 deg.	E
LA Jefferson	10 or less	10 or less	08/29/2005 11E	In County	In County
LA St Mary	76	87	08/29/2005 12E	89 deg.	E
LA St Martin	77	89	08/29/2005 12E	93 deg.	E
LA Vermilion	129	148	08/29/2005 13E	89 deg.	E
LA St Charles	20	23	08/29/2005 13E	81 deg.	E
LA St Bernard	10 or less	10 or less	08/29/2005 14E	In County	In County
LA Cameron	169	194	08/29/2005 14E	91 deg.	E
LA Orleans	11	13	08/29/2005 14E	247 deg.	WSW
LA Plaquemines	10 or less	10 or less	08/29/2005 14E	In County	In County
LA Iberia	83	96	08/29/2005 14E	92 deg.	E
LA Assumption	63	73	08/29/2005 14E	87 deg.	E
LA Calcasieu	190	219	08/29/2005 14E	91 deg.	E
LA St James	49	56	08/29/2005 15E	87 deg.	E

The report's data is initially sorted by Date/Time of closest approach. To sort by a different item, click on its heading once for ascending order, twice for descending order.

To print or export the report data to a file, click the Print button on the Monitoring Ribbon at the top of the program.

Rainfall Report

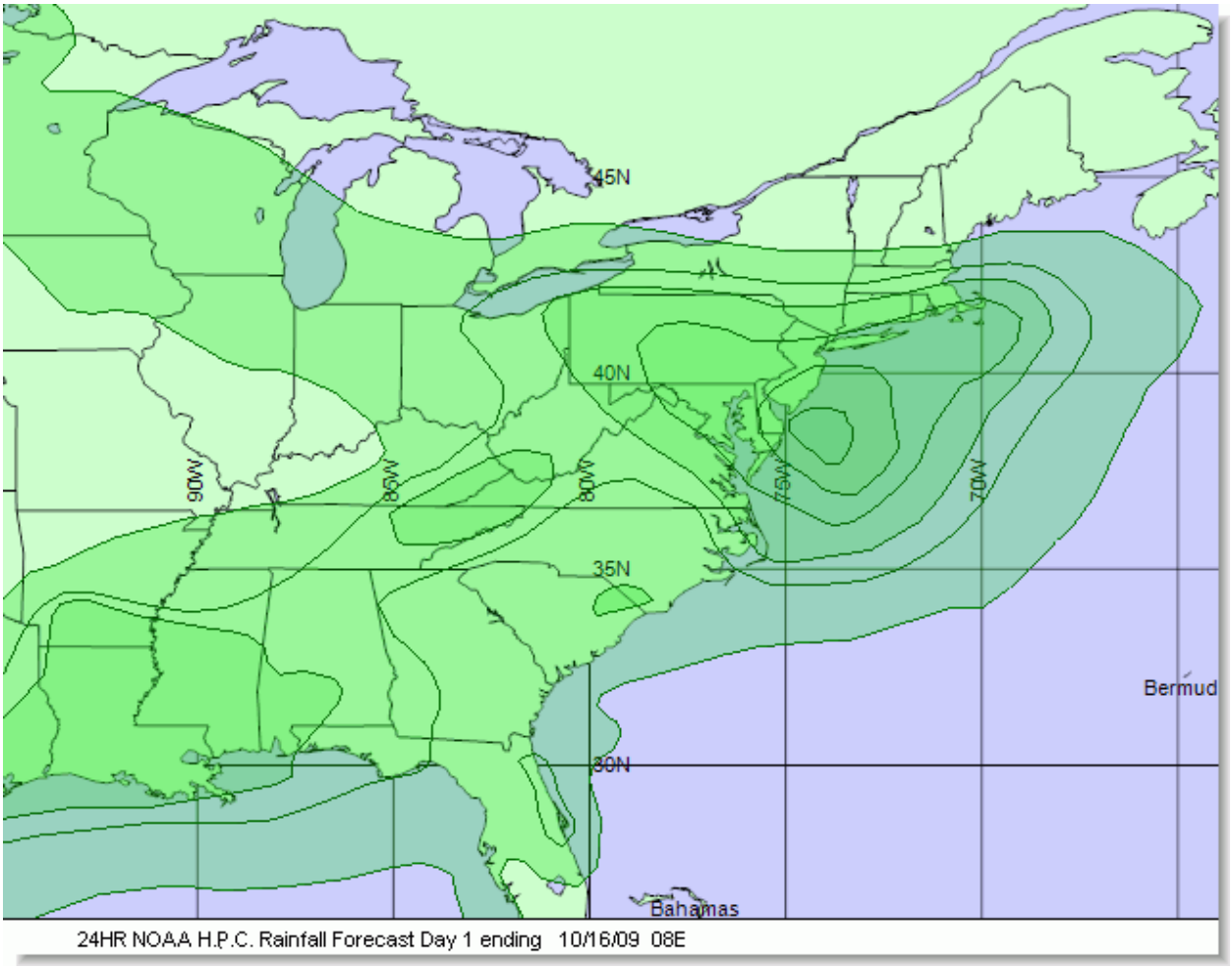
The 3-day quantitative rainfall forecast is one of several Other Forecast Data products that can be helpful to consider when weighing the flooding threat from an approaching storm. This information can be displayed on the map and in a report of affected counties/parishes.

The source of this data is the *HPC*, or *NOAA* Hydro-Met Prediction Center, which compiles generalized rainfall forecasts for the continental US. These forecasts are for three successive days and are issued twice a day, around 8am and 8pm Eastern(12Z and 0Z).

Each 24-hour cumulative rainfall forecast takes the form of isopleths (polygons) of rainfall amount, with the higher amounts of rain nested within the lower amounts. The amounts are in hundredths of an inch, with 0.25 = 1/4 inch, 1.50 = 1-1/2 inch, etc.

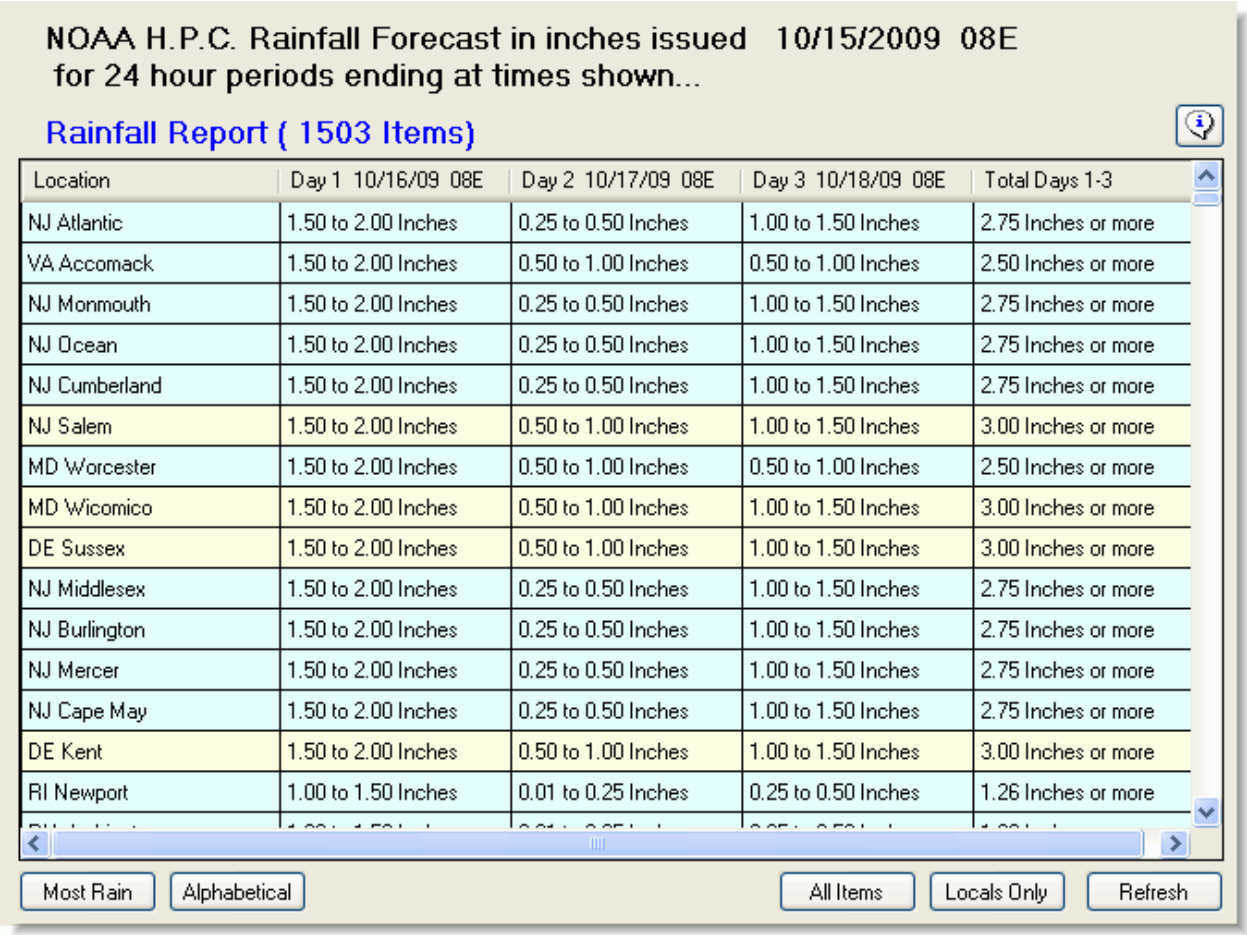
Map View

Days 1, 2, and 3 can be cycled through using the radio buttons under the Rain heading of the Current data tab.



Report View

The Rainfall Report is accessed from the REPORTS heading of Hurrevac2010's Toolbox.



Location	Day 1 10/16/09 08E	Day 2 10/17/09 08E	Day 3 10/18/09 08E	Total Days 1-3
NJ Atlantic	1.50 to 2.00 Inches	0.25 to 0.50 Inches	1.00 to 1.50 Inches	2.75 Inches or more
VA Accomack	1.50 to 2.00 Inches	0.50 to 1.00 Inches	0.50 to 1.00 Inches	2.50 Inches or more
NJ Monmouth	1.50 to 2.00 Inches	0.25 to 0.50 Inches	1.00 to 1.50 Inches	2.75 Inches or more
NJ Ocean	1.50 to 2.00 Inches	0.25 to 0.50 Inches	1.00 to 1.50 Inches	2.75 Inches or more
NJ Cumberland	1.50 to 2.00 Inches	0.25 to 0.50 Inches	1.00 to 1.50 Inches	2.75 Inches or more
NJ Salem	1.50 to 2.00 Inches	0.50 to 1.00 Inches	1.00 to 1.50 Inches	3.00 Inches or more
MD Worcester	1.50 to 2.00 Inches	0.50 to 1.00 Inches	0.50 to 1.00 Inches	2.50 Inches or more
MD Wicomico	1.50 to 2.00 Inches	0.50 to 1.00 Inches	1.00 to 1.50 Inches	3.00 Inches or more
DE Sussex	1.50 to 2.00 Inches	0.50 to 1.00 Inches	1.00 to 1.50 Inches	3.00 Inches or more
NJ Middlesex	1.50 to 2.00 Inches	0.25 to 0.50 Inches	1.00 to 1.50 Inches	2.75 Inches or more
NJ Burlington	1.50 to 2.00 Inches	0.25 to 0.50 Inches	1.00 to 1.50 Inches	2.75 Inches or more
NJ Mercer	1.50 to 2.00 Inches	0.25 to 0.50 Inches	1.00 to 1.50 Inches	2.75 Inches or more
NJ Cape May	1.50 to 2.00 Inches	0.25 to 0.50 Inches	1.00 to 1.50 Inches	2.75 Inches or more
DE Kent	1.50 to 2.00 Inches	0.50 to 1.00 Inches	1.00 to 1.50 Inches	3.00 Inches or more
RI Newport	1.00 to 1.50 Inches	0.01 to 0.25 Inches	0.25 to 0.50 Inches	1.26 Inches or more

The report's data can be sorted by any of the column headings. Click on a heading once for ascending order, twice for descending order...or you can sort by the Most Rain and Alphabetical buttons at the bottom of the report. Each row of the tabular report is colored according to the 3-day total rainfall forecast (blue if less than 3 inches, yellow if less than 5 inches, and red if 5 or more).

The report's data can be filtered by 'Locals Only.' or restored to All Items. The Refresh button should be used if you wish to update the report after a new HPC rainfall forecast is downloaded.

To print or export the report's data to a file, click the Print button on the Monitoring Ribbon at the top of the program.

IMPORTANT NOTES

These forecasts from HPC are currently issued every 12 hours and the NHC issues advisories on hurricanes at least every 6 hours. Therefore by the time the latest advisory from NHC is issued...the HPC rain forecast can easily be several hours old and therefore may not reflect the latest forecast storm track from NHC.

Also, these rainfall forecasts are smoothed and averaged amounts, while actual rain amounts , especially in the warm months, are not usually distributed as evenly, and tend to fluctuate widely over an area.

Therefore, as in hurricane forecasting, think of the forecast rain amounts as "educated guesses" that help you to zero in on the most vulnerable areas. Also as in hurricane forecasting, the rain amount error increases dramatically as the forecast goes to Day 2 and especially Day 3.

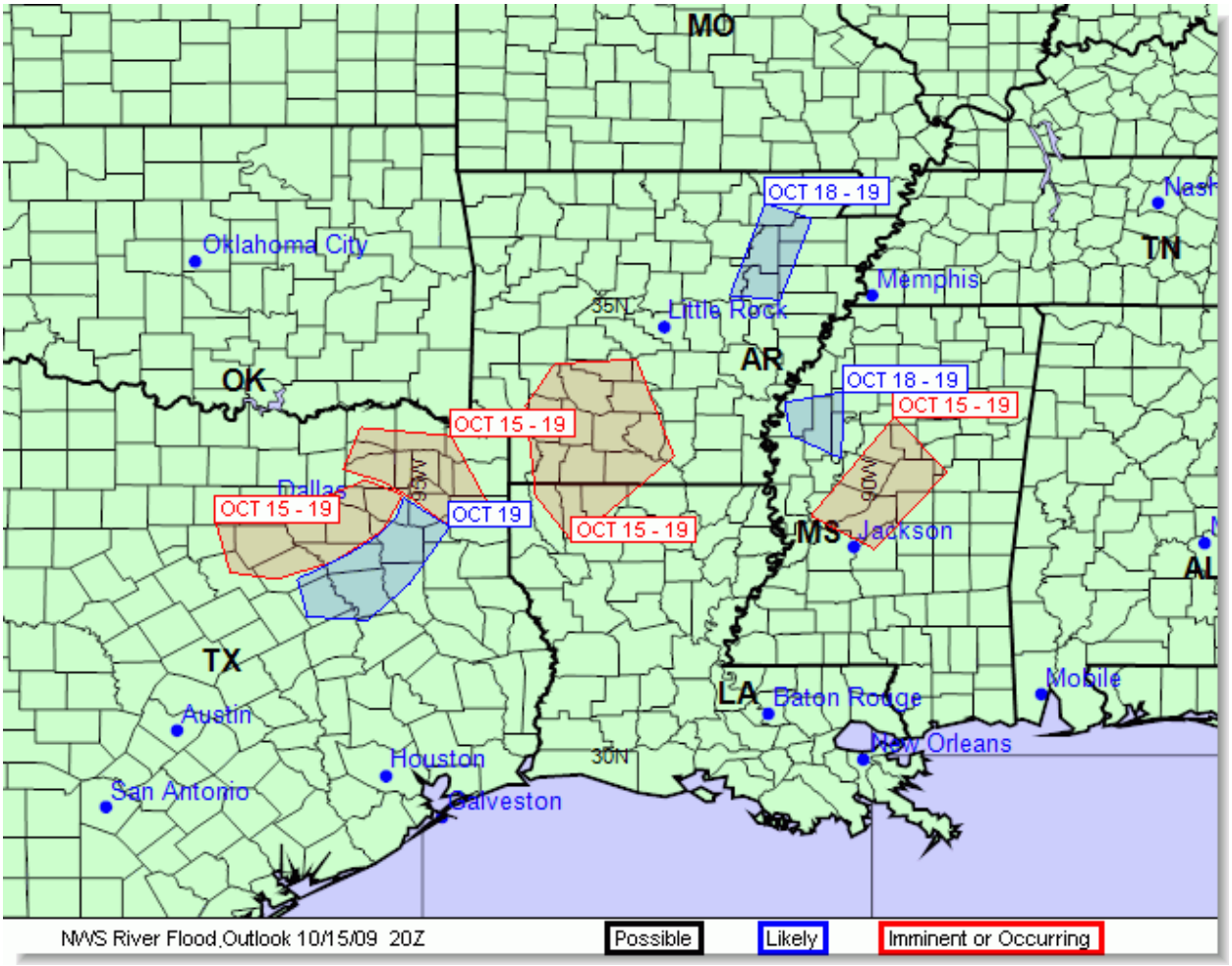
Always check with your local Weather Service office for the latest updates on the rainfall situation and the latest river stages. These forecasts are constantly being revised and the HPC forecast shown in HURREVAC can be several hours old.

River Flood Outlook

The National River Flood Outlook is one of several Other Forecast Data products that can be helpful to consider when weighing the flooding threat from an approaching storm. This information is displayed on the map when the Rivers...Flood Outlook heading is checked under the Current data tab.

Map View

HPC, the National Weather Service Hydro Meteorological Prediction Center, issues a 5-day forecast of freshwater flooding hazards for the continental US using more specific forecasts for each flood basin provided by several regional NWS River Forecast Centers (RFCs) around the country. These outlooks are currently issued once a day around 21Z or 5PM Eastern Daylight Time.



The Flood Outlook takes the form of polygon regions that are color-coded according to the likelihood of flooding. The categories are defined as follows:

- Occurring/Imminent (red) Significant flooding is already occurring or is forecast to occur during the outlook period.
- Likely (blue) hydro meteorological conditions indicate that significant flooding can be expected during the outlook period.

- Possible (black) hydro meteorological conditions indicate that significant flooding could occur. Such flooding is neither certain nor imminent.

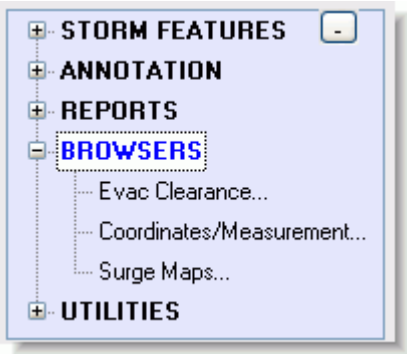
IMPORTANT NOTE

This Flood Outlook is intended to provide a general outlook for significant river flooding. It is not intended to depict all small-scale events such as localized flooding and/or flash flooding. This graphic will not depict minor river flooding as this implies only minimal or no property damage with possibly some public inconvenience. Also, these forecasts are constantly being revised and the HPC forecast shown in HURREVAC can be several hours old. Please refer to products issued by local NWS offices for the latest official river forecasts and warnings.

Browsers

BROWSERS is a heading within Hurrevac2010's Toolbox. When you request an item under this heading, a floating window appears over the program's main screen for the purpose of 'browsing' data that appears on the map. Browser windows can be dismissed or minimized when not in use.

Available Browsers



- Evacuation Clearance Time
- Coordinates/Measurements
- Surge Maps

Gage browsers appear when you turn on either the river gage layer or tide gage layer. These layers are accessed from both the Current or Archive Data Tabs.

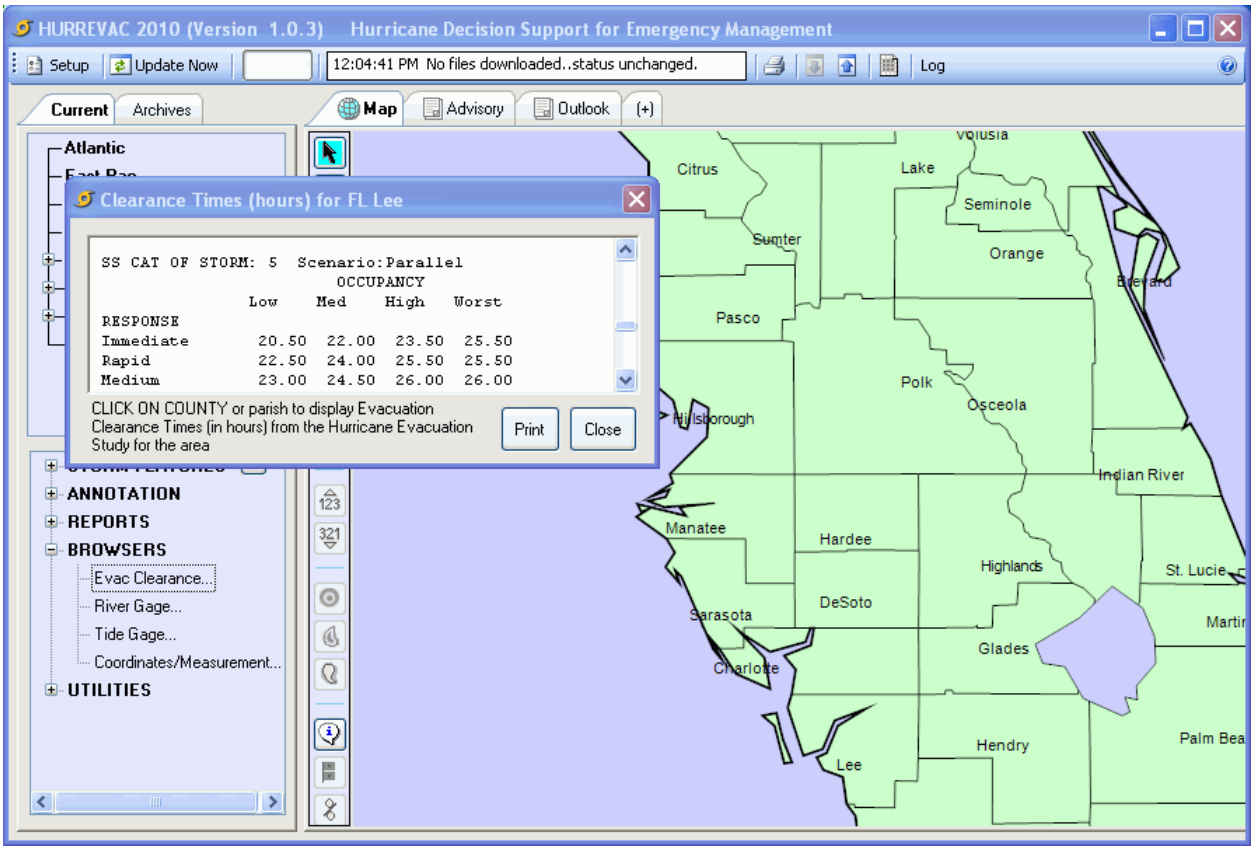
- River Gage
- Tide Gage

Evacuation Clearance Time

The Evacuation Clearance Time Browser is accessed from the BROWSERS heading of Hurrevac2010's Toolbox. This browser is used to view *HES evacuation clearance time* for a select county.

NOTE: These clearance times will only appear in the program if you have downloaded them using the State Plug-In Setup.

To view clearance time tables, open the browser window and then left-click on a county to bring up the information in the browser panel. You may use the Zoom and Pan tools of Map Toolbar to navigate to a county of interest.



About County Clearance Times

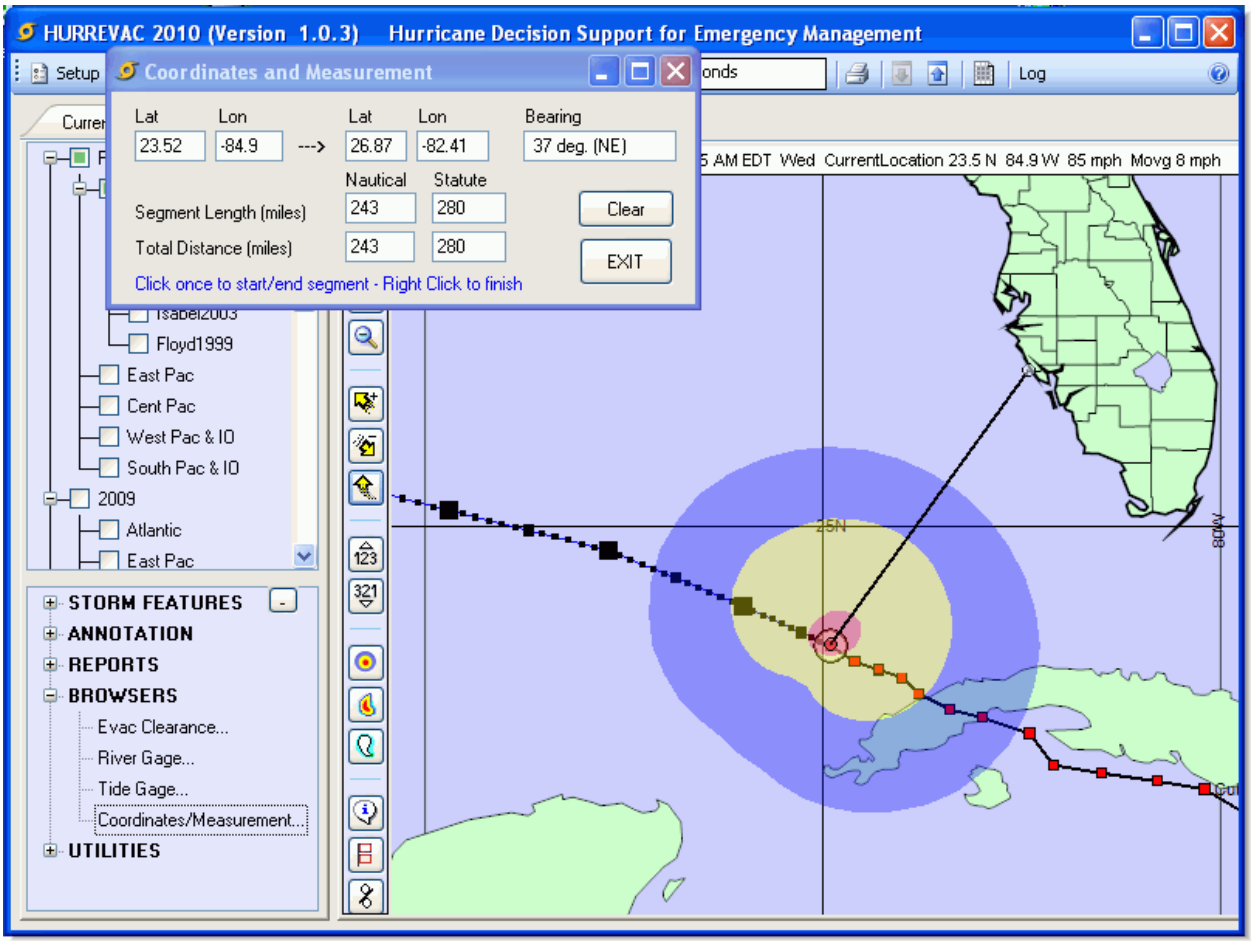
Stronger storms threaten a greater portion of the population and therefore require longer evacuation periods. At least one table (or matrix) exists for each *storm category* (1-5). High tourist occupancy (holiday weekend, for instance) and slow response (public apathy) will lead to longer evacuation periods as well.

Each county's HES has at least one 'Standard' evacuation scenario, but there may be others as well (In-County versus Out-of-County, for example). The Clearance Time Browser should be used to consider all possible evacuation scenarios, tourist occupancy levels, and response times. Decide which settings will be used in Hurrevac's Evacuation Decision Timing based upon a review of the HES documentation and discussions with your emergency management colleagues.

Coordinates/Measurements

The Coordinates/Measurements Browser is accessed from the BROWSER heading of Hurrevac2010's Toolbox. This browser can be used to determine the latitude/longitude coordinates of a map location and to make measurements of distance.

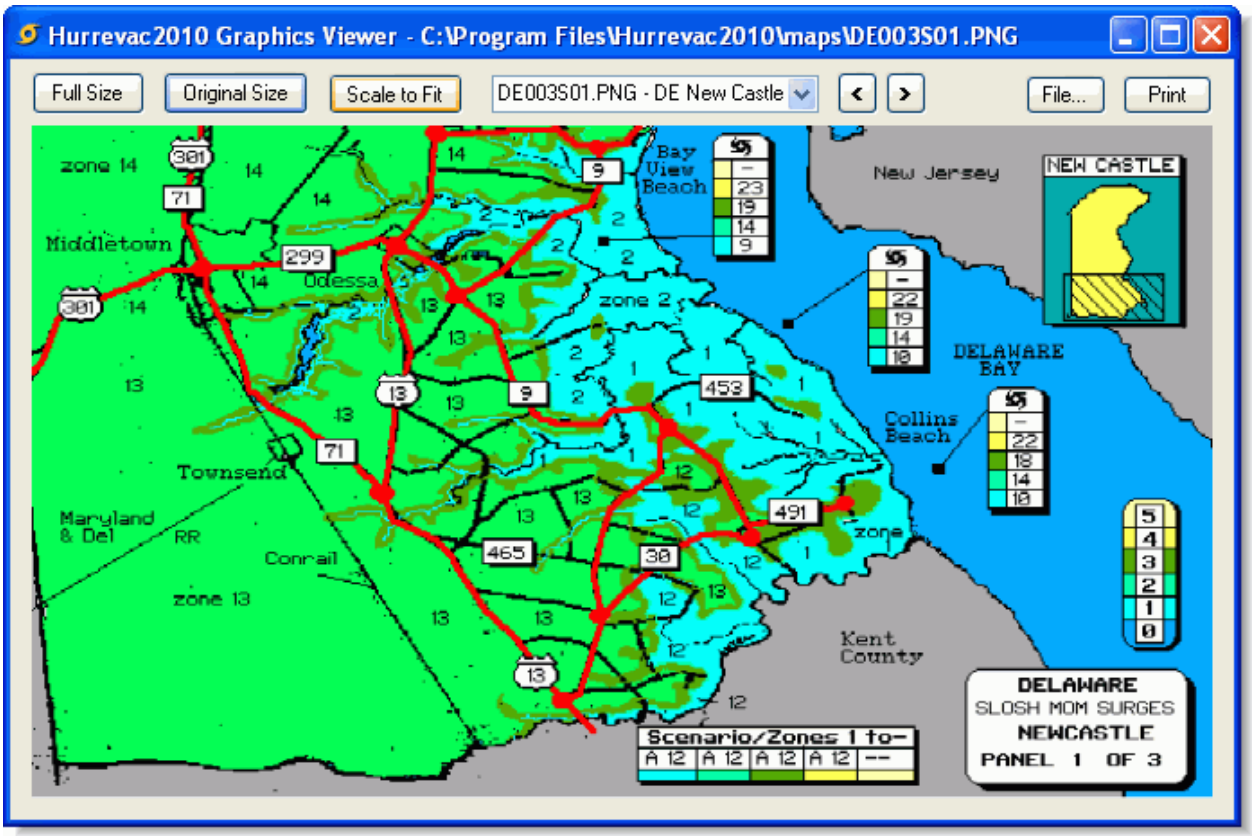
Coordinates of the cursor on the Tracking Map are shown in the browser at all times. To record a measurement of distance, left-click on the map to begin a segment and left-click again to end the segment. You can continue adding segments to the measurement with left-clicks.



Surge Maps

The Surge Maps Browser is accessed from the BROWSER heading of Hurrevac2010's Toolbox. This browser can be used to view the raster-based maps from the old Hurrevac2000 program. The maps vary from one *HES* region to the next, but typically represent local surge patterns, evacuation zones, routes, etc.

IMPORTANT NOTE - You must have one or more Inundation Map State Plug-ins installed in order to have access to any files.



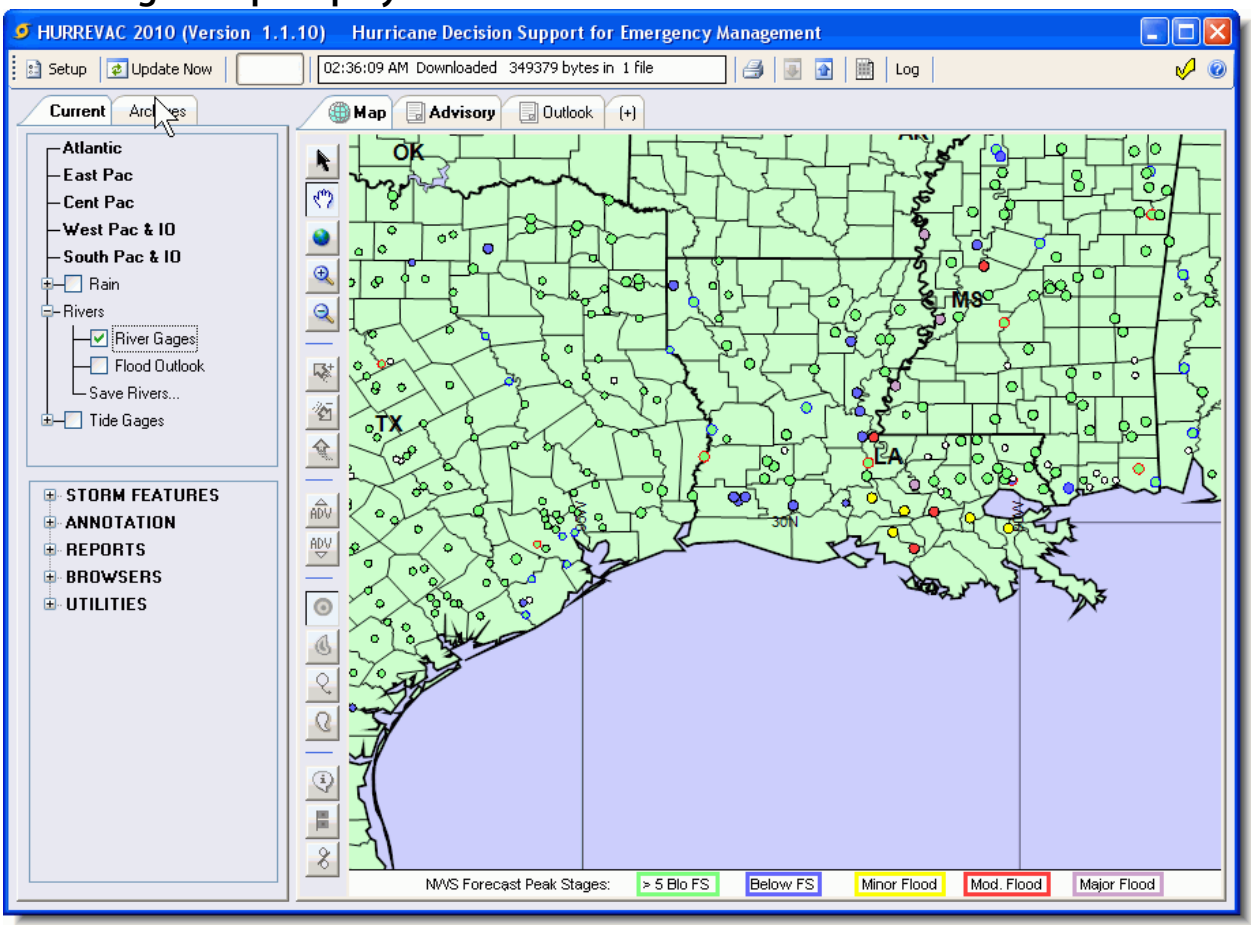
River Gage

The River Gage Browser is accessed from the BROWSER heading of Hurrevac2010's Toolbox. This browser can also be launched by clicking on a specific river gage point on the map. River gages are an available data layer on the 'Current' data tab under the heading 'Rivers.'

HURREVAC monitors roughly 1000 river gages in hurricane prone states from Texas to Maine. The program's River Gage display is part of a suite of inland flood tools that also include the National River Flood Outlook and the *HPC* 3-day Rainfall Forecast. Refer to the 'Other Forecast Data' topic for more information on these.

NOAA's Advanced Hydrologic Prediction Service (AHPS) is the source of this river gage data. The HURREVAC system (*data.hurrevac.com*) receives updated gage observations and forecasts as often as every hour from AHPS' vast network. Each time you turn on the River Gage layer under the Rivers heading of the 'Current' data tab, Hurrevac2010 downloads the latest available information from *data.hurrevac.com*. To refresh the gage display after a number of hours of viewing, simply un-check and then recheck the River Gage layer.

River Gages Map Display



River gages are best displayed on the map when zoomed in to a state-wide or tighter view. The gages appear as circles of different sizes and colors depending on the data available (size) and state and

trend of the river (colors) as shown below. The legend at the bottom of the screen display explains which circle colors represent river stage and which circle border colors represent the river trend.

Circle size indicates data available:

- Gages represented by a small white circle have only OLD or OUTDATED data (or no data)
- Gages with a medium size colored circle have recent data but ONLY OBSERVATIONS and no forecast river conditions. Typically the observations go back 36 hours from the time of the most recent data.
- Gages with a large size colored circle have recent data including BOTH OBSERVATIONS and FORECASTS. Typically the observations go back 36 hours from the time of the most recent data and the forecasts go forward in 6-hourly increments to 120 hours or 5 days.

Circle colors indicates river stage:

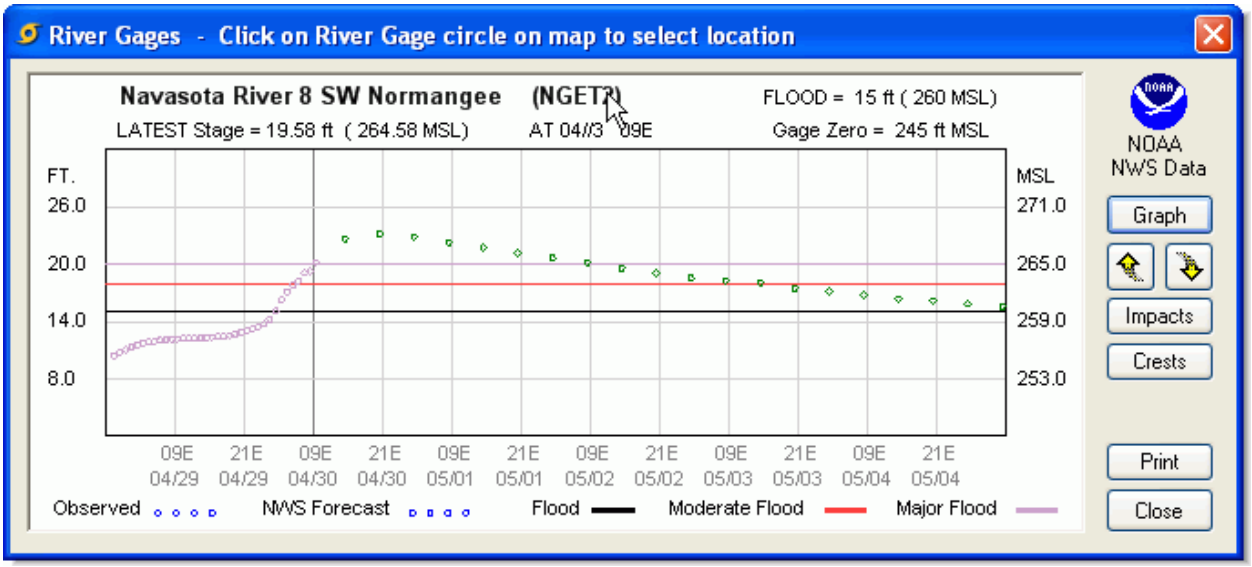
- Green for >5 feet below flood stage
- Blue for below flood stage
- Yellow for Minor Flood
- Red for Moderate Flood
- Purple for Major Flood

Circle border colors represent the river trend:

- Red for rising
- Blue for falling
- Black for steady

River Gage Browser

The browser is used to display the data from an individual gage site. You bring up the browser by clicking on the circle representing the gage of interest.



Graph of river level and rainfall

The River Gage browser time frame is different for observation-only display and observation and forecast displays:

- For observation-only displays, the 36 hours of past gage readings are spread out across the graph for clarity....with the last reading where the heavy vertical line is drawn.
- For observation and forecast displays, the 36 hours of past readings are on the left side of the graph...followed by 120 hours of forecast stages on the right 2/3rds of the display.

The color scheme for the observations and forecasts are noted at the bottom of the browser.

If 'Basin Average Rainfall' observations and forecasts are available, they are presented at the upper left of the graph. The color scheme is the same as for the gage reading and forecast colors.

When amounts are shown, the amounts are BASIN AVERAGE. That is, the amounts are averaged over the basin above the gage shown. So for instance, if a heavy thunderstorm dumped 3 inches over a small area in the basin above the gage, the average rainfall spread over the entire basin may be only a few hundredths of an inch. The same goes for the forecast amounts. If scattered heavy thunderstorms are forecast, they may only produce a few hundredths or tenths of an inch over the entire basin.

On the right side of the browser are buttons for controlling the graph display. The Up Button adjusts the graph scale upward to allow view of Flood, Moderate Flood, and Major Flood levels. The Down Button adjusts the graph scale downward to allow viewing of smaller fluctuations.

Other Information available in the browser

- Impacts statements (Impacts button) from the USGS describe the effects from past floods of various levels;.
- Historical crests and lows (Crests button) from the USGS with high and low water observations from the past;
- River Gage Map shows the area around the gage that would be inundated by a 100-year flood and by a 500-year flood.

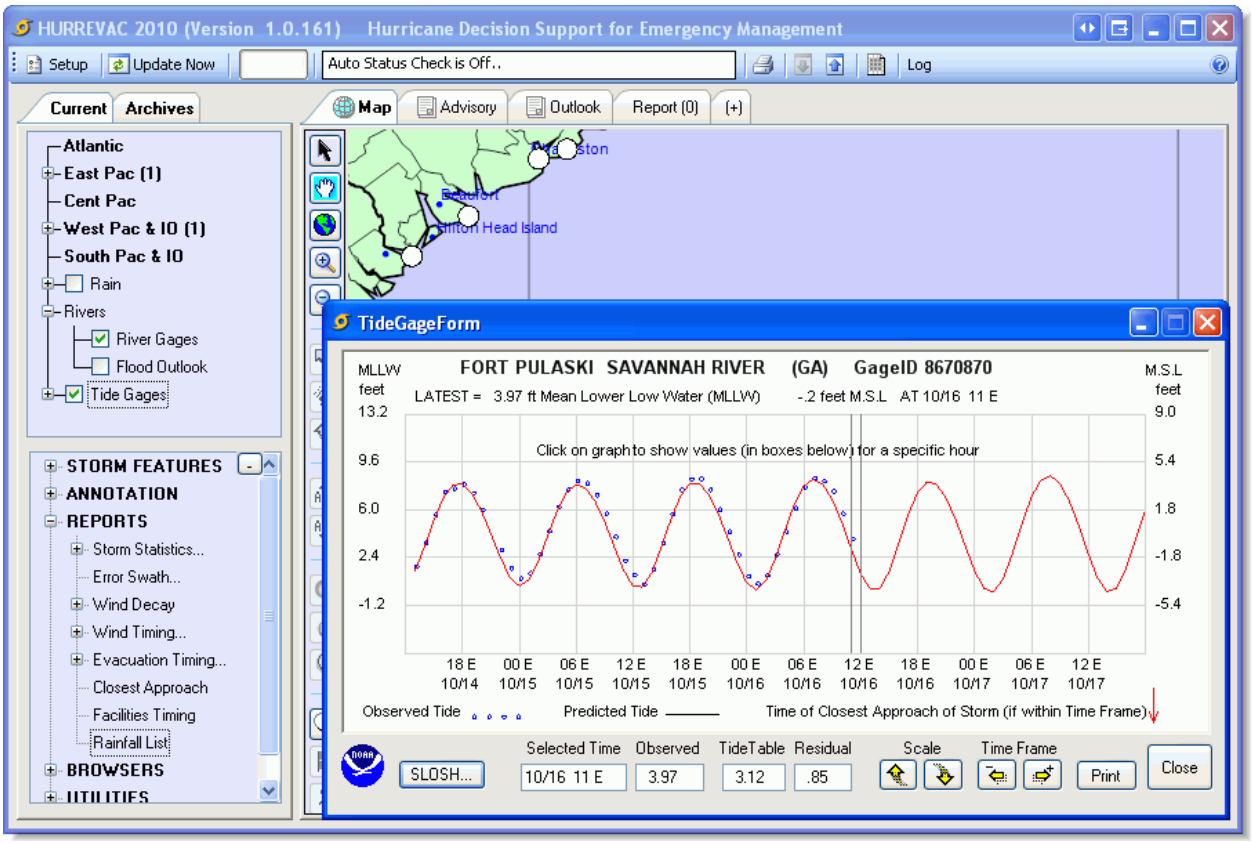
  NOTE: The Map button appears only when the state gage maps are installed and a gage map is available for that specific gage.

Tide Gage

The Tide Gage Browser is accessed from the BROWSER heading of Hurrevac2010's Toolbox. This browser can also be launched by clicking on a specific tide gage point on the map. Tide gages are an available data layer on the 'Current' data tab.

HURREVAC monitors over 100 coastal tide gages in hurricane prone states from Texas to Maine. The program's Tide Gage display is an important tool for weighing tidal inundation and storm surge threats from approaching storms. The storm surge components of this browser are detailed in the SLOSH Display topic.

NOAA 's National Ocean Service (NOS) is the source of this tide gage data. The HURREVAC system (*data.hurrevac.com*) receives updated gage observations and forecasts as often as every hour from NOS. Each time you turn on the Tide Gages layer of the 'Current' data tab, Hurrevac2010 downloads the latest available information from *data.hurrevac.com*. To refresh the gage display after a number of hours of viewing, simply un-check and then recheck the Tide Gages layer.



Working with Tide Gages

Tide gages are best displayed on the map when zoomed in to a state-wide or tighter view. The gages appear as circles along the coast. Click on the circle of interest to bring up the Tide Gage Browser for that gage.

The Tide Gage browser time frame is typically from 48 hours before current time to 30 hours or so beyond the current time. Observations versus predicted heights are available up to the current time and predictions only from current into the future up to 5 days (120 hours). The time frame of the

display can be lengthened forward up to 120 hours by using the Time Frame buttons below the graph. The vertical scale of the gage display can be adjusted using the Scale buttons below the graph.

The heavier gray vertical line represents the latest data and can be moved left or right either by clicking with your mouse or by using the left or right arrows on your key board. The data at the time referenced by the heavy vertical line is displayed in boxes below the graph.

MLLW or Mean Lower Low Water represents the average of the lowest of the tides during the day (typically there are two, one lower than the other). So height MLLW represents the height of the water above this low reference value.

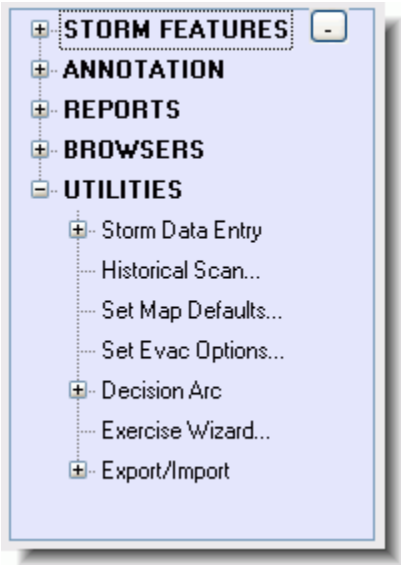
Predicted values are the values computed by using the NOAA Tidal Harmonics algorithms for each gage (each gage has a different set).

The Residual shown is the Tidal Anomaly computed by subtracting the Predicted from the Observed reading. Positive numbers represent tide above normal and negative represent tide below normal.

Tide gage readings are updated at *data.hurrevac.com* about once an hour....but there is some lag to the NOS data, so expect some gage data to be between 1 and 2 hours old even when just downloaded. The residual or anomaly is the most important data and is usually quite slow to change except as the center of a storm approaches. So, in most cases a fairly good estimate can be made of the current tidal height by using the most recent hour's residual and applying it to the current hour.

Utilities

UTILITIES is a heading within Hurrevac2010's Toolbox.



Available Utilities

- Storm Data Entry
- Historical Scan
- Map Default Settings
- Evacuation Option Settings
- Decision Arc
- Exercise Track Wizard
- Export/Import

Storm Data Entry

The Storm Data Entry tools are located under the UTILITIES heading of Hurrevac2010's Toolbox.

These tools give you the ability to edit or create STM files, Hurrevac's native storm file format. The most common use is for creation of a hypothetical storm from scratch or by modifying an existing STM file. Another possible use would be if you were unable to receive STM file updates from *data.hurrevac.com* and needed to manually enter forecast information into the program.

Manual Data Entry/Edit

This screen is where you enter data manually (by hand) if you do not have access to the Internet but have a printed copy of the *NHC* , *CPHC* , or *JTWC* forecast *advisory* available.

The official National Hurricane Center (NHC), Central Pacific Hurricane Center (CPHC), and Joint Typhoon Warning Center (JTWC) forecast advisories are the sources for all data used by Hurrevac2010 concerning the current storm. This is the most important data the program ingests, and must be done correctly or errors will result in all calculations based on this data. The program does checking of gross errors in input but cannot catch all minor errors that may occur.

Header Information

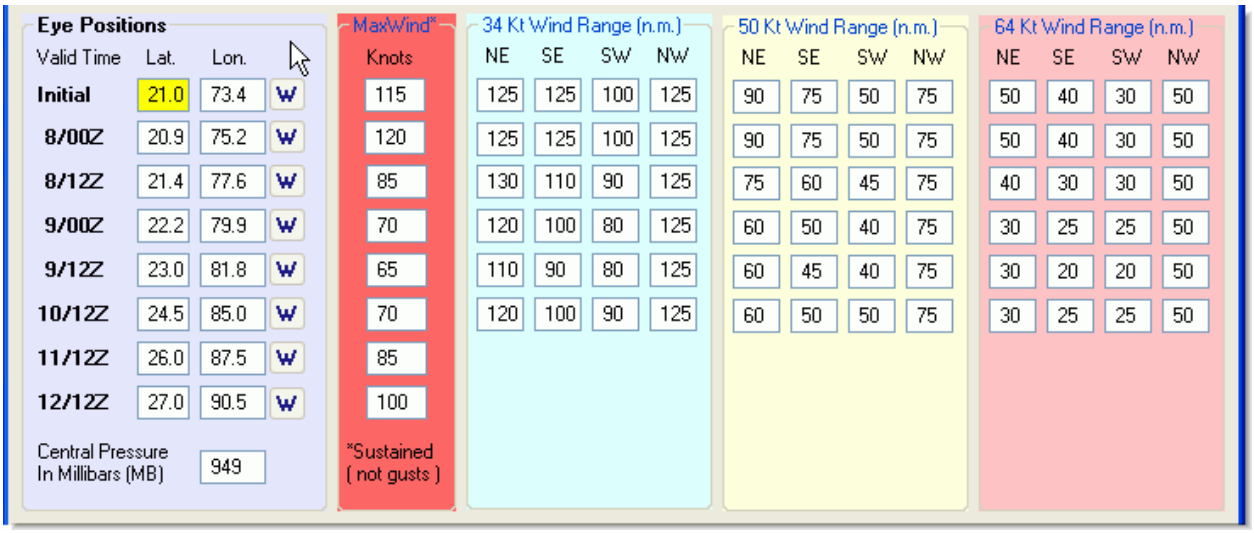
Disk Filename - In this box, you select the filename for the storm file you wish to work with. All advisories for a storm come within one storm file, so if you just want to select another advisory, choose the Advisory box (see below).

Storm Name - The selected storm's name is printed in this box.

Advisory # - This is the box where you can either select another advisory's data to view , or more commonly, this is where you enter a new advisory number to indicate that you want to enter new advisory data from the latest NHC or CPHC Forecast / Advisory.

Note: To enter Intermediate Advisories simply type in the Advisory number plus an A, B , or C as appropriate (that's how they are numbered). Intermediate (Public) advisories do not contain any new forecast information. Just enter the new Initial Position of the storm , change the issuance time, and keep all else same as previous advisory.

Time of Advisory Issuance - If entering a new advisory....in these boxes, you choose the Year/Month/Date/Time of issuance of the advisory. These boxes automatically change if you are simply viewing another advisory in the file, to reflect the issuance time of that advisory. When entering a new advisory, remember that you must use the Z or Zulu (also called GMT) issuance time of the advisory. This is the time frame that is used with the Forecast/Advisory and printed at the top of that advisory.



Data Entry Boxes

It is best to enter new data by Row rather than by Column, since the data on the Forecast/Advisory is grouped together by time. So begin first with the Row labeled Initial Position and enter as follows:

Initial (and Forecast) Eye Positions - The first row represents the current or initial position of the storm from the Forecast/Advisory text. The following rows represent forecasts valid at the time printed to the left of these boxes. Enter the latitude (Lat) and longitude (Lon) taken from the Advisory.

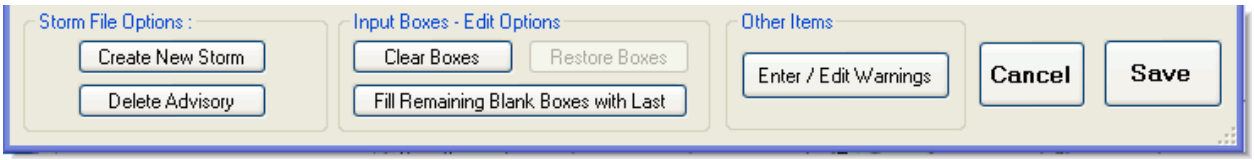
Maximum Wind - Enter in these boxes the maximum sustained wind (not gusts) from the advisory at the time indicated for that row (on the entry screen, times are at the extreme left of the row).

34-Knot Wind Range - Enter the range of 34 knot winds in each quadrant (NE=northeast) (SE=southeast) (SW=southwest) and (NW=northwest) in nautical miles (n.m.) taken from the advisory lines labeled 34KT at the time indicated for the row (on the entry screen, times are at the extreme left of the row). If none, leave blank.

50-Knot Wind Range - Do the same for the 50 knot winds (labeled 50KT in the advisory) taken from the advisory at the time indicated for the row (on the entry screen, times are at the extreme left of the row). If none leave blank.

64-Knot Wind Range - Do the same for the 64 knot winds (labeled 64KT in the advisory) taken from the advisory at the time indicated for the row (on the entry screen, times are at the extreme left of the row). If none leave blank.

Central Pressure (in millibars MB) - Enter the central pressure found on the advisory at the initial (current time or time of issuance of advisory) This is sometimes given in both inches and millibars, but enter the data label MB or millibars.....this will be a number somewhere in the range 900 to 1020.



Storm File Options

Create New Storm Button - This button brings up a screen where you can enter the name of NEW storm (one not in the files). Do not use this to enter a new advisory on an existing storm. Instead use the Advisory Box.

Delete Advisory Button - If you wish to delete the currently shown advisory from the storm file shown, use this option. Use with care...you can always just edit the information if some is bad.

Input Boxes - Edit Options

Clear Boxes - This option clears all of the data input boxes (not the date/time or filename/advisory boxes)...To allow you to start with a clean slate. If you are entering a new advisory...the old advisory data will still be in the input boxes. At that point you can either edit that data or use this option to start anew. If you use this option you can restore the previous data by clicking on the Restore button. (See below)

Restore Boxes - This button restores the data which was in the boxes before the last Clear or Fill In Boxes option.

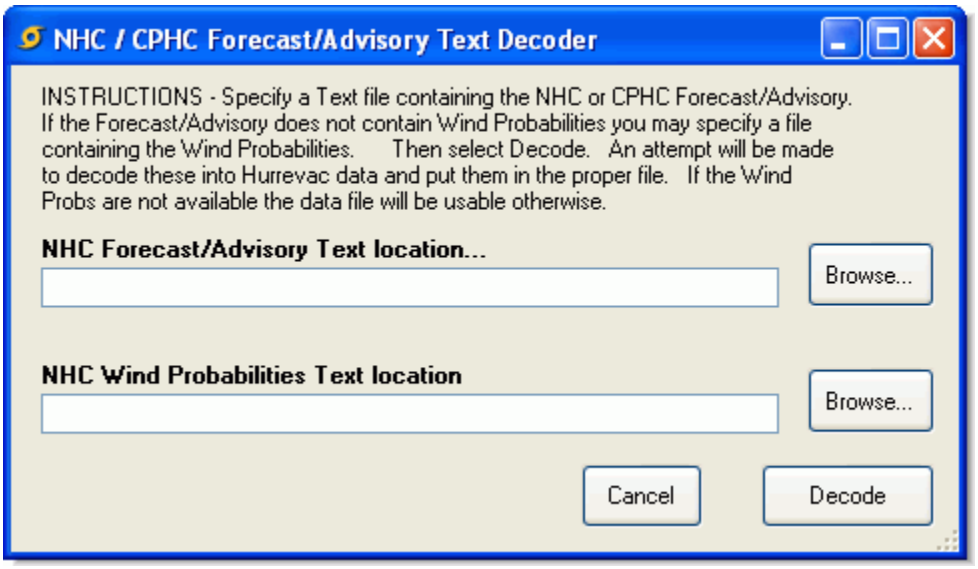
Fill Rest of Blank Boxes with Last - This option is handy for filling in boxes when there is little or no change from the previous forecast valid time(s) on the advisory. The program fills in the boxes below (later times) with information from the previous boxes , if the previous box had any values. From there, you can edit in any changes needed to reflect the Forecast/Advisory data.

Other Items

Warnings - The Enter-Edit Warnings button brings up a screen where you can select areas of NHC or CPHC watches and warnings for display with the active advisory in the program.

Advisory Text Decoder

This tool allows you to decode an ascii (text) file of the NHC or CPHC Forecast/Advisory into an .STM file. Follow the instructions and specify where the forecast advisory and the NHC Wind Probabilities files reside on your system and a data file will be created, or added to, as appropriate.



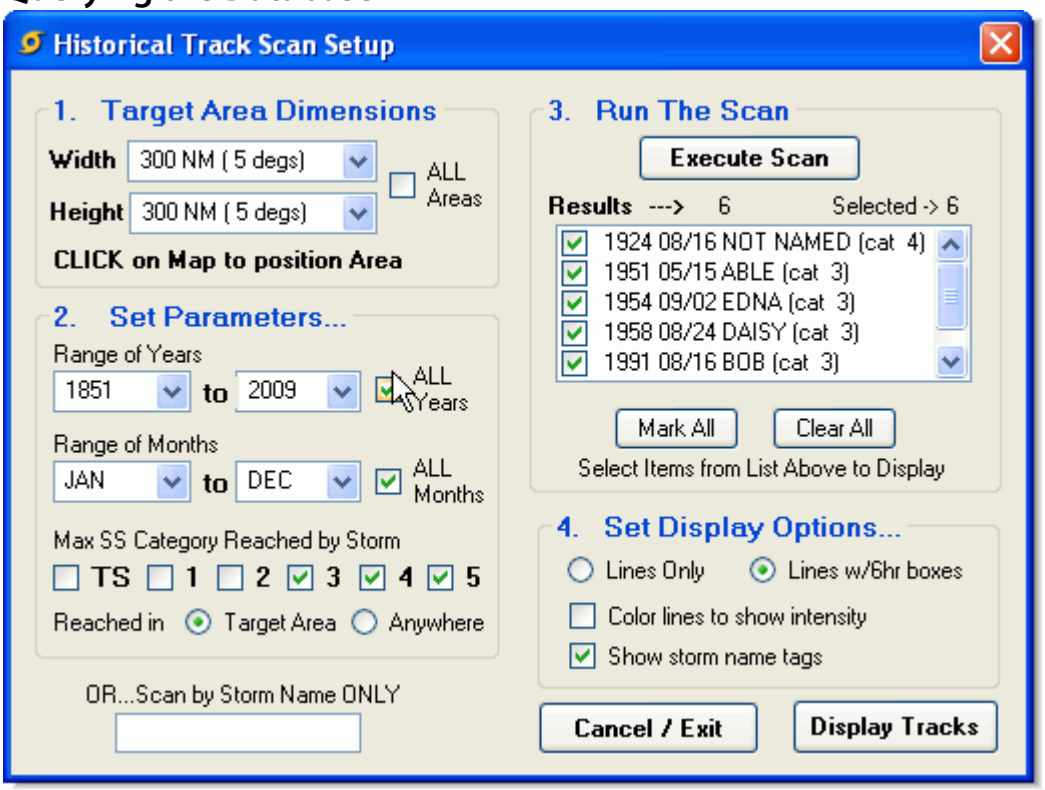
Historical Scan

The Historical Scan is located under the UTILITIES heading of Hurrevac2010's Toolbox. Storm tracks from the National Hurricane Center's historical database of Atlantic (1851-Current Year) and Eastern North Pacific (1949-Current Year) tropical storms and hurricanes may be queried and displayed using this utility.

Historical storm plots are more limited than the plots of HURREVAC's *STM file* because the historical databases do not contain *wind ranges* information. Storms are simply plotted by 6-hourly center locations and are color-coded at each position according to intensity. Storm name (when available), beginning date, and strength category appear on a label near the starting point for each track in the display.

If researching Atlantic basin storms from 1994 and later, it's recommended that you use the Historical Scan for querying and quick track display and then switch to archived .STM files (under the yearly index of the Archives tab) for further investigation.

Querying the Database



Storms must be selected from the database using the Historical Track Scan Setup form. Query options include:

Target Area Dimensions - Limits search to those storm tracks passing through a geographic region that you specify. Select a width and height in nautical miles or degrees, then click on the main map to position a box of the desired dimensions. If you do not wish to limit your search geographically, then check the All Areas box.

Range of Years - Limits search to range of years specified. If you do not wish to limit your search to a range of years, then check the All Years box.

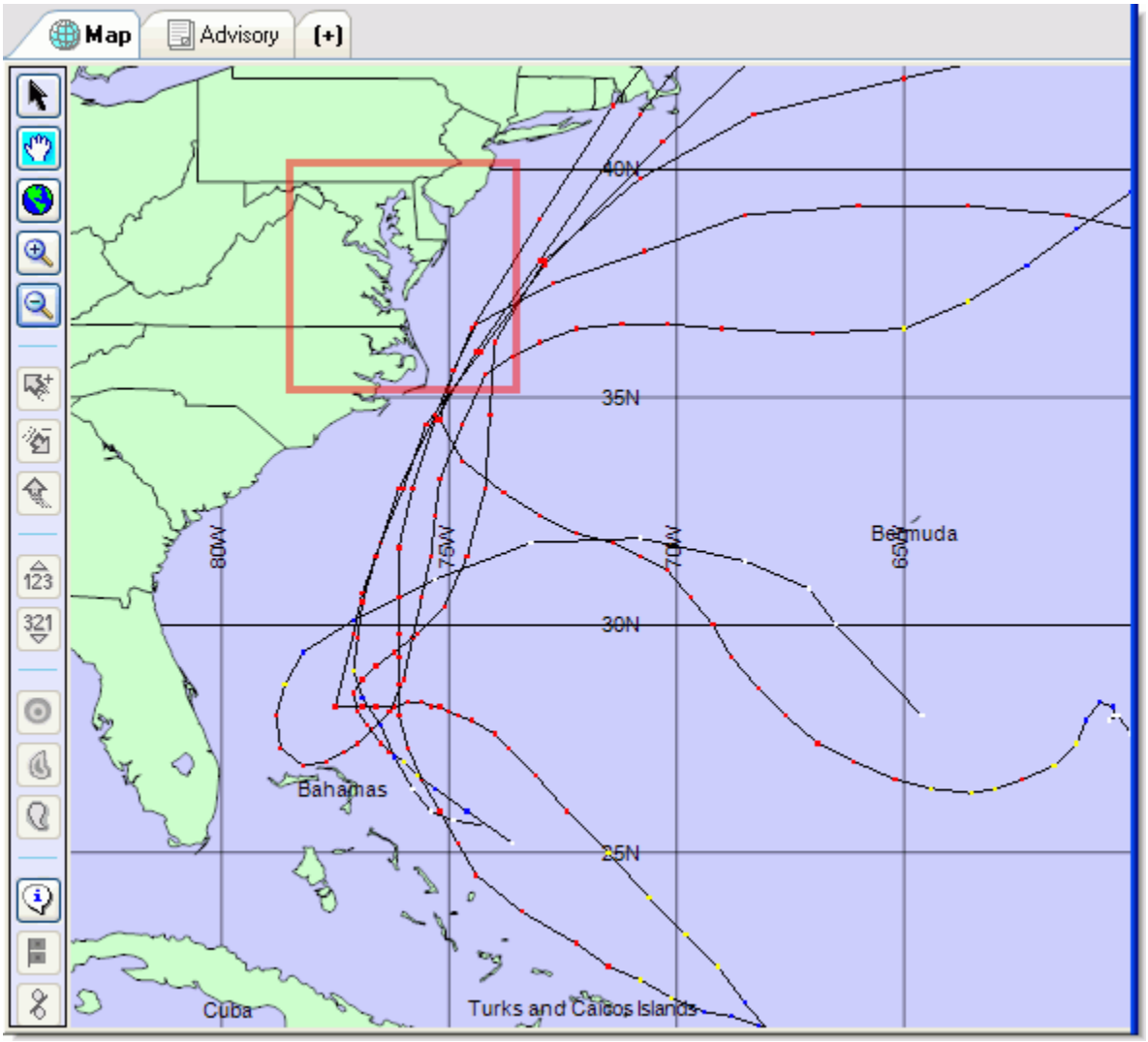
Range of Months - Limits search to the range of months specified. If you do not wish to limit your search to certain months, then check the All Months box.

Max SS Category Reached by Storm - Limits search to specific *storm category* . You may further refine this search to accept only storms that reach a desired strength within the geographical region (In Target Area) you have specified rather than (Anywhere) along their complete tracks.

Scan by Storm Name ONLY - Entering a name here will cause all other search criteria to be ignored.

Press the **Execute Scan** button once you have finished defining scan criteria. Storm tracks meeting your criteria will be listed in the Results box. Individually un-check any tracks that you do not wish to display, or press the **Mark All** or **Clear All** buttons to affect all items in the list.

Set Display Options and then press the **Display Tracks** button to plot selected tracks from the Results list on the main map.

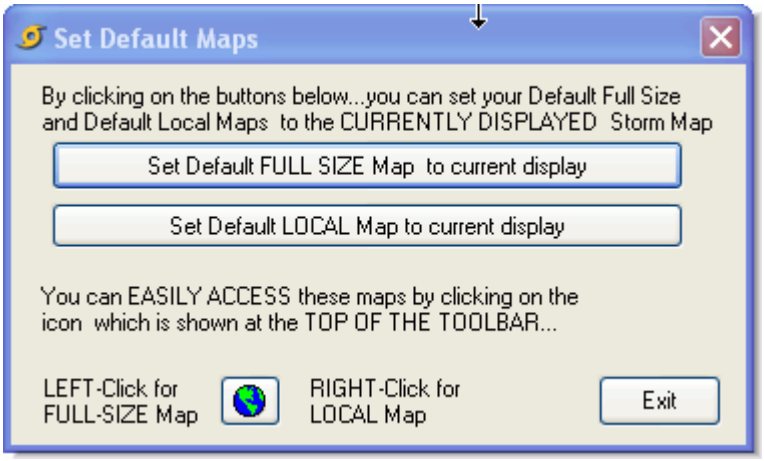


NOTE: The historical database is maintained by the forecasters and researchers at the National Hurricane Center and represents Best Track and intensity estimates of tropical cyclones as determined in a post-analysis of all available data. Early storm tracks should not be regarded as having the same degree of accuracy as recent ones. Please refer to documentation from the NHC for a discussion of these limitations to the database.

Map Defaults

Set Map Defaults is an option under the UTILITIES heading of Hurrevac2010's Toolbox.

Use this utility to set your preferences for a Default FULL SIZE Map and a Default LOCAL Map. Your selections will be saved upon exit of the program. You can easily access these maps through left and right clicks to the Globe button near the top of the Map Toolbar.

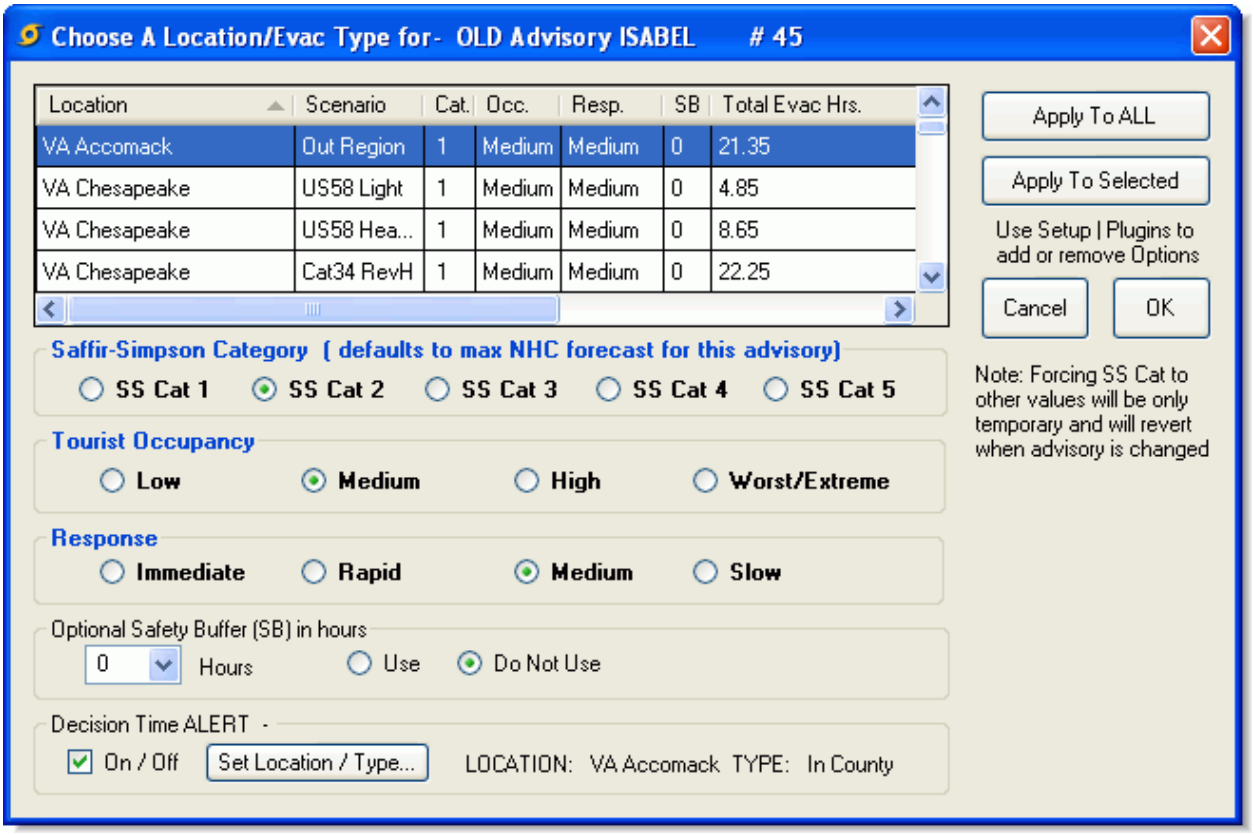


Evacuation Options

Evacuation Options are available under the UTILITIES heading of Hurrevac2010's Toolbox.

The options you select on this screen are very important. They determine the number of evacuation clearance hours to be used in calculating the time at which actions (if any) should be taken. This affects all the Evacuation Timing Reports and the Decision Arc plots.

NOTE: HURREVAC cannot advise you on which scenario to select or whether to override certain variable settings. These decisions should be made after studying your *HES* document and consulting with local officials as to the best course of action. Coordination with surrounding counties and state EM offices is recommended so that all users of the program are looking at reports based upon the same parameters. If several different scenarios are under consideration, you can employ Hurrevac2010's new tabbed interface to display multiple reports in the same session.



The locations/scenarios appearing in the list will vary depending on which State Plug-Ins you have installed. Within the individual state plug-ins, only those counties/parishes that have undergone an official HES are listed. Counties/parishes appear more than once in the list if multiple 'scenarios' are provided by the HES. These scenarios account for varying evacuation patterns such as local versus regional evacuations, heavy versus light traffic, and lane reversal options.

For each location/scenario combination, the Evacuation Settings panel presents just one value at a time, based upon selections of the following variables from a matrix (or table) of available clearance times:

- Storm Category (Saffir/Simpson scale) - 1 to 5
- Occupancy - Low, Medium, High and Worst /Extreme
- Response - Immediate, Rapid, Medium and Slow.

NOTE: HURREVAC's Evacuation Clearance Time Browser can be used to see the complete set of matrices for a location.

Overriding Default Evacuation Settings

1. Category of Storm - The default setting is the maximum wind predicted at any one time over the 120-hour forecast period, however if the maximum wind is within 5 knots of the next Saffir/Simpson category, the category is bumped up one step as insurance. You may wish to change this setting if, for example, your EM office has a policy of evacuating for one category higher than forecast as added insurance. Conversely, New England locations considering the threat from a Cat 4 or 5 storm still well south may want to drop the storm category because the storm is forecast to be much less intense once over the cooler waters of the Northeast.
2. Tourist Occupancy - This option defaults to medium, but can be changed if necessary to a setting relevant for your area. This setting tends to be time dependent and not area dependent. For example, a late October weekday would often find all areas with low tourist occupancies, but a Labor Day weekend would find most all areas with very high occupancies.
3. Response - This also defaults to medium when the screen appears for the first time, but should be set to a coordinated setting relevant for your area. A nighttime evacuation would probably evoke a Slow response, as would heavy rain ahead of the storm or weak media treatment of the threat.
4. Optional Safety Buffer (SB) - The default setting is zero, but you can add up to 10 hours to the evacuation clearance times as a safety buffer, or to allow for pre-evacuation duties or preparation. Any amounts selected will be shown in the SB column and added to the total clearance time period that is needed.
5. Apply Settings to the list - You must apply the settings to the list in order to make the new calculations effective. In most cases, you will use the **Apply To All** button to make the settings applicable to all areas. For some users with multi-state configurations, the **Apply To Selected** may be appropriate. If you wish to apply the settings only to certain areas, you may click and drag on the list, or hold down the CTRL button on your keyboard while clicking on multiple areas. You must press the OK button on exit to make the settings active.

Refer to the topic Decision Time Alert for a description of this additional function of the Evacuation Options.

Decision Arc

The Decision Arc Tool is located under the UTILITIES heading of Hurrevac2010's Toolbox.

This tool provides a graphical means of showing your *decision time* for evacuation...essentially duplicating the manual Decision Arc Method that was necessary before the advent of hurricane tracking software programs. In this method, paper tracking maps were overlaid with a series of concentric arcs radiating out from the location of interest. With each new forecast *advisory* , a particular 'Decision Arc' would be selected by multiplying the *evacuation clearance time* by the *forward speed* of the hurricane and the storm location would be plotted using a special transparent disk representing the storm center and extent of 34kt winds. Decision time was indicated when the storm's 34kt wind ring finally intersected the decision arc.

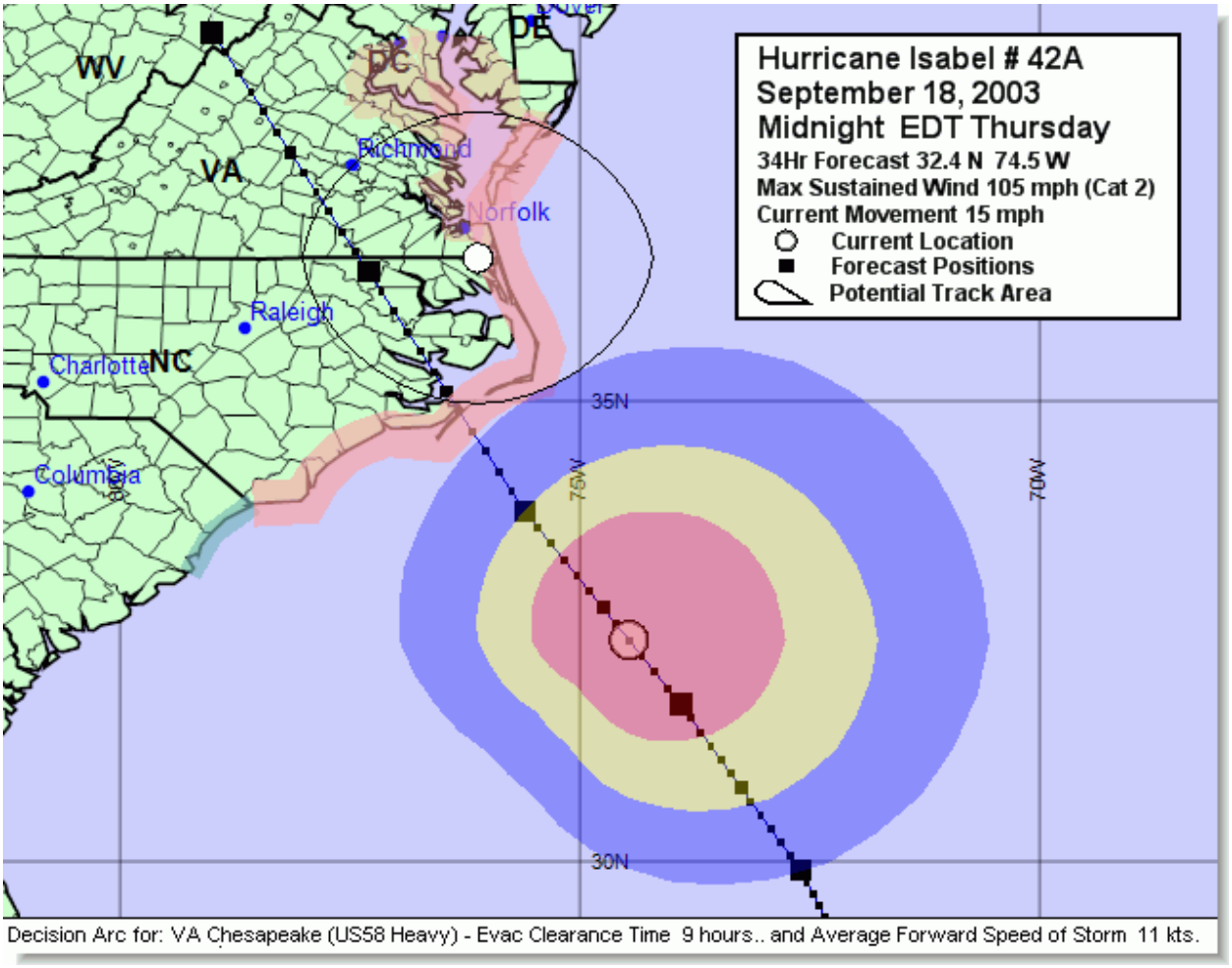
The Decision Arc Method has been largely replace by HURREVAC's Evacuation Timing Report (for a single location), however many emergency managers who are familiar with the method still use this tool in HURREVAC.

How HURREVAC computes a Decision Arc

1. The user selects a location and evacuation scenario from under 'Arc Setup' of the Decision Arc UTILITIES heading. The program uses the evacuation clearance time from the available state plug-ins and uses the settings (such as Occupancy, Response, Storm Category) set in the Evacuation Options utility.
2. The program computes how long it would take 34 knot winds to reach the location of interest assuming a direct hit, and uses this to sample the forecast forward speed of the storm for that time period.
3. Using the forward speed and clearance time obtained above, a distance is obtained (speed x time = distance). An arc with this radius is drawn around the location of interest. The exact location of the center of the arc (if you zoom in close, you will see a white circle there) is the nearest corner of the county to the present storm's *initial position* .

How to use the Decision Arc


Move the storm forward along its forecast track until the outermost ring (the 34knot winds) touches the arc. For the facilities version of the program, the decision arc for flood-threatened locations such as tunnels are eye-based instead.



Note the time and date indicated in the Storm Information Box. This is your latest decision time for this storm and this advisory. This does not mean that any action must be taken, (your decision may be to do nothing).....but only means a decision should be made by this time or the evacuation (if any) could be rushed. In general if you are in or near the Average Error Swath, you should be concerned and consider the latest decision time as an important time landmark.

If the 34 knot ring is already within the Decision Arc....decision time has already passed. This can easily happen "suddenly" with a new advisory if the new advisory a) increases the wind range, b) speeds up the storm, or c) increases the storm category (max wind) resulting in a longer evacuation clearance time and wider Decision Arc. Moral - don't count on the storm gradually creeping toward the Arc, in one advisory the storm could jump toward the Arc, or the Arc could expand quickly toward the storm (or both could occur).

In reality the forecast is constantly evolving and each new advisory is just a "snapshot" of a fluid, changing atmosphere and its effect on the storm. It is rare indeed to have little or no change from advisory to advisory.

Toggle Arc - Turns on or off the last defined Decision Arc.

Adjust Speed - This option should be used with care, in adjusting the assumed *forward speed* of the storm. By default, the speed is assumed from the forecast using the speeds averaged from the hours

before the arrival of 34 knot winds. Speeding up the storm will cause an earlier *decision time* and slowing it down, will delay it. If you use this, it will only be in effect until you change locations or any other item in Evacuation Option Settings at which time it will revert to the default forecast speeds.

Export/Import

Export/Import Tools are located under the UTILITIES heading of Hurrevac2010's Toolbox. The Export and Import Plot tools copy STM files in and out of the Hurrevac2010's data directories. Imported storms are placed in a special *ExerciseSTMFiles* data directory and appear in the program under the Exercise heading of the Archive Tab.

The GIS Export Tool generates shapefiles from HURREVAC's storm tracking display that can be loaded into outside mapping programs.

What is a Shapefile?

Shapefile is a widely adopted vector data format for describing geospatial points, lines, and polygons along with their associated tabular attribute data. ESRI developed the format with open specifications, and therefore many Geographic Information System software programs have incorporated the ability to read and write shapefile data.

The shapefile (with an ".shp" extension) stores geometry of either points, lines, or polygons. It must be accompanied by two supporting files of the same name—an ".shx" file containing an index to the geometry, and a ".dbf" storing a database of attributes associated with the geometric shapes. A number of other files having the same name but different extensions may also accompany the .shp file. Most notable of these are the ".prj" file that stores the geographic coordinate system, or projection, and the ".shp.xml" that stores metadata.

Hurrevac's GIS Export Tool creates .shp, .shx, .dbf, and .lyr files for each shapefile. The files are saved by default in the \GIS subdirectory under your main Hurrevac data directory.

Available Layers

The number and types of fields available for export will vary based upon what is currently displayed on the Storm Map. The following fields may be available and are described here.

1. A *forecast track* from the current advisory as points and lines Separate files are created for the two shape types and are differentiated by "_p" and "_l" tacked on to the end of the filenames. Nodes (in the line file) and points (in the points file) represent the 0,12, 24, 36, 48, 72, 96, and 120-hour forecasted positions for the current advisory. Points are attributed with a date/time field and a maximum wind speed field.
2. A *past track* as points and lines Separate files are created for the two shape types and are differentiated by "_p" and "_l" tacked on to the end of the filenames. Nodes (in the line file) and points (in the points file) represent the initial positions of each advisory for the past track. Points are attributed with a date/time field and a maximum wind speed field.
3. The *wind ranges* from any forecast hour (0-72) as polygons Up to three rings with values of 39, 58, and 74 mph may be output.
4. Wind swath through hour 72 of current advisory as polygons Up to three polygons with values of 39, 58, and 74 mph may be output.
5. Error swath or error swath plus winds as polygons -- Up to three polygons with a single attribute field indicating 72-hour average error (72), extended forecast average error (120), and average error plus winds (0).
6. Error ellipse (with or without winds) from any forecast hour (0-120) as polygons One polygon (attribute value of 72 or 120) for the error ellipse and a larger wind ellipse (attribute value of 0).

7. *MEOW (wind)* for specified region and storm conditions as polygons Polygons are attributed with 39, 58, 74, 92, 109, and 127 mph to indicate the maximum wind possible for the region.
8. *HPC* rainfall isopleths for specified day (1-3) as polygons Polygons have attribute values to indicate a regions expected rainfall in 100th of inches.
9. *NWS* river flood outlook as polygons Polygons have attribute values to indicate whether the likelihood of flooding in a region is possible (1), likely (2), or imminent or occurring (3).

Additional Notes

By default, the polygons overlay each other. In other words, with the 3 wind ranges surrounding a hurricane the 64kt (74mph) wind ring will overlay the 50kt(58mph) wind polygon, which will in turn overlay the 34kt(39mph) polygon. If the higher 2 wind polygons are then turned off in the GIS program display, what will remain is a polygon representing winds >34kt (39mph). In other words, you do not have "doughnuts" representing wind >34kt and <50kt. The wind swaths, error swaths, and HPC rainfall isopleths also export in this manner.

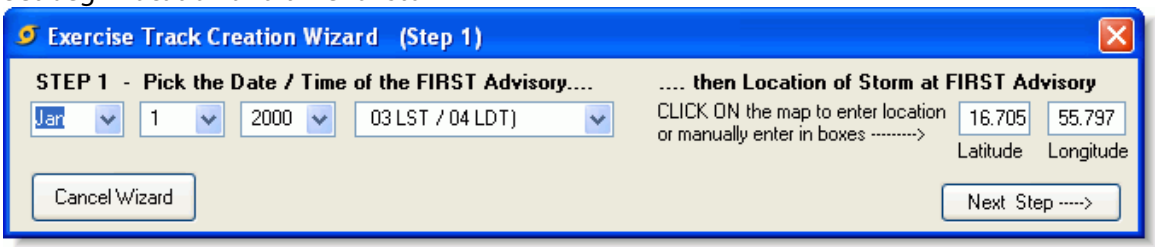
For help in creating unique "doughnut" polygons, refer to the “GIS Issues” page of the support website at www.hurrevac.com. Legend (.AVL) and layer (.LYR) files are also available on the web site to assist you in illustrating exported shapes in Arcview 3.x and ArcGIS 8.x as they appear in HURREVAC. Experience in GIS is recommended, as the manipulation of these exported files may not be easy for the casual user of HURREVAC.

Exercise Track Wizard

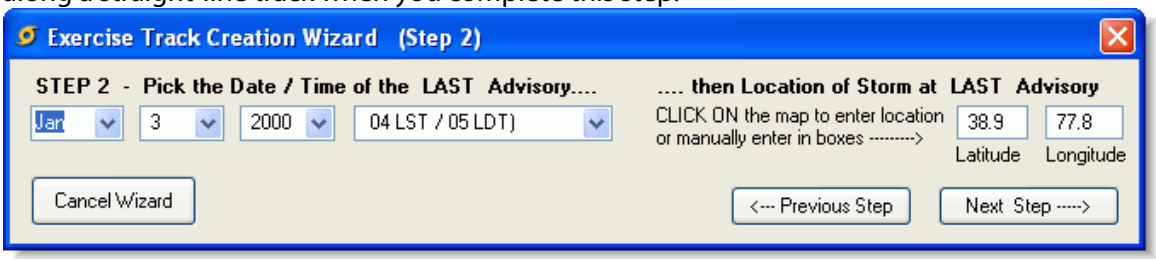
The Exercise Track Wizard is located under the UTILITIES heading of Hurrevac2010's Toolbox. This tool leads you through steps necessary to create an *STM file* of your own for an exercise. STM files are HURREVAC's native file format for storing all the forecast advisories from a single storm.

The Exercise Track Wizard leads you through a sequence of 5 steps. You can use the **Previous Step** button to backtrack at any point, but keep in mind that any work you have done on later steps will be overwritten.

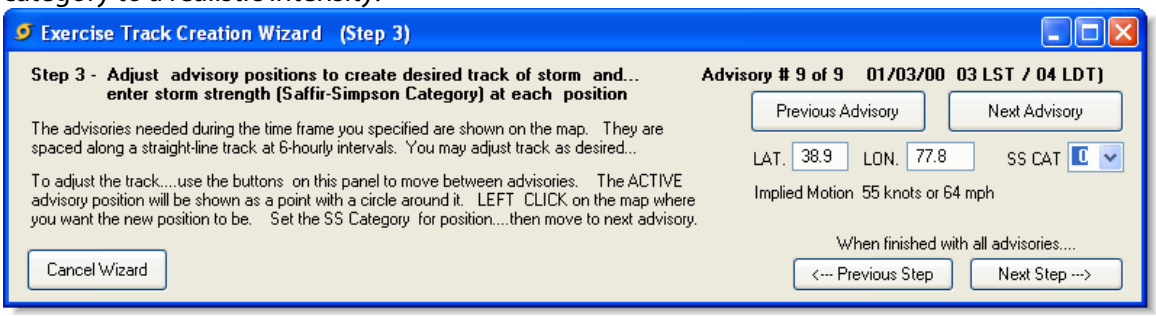
1. Set begin location and time for storm



2. Set end location and time for storm. The correct number of 6-hourly advisories will be created along a straight-line track when you complete this step.

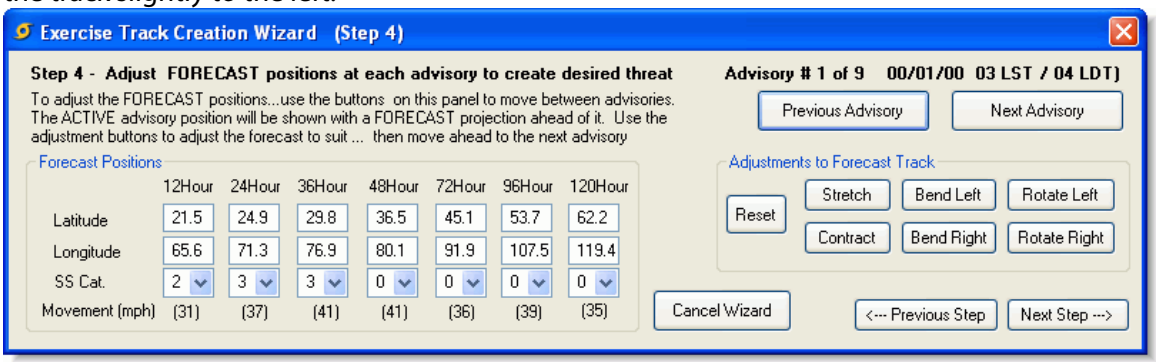


3. Next, work with the initial location of each advisory, adjusting its location and *storm category* (SS CAT) to suit. Pay close attention to the 'Implied Motion' and move advisory locations closer together if speed seem unrealistically high. By default the Wizard escalates the storm's intensity up to the final advisory. If your final advisory is well inland, be sure to drop the storm category to a realistic intensity.

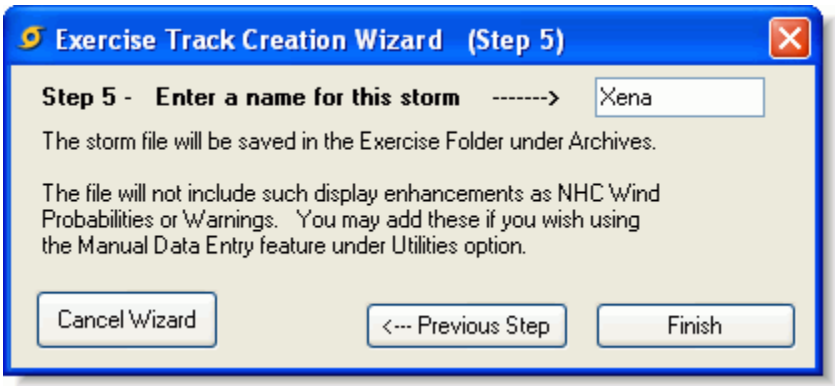


4. In this step, modify the forecast track of each advisory as desired. The wizard creates forecast tracks that are very similar in intensity and speed to the later advisory positions. It positions

the track slightly to the left.



5. Finally, name the storm. The filename will be saved as Xx_yyyy.stm (example XA_2002.stm for Allison from 2002), so as to prevent an overwrite by real storms during the season. The name inside the file however will be whatever name you gave it in the Name box and when you load the Xx file the name you gave it will appear within the program as usual. Your storm will be saved in a special *ExerciseSTMFiles* data directory and is accessible in the program through the Exercise heading of the Archives Tab



NOTE: Standard wind ranges are assumed by the Track Wizard initially. You can make fine-tuning adjustments to the *wind ranges* and add *watch* / *warning* locations by using Storm Data Entry... Manual Edit utility.

Other Forms

Setup Form

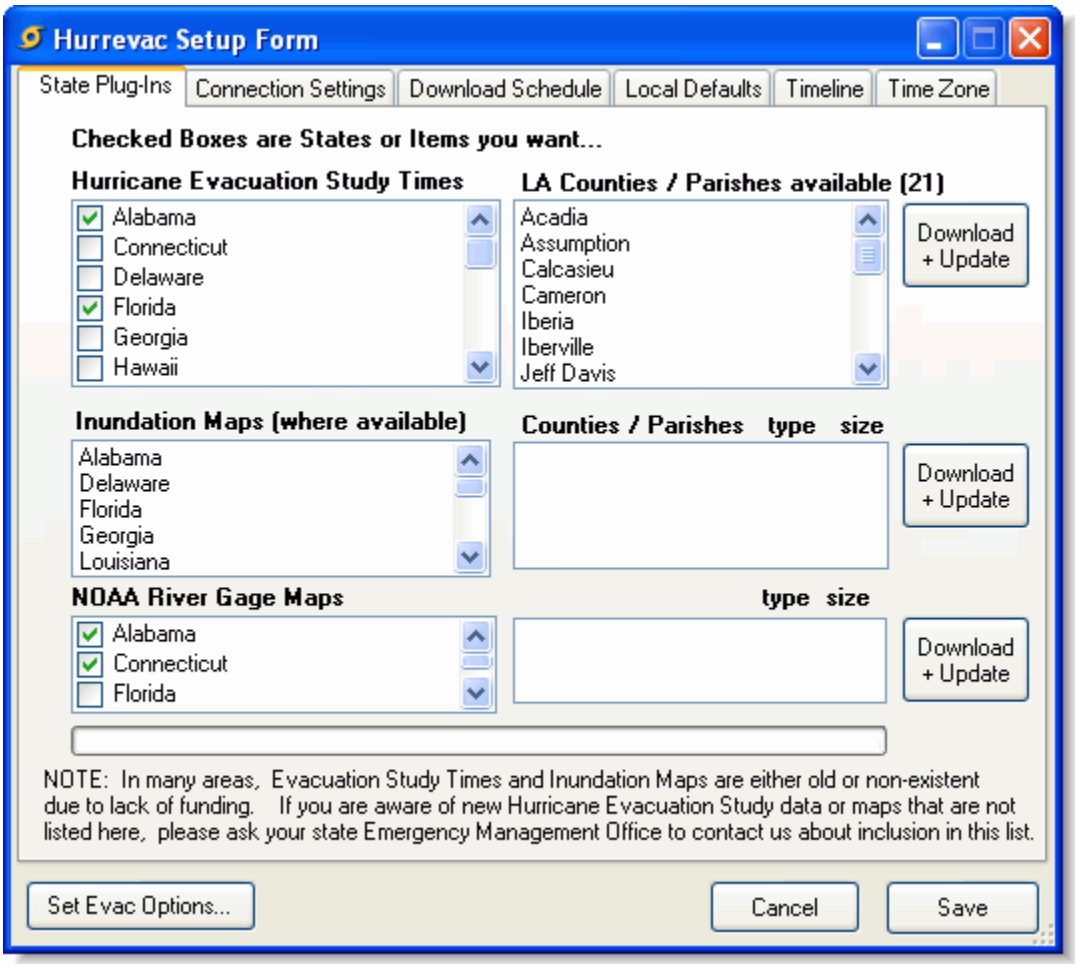
Hurrevac2010's Setup Form is called from the 'Setup' button at top right of the Monitoring Ribbon.

Setup Tabs

- State Plug-Ins
- Connection Settings
- Download Schedule
- Local Defaults
- Timeline
- Time Zone

State Plug-Ins

State Plug-In configuration is handled by Hurrevac2010's Setup Form.



Although Hurrevac2010 is designed to be generic and quickly usable by all areas to track hurricanes and time arrival of various wind parameters, the program relies on certain plug-ins in order to produce evacuation decision times, show inundation areas, show river gage maps, and do other specialized duties for at-risk states.

When you select *state plug-ins* here, files are downloaded to your computer from HURREVAC's support site and installed in appropriate folders under the program's installation directory. This form should also be used to update plug-ins when you are notified of changes. It's important that you register for the program and notify the HURREVAC support team of any change in e-mail address so that you can be kept informed of program updates.

Hurricane Evacuation Study Times

FEMA / *USACE* Hurricane Evacuation Studies (HES) assist emergency management offices in determining who should evacuate when a hurricane threatens and when they should leave. HES clearance times (the time it takes to complete an evacuation of a vulnerable population) are needed in Hurrevac's Evacuation Decision Timing operations.

HES data is generally only available for coastal counties of hurricane-prone states. If you don't find your location in the list of available Counties/Parishes, it is because no study has been done. Check with your state's hurricane planner for information on if/when that might change. This person will also know the age of your HES data and when a restudy might be planned.

Once you have downloaded HES data for one or more counties, you can use HURREVAC's Evacuation Clearance Time Browser to view the data within the program.

Inundation Maps

These are old raster-based, static maps of surge zones that have been ported from Hurrevac2000. While the type of information on these maps is extremely useful, the crude resolution and age of those available in HURREVAC severely limit their usefulness. Check with your county or state hurricane planner for newer versions of these maps that are often distributed in *GIS* or PDF formats.

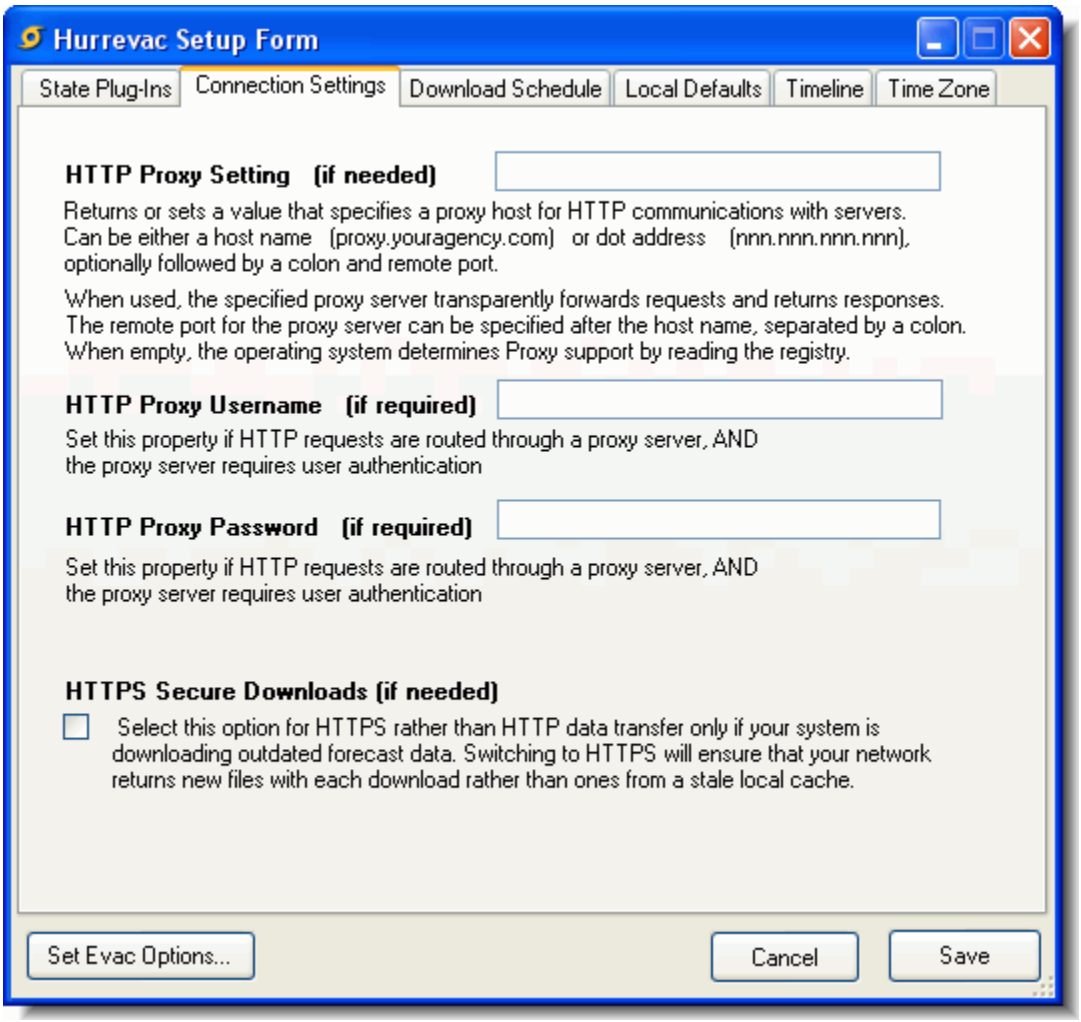
One you have downloaded an inundation map plug-in , use HURREVAC's Surge Map Browser under the UTILITIES heading to view available maps.

NOAA River Gage Maps

Static (raster-based) maps are available for certain river gages within Hurrevac's River Gage Browser. These maps consist of aerial photography showing the area around the gage that would be inundated by a 100-year flood and by a 500-year flood.

Connection Settings

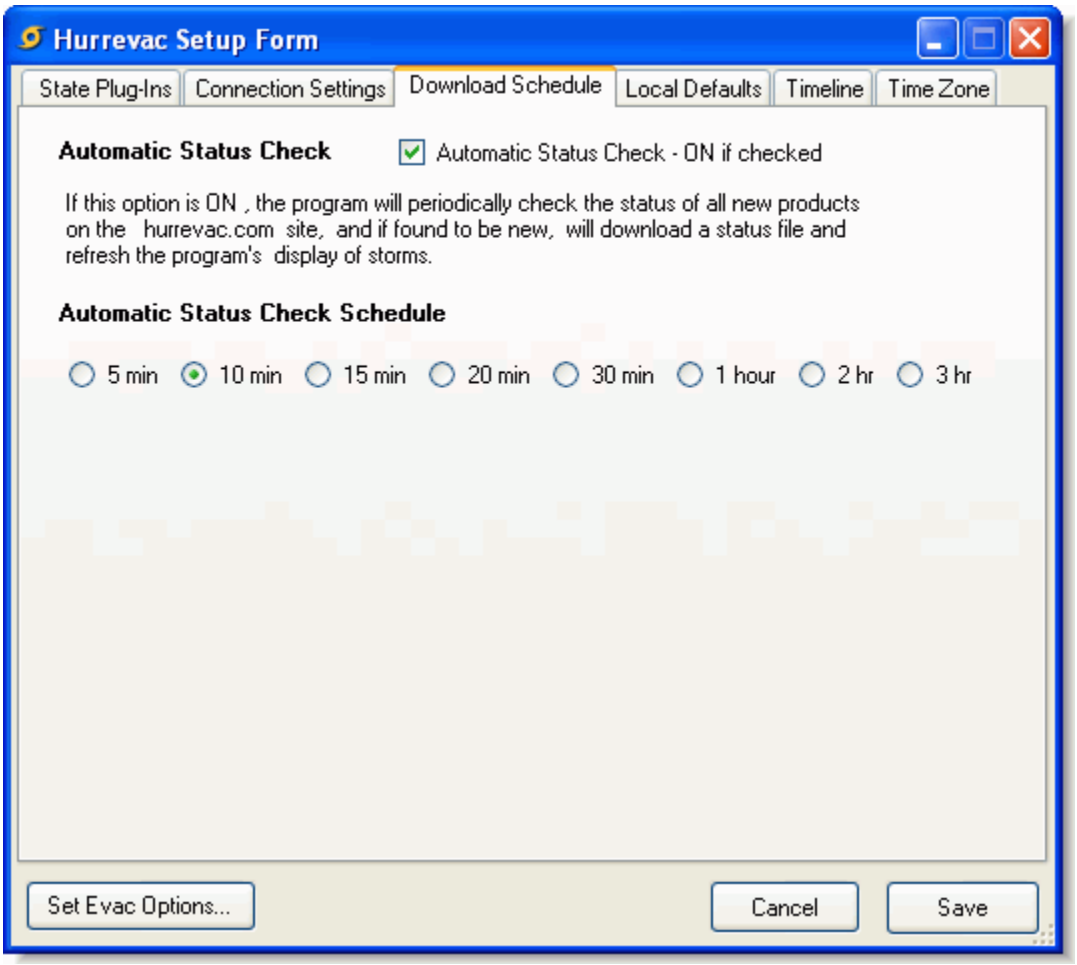
Connection Settings are handled by Hurrevac2010's Setup Form.



HTTP Proxy Settings many be left blank under normal situations. However, if the program gives you a message about not being able to connect to the internet site, then try to access http://data.hurrevac.com using your web browser. If you are able to connect in the web browser but not in Hurrevac2010, you may need to duplicate the proxy settings from the browser here. Contact your network administrator if you have trouble finding these settings.

Download Schedule

A Download Schedule is configured in Hurrevac2010's Setup Form.

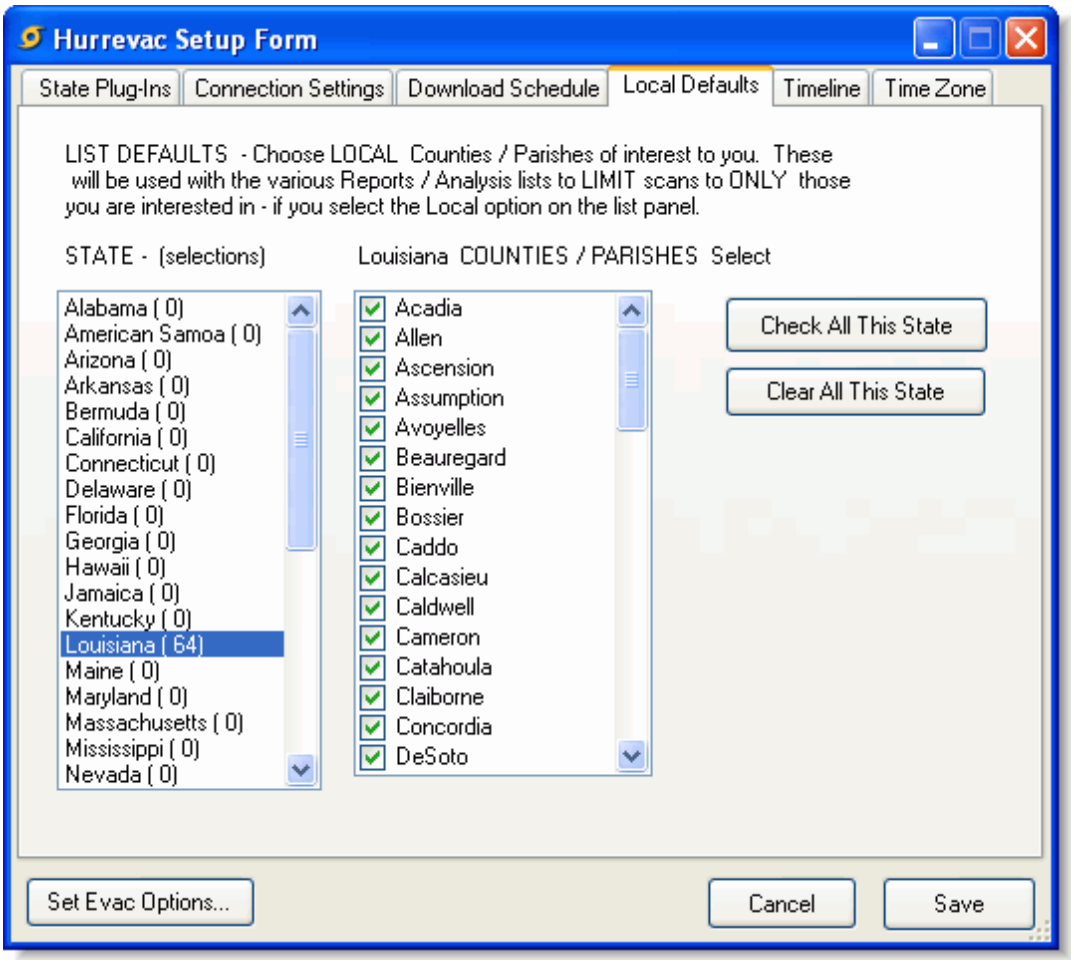


Hurrevac2010 will routinely poll for new storm advisories and other forecast data if you select 'Automatic Status Check' in the Download Schedule. When Hurrevac is left running on your desktop in monitoring mode, a small status.txt file is downloaded from data.hurrevac.com at the interval you have specified. If files described in the status.txt file are new or different that what already exists, the program will download updates to your computer.

For more information about the program's download and monitoring functions, refer to the 'Monitoring Ribbon' topic.

Local Defaults

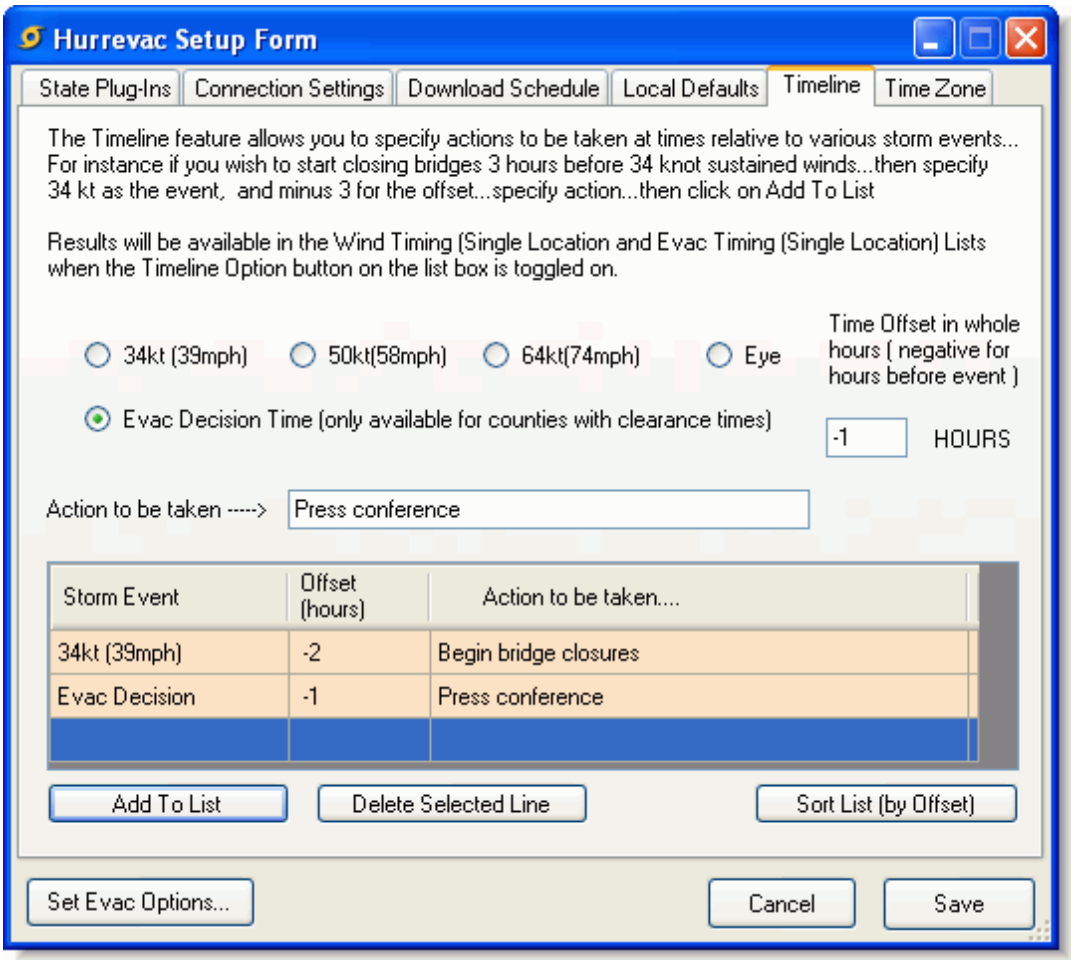
Local Defaults selections are made in Hurrevac2010's Setup Form.



On this Setup tab, mark the counties/parishes of interest to you. Many of HURREVAC's reports contain information on a large number of localities. Specifying a local area of interest will give you the ability to limit the report size if desired.

Timeline

Timeline items are configured in Hurrevac2010's Setup Form.



The Timeline feature allows you to specify Standard Operating Procedure-type actions to be taken at times relative to any of the following storm events:

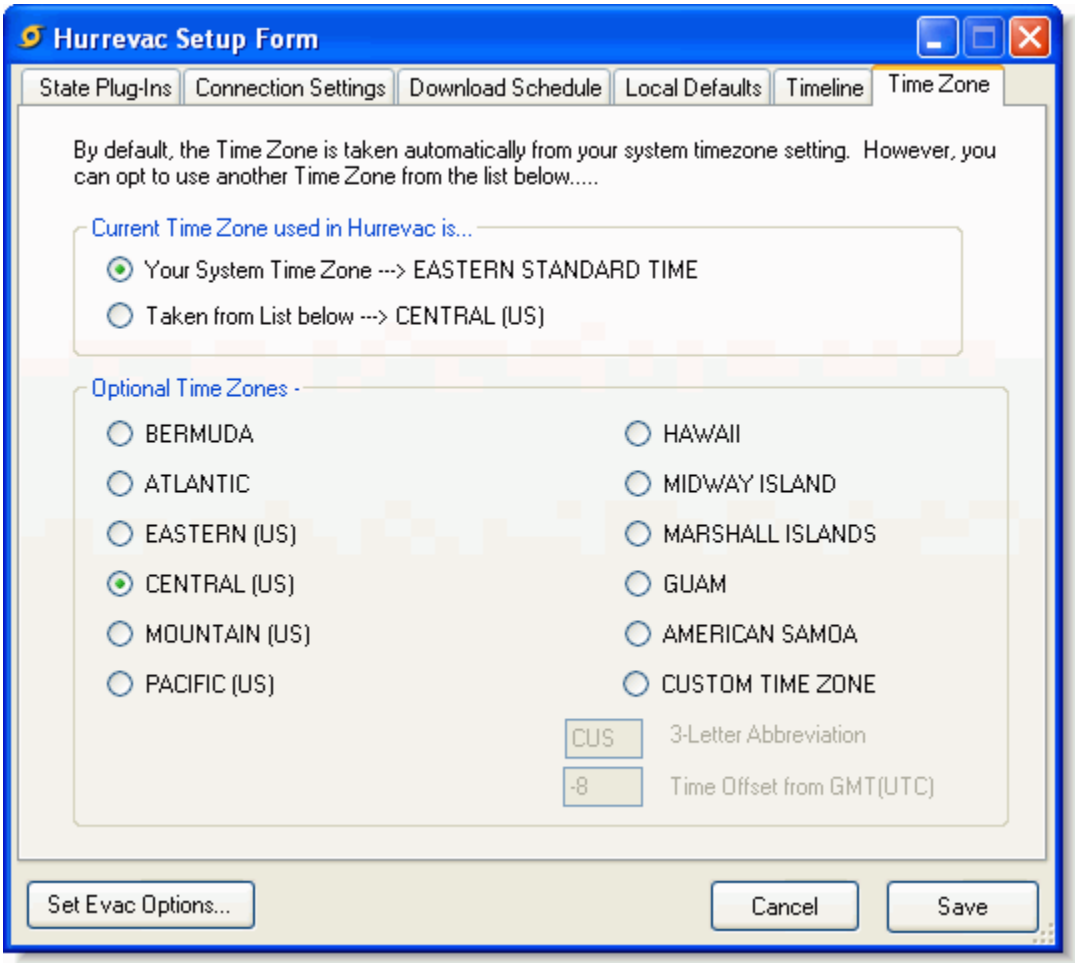
- arrival of the 34kt winds
- arrival of the 50kt winds
- arrival of the 64kt winds
- time of eye's closest approach
- evacuation *decision time* (available only if a county clearance time is installed)

Results will be available in the Wind Timing (single location) and Evacuation Timing (single location) reports when the Timeline Option button on the report is toggled on.

Time Zone

Time Zone is a tab on Hurrevac2010's Setup Form.

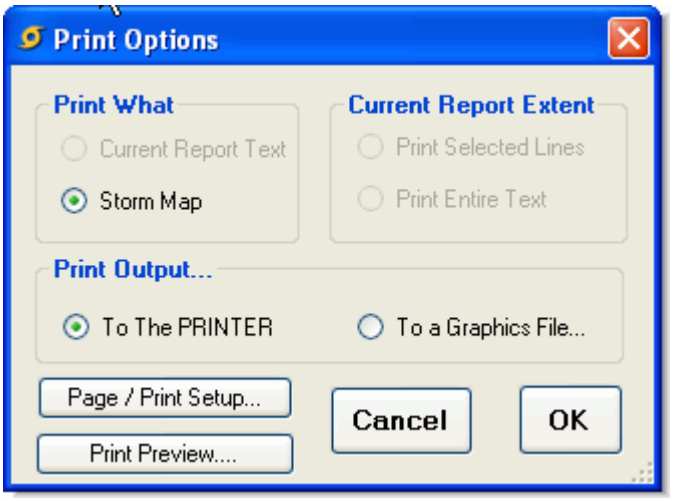
Under most conditions, you will not need to touch this setting because the time zone setting in HURREVAC matches your computer clock. This option is here in case you are preparing a map or report for a distant location and want to use the local time zone with out changing your computer's setting.



Printing

Hurrevac2010's Print Options are accessed though a button on the Monitoring Ribbon.

HURREVAC's Print Options are used both for printing to a printer and for exporting maps and data ('Print to File')



Print Item

Report Text - If you have an active report or text advisory showing, HURREVAC assumes that you want to print the report. If you want to print such a report you must generate it first and leave it showing on the screen. *Caution: Some of these lists (especially the Wind Decay affected list) can be quite long and you may want to select lines first for printing (see below).*

Storm Map - This item is set automatically if there is no report showing. This prints the map only, including any annotations thereon.

Current Report Extent

Selected Lines - If you have selected lines in the report showing on screen, this option is set automatically. You must select lines in the report (click and drag over the ones you want) in order to use this option.

Entire List - If you have not selected lines in the current affected list showing on screen, then it is assumed you want to print out the entire list.

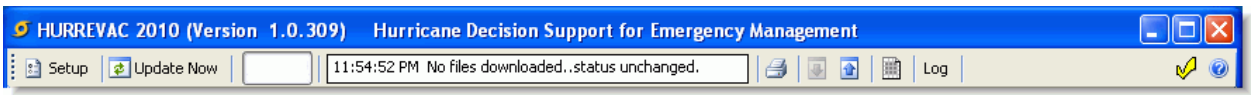
Print Output

Printer - Sends the printout to the current printer.

File - Sends the printout to a file of your choice with a default destination of 'My Documents.' Graphics files can be saved in several different formats. Reports are saved as plain text files which may be imported into a spreadsheet as 'space delimited' data.

Monitoring Ribbon

Hurrevac2010 features a ribbon across the top of the program interface that is primarily dedicated to monitoring a live stream of storm tracking and other data coming from HURREVAC's Internet site. Refer to the Download Schedule and Connection Settings for setup information.



Items on the ribbon are as follows (from left to right):

Setup - Access to Hurrevac's Setup Form

Update Now - Used to IMMEDIATELY check for and download any new data

Download Progress Bar - Blue bars in this window indicate that a download is in progress. Window remains empty otherwise.

Status Report Window - If Auto-Monitoring is turned on, the status report window will alternately show either the status of the last check for new data or the countdown to the next one. The window will flash when new data has been downloaded and stop flashing once you have acknowledged the alert by clicking on the program window.

Print Button - Access to Hurrevac's Printing options.

Collapse/Expand Buttons - To switch between Full-Program display and Ribbon-Only display

Analysis/Reports Button - To access the 'Analysis/Reports Selection' form

Log - To see a text log of recent monitoring and download activity.

Check - Signals that you have the latest version of Hurrevac2010 installed and changes to an exclamation mark if a later version is available. You can click on the mark for details.

Help - To access Hurrevac2010's help system.

Map Toolbar

The Map Toolbar consists of a set of a set of buttons and tools for map and storm plot manipulation.

Items on the toolbar are as follows (from top to bottom):

Zoom Tool - Click-and-Drag zooming on the map.

Pan Tool - Click-and-Drag panning on the map.

Extent Button - Left-click to zoom to full-extent map, right-click to zoom to local map. See UTILITIES...Map Defaults for configuration instructions.

Zoom IN and OUT Buttons - Left-click for 20% incremental zoom in or out, right-click for 40% zoom.

Move Storm AHEAD and BACK Buttons - Advance storm forward or back in forecast hour (1 hour with left-click, 6 hours with right-click).

NEXT and PREVIOUS Advisory Buttons - Advance storm forward or back in advisories (1 advisory with left-click, 3 advisories with right-click).

Wind Ranges Button - Action duplicates STORM FEATURES...Hourly Wind Ranges.

Forecast Wind Swath Button - Action duplicates STORM FEATURES...72-Hr Wind Swath.

Average Error Button - Action duplicates STORM FEATURES...Error Swath.

Storm Track Labels Button - Action duplicates ANNOTATION...Advisory Labels.

Watches/Warnings Button - Action duplicates STORM FEATURES...Watches/Warnings.

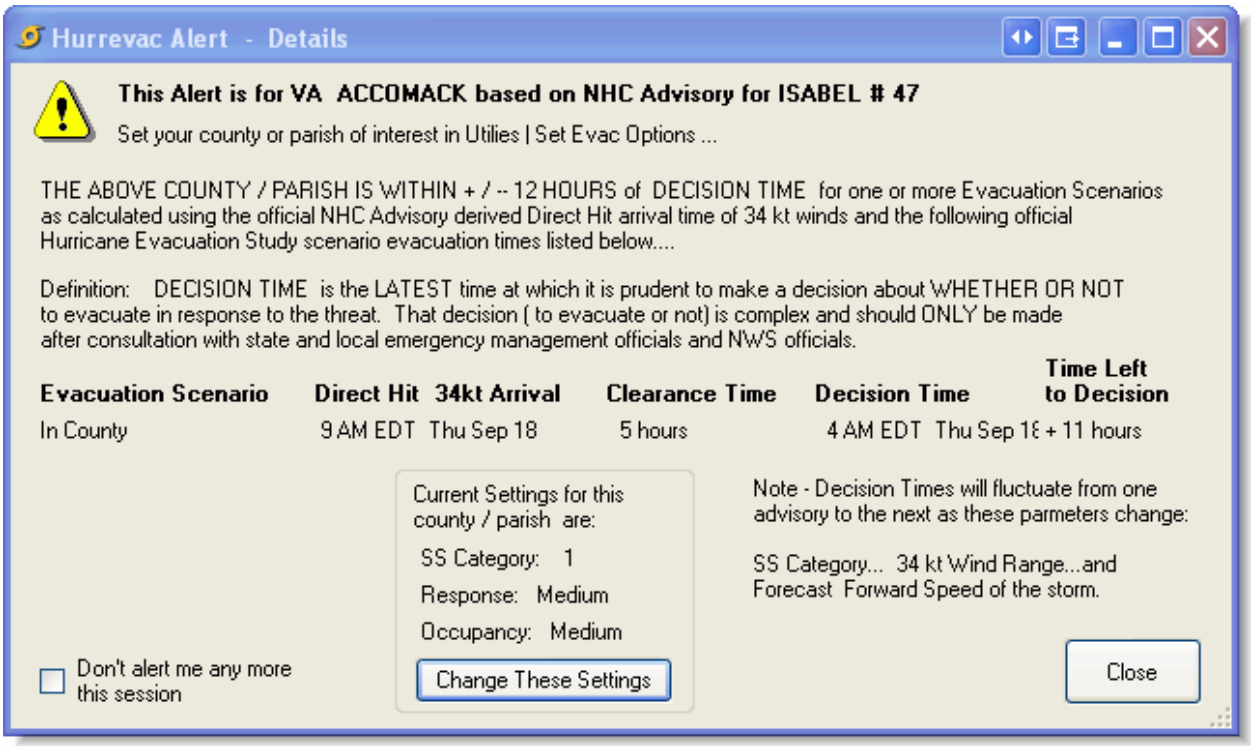
Wind Probabilities Button - Action duplicates STORM FEATURES...Wind Probabilities.

Decision Time Alert

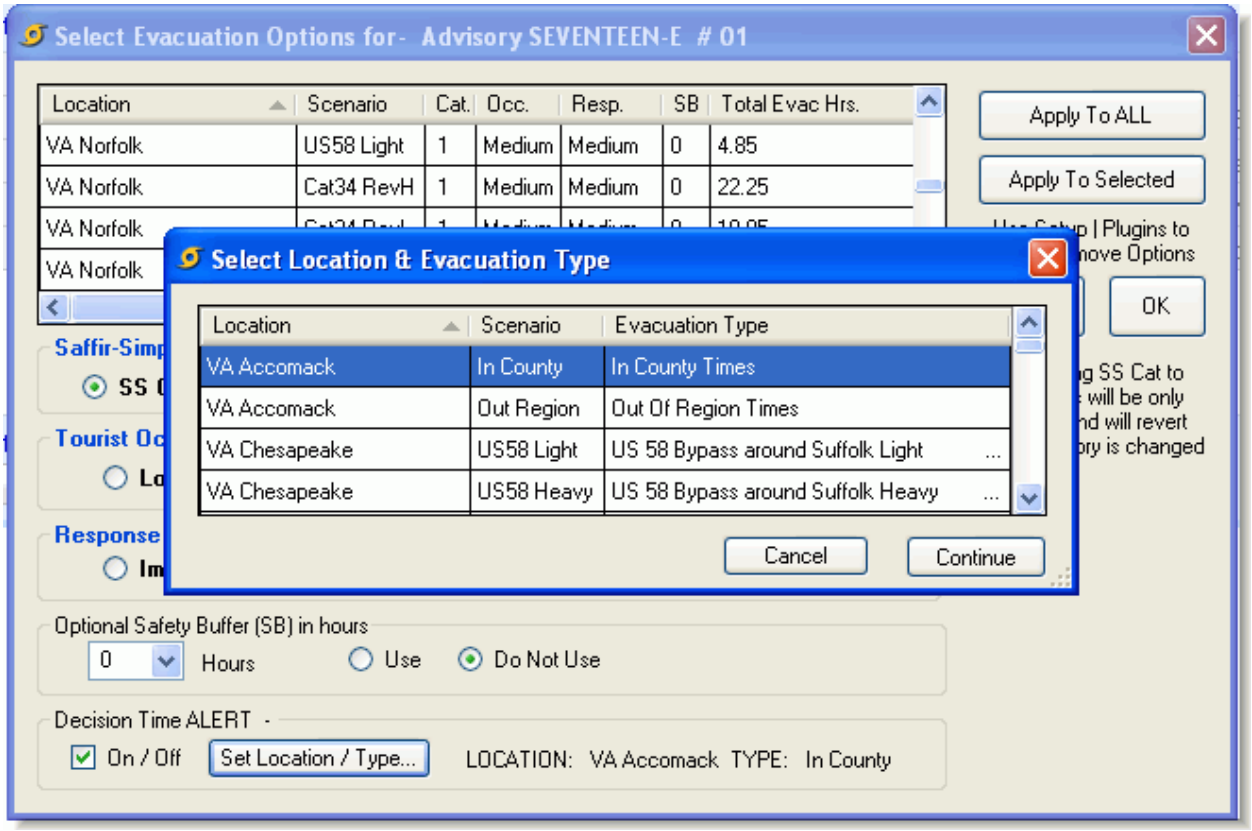
During the tracking of an approaching storm, the Decision Time Alert can be used to notify you of the first forecast *advisory* that puts the storm within 12 hours of evacuation *decision time* for a select county and evacuation scenario. Since the *NHC* , *CPHC* , and *JTWC* issue new forecast advisories at 6-hour intervals, the alert is intended as advance warning that an evacuation decision will need to be made based upon the next advisory or two.

NOTE: The appearance of the Alert does not automatically imply an evacuation is necessary, merely that the time for an evacuation decision is nearing. See Evacuation Decision Timing for more information on this topic.

Clicking on the Details of the Alert, you are then presented with the calculated Decision Time and the actual number of hours remaining (Time Left to Decision).



A Decision Time Alert can be configured under the Evacuation Options UTILITIES within Hurrevac2010's Toolbox. Only one location/scenario can be selected for this alert. If you are responsible for multiple counties or are considering multiple scenarios, selecting the location/scenario that has the longest lead times will ensure that you are alerted at the earliest possible time. The location/scenario you select will be retained even upon exit of the program.



Adjustments you make to evacuation options such as SS Category, Tourist Occupancy, and Response will also be reflected in the Decision Time Alert, however they will not be retained upon exit of the program.

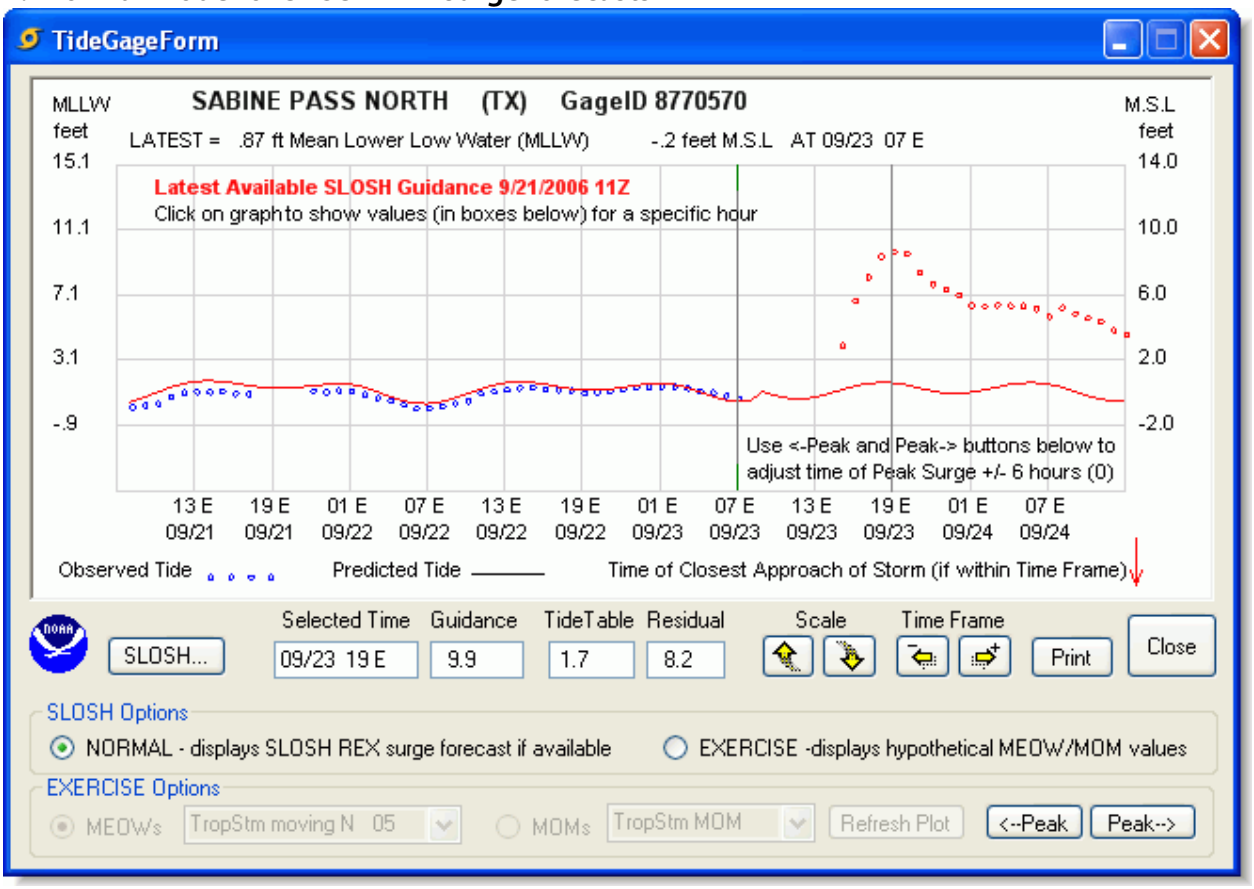
SLOSH Display

SLOSH (Sea, Lake, and Overland Surge from Hurricanes) is a computer software model used by the *NHC* to predict potential storm surge for a storm of specific barometric pressure, direction and speed of approach, and wind field size. Geography of the local area (shape of the coastline, depth of the ocean floor) are also critical inputs into the model.

SLOSH is generally accurate plus or minus 20% when given a known storm track. SLOSH output is much less certain, however, when used on a hurricane forecast, especially if the storm is still more than 24 hours from landfall. For this reason, emergency managers are advised to focus on maximum surge potential for a location, rather than the predicted surge for a specific storm scenario. These maximums are summarized in SLOSH MEOWs (Maximum Envelope of Water) and MOMs (Maximum of Maximums).

HURREVAC does not do actual SLOSH modeling. but rather ingests SLOSH model output from NHC and superimposes the surge predictions on the Tide Gage Browser. There are two types of SLOSH display modes available:

1. Normal mode for SLOSH REX surge forecasts

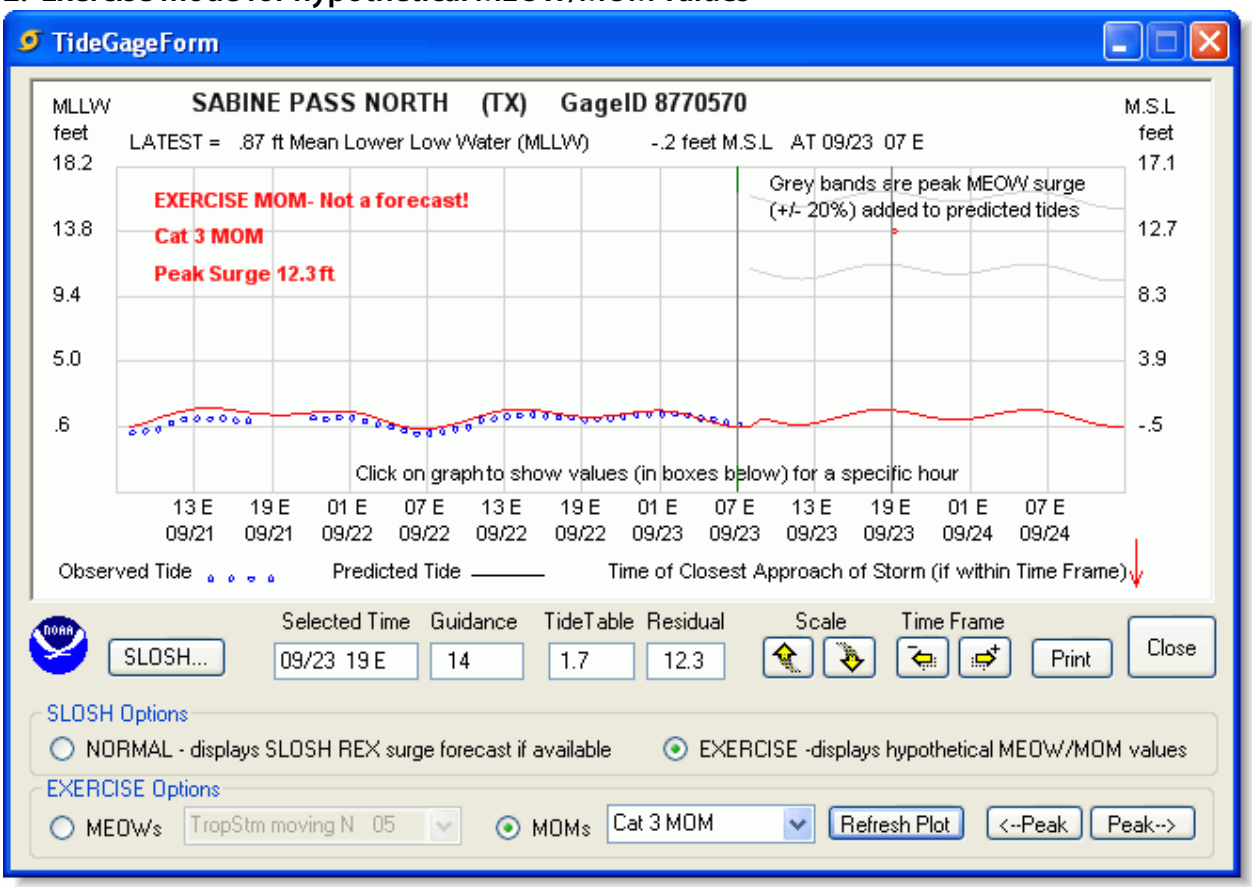


NORMAL mode is for live storms. It displays the usual tide plot PLUS any recent or archived SLOSH REX (output) files received at hurrevac.com from the NHC. As a general rule, these will be available only 24 hours before projected landfall of a storm and only for the general strike location of that storm.

When real-time SLOSH modeling is available for a gage, the location will be marked on the map with an **S.** Click on the gage to display its tide chart, then click on the SLOSH button next to the NOAA logo in the tide chart. The SLOSH-based storm tide guidance amounts will be displayed as red circles above the tide table heights on the right side of the graph. The amounts are the result of tide table heights plus the SLOSH surge guidance values. You can check the individual values at any point by clicking on the graph at the hour of your choice. Underneath the graph, in the box labeled **Residual**, is the specific SLOSH value, which is added to the Tide Table value to obtain the total **Guidance** storm tide level amount. The box is labeled Guidance, rather than forecast, since the projection is based on a specific landfall location which will be in error by some amount.

The **<-Peak** and **Peak->** buttons at the bottom of the panel allow the user to adjust the arrival time of the Peak Surge forward or backward 6 hours in time. The current setting of this adjustment is displayed on the graph in parentheses( ) following the Peak surge adjustment explanation.

2. Exercise mode for hypothetical MEOW/MOM values



MEOW or MOM Exercise mode allows the user to choose, for exercise purposes, a Maximum Envelope Of Water (MEOW) storm surge amount or a Maximum of Maximums (MOM) storm surge amount from the drop-down lists shown for this particular tide gage.

The MEOWs refer to SLOSH surges grouped into categories of Saffir Simpson scale (1 to 5), Direction of movement, and Speed of Movement.

The MOMs refer to the maximum surge amounts for each SS Category, regardless of Direction or Speed.

Once a MOM or MEOW is selected, a set of bands are drawn on the right hand side of the graph, indicating the storm tide amount that could be expected (plus or minus 20%) given the tide table height for that hour, and the MEOW or MOM surge height. By clicking on the graph at a specific hour, a red circle is drawn at the projected hypothetical storm tide height. Underneath the graph, in the box labeled **Residual**, is the specific SLOSH value, which is added to the Tide Table value to obtain the total **Guidance** storm tide level amount.

Special Tools

Supplementing HURREVAC's standard toolset are a few special tools that handle unique circumstances and locally-tailored analysis for certain states. These special tools are included with Hurrevac2010's main installation, but only appear in the program interface if the user has installed a Hurricane Evacuation Study Times plug-in containing tool information.

Special tools currently available in Hurrevac2010 are as follows:

Risk Profile - A report that compiles custom threat assessment information for a state and its localities. Risk Profiles are available for the following states:

- Florida
- Virginia (including northeastern North Carolina)
- New York (including northeastern New Jersey)

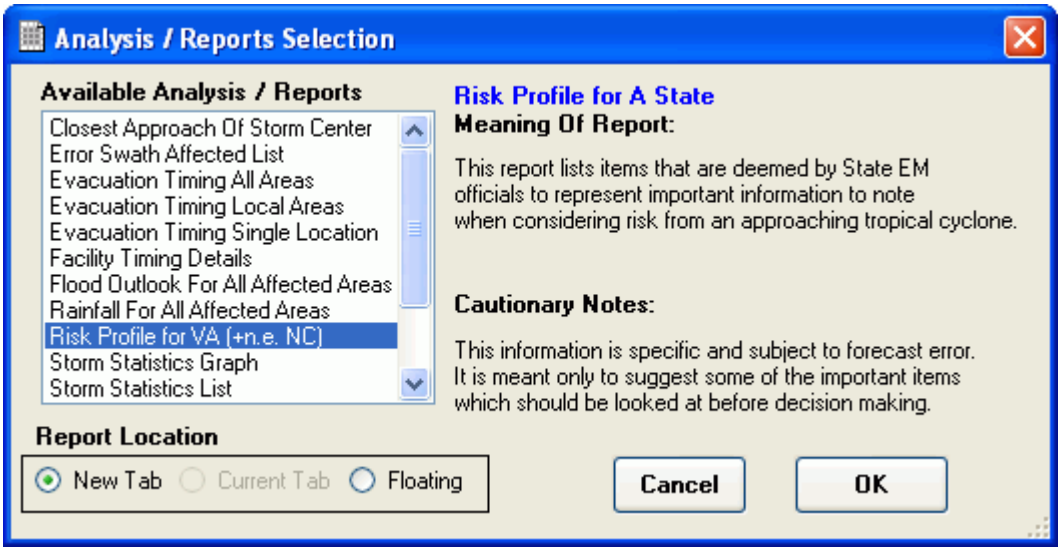
Facilities Timing - Reports and special settings that handle complex *HES* clearance time calculations for bridges, tunnels, and other transportation facilities in the New York City metropolitan area.

Risk Profiles

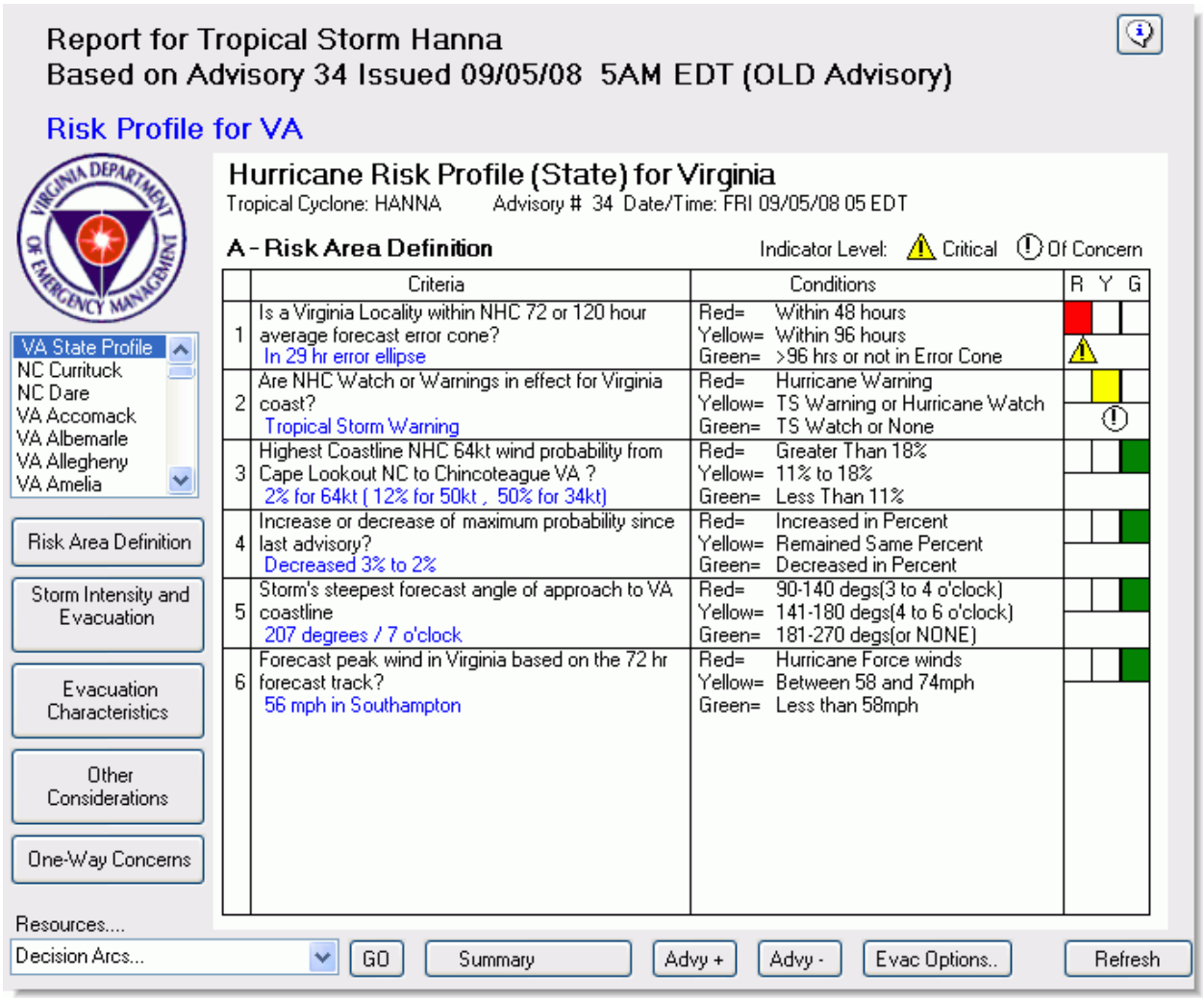
The Risk Profile is a special state-specific tool in HURREVAC which highlights information that is felt by a state's emergency managers to be especially important to consider when under a tropical cyclone threat. State-specific risk profiles are integrated into Hurrevac2010 but only appear in the program interface if the user has installed a Hurricane Evacuation Study Times plug-in containing risk profile information. The Hurricane Evacuation Study plug-ins for Florida, Virginia, and New York will activate Risk Profiles for those respective states.

The Risk Profile is accessed through the Analysis/Reports Selection panel and the resulting report is based upon whatever storm advisory is currently displayed in the Map View.

Only standard reports are listed under the REPORTS heading of Hurrevac2010's toolbox. To access the Risk Profile, you must use the [+] tab to add a new report from the list below:



The initial display for the Risk Profile will be something similar to this example below from Virginia.



How a Risk Profile Works

A Risk Profile is customized for an individual state using a series of criteria (questions) and conditions (possible answers) identified by emergency managers in that state as most relevant. The Risk Profile extracts the required information from the main HURREVAC program and presents it in a series of tables.

For each criterion, a color coded box (red, yellow, or green) highlights the severity of the condition.

When certain criteria reach either a yellow or a red condition, they are flagged to give special notice to their importance in the evacuation decision making process:

⚠ The ***Critical Indicator*** is a yellow triangle with an exclamation mark inside. This means that you should carefully consider the condition of this criterion. It is an important indication of a threat and is a critical one to consider.

ⓘ The ***Indicator of Concern*** is a white circle with an exclamation mark inside. This means that the condition of the criterion is important, but not quite at the critical level and should be monitored closely.

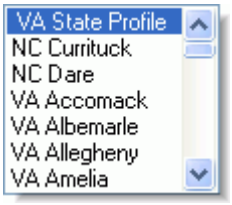
The intention is to lead the emergency manager toward a decision in a logical manner that takes advantage of the information that is available, but which may not be readily apparent to all but the most experienced.

Risk Profile Components

The following controls are used to manipulate the Risk Profile report (in other words, change the type of information displayed within the white box):

Geographic Scope Selection

This list box at top left of the Risk Profile is used to define a geographic scope for the report. Choices are either for an overall (State Profile) perspective or for the (Local) perspective of a single jurisdiction. Some states' Risk Profiles include a few neighboring counties in other states if their evacuation plans are interrelated (i.e. Outer Banks counties of Dare and Currituck, North Carolina would evacuate through the southeastern corner of Virginia).

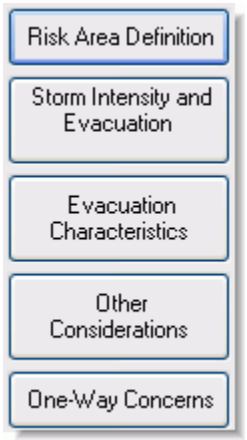


Criteria are often worded differently depending on whether the scope is state-wide or local. For example, a state-wide question about forecast peak winds is phrased "Forecast peak wind in Virginia based on the 72-hr forecast track?" and answered "82 mph in Suffolk" while the county-specific question is phrased "Forecast peak wind in your locality based on the 72-hr forecast track?" and answered with a county-specific wind speed.

In a few cases, criteria may apply to one scope but not the other. For example, since interstate lane reversal is a regional evacuation option, it is only addressed in criteria that appear under the State Profile.

Topics

Criteria are organized and labeled according to topic. These topics are shown on sequentially-lettered (A, B, C, D, etc) screens. The number and types of topics vary according to the custom design of each state's Risk Profile and may include any number of the following:



Risk Area Definition - Criteria that lead the user to consider information that is felt necessary to define the geographic region at risk and the change in risk from recent advisories.

Storm Intensity and Evacuation Scenario - Criteria that lead the user toward the correct Saffir-Simpson Category assumption for determining the type and extent of evacuation, should one be needed.

Evacuation Characteristics - Criteria that lead the user toward determining the proper evacuation decision time, based not only on the length of clearance time needed, but on such things as the time of day at which evacuation occurs.

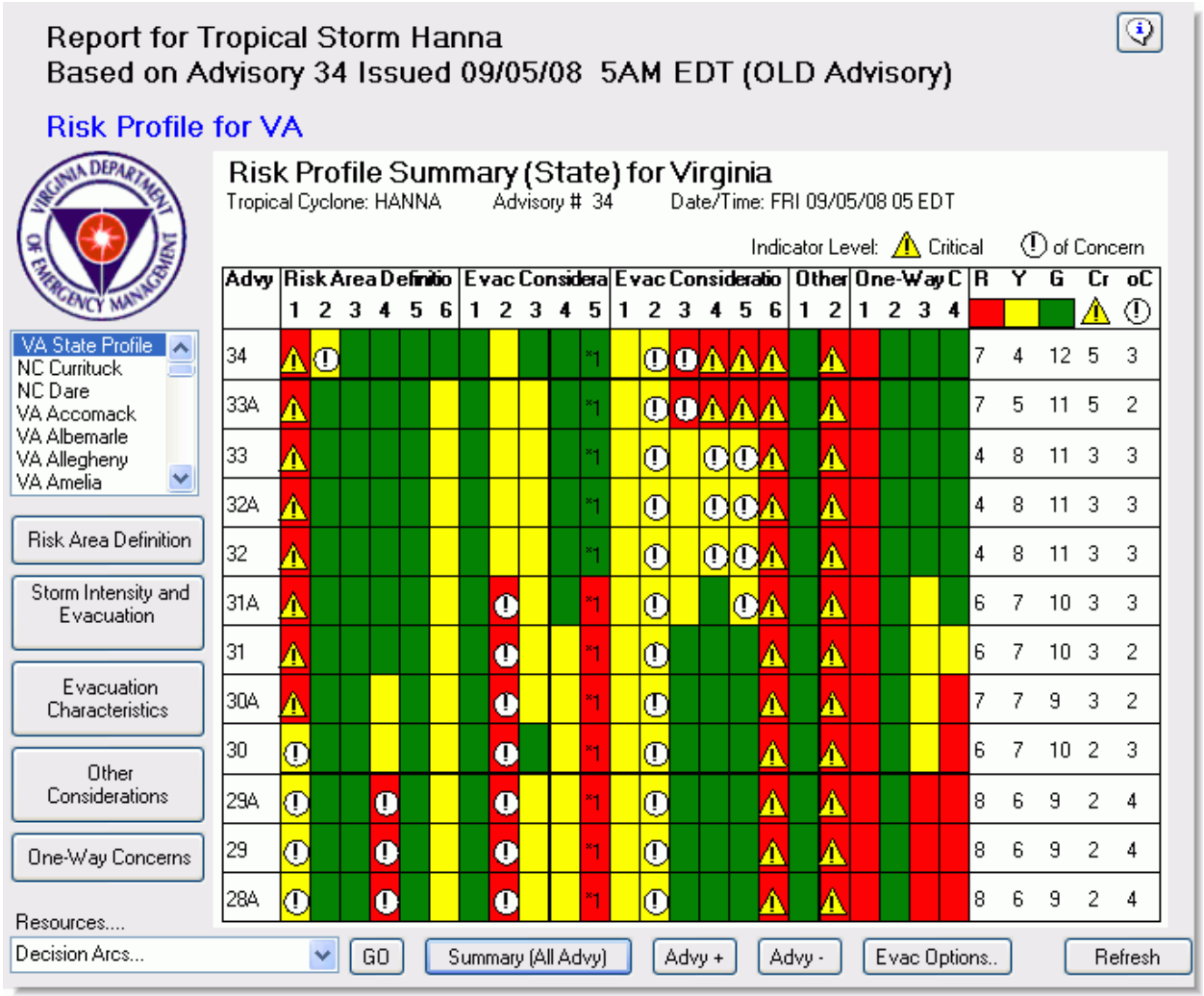
Storm Surge and Flooding - Criteria that lead the user to consider the potential for severe coastal storm surge and/or inland flooding due to heavy rainfall.

Other Considerations - This topic includes other information which may affect your evacuation, such as time of year, and whether other nearby regions are likely to be evacuating.

One-Way Concerns - This topic is usually available only when the state profile is selected. It considers the problem of whether and when to reverse-lane certain evacuation routes in order to increase capacity.

Summary

A summary screen can be generated of either the state profile or local county topics by clicking on the Summary button. The summary provides a graphical overview of the Risk Profile Indicators for the last 12 advisories. Once the summary screen is displayed, subsequent clicks on the Summary button will toggle between a view of 12 main and intermediate advisories (*AllAdvy*) and a view of main advisories only (*Main Advy*).



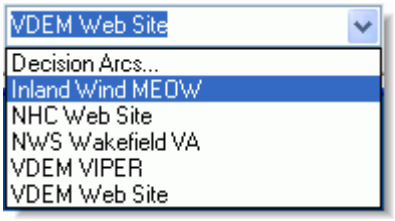
Special Considerations

The Risk Profile is very much a "weight of the evidence" system, designed to light up red when the user's region is threatened in a meaningful way. There are no hard and fast rules for using the system, but over time, users will no doubt develop some rules of thumb, such as a low number of green boxes on the Summary screen.

In looking for trends on the Summary screen, keep in mind that certain criteria, such as the One-Way Concerns, are designed to function more as timing indicators for starting a lane reversal option. That is, they move to red as the time for lane reversal setup is close and move back to green after the time has passed and the strategy can no longer be considered. Thus, while the other indicators may go to red and stay there as the storm approaches, the One-Way indicators on the State Summary screen will normally light up red only for one or two advisories around the time of One-Way setup.

Resources

The Resources list box at the bottom left highlights additional information (both internal and external to HURREVAC) that could be relevant to the local or state situation. Making a selection in this box and then pressing GO will either launch a web page or open a Hurrevac2010 control.



Additional Tips

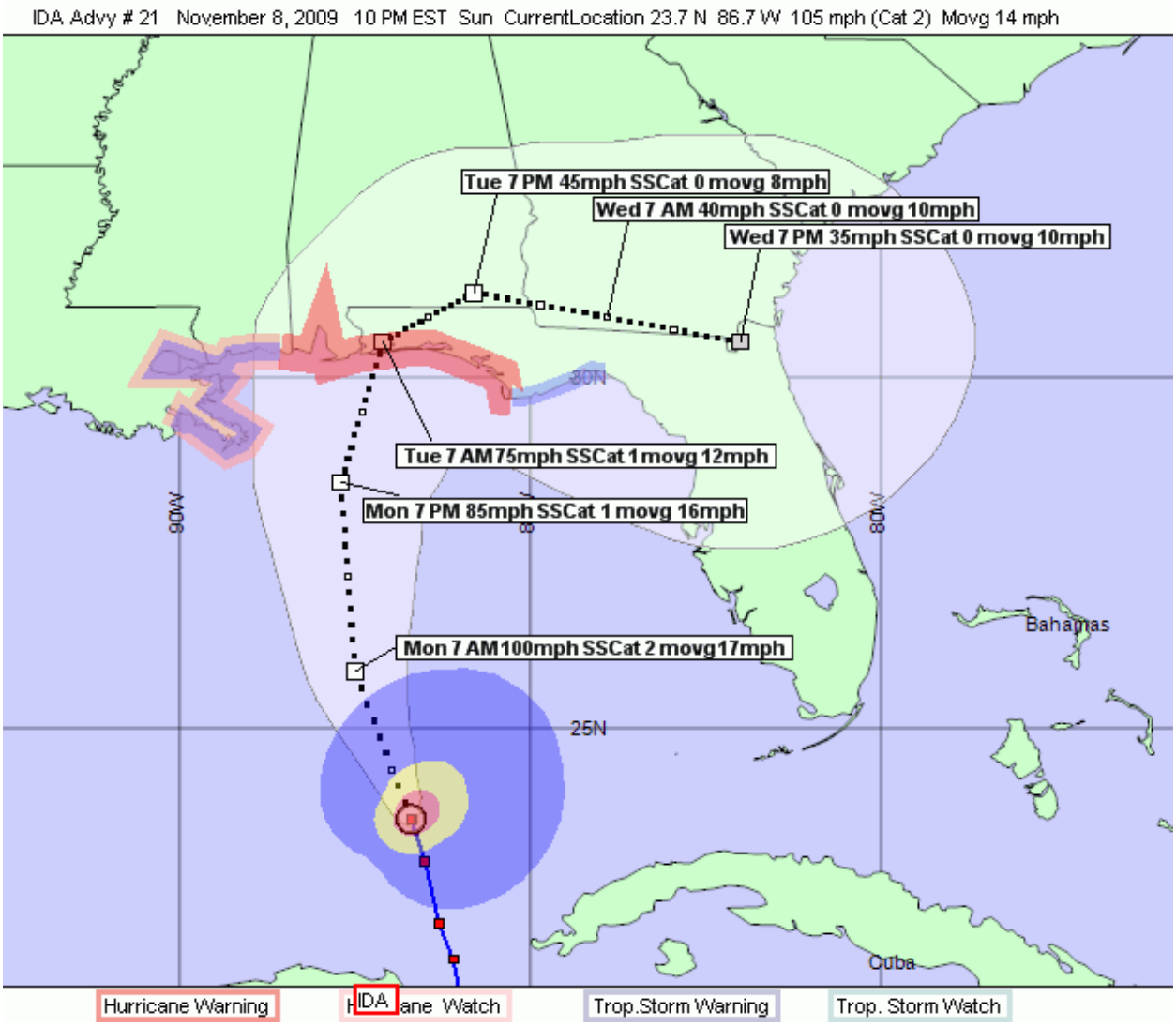
To print or export the report's data to a file, click the **Print** button on the Monitoring Ribbon at the top of the program.

Use the **Refresh** button at bottom right to redo the report if you have a new storm or different advisory loaded into the Map Display. The Refresh button can be useful in a live-storm situation in which a new advisory is received by the system and you want to refresh the Risk Profile with the latest forecast information. Alternately, you could use the **Advy+** and **Advy-** buttons to run a Risk Profile for a different advisory.

The **Evac Options** button allows you to view and change the default HES settings for a county or counties. Changing these settings can have a major effect on the Risk Profile output and should only be manipulated if you are very familiar with the underlying Hurricane Evacuation Study.

Florida Risk Profile

This series of images shows an example of the Risk Profile for Florida from Hurricane Ida Advisory #21 (2009).



State and Local Topics

Hurricane Risk Profile (State) for Florida

Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

A - Risk Area Definition Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R Y G
1	Where is Florida located with respect to NHC 72hr or 120 hour average forecast error Cone? In 25 hr Error Ellipse	Red= Within 48 hours Yellow= Within 96 hours Green= >96 hrs or not in Error Cone	⚠
2	Are NHC Watch or Warnings issued for Florida? Hurricane Warning	Red= Hurricane Warning Yellow= TS Warning or Hurricane Watch Green= TS Watch or None	⚠
3	Highest NHC 64kt wind probability for the Florida coastline? 18% (45% for 50kt , 86% for 34kt) PENSACOLA FL	Red= Greater Than 18% Yellow= 11% to 18% Green= Less Than 11%	ⓘ
4	Increase or decrease of maximum probability since last advisory? Increased 14% to 18%	Red= Increased in Percent Yellow= Remained Same Percent Green= Decreased in Percent	ⓘ
5	What is the forecast peak wind in Florida based on the 72 hour forecast track? 75 mph in Santa Rosa	Red= Hurricane Force winds or greater Yellow= Between 58 mph and 74 mph Green= Less than 58 mph	
6	Compared to the previous 3 advisories..how is the current forecast track..closest point of approach..moving relative to Florida? 0n.m.--> 0--> 0--> 0	Red= Consistently moving closer to Florida over at least 3 advisories OR consistently close(<50nm) Yellow= Inconsistent trend OR moving closer to Florida last advisory Green= Consistently moving away from county over last 3 advisories	

Hurricane Risk Profile (Local) for Santa Rosa County FL

Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

A - Risk Area Definition

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Is this county within the NHC 120-hour average forecast error cone? 25 hours	Red= Within 48 hours Yellow= Within 96 hours Green= >96 hrs or not in error cone	⚠		
2	Are NHC Watches or Warnings in effect for your county OR if inland county.. nearby coast? Hurricane Warning	Red= Hurricane Warning Yellow= TS Warning or Hurricane Watch Green= TS Watch or None	⚠		
3	What is the NHC 64kt wind probability nearest your county? 17% for 64kt (43% for 50kt , 84% for 34kt)	Red= Greater than 18% Yellow= 11% to 18% Green= Less than 11%		ⓘ	
4	Have the wind probabilities nearest your county increased or decreased since the last advisory? Increased 14% to 17%	Red= Increased in percent Yellow= Remained same percent Green= Decreased in percent or <3%	ⓘ		
5	Forecast peak wind in your county based on the 72-hour forecast track? 75 mph (65kt)	Red= Greater than 110 mph Yellow= Between 74 mph and 110 mph Green= Less than 74 mph			
6	Compared to the previous 3 advisories..how is the current forecast track Closest Point of Approach...moving relative to your county's center? 36n.m.--> 26--> 22--> 19	Red= Consistently moving toward county over at least 3 advisories OR consistently close (50nm) Yellow= No Consistent trend Green= Consistently moving away from county over last 3 advisories OR consistently far (>300nm)			

Hurricane Risk Profile (State) for Florida

Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

B - Storm Intensity and Evacuation Scenario

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	What is the current intensity of the storm? Cat 2 hurricane	Red= Major hurricane (Cat 3/4/5) Yellow= Hurricane (Cat 1 or 2) Green= Tropical storm or lower		■	
2	How is the storm intensity forecast to change before landfall? No change	Red= Increase in category Yellow= No increase in category Green= Decrease in category		■	
3	How close is the storm maximum forecast wind to the next highest Saffir/Simpson category? 7 mph from Cat 3	Red= Within 5 mph of next category Yellow= Within 10 mph of next category Green= 10 mph or more from next category		■	
4	Number of hours left for storm to intensify before landfall of eye on projected track? 72 hrs	Red= 49 or more hours Yellow= 25 to 48 hours Green= 24 hours or less	■		
5	Planning assumption for determination of evacuation zones (Any red or yellow boxes in B3 or B4 above)? Yes..Evac Zones Up 1 to Cat 3	Red= Yes...Assume evac zones one category higher Yellow= Not used Green= No...Evac zones remain same	■		
6	What is the tourist population in the region at risk (counties in the error cone)? Medium	Red= High occupancy Yellow= Medium occupancy Green= Low occupancy		■	

Hurricane Risk Profile (Local) for Santa Rosa County FL

Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

B - Storm Intensity and Evacuation Scenario Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	What is the current intensity of the storm? Cat 2 hurricane	Red= Major hurricane (Cat 3/4/5) Yellow= Hurricane (Cat 1 or 2) Green= Tropical storm or lower		■	
2	How is the storm intensity forecast to change before landfall? No change	Red= Increase in category Yellow= No increase in category Green= Decrease in category		■	
3	How close is the storm maximum forecast wind to the next highest Saffir/Simpson category? 7 mph from Cat 3	Red= Within 5 mph of next category Yellow= Within 10 mph of next category Green= 10 mph or more from next category		■	
4	Number of hours left for storm to intensify before landfall of eye on projected track? 72 hrs	Red= 49 or more hours Yellow= 25 to 48 hours Green= 24 hours or less	■		
5	Planning assumption for determination of evacuation zones (Any red or yellow boxes in B3 or B4 above)? Yes..Evac Zones Up 1 to Cat 3	Red= Yes...Assume evac zones one category higher Yellow= Not used Green= No...Evac zones remain same	■		
6	What is the tourist population in county? Medium	Red= High occupancy Yellow= Medium occupancy Green= Low occupancy		■	

Hurricane Risk Profile (State) for Florida

Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

C - Evacuation Characteristics

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Is the forward speed of the storm forecast to increase..decrease or stay same? Decrease-5 to average 12 mph before CPA	Red= Increase Yellow= Remain same Green= Decrease			■
2	Number of hours until onset of tropical storm force wind (39 mph) in Florida based on the forecast track? 19 hrs in Escambia	Red= Within 24 hours Yellow= Between 24 and 36 hours Green= Greater than 36 hours or none	■		ⓘ
3	Maximum clearance time for a Florida county within the NHC 72-hour average error cone? Hillsborough 33.5 hrs for Cat 3	Red= Greater than 24 hours Yellow= Between 12 and 24 hours Green= Less than 12 hours	■		⚠
4	Earliest NHC Forecast Track (CPA) Decision Time for counties within the 72-hour average forecast error cone? PAST DECISION TIME(-6.2 hrs) Escambia	Red= Decision time has past Yellow= 12 hours or less to decision time Green= Greater than 12 hours to decision time	■		⚠
5	Earliest Direct Hit Decision Time for counties within the 72-hour average forecast error cone? PAST DECISION TIME(-21.5 hrs) Manatee	Red= Decision time has past Yellow= 12 hours or less to decision time Green= Greater than 12 hours to decision time	■		⚠
6	For the Florida county with earliest Decision Time..period of day when the decision time occurs? 12 AM Sun	Red= 11PM-6AM or 9AM-4PM Mon-Fri Yellow= 4PM-11PM Green= 6AM-9AM or 9AM-4PM Sat-Sun	■		⚠

Hurricane Risk Profile (Local) for Santa Rosa County FL

Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

C - Evacuation Characteristics

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R Y G
1	Is the forward speed of the storm forecast to increase..decrease or stay same? Decrease-2 to average 15 mph before CPA	Red= Increase Yellow= Remain same Green= Decrease	G
2	Number of hours until onset of tropical storm force winds (39 mph) in county based on the forecast track? 19 hrs	Red= Within 24 hours Yellow= Between 24 and 36 hours Green= Greater than 36 hours or none	R
3	Greatest clearance time for county based on the maximum forecast intensity (as adjusted in Topic B)? 9 hrs for Cat 3 Medium Occ. / Medium Resp.	Red= Greater than 24 hours Yellow= Between 12 and 24 hours Green= Less than 12 hours	G
4	NHC Forecast Track (CPA) Decision Time for this county if within the 72-hour wind swath (Item 1 minus Item 2)? 10 hrs 11/09/09 7 AM	Red= Decision time has passed Yellow= 12 hours or less to decision time Green= Greater than 12 hours to decision time	Y ⓘ
5	Assuming a Direct Hit track...what is the Decision Time for this county? 9 hrs 11/09/09 6 AM	Red= Decision time has passed Yellow= 12 hours or less to decision time Green= Greater than 12 hours to decision time	Y ⓘ
6	Period of day when Decision Time for your county occurs? 6 AM Mon	Red= 11PM-6AM or 9AM-4PM Mon-Fri Yellow= 4PM-11PM Green= 6AM-9AM or 9AM-4PM Sat-Sun	R ⚠

Hurricane Risk Profile (State) for Florida

Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

D - Other Considerations

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Greatest rainfall forecasted for a Florida county in the next 72 hours? Data not available for advisory >24 hours old	Red= Greater than 6 inches Yellow= 3 to 6 inches Green= Less than 3 inches (or N/A)			■
2	What is the maximum clearance time for a Florida county within the 120-hour forecast error cone? Hillsborough 33.5 hrs for Cat 3	Red= Greater than 24 hours Yellow= Between 12 and 24 hours Green= Less than 12 hours	■		⚠
3	Are there any special events or holiday weekend considerations in evacuation planning? after Oct20 high occupancy S/SW FL	Red= around July 4 / Labor Day / OR Oct 20-Nov 30 S or SW FL Yellow= after July 4 week to Labor Day Green= No holiday or special event	■	⚠	
4	What is the inland extent of hurricane force winds based on MEOWs for (adjusted) forecast intensity and forward speed? Extend to Inland Counties	Red= Exits FL as hurricane Yellow= Extends to inland counties Green= Coastal Counties only		■	
5	Which Florida RPC Regions are in the 72 hour average forecast error cone? (9) W / Apala / NCent / NE / Withla / ECent / Cent / TPABay / TreaCst /	Red= SW / S / TPA Bay Yellow= TreaCst/ ECent / NW / W Green= Withlacoo / NCent / Apalach	■	ⓘ	
6	Does the state qualify for pre-landfall declaration? Likely.. 13 Counties with hurricane warning	Red= 3 or more counties in error cone and Cat storm major (3/4/5) Yellow= 3 to 6 counties in hurricane warning Green= Less than 3 counties in hurricane warning	■		

Hurricane Risk Profile (Local) for Santa Rosa County FL

Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

D - Other Considerations

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Amount of rainfall forecasted for this county in the next 72 hours? Data not available for advisory >24 hours old	Red= Greater than 6 inches Yellow= 3 to 6 inches Green= Less than 3 inches (or N/A)			■
2	What is the maximum clearance time for a Florida county within the 120-hour forecast error cone? Hillsborough 34 hrs for Cat 3	Red= Greater than 24 hours Yellow= Between 12 and 24 hours Green= Less than 12 hours	■		⚠
3	Are there any special events or holiday weekend considerations in evacuation planning? after Oct20 high occupancy S/SW FL	Red= Hurricane occurring within 1 week of July 4 or Labor Day Weekend Yellow= Hurricane occuring after July 4 week..before Labor Day Weekend or local special event Green= No holiday or special event	■		⚠
4	Do hurricane force winds normally reach this county in a storm with this strength and forward speed? Hurricane force	Red= Hurricane force...64 kts(74 mph) or greater Yellow= 50 to 63 kts (58 to 73 mph) Green= Less than 50 kts (58mph) or not in error cone	■		
5	Which Florida RPC Regions are in the 72-hour average forecast error cone? (9) W / Apala / NCent / NE / Withla / ECent / Cent / TPABay / TreaCst /	Red= Southwest/South/Tampa Bay Yellow= Treasure Coast/East Central/Northeast/West Green= Withlacoochee/North Central/Apalachee	■		ⓘ

Hurricane Risk Profile (State) for Florida

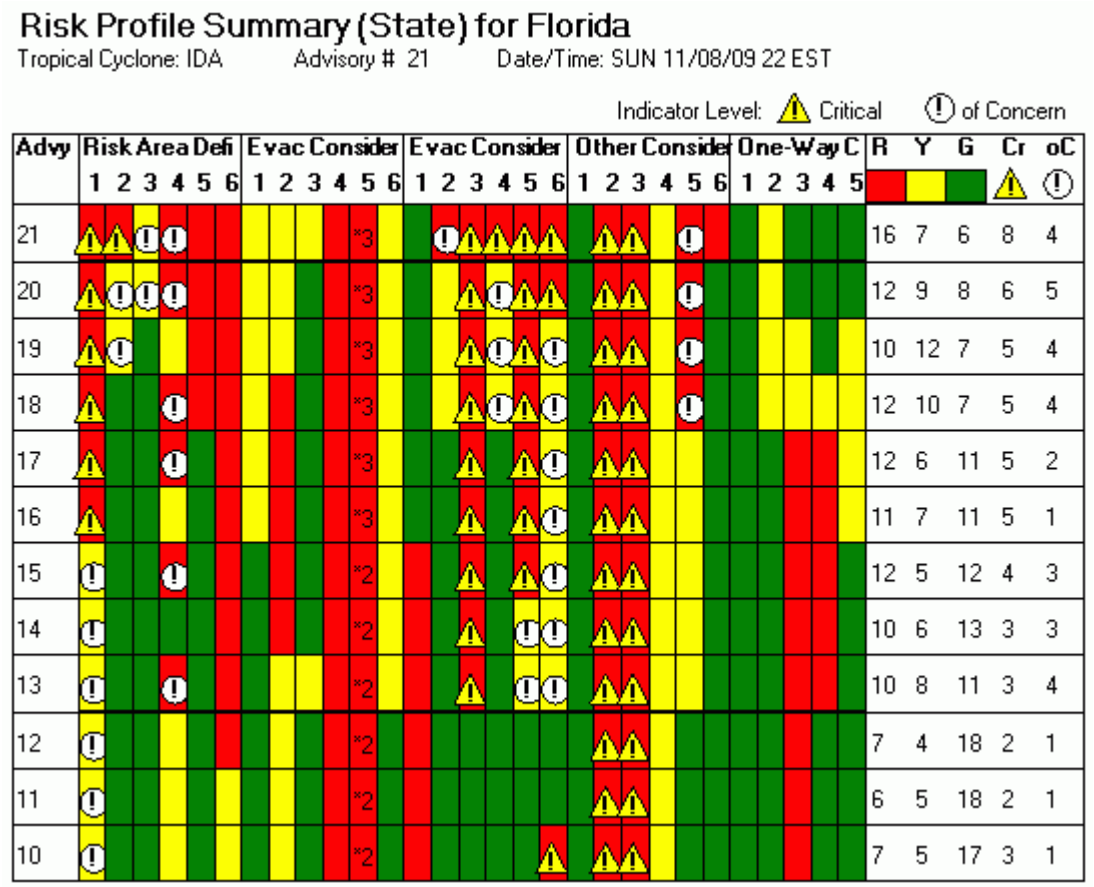
Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

E - One-Way Concerns

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Is the hurricane forecast to be a Category 4 or 5 within 72 hrs or before landfall? Forecast Cat 2	Red= Is now or forecast Cat 4/5 Yellow= Forecast Cat3..BUT at least 48 hours away so could intensify Green= Forecast only Cat 1/2			■
2	Are Southeast..Southwest..Tampa Bay..Northeast or West in 72 hr hurricane Wind Swath? West / (partial)	Red= Yes..entire RPC region or more than one region Yellow= Yes..one region is partially in hurricane wind swath Green= None of the regions are in hurricane wind swath		■	
3	Are there enough hours left before tropical storm winds to prepare and execute the One-Way option in Florida? 19 hrs left till TS Winds at 11/09/09 5 PM	Red= Yes At least 37 hours Yellow= Maybe if storm slows (30 to 36 hrs) Green= No unless storm slows			■
4	Are there at least 12 continuous hours of daylight after 25-hour setup time? not enough time for Setup	Red= Yes..At least 12 daylight hours after setup Yellow= Almost..9 to 11 hours Green= No..less than 9 hours			■
5	If One-Way setup is to be done WITH 12 HRS DAYLIGHT AFTER 25 hr setup..are we close to the required One-Way decision time? 38 hrs past OneWay Decision time at 11/07/09 8 AM	Red= Yes..within 2 hours of One-Way decision time Yellow= Yes..between 2 and 6 hours of One-Way decision time Green= No..more than 6 hours from One-Way decision time			■

State and Local Summaries



Advy	Risk Area Defi 1 2 3 4 5 6	Evac Consider 1 2 3 4 5 6	Evac Consider 1 2 3 4 5 6	Other Consider 1 2 3 4 5 6	One-Way C 1 2 3 4 5	R	Y	G	Cr	oC
21	⚠ ⚠ ! !	3	! ⚠ ⚠ ⚠ ⚠	⚠ ⚠ !		16	7	6	8	4
20	⚠ ! ! !	3	⚠ ! ⚠ ⚠	⚠ ⚠ !		12	9	8	6	5
19	⚠ !	3	⚠ ! ⚠ !	⚠ ⚠ !		10	12	7	5	4
18	⚠ !	3	⚠ ! ⚠ !	⚠ ⚠ !		12	10	7	5	4
17	⚠ !	3	⚠ ⚠ !	⚠ ⚠		12	6	11	5	2
16	⚠	3	⚠ ⚠ !	⚠ ⚠		11	7	11	5	1
15	! !	2	⚠ ⚠ !	⚠ ⚠		12	5	12	4	3
14	!	2	⚠ ! !	⚠ ⚠		10	6	13	3	3
13	! !	2	⚠ ! !	⚠ ⚠		10	8	11	3	4
12	!	2	⚠ ⚠			7	4	18	2	1
11	!	2	⚠ ⚠			6	5	18	2	1
10	!	2	⚠	⚠ ⚠		7	5	17	3	1

Risk Profile Summary (Local) for Santa Rosa County FL

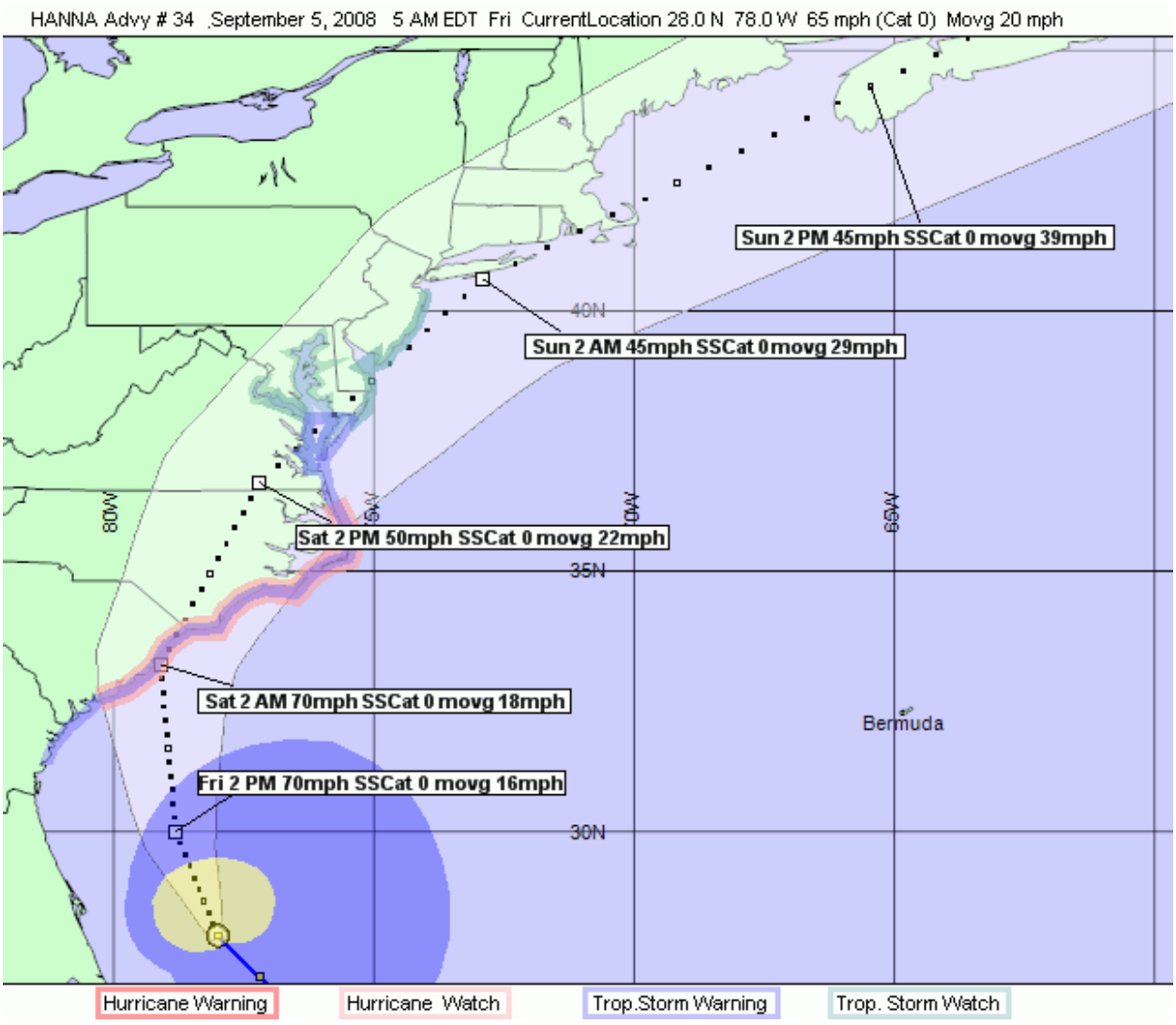
Tropical Cyclone: IDA Advisory # 21 Date/Time: SUN 11/08/09 22 EST

Indicator Level: ⚠ Critical ⓘ of Concern

Advy	Risk Area Definitio						Evac Consideratio						Evac Consideratio						Other Consider					R	Y	G	Cr	oC
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5				⚠	ⓘ
21	⚠	⚠	ⓘ	ⓘ							*3					ⓘ	ⓘ	⚠		⚠	⚠		ⓘ	12	8	3	5	5
20	⚠	ⓘ	ⓘ	ⓘ							*3							⚠		⚠	⚠		ⓘ	10	7	6	4	4
19	⚠	ⓘ									*3									⚠	⚠		ⓘ	7	8	8	3	2
18	⚠			ⓘ							*3									⚠	⚠		ⓘ	9	5	9	3	2
17	⚠			ⓘ							*3							⚠		⚠	⚠			9	4	10	4	1
16	⚠										*3									⚠	⚠			8	3	12	3	0
15	ⓘ										*2							⚠		⚠	⚠			9	3	11	3	1
14	ⓘ										*2							⚠		⚠	⚠			9	3	11	3	1
13	ⓘ										*2							⚠		⚠	⚠			8	5	10	3	1
12	ⓘ										*2										⚠			4	3	16	1	1
11	ⓘ										*2										⚠			4	3	16	1	1
10	ⓘ										*2										⚠			4	3	16	1	1

Virginia Risk Profile

This series of images shows an example of the Risk Profile for Virginia from Tropical Storm Hanna Advisory #34 (2008).



State and Local Topics

Hurricane Risk Profile (State) for Virginia

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

A - Risk Area Definition Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R Y G
1	Is a Virginia Locality within NHC 72 or 120 hour average forecast error cone? In 28 hr Error Ellipse	Red= Within 48 hours Yellow= Within 96 hours Green= >96 hrs or not in Error Cone	⚠
2	Are NHC Watch or Warnings in effect for Virginia coast? Trop Storm Warning	Red= Hurricane Warning Yellow= TS Warning or Hurricane Watch Green= TS Watch or None	ⓘ
3	Highest Coastline NHC 64kt wind probability from Cape Lookout NC to Chincoteague VA ? 2% (12% for 50kt , 50% for 34kt)	Red= Greater Than 18% Yellow= 11% to 18% Green= Less Than 11%	
4	Increase or decrease of maximum probability since last advisory? Decreased 3% to 2%	Red= Increased in Percent Yellow= Remained Same Percent Green= Decreased in Percent	
5	Storm's steepest forecast angle of approach to VA coastline 207 degrees / 7 O'clock	Red= 90-140 degs(3 to 4 o'clock) Yellow= 141-180 degs(4 to 6 o'clock) Green= 181-270 degs(or NONE)	
6	Forecast peak wind in Virginia based on the 72 hr forecast track? 56 mph in Southampton	Red= Hurricane Force winds Yellow= Between 58 and 74mph Green= Less than 58mph	

Hurricane Risk Profile (Local) for Va Beach County VA

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

A - Risk Area Definition

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R Y G
1	Is this Locality within NHC 72 or 120 hour average forecast error cone? 30 hours	Red= Within 48 hours Yellow= Within 96 hours Green= >96 hrs or not in Error Cone	⚠
2	Are NHC Watch or Warnings issued for your county OR if inland county.. nearby coast? TS Wrng	Red= Hurricane Warning Yellow= TS Warning or Hurricane Watch Green= TS Watch or None	ⓘ
3	What is the NHC 64kt wind probability nearest your locality? 2% (12% for 50kt , 50% for 34kt)	Red= Very High Risk >18% Yellow= High Risk 11 to 18% Green= Med or Low Risk <11%	
4	Have the wind probabilities nearest your location increased or decreased since the last advisory? Same 2 --> 2	Red= Increased in Percent Yellow= Remained Same Percent Green= Decreased in Percent or <3%	
5	Storm's steepest forecast angle of approach to VA coastline 207 degrees / 7 O'clock	Red= 90-140 degs(3 to 4 o'clock) Yellow= 141-180 degs(4 to 6 o'clock) Green= 181-270 degs(or NONE)	
6	Forecast peak wind in your locality based on the 72 hr forecast track? 52Mph (45Kt)	Red= Hurricane Force winds Yellow= Between 58 and 74mph Green= Less than 58mph	

Hurricane Risk Profile (State) for Virginia

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

B - Storm Intensity and Evacuation Scenario

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	What is the current intensity of the storm? Cat 0 Tropical Storm	Red= Major Hurricane(Cat 3/4/5) Yellow= Hurricane (Cat 1 or 2) Green= Tropical Storm or lower			■
2	How is the storm intensity forecast to change before landfall? No Change	Red= Increase in Category Yellow= No Increase in Cat Green= Decrease in Cat		■	
3	Difference in central pressure from last advisory? 1 millibars (mb) RISE	Red= Decrease by more than 5 mb Yellow= Decrease by less than 5 mb or Same Green= Increase			■
4	Number of hours left to intensify before landfall on projected track? 25 hrs	Red= Greater than 72 hours Yellow= 37 to 72 hours Green= 36 hours or less			■
5	Planning Assumption for determination of Evacuation Category.. if B2 is Red..use NHC Forecast Cat OR if B3 and B4 are Red Increase One Category from that of B1... No..Evac Category should remain for Cat 0	Red= Assume Evacuation Category higher Yellow= Not used Green= Evacuation Category remains same			■

Hurricane Risk Profile (Local) for Va Beach County VA

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

B - Storm Intensity and Evacuation Scenario Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	What is the current intensity of the storm? Cat 0 Tropical Storm	Red= Major Hurricane(Cat 3/4/5) Yellow= Hurricane (Cat 1 or 2) Green= Tropical Storm or lower			■
2	How is the storm intensity forecast to change before landfall? No Change	Red= Increase in Category Yellow= No Increase in Cat Green= Decrease in Cat		■	
3	Difference in central pressure from last advisory? 1 millibars (mb) RISE	Red= Decrease by more than 5 mb Yellow= Decrease by less than 5 mb Green= Increase			■
4	Number of hours left to intensify until landfall of eye? 25 hrs	Red= Greater than 72 hours Yellow= 37 to 72 hours Green= 36 hours or less			■
5	Planning Assumption for determination of Evacuation Category.. if B2 is Red..use NHC Forecast Cat OR if B3 and B4 are Red Increase One Category from that of B1... No..Evac Category should remain for Cat 0	Red= Assume Evacuation one Category higher Yellow= Not used Green= Evacuation Category remains same			■

Hurricane Risk Profile (State) for Virginia

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

C - Evacuation Characteristics

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Predicted forward speed over 72 hour forecast period or until landfall? Avg. Forward Speed To Landfall 18 mph	Red= 25 MPH or greater Yellow= 15 to 25 MPH Green= Less than 15 MPH			
2	Highest Clearance time for Virginia HES Risk Locality within 72 hr average forecast error cone? York 22.25 hrs for Cat 1	Red= Locality with 24hrs or greater Yellow= Locality with 16to23hrs Green= Less than 16 hours		ⓘ	
3	Number of hours until onset of Tropical Storm force winds in Virginia based on the forecast track..? 19 hrs in Greensville	Red= Within 24 Hours Yellow= Between 24 and 36 hrs Green= Greater than 36hrs or none		ⓘ	
4	Earliest NHC Forecast Track (CPA) Decision Time for localities within the 72 hr average forecast error cone? PAST DECISION TIME(-2.25hrs) Chesapeake	Red= Decision time has passed Yellow= 12 Hrs or less to Decision time Green= Greater than 12 hrs from Decision time		⚠	
5	Earliest Direct-To-Point (DTP) Decision Time for localities within the 72 hr average forecast error cone? PAST DECISION TIME(-2.25hrs) Va Beach	Red= Decision time has passed Yellow= 12 Hrs or less to Decision time Green= Greater than 12 hrs from Decision time		⚠	
6	Period of day when Forecast Track Decision Time for the above occurs (Probability of public emergency decisions being received and acted on)? 2 AM Fri	Red= 11PM to 6AM or 9AM to 4PM Mon-Fri Yellow= 4PM to 11PM Green= 6AM to 9AM or 9AM to 4PM Sat-Sun		⚠	

Hurricane Risk Profile (Local) for Va Beach County VA

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

C - Evacuation Characteristics

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R Y G
1	Predicted forward speed over 72 hour forecast period or until landfall? Avg. Forward Speed To Landfall 18 mph	Red= 25 MPH or greater Yellow= 15 to 25 MPH Green= Less than 15 MPH	
2	Clearance time for your locality (If non-HES risk locality then standard 6 hrs used) 22.25 hrs for Cat 1 Medium Occ. / Medium Resp.	Red= Locality with 24hrs or greater Yellow= Locality with 16to23hrs Green= Less than 16 hours	ⓘ
3	Number of hours until onset of Tropical Storm force winds on the forecast track..? 21 hrs	Red= Within 24 Hours Yellow= Between 24 and 36 hrs Green= Greater than 36hrs or none	ⓘ
4	Assuming a Direct-To-Point (DTP) track..Calculated Decision Time for this locality? PAST DECISION TIME(-2.25hrs)	Red= Decision time has passed Yellow= Within 6 hrs of decision time Green= 12 hrs or greater from decision time	⚠
5	Period of day when Decision Time for your locality occurs? 2 AM Fri	Red= 11PM to 6AM or 9AM to 4PM Mon-Fri Yellow= 4PM to 11PM Green= 6AM to 9AM or 9AM to 4PM Sat-Sun	⚠

Hurricane Risk Profile (State) for Virginia

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

D - Other Considerations

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Inland extent of hurricane force winds based on MEOWs for forecast intensity and forward speed? (*see References for MEOW) Coastal localities only	Red= Several Inland Localities Yellow= A few Inland Localities affected Green= Coastal Localities only			■
2	Special Events or Holiday Weekend Considerations? +/- 1 week of LaborDay	Red= Hurricane occurring within 1 week of July 4 or Labor Day Weekend Yellow= Hurricane occurring after July 4 week and before Labor Day Weekend or local special event Green= No holiday or special event	■ ⚠		

Hurricane Risk Profile (Local) for Va Beach County VA

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

D - Other Considerations

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions		R Y G
1	If your county is within the 72 hr average error cone..what is the peak wind in your county based on MEOWs for max(adjusted) forecast intensity and forward speed? (*see References for MEOW) 50 Kt (58mph)	Red= Yellow= Green=	Hurricane Force..64 knots(74mph)or greater 50 knots to 63 knots (58 to 73mph) less than 50 knots(58mph)	Y
2	Special Events or Holiday Weekend Considerations? +/- 1 week of LaborDay	Red= Yellow= Green=	Hurricane occurring within 1 week of July 4 or Labor Day Weekend Hurricane occurring after July 4 week and before Labor Day Weekend or local special event No holiday or special event	R ⚠
3	Which Virginia Regions are in the 72 hr Average Forecast Error Cone (Heavy coastal evacuation traffic likely)? (2) Coast / Central /	Red= Yellow= Green=	Tidewater/Bay/EShore Central Western	R ⚠

Hurricane Risk Profile (State) for Virginia

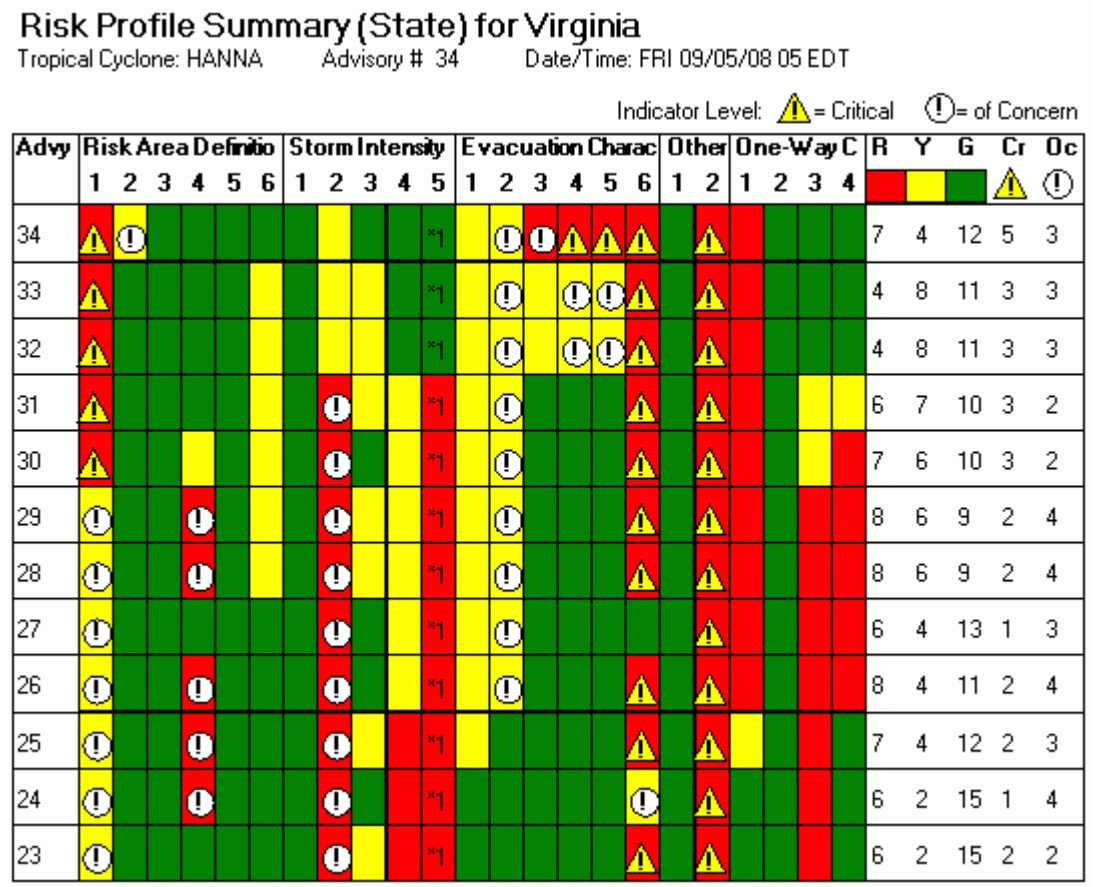
Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

E - One-Way Concerns

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Which Virginia Regions are in the 72 hr Average Forecast Error Cone? (2) Coast / Central /	Red= Tidewater/Bay/EShore Yellow= Central Green= Western	■		
2	Is the hurricane forecast to be a Category 4 or 5 within 72 hrs or before landfall? Forecast Cat 1 or less	Red= Is now or forecast Cat4/5 Yellow= Forecast Cat3..BUT >=48 hrs away so could intensify Green= Forecast only Cat 1/2			■
3	Are there enough hours left before Trop Storm Winds to prepare and execute the I-64 Lane Reversal Option? 19 hrs left till TS Winds at 09/06/0812 AM	Red= Yes At least 48 hours Yellow= Maybe if storm slows (36 to 47 hrs) Green= No unless storm slows			■
4	Are there at least 12 continuous hours of daylight after 24 hour mobilization and setup time? not enough time for Setup	Red= At least 12 daylight hrs after setup Yellow= Almost..9 to 11 hours Green= No..8 or less hours			■

State and Local Summaries



Risk Profile Summary (Local) for Va Beach County VA

Tropical Cyclone: HANNA Advisory # 34 Date/Time: FRI 09/05/08 05 EDT

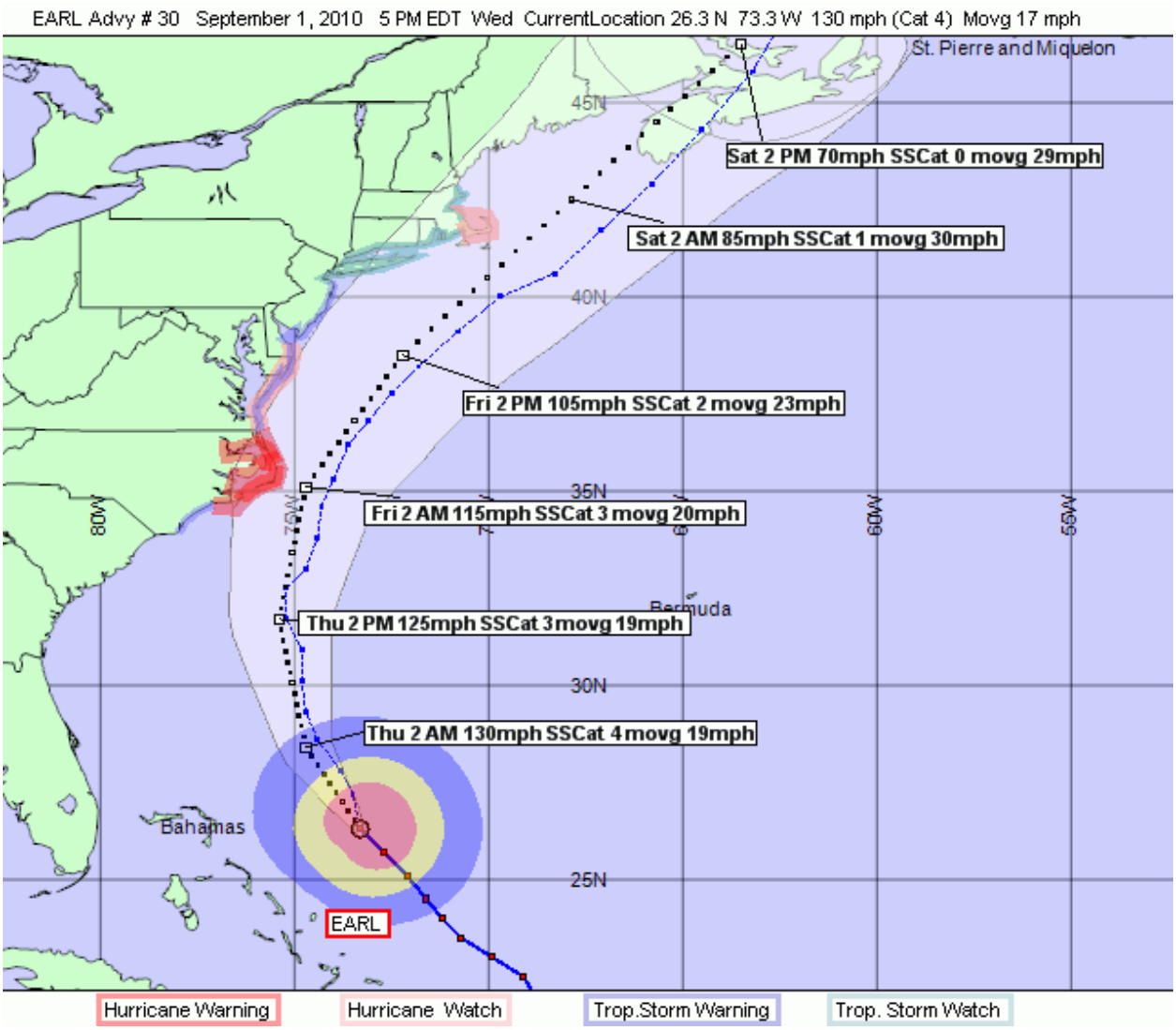
Indicator Level: ⚠ = Critical ⓘ = of Concern

Advy	Risk Area Definition						Storm Intensity and					Evacuation Charact					Other Cons			R	Y	G	Cr	Oc
	1	2	3	4	5	6	1	2	3	4	5	1	2	3	4	5	1	2	3					
34	⚠	ⓘ									*1		ⓘ	ⓘ	⚠	⚠		⚠	⚠	6	5	8	5	3
33	⚠										*1		ⓘ		ⓘ	⚠		⚠	⚠	4	7	8	4	2
32	⚠										*1		ⓘ		ⓘ	ⓘ		⚠	⚠	3	10	6	3	3
31	⚠							ⓘ			*1		ⓘ			⚠		⚠	⚠	6	6	7	4	2
30	ⓘ							ⓘ			*1		ⓘ			ⓘ		⚠	⚠	4	8	7	2	4
29	ⓘ			ⓘ				ⓘ			*1		ⓘ			⚠		⚠	⚠	6	7	6	3	4
28	ⓘ							ⓘ			*1		ⓘ			⚠		⚠	⚠	5	8	6	3	3
27	ⓘ							ⓘ			*1		ⓘ					⚠	⚠	4	5	10	2	3
26	ⓘ			ⓘ				ⓘ			*1		ⓘ			ⓘ		⚠	⚠	5	6	8	2	5
25	ⓘ			ⓘ				ⓘ			*1		ⓘ			ⓘ		⚠	ⓘ	5	7	7	1	6
24	ⓘ							ⓘ			*1		ⓘ					⚠		4	2	13	1	3
23	ⓘ							ⓘ			*1		ⓘ					⚠		4	3	12	1	3

New York Risk Profile

Last updated: 04-2011

This series of images shows an example of the Risk Profile for New York from Hurricane Earl Advisory #30 (2010). New York-specific criteria and special considerations are discussed.



New York's Risk Profile assigns the indicator icons to specific criteria when their conditions reach red or yellow status. Criteria designated as 'Critical' will have a ⚠ next to their description while criteria designated as 'of Concern' will have a ⓘ next to their description below. Critical and of Concern indicators are also referred to as Tier 1 and Tier 2 indicators, respectively.

State and Local Topics

Topic A - Risk of Impact

The overall purpose of the 'Risk of Impact' topic is to define the area at risk and quantify the degree of risk to that area.

Examples of state and local output for this topic are shown here. The same 6 criteria are used in both the state and local scopes. See below the screen shots for notes describing each criterion and its specific purpose.

Hurricane Risk Profile (State) for New York

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

A - Risk Of Impact Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Is a NY/Northern NJ county within the NHC 120-hour average forecast error cone? In 48 hr error ellipse	Red= Within 48 hours Yellow= Within 72 hours Green= >72 hours or not in error cone	⚠		
2	Are NHC Watches or Warnings in effect anywhere from Manasquan NJ to Port Jefferson Harbor NY? Tropical Storm Warning	Red= Hurricane Warning Yellow= TS Warning or Hurricane Watch Green= TS Watch or none		⚠	
3	Highest coastline NHC 64kt wind probability from Atlantic City NJ to Montauk Point NY? 7% for 64kt (22% for 50kt , 53% for 34kt)	Red= Greater than 18% Yellow= 11% to 18% Green= Less than 11%			■
4	Increase or decrease of maximum probability since last advisory? Decreased 9% to 7%	Red= Increased in percent Yellow= Remained same percent Green= Decreased in percent			■
5	Storm's steepest forecast angle of approach to NY/Northern NJ coastline? Does not cross NY / Northern NJ coastline	Red= 120-160 degs (4 to 5 o'clock) Yellow= 161-199 degs (5 to 7 o'clock) Green= All other approaches (or N/A)			■
6	Forecast peak wind in NY/Northern NJ based on the 72-hour forecast track? 49 mph in Suffolk	Red= Hurricane force (>74 mph) Yellow= Between 58 and 74 mph Green= Less than 58 mph			■

Hurricane Risk Profile (Local) for NYC Metro County NY

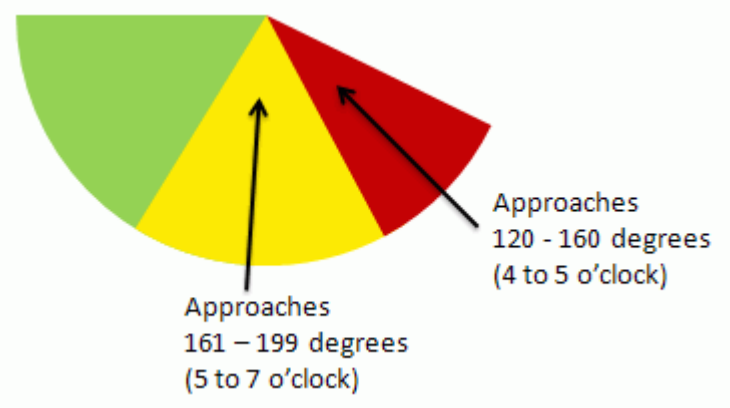
Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

A - Risk Of Impact Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Is this county within the NHC 120-hour average forecast error cone? Outside error cone	Red= Within 48 hours Yellow= Within 72 hours Green= >72 hours or not in error cone			■
2	Are NHC Watches or Warnings in effect for your county OR if inland county...nearby coast? Tropical Storm Watch	Red= Hurricane Warning Yellow= TS Warning or Hurricane Watch Green= TS Watch or none			■
3	What is the NHC 64kt wind probability nearest your county? 0% for 64kt (6% for 50kt , 32% for 34kt)	Red= Greater than 18% Yellow= 11% to 18% Green= Less than 11%			■
4	Have the wind probabilities nearest your county increased or decreased since the last advisory? Decreased 1% to 0%	Red= Increased in percent Yellow= Remained same percent Green= Decreased in percent			■
5	Storm's steepest forecast angle of approach to NY/Northern NJ coastline? Does not cross NY / Northern NJ coastline	Red= 120-160 degs (4 to 5 o'clock) Yellow= 161-199 degs (5 to 7 o'clock) Green= All other approaches (or N/A)			■
6	Forecast peak wind in your county based on the 72-hour forecast track? <39 mph (34kt)	Red= Hurricane force (>74 mph) Yellow= Between 58 and 74 mph Green= Less than 58 mph			■

Notes on the 'Risk of Impact' Criteria

1. ⚠ ***Is there a chance that the storm might pass directly over this area?*** Error cones and hourly ellipses encompass the area in which the storm is most likely to track.
2. ⚠ ***Does the National Weather Service consider the threat significant enough for watches and/or warnings?*** Watches and warnings are issued along the coastline when tropical storm or hurricane conditions are possible within 48 hours.
3. ⓘ ***What are the odds of this area experiencing hurricane-force winds?*** Wind probabilities at point locations along the coast quantify the potential for hurricane winds within a 5-day period.
4. ***Are the odds of hurricane-force winds increasing?*** Differences in wind probabilities from one advisory to the next indicate increasing or decreasing risk. Probabilities from distant storms are typically low due to the high degree of uncertainty and increase as the storm gets closer and continues to threaten.
5. ⓘ ***Could there be greater risk due to the direction from which the storm is approaching?*** As a general rule, storms having a more perpendicular angle of approach to the Northeast coastline carry greater risk than



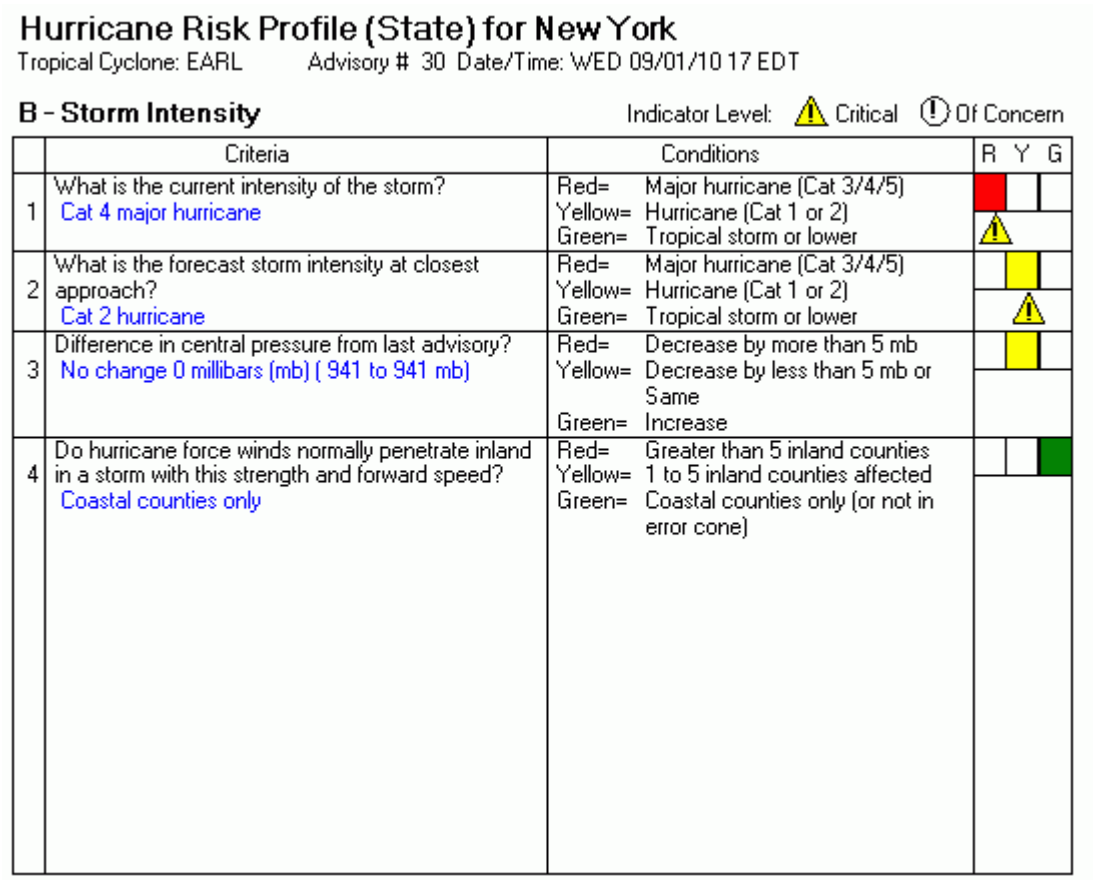
those that curve along (and parallel) the East Coast. The reason for this is that a paralleling storm is more likely to first make landfall elsewhere (therefore diminishing its intensity before reaching the New York area).

6. ***How high are the winds estimated to get in this area?*** Focus on this criterion and its specific wind forecasts only when a storm is close and threatening (48 hours or less). A storm's precise track and intensity over a longer period has a high degree of uncertainty.

Topic B - Storm Intensity

The purpose of this topic is to give guidance on what intensity (*storm category*) the storm may have when it impacts the area. Storm category is used for determining the type and extent of evacuation, should one be needed. The higher the storm category, the greater the vulnerable population and longer the evacuation time.

Screen shots of state and local output for this topic are shown here. The same 4 criteria apply to both the state and local scopes. See below for notes describing each criterion and its specific purpose.

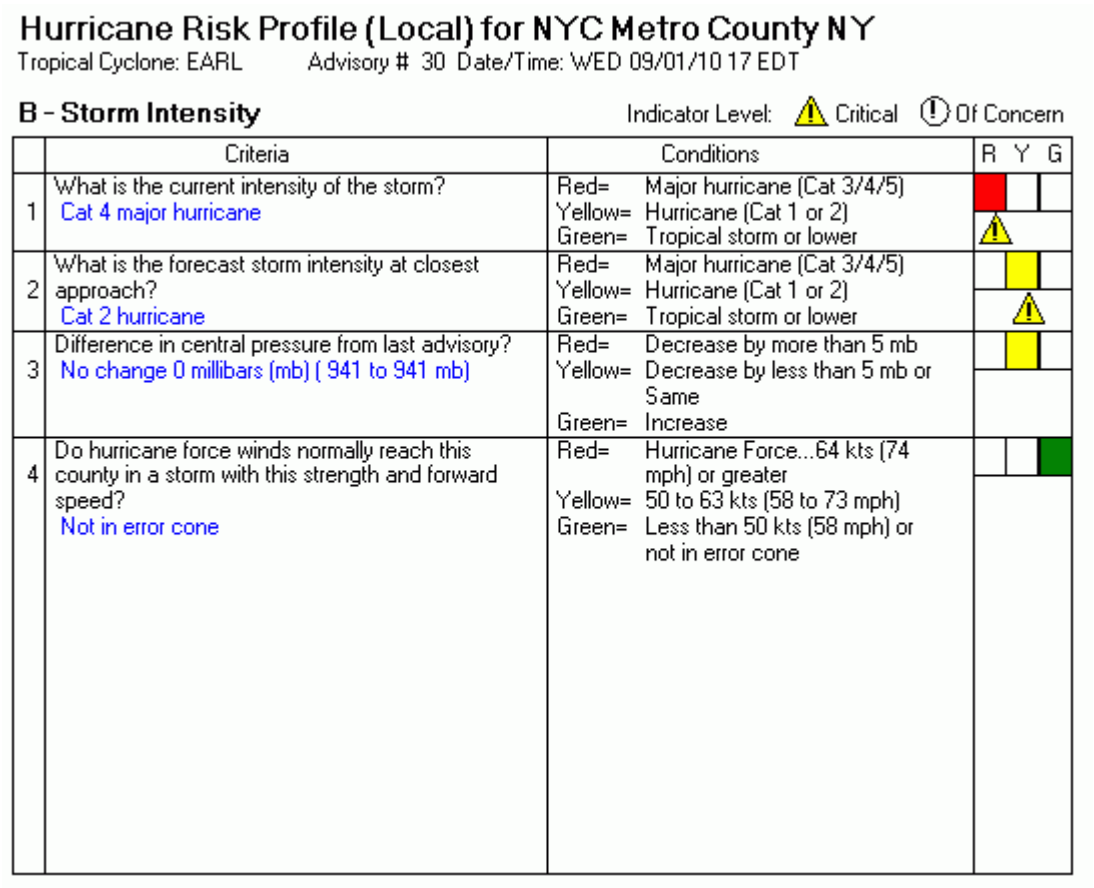


Hurricane Risk Profile (State) for New York

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

B - Storm Intensity Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R Y G
1	What is the current intensity of the storm? Cat 4 major hurricane	Red= Major hurricane (Cat 3/4/5) Yellow= Hurricane (Cat 1 or 2) Green= Tropical storm or lower	
2	What is the forecast storm intensity at closest approach? Cat 2 hurricane	Red= Major hurricane (Cat 3/4/5) Yellow= Hurricane (Cat 1 or 2) Green= Tropical storm or lower	
3	Difference in central pressure from last advisory? No change 0 millibars (mb) (941 to 941 mb)	Red= Decrease by more than 5 mb Yellow= Decrease by less than 5 mb or Same Green= Increase	
4	Do hurricane force winds normally penetrate inland in a storm with this strength and forward speed? Coastal counties only	Red= Greater than 5 inland counties Yellow= 1 to 5 inland counties affected Green= Coastal counties only (or not in error cone)	



Hurricane Risk Profile (Local) for NYC Metro County NY

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

B - Storm Intensity Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R Y G
1	What is the current intensity of the storm? Cat 4 major hurricane	Red= Major hurricane (Cat 3/4/5) Yellow= Hurricane (Cat 1 or 2) Green= Tropical storm or lower	⚠
2	What is the forecast storm intensity at closest approach? Cat 2 hurricane	Red= Major hurricane (Cat 3/4/5) Yellow= Hurricane (Cat 1 or 2) Green= Tropical storm or lower	⚠
3	Difference in central pressure from last advisory? No change 0 millibars (mb) (941 to 941 mb)	Red= Decrease by more than 5 mb Yellow= Decrease by less than 5 mb or Same Green= Increase	
4	Do hurricane force winds normally reach this county in a storm with this strength and forward speed? Not in error cone	Red= Hurricane Force...64 kts (74 mph) or greater Yellow= 50 to 63 kts (58 to 73 mph) Green= Less than 50 kts (58 mph) or not in error cone	

Notes on the 'Storm Intensity' Criteria

1. ⚠ ***What is the storm category at the present time and position?*** Remember that this rating indicates the storm's observed strength at its *initial position* in the forecast advisory. It may be many hours before the storm is predicted to make landfall and by this time it may have weakened. Storms typically decrease in intensity as they head north and encounter cooler waters.
2. ⓘ ***What is the forecasted storm category at the time when the storm is closest?*** For reasons described in Item #1, this may be a more appropriate assumption for New York's Evacuation Options settings than the default choice of the maximum category over the entire forecast period.
3. ***Is the storm intensifying?*** Central pressure is inversely proportional to storm intensity. A storm observed to drop in pressure or maintain a low pressure over several approaching advisories is cause for concern and may warrant selection of a higher storm category for New York's Evacuation Options than the category forecasted at closest approach (Item #2).
4. ⓘ ***If the storm tracks over the area, how far inland could hurricane-force winds penetrate?*** Wind decay modeling (MEOWs) can be helpful for inland counties weighing whether or not they could be impacted by strong winds if the storm tracks over the area.

Topic C - Evacuation Considerations

Beyond the storm category assumption (Topic B), a number of other factors must be considered in order to arrive at an Evacuation Decision Time.

Screen shots of state and local output for this topic are shown here. See below for notes describing each criterion and its specific purpose. The first two criteria are shared by State and Local. Subsequent criteria are grouped and described according to similarity rather than number.

Hurricane Risk Profile (State) for New York

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

C - Evacuation Considerations

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Average forward speed over 72-hour forecast period or until landfall? Average forward speed 24 mph	Red= 30 mph or greater Yellow= 20 to 29 mph Green= Less than 20 mph		■	
2	Has the radius of maximum tropical storm force winds expanded from previous advisories? No expansion or decrease	Red= Expanding over previous two advisories Yellow= Expanding since the last advisory Green= No expansion or decrease			■
3	Number of hours until onset of tropical storm force winds (39 mph) in NY/Northern NJ based on the forecast track? 44 hrs in Suffolk	Red= Within 24 hours Yellow= Between 24 and 36 hours Green= Greater than 36 hours or none			■
4	Earliest NHC Forecast Track (CPA) Decision Time for counties within the 72-hour average forecast error cone? 44 hrs Suffolk 09/03/10 1 PM	Red= Decision time has passed Yellow= 12 hours or less to decision time Green= Greater than 12 hours from decision time			■
5	Earliest Direct Hit Decision Time for counties within the 72-hour average forecast error cone? 41 hrs NYC Metro 09/03/10 10 AM	Red= Decision time has passed Yellow= 12 hours or less to decision time Green= Greater than 12 hours from decision time			■
6	Does the storm event coincide with a holiday period? +/- 1 week of Labor Day	Red= Within 1 week of July 4 or Labor Day weekend Yellow= After July 4 week and before Labor Day weekend Green= Outside of holiday period	■		

Hurricane Risk Profile (Local) for NYC Metro County NY

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

C - Evacuation Considerations

Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Average forward speed over 72-hour forecast period or until landfall? Average forward speed 24 mph	Red= 30 mph or greater Yellow= 20 to 29 mph Green= Less than 20 mph			
2	Has the radius of maximum tropical storm force winds expanded from previous advisories? No expansion or decrease	Red= Expanded over previous two advisories Yellow= Expanded since the last advisory Green= No expansion or decrease			
3	Maximum clearance time for your county? (If non-HES risk county then standard 6 hrs used) 35 hrs for Cat 4 Medium Occ. / Medium Resp.	Red= County with 24 hours or greater Yellow= County with 16 to 23 hours Green= Less than 16 hours			
4	Number of hours until onset of tropical storm force winds (39 mph) on the forecast track? Not forecast within 72 hrs	Red= Within 24 hours Yellow= Between 24 and 36 hours Green= Greater than 36 hours or none			
5	Earliest NHC Forecast Track (CPA) Decision Time for this county if within the 72-hour wind swath? No tropical storm winds forecast	Red= Decision time has passed Yellow= 12 hours or less to decision time Green= Greater than 12 hours from decision time			
6	Assuming a Direct Hit track...what is the Decision Time for this county? 6 hrs 09/01/10 11 PM	Red= Decision time has passed Yellow= 12 hours or less to decision time Green= Greater than 12 hours to decision time			
7	Period of day when Decision Time for your county occurs? 11 PM Wed	Red= 11PM-6AM or 9AM-4PM Mon-Fri Yellow= 4PM-11PM Green= 6AM-9AM or 9AM-4PM Sat-Sun			

Notes on the 'Evacuation Considerations' Criteria

1. 1(State and Local) - ***How fast is the storm tracking toward the area?*** Storms typically pick up *forward speed* as they move further north, meaning that a decision might need to be made on a storm when it is still well to the south.

2. 2(State and Local) - ⓘ ***Are the tropical storm-force wind fields of the storm growing in size?*** Storms often grow in dimension as they move further north, thereby decreasing the amount of time remaining before tropical storm force winds are encountered. This and all subsequent calculations within this topic are limited to a 72-hour period in which wind extents are forecast.

3. 3(Local) - ⚠ ***What is the county's longest evacuation clearance time for a storm of this category?*** Remember that by default HURREVAC will use the highest category predicted over the forecast period to answer this criterion. This may or may not be the most appropriate selection. For closer consideration, refer to notes for Items 1 - 3 under the 'Storm Intensity' topic. The default selections can be adjusted as described in Evacuation Options.

4. 3(State)/4(Local) - ⚠ ***Using the official forecast track (closest point of approach), are tropical storm-force winds forecast in the area and if so, when?*** In this calculation, the Hourly Wind Ranges are advanced along the forecast track and a time is noted when tropical storm-force winds first enter the area.

5. 5(Local) - ⚠ ***If this county is within the 72-hour wind swath, how soon might a worst-case evacuation need to be initiated?*** This is calculated by subtracting the answer from Item #3 from the answer from Item #4.

6. 5(State)/6(Local) - ***For counties within the error swath, how soon might a worst-case evacuation need to be initiated?*** A worst-case *direct hit* is used in this calculation as described in HURREVAC's methods for Evacuation Decision Timing. The clearance time used in this calculation comes from Item #3.

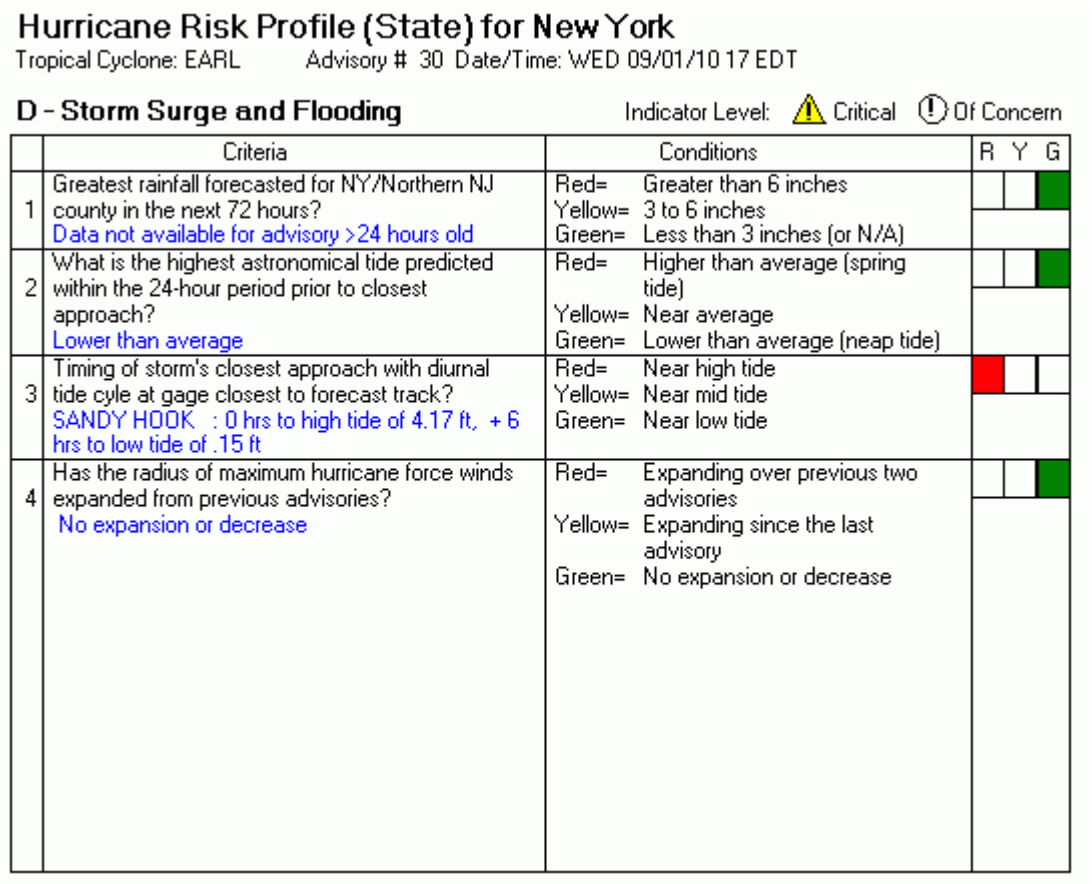
7. 6(State) - ***Do extra hours need to be added to evacuation clearance times?*** A holiday period or special event might warrant adjustments in tourist occupancy settings of Evacuation Options. This is an important consideration when determining evacuation timing and public messaging.

8. 7(Local) - ***Does the evacuation decision time need to be shifted to a more favorable time of day?*** If Decision Time is calculated to occur during a time when the public is unlikely to respond promptly, this may warrant an adjustment in the response settings and/or safety buffer of Evacuation Options.

Topic D - Storm Surge and Flooding

This topic considers threats posed by heavy rainfall and storm surge brought about by an approaching storm.

Screen shots of state and local output for this topic are shown here. The same four criteria apply to both the state and local scopes. See below for notes describing each criterion and its specific purpose.



Hurricane Risk Profile (State) for New York

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

D - Storm Surge and Flooding Indicator Level: ⚠ Critical ⓘ Of Concern

	Criteria	Conditions	R	Y	G
1	Greatest rainfall forecasted for NY/Northern NJ county in the next 72 hours? Data not available for advisory >24 hours old	Red= Greater than 6 inches Yellow= 3 to 6 inches Green= Less than 3 inches (or N/A)			■
2	What is the highest astronomical tide predicted within the 24-hour period prior to closest approach? Lower than average	Red= Higher than average (spring tide) Yellow= Near average Green= Lower than average (neap tide)			■
3	Timing of storm's closest approach with diurnal tide cyle at gage closest to forecast track? SANDY HOOK : 0 hrs to high tide of 4.17 ft, + 6 hrs to low tide of .15 ft	Red= Near high tide Yellow= Near mid tide Green= Near low tide	■		
4	Has the radius of maximum hurricane force winds expanded from previous advisories? No expansion or decrease	Red= Expanding over previous two advisories Yellow= Expanding since the last advisory Green= No expansion or decrease			■

Hurricane Risk Profile (Local) for NYC Metro County NY

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

D - Storm Surge and Flooding

Indicator Level: ⚠ Critical ⓘ Of Concern

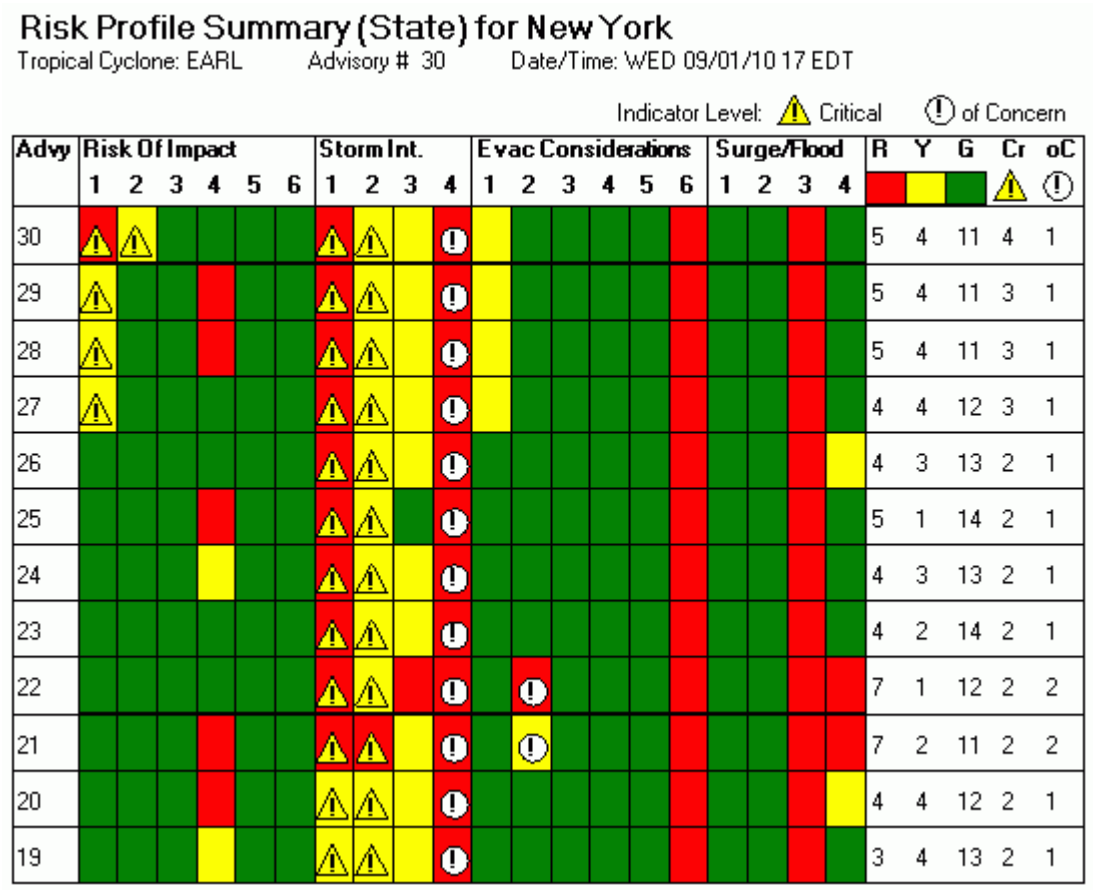
	Criteria	Conditions	R	Y	G
1	Amount of rainfall forecasted for this county in the next 72 hours? Data not available for advisory >24 hours old	Red= Greater than 6 inches Yellow= 3 to 6 inches Green= Less than 3 inches (or N/A)			■
2	Are tides higher than normal within the 24-hour period prior to closest approach? Lower than average	Red= Higher than average (spring tide) Yellow= Near average Green= Lower than average (neap tide)			■
3	Timing of storm's closest approach with diurnal tide cycle at gage closest to county? SANDY HOOK : 0 hrs to high tide of 4.17 ft, + 6 hrs to low tide of .15 ft	Red= Near high tide Yellow= Near mid tide Green= Near low tide	■		
4	Has the radius of maximum hurricane force winds expanded from previous advisories? No expansion or decrease	Red= Expanding over previous two advisories Yellow= Expanding since the last advisory Green= No expansion or decrease			■

Notes on the 'Storm Surge and Flooding' Criteria

1. ⓘ ***Could this storm generate a large amount of rainfall over the area?*** This calculation is made using the HPC 3-day quantitative rainfall forecast. Note that this item cannot be answered for archived storms since there is no rainfall forecast available for the historic period.
2. ***Is this a period of especially strong or weak tides?*** Spring tides are about 20% higher than average high tides. Neap tides are about 20% less than average. A spring tide may exacerbate surge flooding while a neap tide could mitigate.
3. ***Is the storm approach projected to coincide with high tide?*** Diurnal tide fluctuates as much as 5 feet in the New York area and can make a difference in the severity of storm surge water levels. However, it is difficult to make a tide timing determination until a storm very close to landfall since only 6 hours of time separate high and low tides.
4. ***Is this a large, powerful storm capable of generating large amounts of storm surge?*** Storms with sizeable *hurricane-force* wind fields have the power to push greater amounts of storm surge ahead of them.

State and Local Summaries

For more information on summaries, see the description under the general Risk Profile section.



Risk Profile Summary (State) for New York

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

Indicator Level: ⚠ Critical ⓘ of Concern

Advy	Risk Of Impact						Storm Int.				Evac Considerations						Surge/Flood				R	Y	G	Cr	oC
	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5	6	1	2	3	4				⚠	ⓘ
30	⚠	⚠					⚠	⚠		ⓘ											5	4	11	4	1
29	⚠						⚠	⚠		ⓘ											5	4	11	3	1
28	⚠						⚠	⚠		ⓘ											5	4	11	3	1
27	⚠						⚠	⚠		ⓘ											4	4	12	3	1
26							⚠	⚠		ⓘ											4	3	13	2	1
25							⚠	⚠		ⓘ											5	1	14	2	1
24							⚠	⚠		ⓘ											4	3	13	2	1
23							⚠	⚠		ⓘ											4	2	14	2	1
22							⚠	⚠		ⓘ		ⓘ									7	1	12	2	2
21							⚠	⚠		ⓘ		ⓘ									7	2	11	2	2
20							⚠	⚠		ⓘ											4	4	12	2	1
19							⚠	⚠		ⓘ											3	4	13	2	1

Risk Profile Summary (Local) for NYC Metro County NY

Tropical Cyclone: EARL Advisory # 30 Date/Time: WED 09/01/10 17 EDT

Indicator Level: ⚠ Critical ⓘ of Concern

Advy	Risk Of Impact						Storm Int.				Evac Considerations							Surge/Flood				R	Y	G	Cr	oC
	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5	6	7	1	2	3	4				⚠	ⓘ
30							⚠	⚠					⚠									4	4	13	3	0
29A							⚠	⚠					⚠									4	4	13	3	0
29							⚠	⚠					⚠									4	3	14	3	0
28A							⚠	⚠					⚠									3	3	15	3	0
28							⚠	⚠					⚠									3	4	14	3	0
27A							⚠	⚠					⚠									3	3	15	3	0
27							⚠	⚠					⚠									3	4	14	3	0
26A							⚠	⚠					⚠									4	3	14	3	0
26							⚠	⚠					⚠									4	3	14	3	0
25A							⚠	⚠					⚠									3	2	16	3	0
25							⚠	⚠					⚠									3	2	16	3	0
24B							⚠	⚠					⚠									3	1	17	3	0

Facilities Timing

Last updated: 04-2011

Facilities Timing refers to a special set of HURREVAC functions developed specifically to accommodate Hurricane Evacuation Study (*HES*) clearance times for bridges, tunnels, and other transportation facilities in the New York City metropolitan area. The facilities functions of Hurrevac2010 are only active if the New York HES data has been installed within the State Plug-Ins Setup.

HURREVAC's report capabilities for facilities are similar to those for counties, but with some extra features to handle the more complicated evacuation/closure scenarios required by facilities.

The entries that are part of this module were determined by the transportation agency to be the most critical facilities or locations within their transportation network that are vulnerable to a hurricane. Some entries represent multiple facilities or locations.

Discrete Action Periods

Instead of a single *evacuation clearance time* as in the case of counties, facilities have 3 time periods for actions that need to be taken before arrival of the hazards. Individual times are dependent on a variety of factors including agency ownership and type of facility. They are:

1. **Mobilization Period** - Amount of time needed to organize internal decision making and stage equipment, vehicles, and personnel. Most agencies have designated only a brief mobilization time of 1 to 2 hours, expecting this time to be executed quickly or even concurrently with other emergency time phases. Exceptions are the transit agencies with concerns about redirecting resources/transit cars and buses.
2. **Evacuation Period** - Time frame during which a facility will function to move evacuees. Commuter transit facilities will function like they do in a heavy PM peak period; highway facilities will carry evacuation traffic over time periods defined in the regional HES.
3. **Closure Period** - Amount of time needed to secure and close facilities and redirect employees to safe shelter before hazards arrive.

A facility's clearance time is the sum total of the mobilization, evacuation, and closure times.

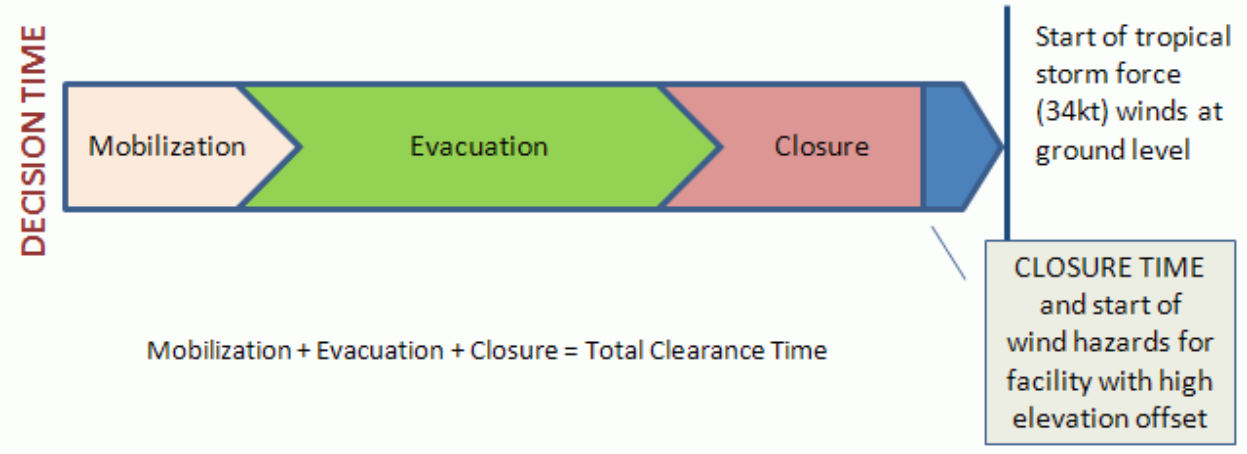
Wind versus Surge-Timed Facilities

In calculating the hazard arrival time for facilities, HURREVAC must differentiate between two types of facilities:

Wind-Affected Facilities

These facilities are affected primarily by wind hazards, specifically 34 knot (39mph) winds of an approaching storm, and treated much the same as county evacuation timing in HURREVAC. For tall facilities such as bridges however, an offset (also known as pre-landfall hazard time) of 1, 2, or 3 hours is placed in front of (ground) forecasted 34 knot wind arrival time to account for the fact that winds are routinely stronger at these high altitudes and the storm effects will be felt sooner.

Therefore with wind-affected facilities, HURREVAC computes the direct hit arrival time of 34 knot winds to the facility, and subtracts the combined times for mobilization, evacuation and closure to arrive at a proper decision time.



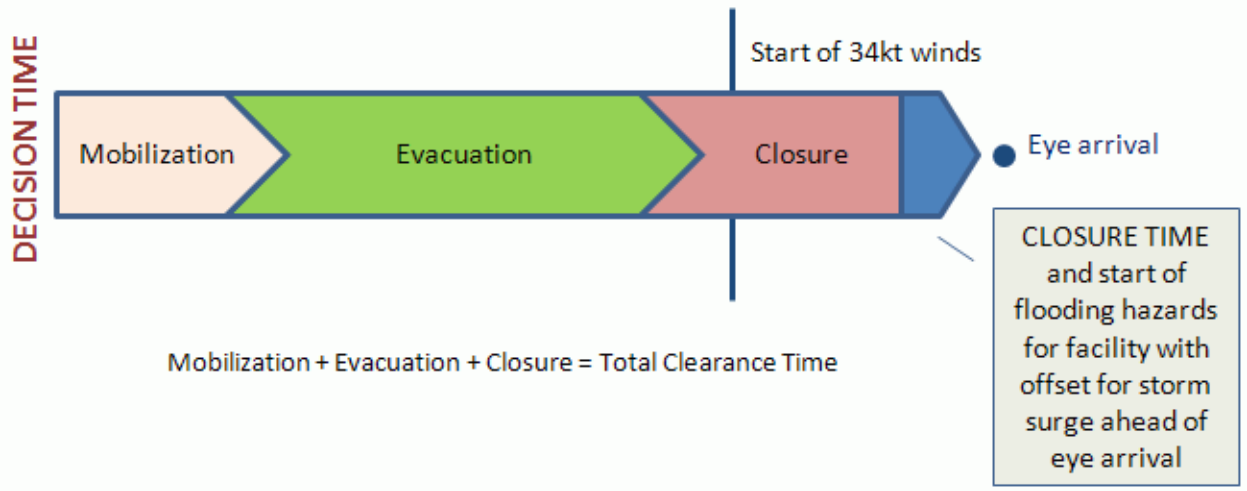
Note: Certain facilities affected primarily by RAINFALL flooding are placed in the Wind-Affected Facilities category because wind and rainfall will begin at about the same time.

Surge-Affected Facilities

These facilities are affected first by flooding, specifically flooding from storm surge as determined by the National Weather Service *SLOSH* model, which predicts flooding that would occur assuming a direct hit or worst case assumption.

The SLOSH model data results in an offset time, in hours, before the arrival of the eye, when flooding would commence at the facility. This may range from 0 hours (flooding arrives only when eye arrives) or as much as 7 hours before the eye for a severe storm approaching from a critical direction. This offset is based on the location and elevation of the facility. In most cases, the flood-affected facilities will have much later decision times than the wind-affected ones.

Therefore with surge-affected facilities, HURREVAC first computes the *direct hit* arrival time of the storm's eye or center in the area, and subtracts the pre-landfall flooding time in hours as determined by the SLOSH model for the worst case. After the surge arrival time is determined from the SLOSH model offset, the program then subtracts the combined times for mobilization, evacuation and closure to arrive at a proper decision time.



Presentation of Facilities Data

The primary presentation of facilities data is within the Facilities Timing Details report which calculates start times for mobilization, evacuation, and closure of each facility. This report contains special filtering, data export, and other facilities-related options that are not available elsewhere in HURREVAC.

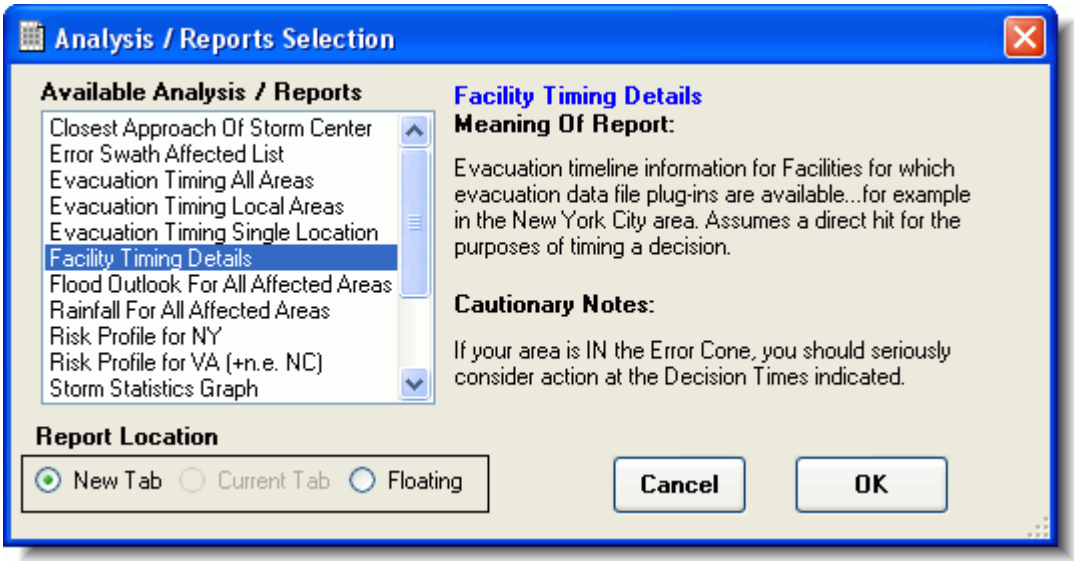
You can also generate a standard Evacuation Timing...Single Location report on a facility. This report consists of an hour-by-hour timeline of actions with the start of the mobilization, evacuation, and closure periods noted. It also indicates daytime and nighttime along the timeline.

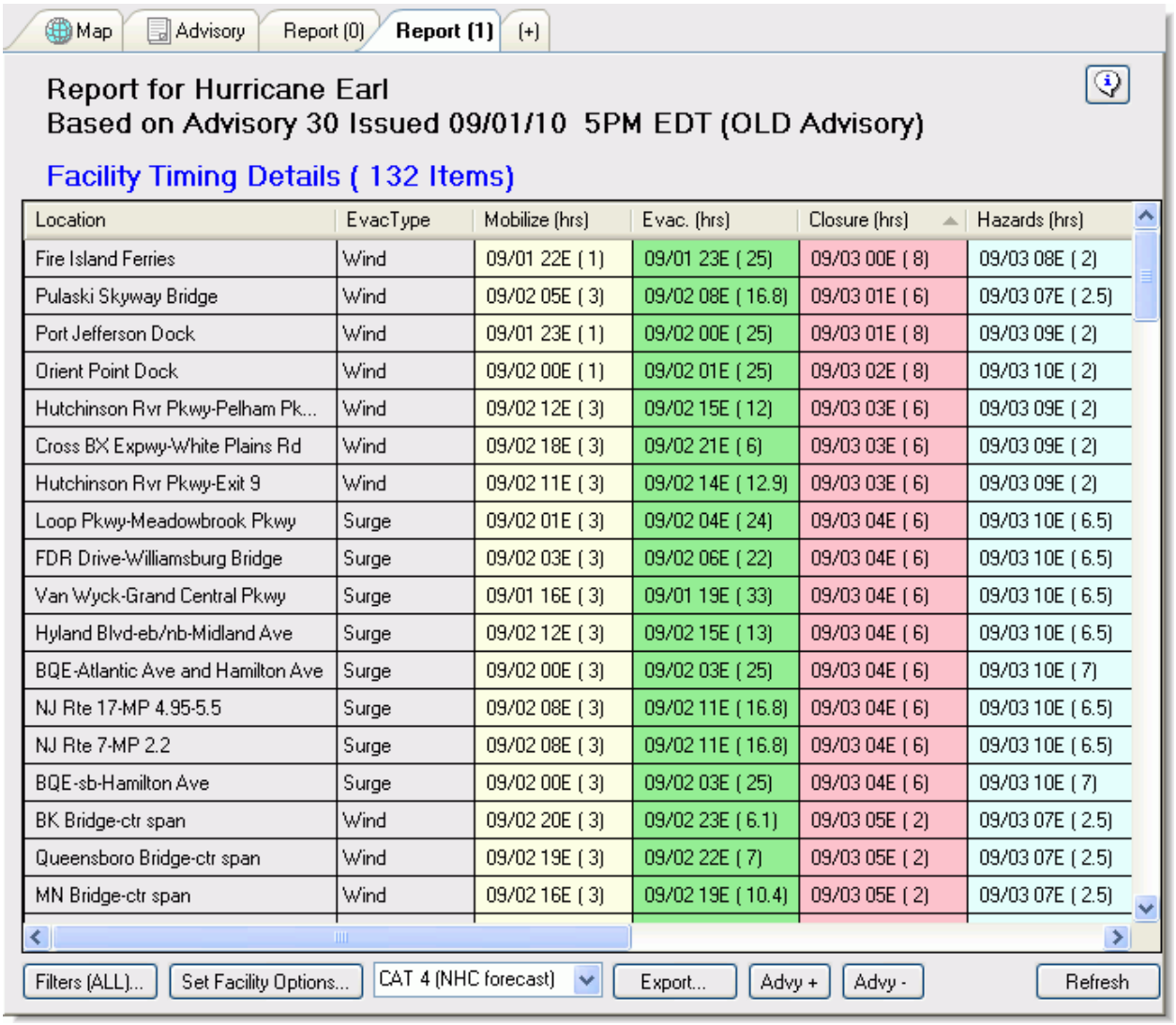
Facility Timing Details

Facility Timing Details is the main report of Hurrevac2010's special Facilities Timing toolset for the New York City metropolitan area.

It is accessed through the Analysis/Reports Selection panel and the resulting report is based upon whatever storm advisory is currently displayed in the Map View. *Note: The NHC does not include wind ranges information in the extended forecast from 72 to 120 hours. Therefore, the reporting period for this tool is only from hour 0 (the hour the NHC forecast is issued) to hour 72.*

Only standard reports are listed under the REPORTS heading of Hurrevac2010's toolbox. To access Facility Timing Details, you must use the [+] tab to add a new report from the list below:





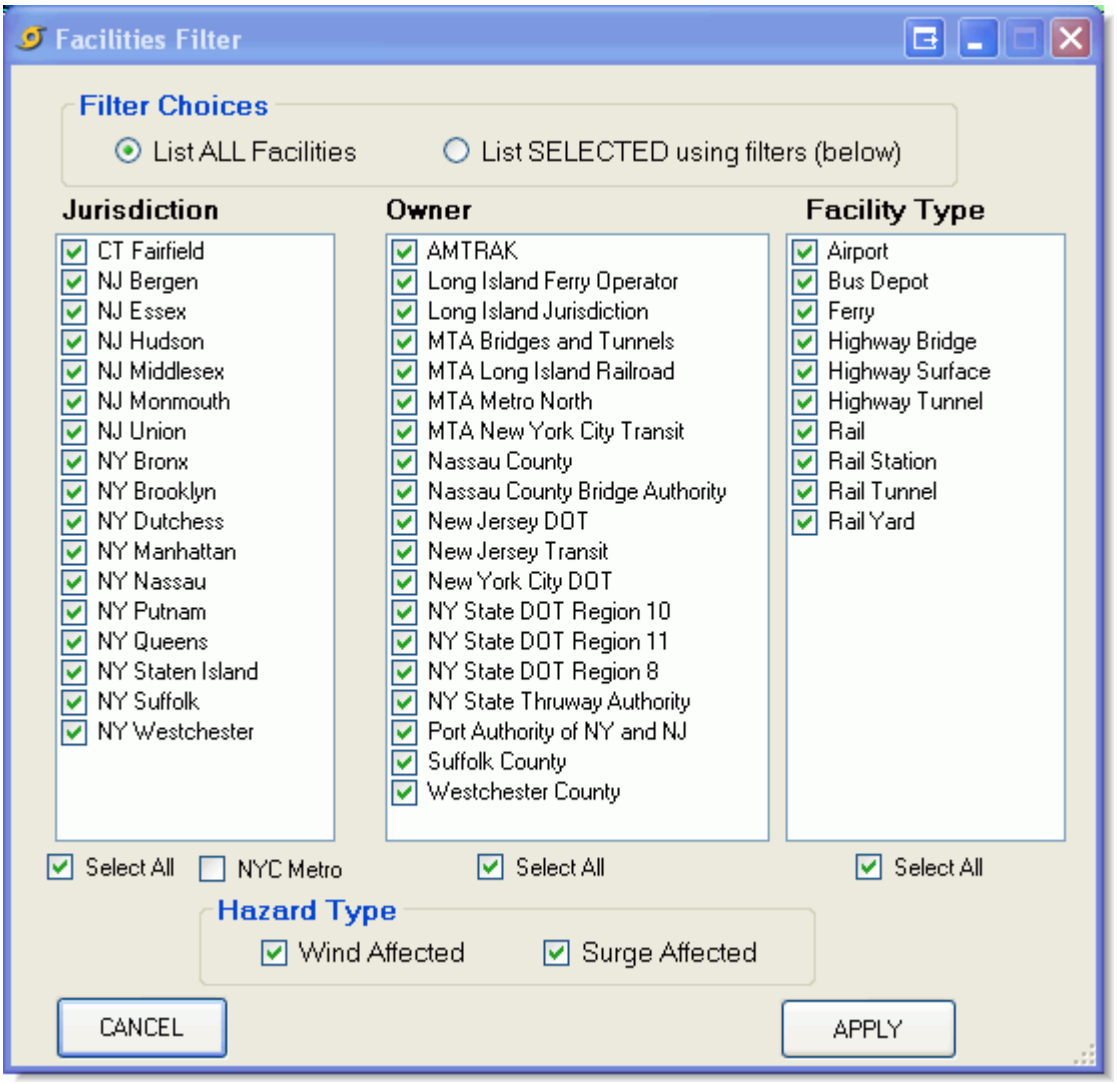
The initial report calculates *direct hit* impacts for all 132 facilities in the HURREVAC Critical Facilities list:

- **Evac Type** - identifies facility as either wind or surge vulnerable.
- **Mobilize (hrs)** - Date/Time to start mobilization with the duration in parentheses. [Past] indicates that the action should already be underway if needed.
- **Evac (hrs)** -Date/Time to start an evacuation with the duration in parentheses. [Past] indicates that the action should already be underway if needed.
- **Closure (hrs)** -Date/Time to start closure with the duration in parentheses. [Past] indicates that the action should already be underway if needed.
- **Hazards (hrs)** - Beginning time for the wind or surge hazards. This calculation includes the hazards offset (in parentheses) which is used to account for earlier winds (at high elevations) or surge in advance of eye arrival.
- **Eye Arrives** - Date/Time when the eye of the storm would pass over the facility assuming a direct hit
- **Jurisdiction/Owner/Type** - facility description details which can be used to sort or filter the list. Clicking on any heading will cause the list to sort according to data in that column.

Filtering

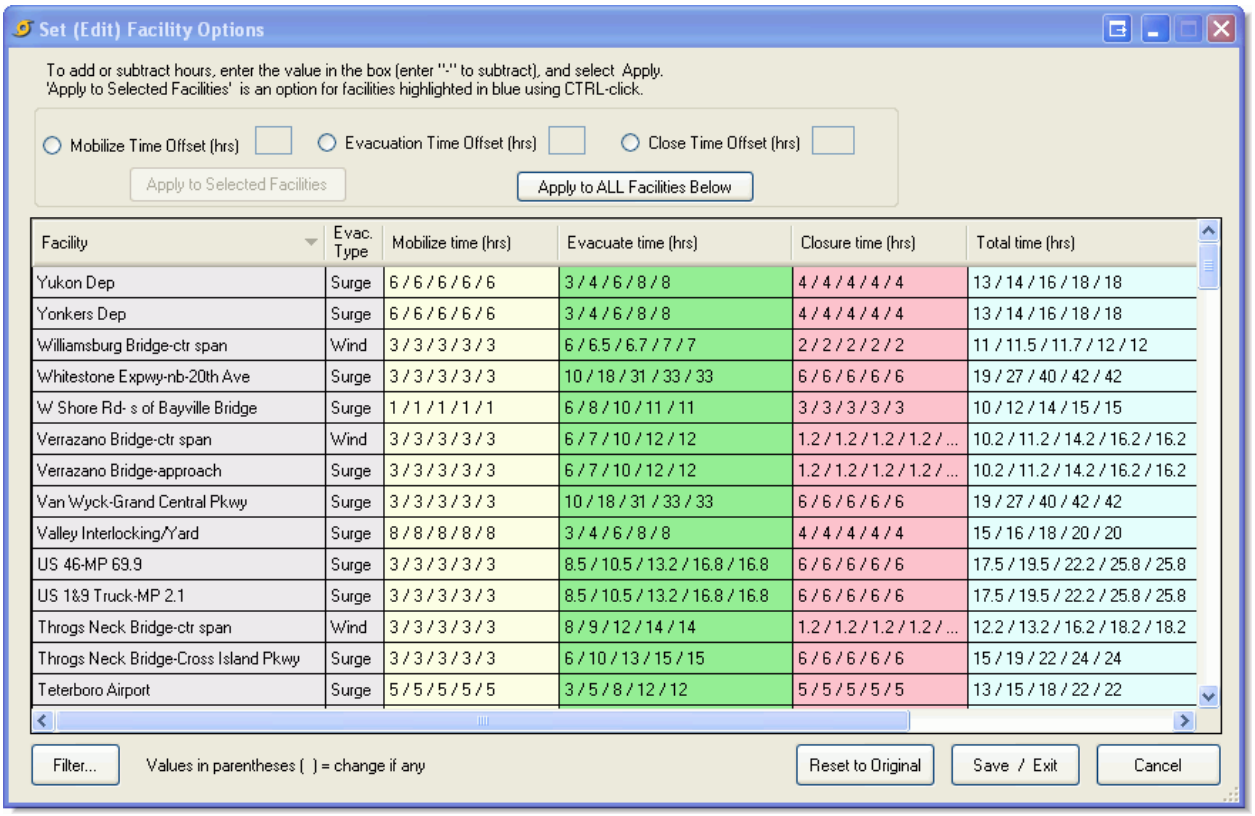
The facilities list can be filtered by any or all of the following criteria: jurisdiction, owner, facility type, and hazard type. The effect of this filtering is to pare down the long list of facilities to only those of particular interest.

When the facility list is filtered, it is denoted in the "Filter" tab on the lower left screen by saying "Filter (SOME)". When the facility list is not filtered, it is denoted in the "Filter" tab by saying "Filter (ALL)".



Facility Options

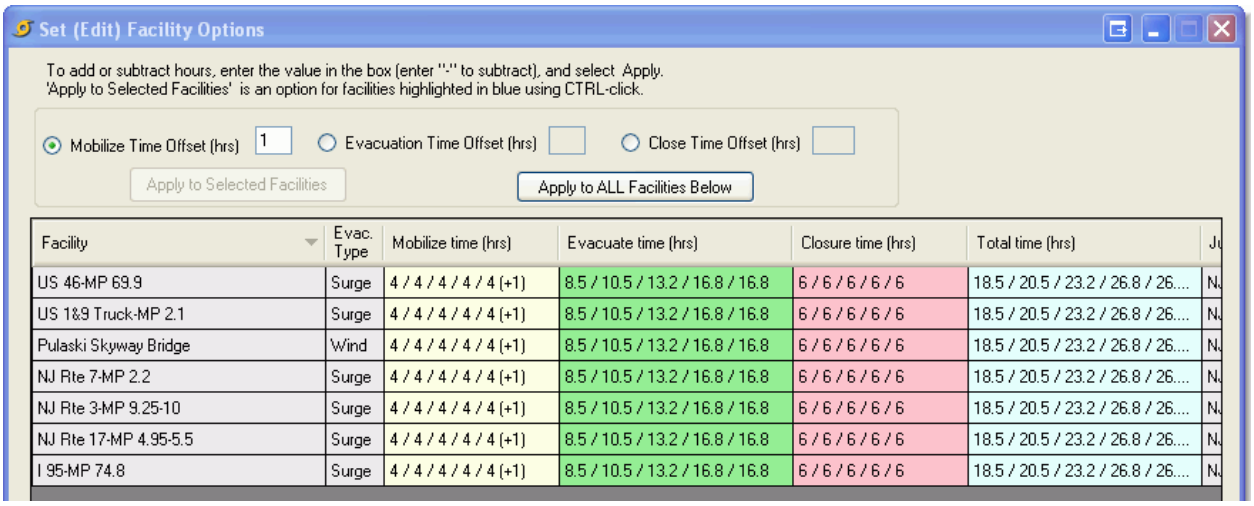
To view/change the underlying facility clearance time components, press the Set Facility Options button. In the 'Mobilize time', 'Evacuate time', 'Closure time', and 'Total time' columns here, you see the default number of hours required for each category of storm (CAT 1/2/3/4/5).



Modifying Facility Times

To add or subtract hours from the default values, enter an offset number in the appropriate box (using a minus sign before the number if subtracting) and press one of the two **Apply** buttons. The **Apply to ALL Facilities Below** button makes the change to all facilities shown in the list, while the **Apply to Selected Facilities** button makes the change to only those facilities highlighted. Click on a facility to highlight it in blue and use the CTRL key to make a selection of multiple facilities.

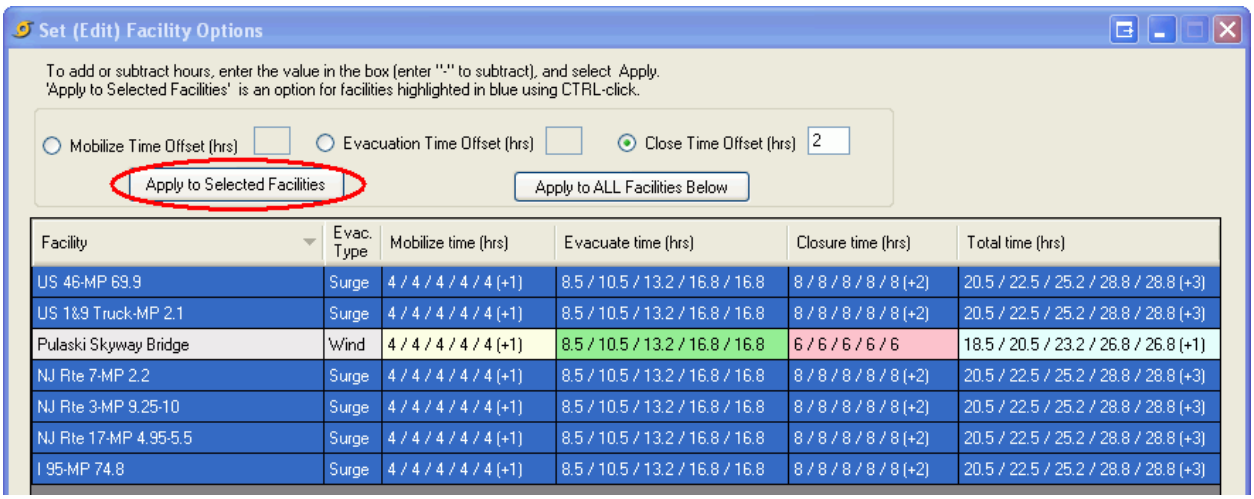
If closed with the **Save/Exit** button, the underlying report will refresh with adjusted times. If closed with the **Cancel** button, the time modifications from this Facility Options session will be discarded. The **Reset to Original** button is used to return to default values, thereby discarding modifications from all sessions.



Facility	Evac. Type	Mobilize time (hrs)	Evacuate time (hrs)	Closure time (hrs)	Total time (hrs)	Ju
US 46-MP 69.9	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	6 / 6 / 6 / 6 / 6	18.5 / 20.5 / 23.2 / 26.8 / 26....	N.
US 1&9 Truck-MP 2.1	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	6 / 6 / 6 / 6 / 6	18.5 / 20.5 / 23.2 / 26.8 / 26....	N.
Pulaski Skyway Bridge	Wind	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	6 / 6 / 6 / 6 / 6	18.5 / 20.5 / 23.2 / 26.8 / 26....	N.
NJ Rte 7-MP 2.2	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	6 / 6 / 6 / 6 / 6	18.5 / 20.5 / 23.2 / 26.8 / 26....	N.
NJ Rte 3-MP 9.25-10	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	6 / 6 / 6 / 6 / 6	18.5 / 20.5 / 23.2 / 26.8 / 26....	N.
NJ Rte 17-MP 4.95-5.5	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	6 / 6 / 6 / 6 / 6	18.5 / 20.5 / 23.2 / 26.8 / 26....	N.
I 95-MP 74.8	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	6 / 6 / 6 / 6 / 6	18.5 / 20.5 / 23.2 / 26.8 / 26....	N.

In the screen shot above, times have been adjusted for NJ DOT facilities. The **Filter** button was first used to limit the list of facilities here and on the main Facility Timing Report to NJ DOT facilities. Next, a Mobilize Time Offset of 1 extra hour was added to all 7 facilities with the **Apply to ALL Facilities Below** button. This change is reflected in the CAT 1/2/3/4/5 values and (+1) notations in both the 'Mobilize time' and 'Total time' columns.

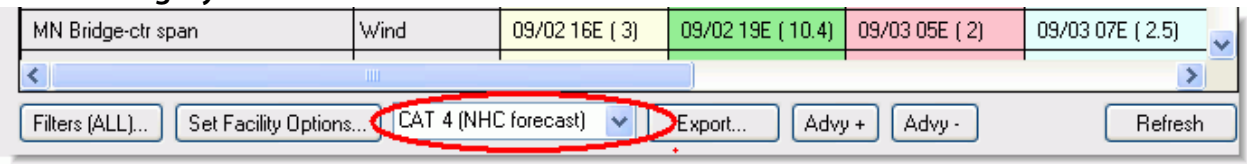
In this next screen shot below, 2 hours have also been added to the closure time of surge-affected NJ DOT facilities. The desired facilities were individually selected while holding down the CTRL key and then **Apply to Selected Facilities**. The lone wind-affected facility retains a total offset of just 1 (Mobilize) hour, while the others now have a total offset of 3 hours (1 Mobilize, 2 Closure).



Facility	Evac. Type	Mobilize time (hrs)	Evacuate time (hrs)	Closure time (hrs)	Total time (hrs)
US 46-MP 69.9	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	8 / 8 / 8 / 8 / 8 (+2)	20.5 / 22.5 / 25.2 / 28.8 / 28.8 (+3)
US 1&9 Truck-MP 2.1	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	8 / 8 / 8 / 8 / 8 (+2)	20.5 / 22.5 / 25.2 / 28.8 / 28.8 (+3)
Pulaski Skyway Bridge	Wind	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	6 / 6 / 6 / 6 / 6	18.5 / 20.5 / 23.2 / 26.8 / 26.8 (+1)
NJ Rte 7-MP 2.2	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	8 / 8 / 8 / 8 / 8 (+2)	20.5 / 22.5 / 25.2 / 28.8 / 28.8 (+3)
NJ Rte 3-MP 9.25-10	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	8 / 8 / 8 / 8 / 8 (+2)	20.5 / 22.5 / 25.2 / 28.8 / 28.8 (+3)
NJ Rte 17-MP 4.95-5.5	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	8 / 8 / 8 / 8 / 8 (+2)	20.5 / 22.5 / 25.2 / 28.8 / 28.8 (+3)
I 95-MP 74.8	Surge	4 / 4 / 4 / 4 / 4 (+1)	8.5 / 10.5 / 13.2 / 16.8 / 16.8	8 / 8 / 8 / 8 / 8 (+2)	20.5 / 22.5 / 25.2 / 28.8 / 28.8 (+3)

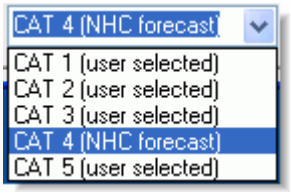
Such an adjustment might perhaps be temporarily warranted by a special condition on the ground, but generally speaking the HES clearance times should be used as is...with greater consideration given to the storm category selection. *Note: Any adjustments made in the Facilities Options will be retained during this program session. After the user exits the program, all adjustments will be lost.*

Storm Category Selection



Storm category is an important consideration in facility decision times. HURREVAC selects the default storm category based on the highest winds predicted over the 72-hour forecast period; however if the maximum wind is within 5 knots of the next Saffir/Simpson category, HURREVAC increases the default selection by one storm category as insurance.

Tip: New York locations considering the threat from a Cat 4 or 5 storm still well south may want to drop the storm category because the storm is forecast to be much less intense once over the cooler waters of the Northeast. For example, after consulting with your local NWS office, you might opt to select 'CAT 2 (user selected)' from the list below where 'CAT 4 (NHC forecast)' was the default for an intense storm still sitting off the coast of Florida.



Press the Refresh button to update the facility report for this advisory. *Note: New advisories will revert back to the default selection since this is an important decision that must be re-evaluated with each new forecast.*

Additional Tips

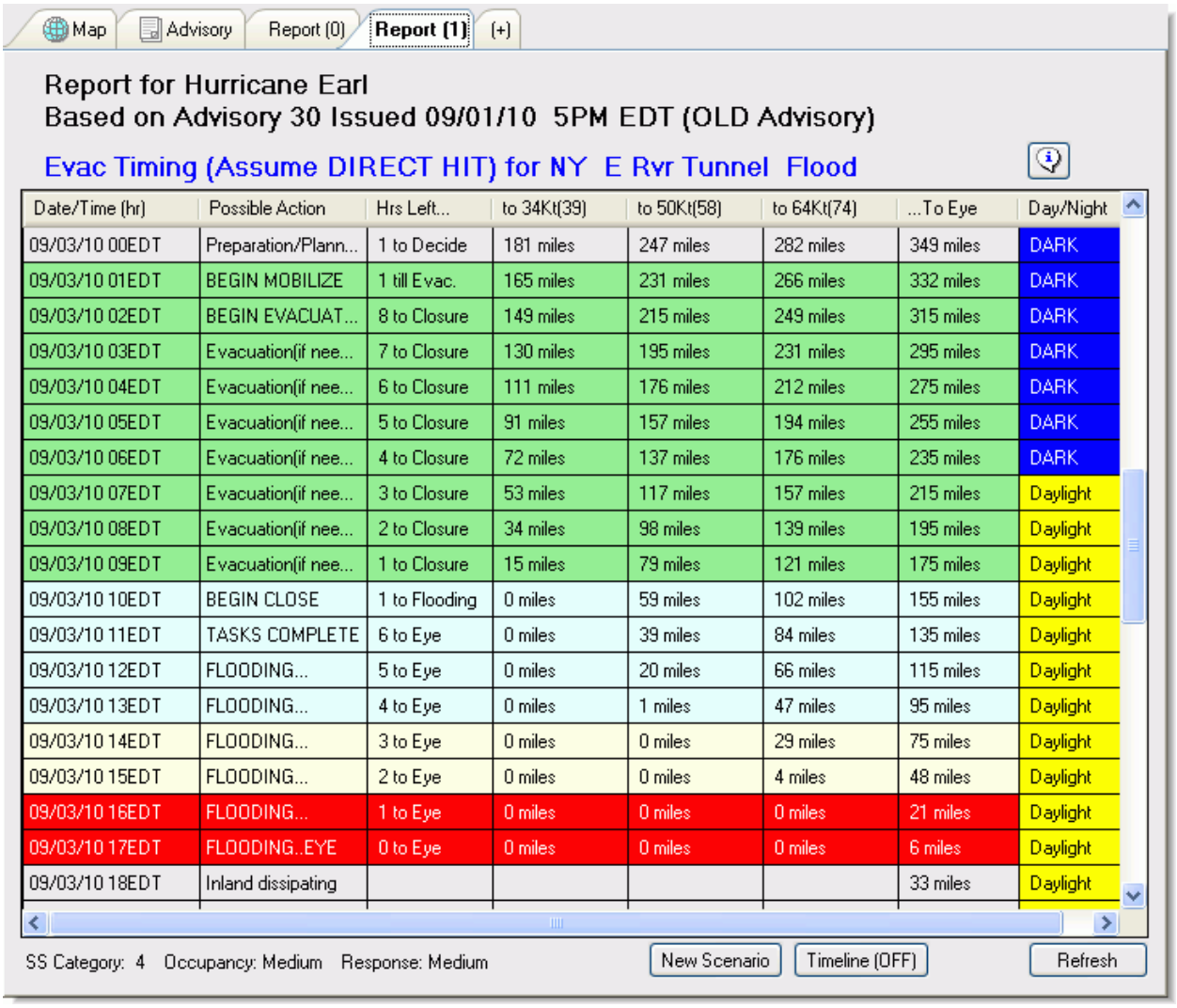
To print the report's data to a file, click the **Print** button on the Monitoring Ribbon at the top of the program. Special export options are available within the Facility Timing Detail's report interface. Click the **Export** button and then specify your choice of file name and location. For file type, choose 'dbf' if you want to work with the data in a spreadsheet. Choose 'shp' if you wish to have a shapefile and attribute table exported for use in a GIS program.

Use the **Refresh** button at bottom right to redo the report if you have a new storm or different advisory loaded into the Map Display. The Refresh button can be useful in a live-storm situation in which a new advisory is received by the system and you want to refresh the Facility Timing Details report with the latest forecast information. Alternately, you could use the **Advy+** and **Advy-** buttons to run a report for a different advisory.

Evacuation Timing for a Single Facility

Evacuation Timing for a Single Facility is another component of Hurrevac2010's special Facilities Timing toolset for the New York City metropolitan area. It is a slightly modified version of the standard Evacuation Timing...Single Location report that breaks down a county's evacuation and hazard timing analysis hour by hour. *Note: The NHC does not include wind ranges information in the extended forecast from 72 to 120 hours. Therefore, the reporting period for this tool is only from hour 0 (the hour the NHC forecast is issued) to hour 72.*

When this report is produced for a facility, the 'Possible Action' column specifically indicates each clearance hour as one of the three types (either mobilization, evacuation, or closure) and the hours after TASK COMPLETE as the type of hazard indicated for that facility (either wind or storm surge).



Date/Time (hr)	Possible Action	Hrs Left...	to 34Kt(39)	to 50Kt(58)	to 64Kt(74)	...To Eye	Day/Night
09/03/10 00EDT	Preparation/Plann...	1 to Decide	181 miles	247 miles	282 miles	349 miles	DARK
09/03/10 01EDT	BEGIN MOBILIZE	1 till Evac.	165 miles	231 miles	266 miles	332 miles	DARK
09/03/10 02EDT	BEGIN EVACUAT...	8 to Closure	149 miles	215 miles	249 miles	315 miles	DARK
09/03/10 03EDT	Evacuation(if nee...	7 to Closure	130 miles	195 miles	231 miles	295 miles	DARK
09/03/10 04EDT	Evacuation(if nee...	6 to Closure	111 miles	176 miles	212 miles	275 miles	DARK
09/03/10 05EDT	Evacuation(if nee...	5 to Closure	91 miles	157 miles	194 miles	255 miles	DARK
09/03/10 06EDT	Evacuation(if nee...	4 to Closure	72 miles	137 miles	176 miles	235 miles	DARK
09/03/10 07EDT	Evacuation(if nee...	3 to Closure	53 miles	117 miles	157 miles	215 miles	Daylight
09/03/10 08EDT	Evacuation(if nee...	2 to Closure	34 miles	98 miles	139 miles	195 miles	Daylight
09/03/10 09EDT	Evacuation(if nee...	1 to Closure	15 miles	79 miles	121 miles	175 miles	Daylight
09/03/10 10EDT	BEGIN CLOSE	1 to Flooding	0 miles	59 miles	102 miles	155 miles	Daylight
09/03/10 11EDT	TASKS COMPLETE	6 to Eye	0 miles	39 miles	84 miles	135 miles	Daylight
09/03/10 12EDT	FLOODING...	5 to Eye	0 miles	20 miles	66 miles	115 miles	Daylight
09/03/10 13EDT	FLOODING...	4 to Eye	0 miles	1 miles	47 miles	95 miles	Daylight
09/03/10 14EDT	FLOODING...	3 to Eye	0 miles	0 miles	29 miles	75 miles	Daylight
09/03/10 15EDT	FLOODING...	2 to Eye	0 miles	0 miles	4 miles	48 miles	Daylight
09/03/10 16EDT	FLOODING...	1 to Eye	0 miles	0 miles	0 miles	21 miles	Daylight
09/03/10 17EDT	FLOODING..EYE	0 to Eye	0 miles	0 miles	0 miles	6 miles	Daylight
09/03/10 18EDT	Inland dissipating					33 miles	Daylight

Rows of the tabular report are colored according to activity:

- **gray** if pre-decision or post-storm time
- **green** if active clearance time
- **blue** if within tropical storm force (34kt or 39mph)

- **yellow** if within 50kt or 58mph
- **red** if within hurricane force (64kt or 74mph)

In the 'Day/Night' column, the hours in daylight and dark are noted respectively as yellow or blue.

Glossary

A

actual track: A line created from multiple advisories by connecting the storm center's initial position at each old advisory. Also referred to as the 'past track.'

advisory: A collection of various forecast products issued by the tropical cyclone forecast center on a single storm at a single point in time. Advisory packages are sequentially numbered and typically issued at 6 hour intervals. Additional advisories (intermediate A and sometimes A and B) are issued whenever watches or warnings are in effect.

AHPS: Advanced Hydrologic Prediction Service; a National Weather Service clearinghouse for various water forecasts and flood warnings.

B

basins: Oceanographic regions used to describe the general locations of tropical systems. Hurrevac2010 organizes tropical systems into the following basins: Atlantic, East Pacific, Central Pacific, West Pacific and North Indian Ocean, and South Pacific and South Indian Ocean.

basins (SLOSH): Local coastal regions delineated and mapped for storm surge modeling (SLOSH).

C

closest point of approach: This refers to the calculation by HURREVAC of the direction, distance, and time at which the storm will pass closest by a specified county. CPA calculations are based upon the official NHC forecast track. The parameters for your county are presumably near their peak at the Closest Point of Approach.

CPHC: Central Pacific Hurricane Center. This National Weather Service office, located in Honolulu, Hawaii, is responsible for tropical cyclone forecasts from 140 to 180 degrees West. It is the source of Central Pacific advisory data in HURREVAC.

D

decision time: The last possible time at which a decision to evacuate or not can be made and still allow sufficient time to complete the evacuation before tropical storm winds begin.

deterministic forecast: A forecast presenting a single 'best guess' estimate without any representation of the likelihood of that outcome. The NHC's forecast advisory is deterministic.

direct hit: Scenario in which the storm center passes directly over the area specified. HURREVAC takes a straight-line direct hit approach to evacuation decision timing. That is, from the time the advisory is issued, the storm is assumed to head straight for your county using the forecast speed from the NHC.

direct to point: see direct hit definition

E

evacuation clearance time: The amount of time (number of hours) it takes to move a vulnerable population to safety. Hurricane Evacuation Studies determine these for an area based on various storm parameters and local conditions.

F

FEMA: Federal Emergency Management Agency

forecast period: Length of forecast. Beginning at synoptic time, tropical cyclone tracks are forecasted to 120 hours (5 days), while wind extents are forecasted only to 72 hours (3 days).

forecast track: A line created for a single advisory by connecting the storm center's initial position with its 12, 24, 36. 48, 72, 96, and 120-hour forecast positions.

forward speed: Speed at which the storm center is moving along either its forecast or actual track.

fringe winds: Winds of 34kts (tropical storm strength) or greater surrounding the storm's core.

G

GIS: Geographic Information System; a class of software programs that manipulate, analyze, and present map-based information. HURREVAC includes a GIS Export Tool for transferring storm related information into GIS programs.

H

HES: Hurricane Evacuation Study; a program of FEMA and USACE to assist local emergency managers in determining who should evacuate when a hurricane threatens and when they should leave.

HPC: Hydrometeorological Prediction Center; a National Weather Service office that prepares maps and forecast guidance products related to precipitation.

hurricane: A tropical system with maximum sustained winds greater than 64 knots(74 mph). Term used for systems occurring in the Atlantic, East Pacific, and Central Pacific basins.

I

initial position: Position of the storm center at the time of advisory issuance.

intensity: Synonomous with 'maximum sustained winds' or SS Category.

J

JTWC: Joint Typhoon Warning Center. This US Navy office, located on the Naval Base at Pearl Harbor in Hawaii, is responsible for all tropical cyclone forecasts west of 180 degrees. It is the source of West Pacific, South Pacific, and Indian Ocean advisory data in HURREVAC.

M

MEOW (surge): Maximum Envelope of Water is a SLOSH model output describing the maximum storm surge value produced by parallel tracks of storms with the same forward speed, strength, and angle of approach.

MEOW (wind): Maximum Envelope of Winds is a wind decay model describing the maximum distance certain categories of wind can penetrate inland given the storm strength and forward speed.

MOM: Maximum of Maximums is a SLOSH model output describing the maximum storm surge value produced by storms of a single Safir Simpson category, taking into account all angles of approach and forward speeds.

N

NHC: National Hurricane Center. This National Weather Service office, located in Miami, FL, is responsible for tropical cyclone forecasts for the Atlantic and East Pacific (to 140 degrees West). It is the source of Atlantic and East Pacific advisory data in HURREVAC.

NOAA: National Oceanic and Atmospheric Administration; parent organization to the National Weather Service (NWS).

NWS: National Weather Service; the official US government agency for weather, hydrologic, and climate forecasts.

P

past track: A line created from multiple advisories by connecting the storm center's initial position at each old advisory. Also referred to as the 'actual track.'

probabilistic forecast: A forecast presenting the likelihood of various outcomes. The NHC's Wind Probabilities is probabilistic.

S

SLOSH: Sea, Lake, and Overland Surge from Hurricanes; the official storm surge model of the National Hurricane Center.

state plug-ins: State-specific data necessary for certain HURREVAC operations such as evacuation decision timing. After initial program installation, plug-ins must be added using Hurrevac2010's Setup Panel.

STM file: HURREVAC's native file format for storing all forecast advisory information from a single storm.

storm category: Saffir-Simpson Hurricane Wind Scale, a 1 to 5 ranking of hurricane wind strength where categories 3, 4, and 5 are considered 'major' hurricanes.

synoptic time: Time that data is collected. Weather data is collected around the world at 00 Zulu, 06 Zulu, 12 Zulu, and 18 Zulu. Zulu is also known as GMT or UTC time.

T

tropical cyclone: Generic term for hurricanes and typhoons--tropical systems with maximum sustained winds greater than 64 knots(74 mph). Indian Ocean and South Pacific basin systems are typically referred to as topical cyclones.

tropical depression: A tropical system with maximum sustained winds of less than 34 knots(39 mph).

tropical storm: A tropical system with maximum sustained winds greater than 34 knots(39 mph) but less than 64 knots(74 mph).

typhoon: A tropical system with maximum sustained winds greater than 64 knots(74 mph). Term used for systems occurring in the West Pacific basin.

U

USACE: Abbreviation for US Army Corps of Engineers

W

warning: A hurricane or tropical storm warning means that those conditions could affect the area within 24 hours.

watch: A hurricane or tropical storm watch means that those conditions could affect the area within 36 hours.

wind ranges: The extent of 34kt, 50kt, and 64kt winds surrounding the storm center. Advisories from NHC, CPHC, and JTWC provide wind extents by quadrant (NE, SE, SW, NW) for the initial position and 12, 24, 36, 48, and 72-hour forecast positions.