HURREVAC

A Quick Reference Guide

THE SOFTWARE TOOL USED BY EMERGENCY OFFICIALS FOR HURRICANE EVACUATION ASSISTANCE

www.hurrevac.com

About HURREVAC

HURREVAC is a software tool used by emergency managers to gather the information they need to make evacuation decisions. The software couples hurricane evacuation study data with real-time weather forecast data. This combination allows users to compute unique evacuation times as hurricanes and other hazardous weather systems approach.

Use of HURREVAC is restricted to active members of the emergency management community. The name is derived from the words "hurricane evacuation."

Emergency managers first used HURREVAC during the 1989 hurricane season in South Carolina and Georgia. Additional states were gradually added, and the program has undergone many updates. The current version is general enough to be used throughout most of the nation's coastal zone (including the U.S. Virgin Islands, Puerto Rico, and the U.S. Pacific Islands), yet it retains the local data-capturing capabilities that make it so useful.

Instructions on how to use HURREVAC are available at *www.hurrevac.com/training.htm* A training CD-ROM is available for purchase from *www.seaislandsoftware.biz/training/.* HURREVAC software was developed by Sea Island Software, Inc.

HURREVAC Sponsors
Federal Emergency Management Agency
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Discover what HURREVAC can do for you.
When hazardous weather approaches, a tremendous amount of important decision making falls to the local and state emergency management team. The list is long and significant, and includes decisions about evacuation timing, evacuation routes, and shelter openings and closings.

HURREVAC gives emergency officials easy access to the information they need for efficient decision making. This booklet helps users get the most out of HURREVAC by summarizing the different components of the program.

Note: Keep in mind that the HURREVAC program is a decision-support tool. Decisions should not be based solely on the display of one component of this program. Components of this program should be used simultaneously and with other information resources.

A HURREVAC user must be an active member of the governmental emergency management community. Register to use HURREVAC 2000 for Windows95/98/2000/XP at *www.hurrecvac.com/reg_win.htm*. Eligible users will be sent information by e-mail on how to download, install, and use the program.

Things to Know Before Using HURREVAC

Data Download

Before using HURREVAC each time, users need to download current data. To download the latest data, go to the **File** drop-down menu and highlight **INTERNET DOWNLOAD OF DATA**. Select **AUTO-Download Latest**. This will initiate the download of current data. Data can also be downloaded from the left side bar by selecting the **DATA** button.

Plug-ins

Some options used in HURREVAC require data plug-ins to be downloaded from the HURREVAC Web site on the plug-ins page (***www.hurrevac.com/ plugins.htm***). This site contains data plug-ins for evacuation data, inundation graphics, and National Oceanic and Atmospheric Administration (NOAA) river gage maps. Evacuation data plug-ins by state must be installed on the user's machine before the evacuation timing options become available. The site has evacuation data plug-ins for states that have current evacuation clearance times produced by hurricane evacuation studies. Inundation graphic plug-ins based on the National Weather Service's Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model are also available for at-risk areas.

Tailoring HURREVAC to Local Areas

A great strength of the HURREVAC program is the ability to incorporate local data into the planning models. See the "Plug-ins" section above for information on local plug-ins.

HURREVAC can also be customized to make the tool easier to use. The General Setup window, accessed from the **File** menu under **Program Setup**, allows users to change the default program settings for advisory downloads, local plug-ins, and display. These settings are accessed from
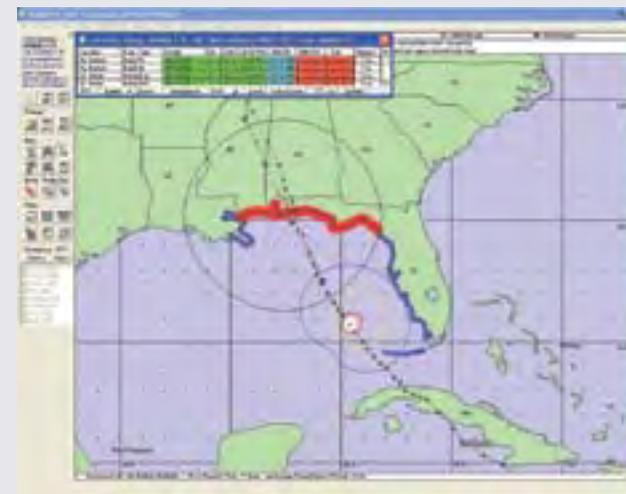
Decision Arc with Evacuation Timetable

The circle depicts the area where decisions should be made about possible evacuations. The evacuation timetable should be used along with the decision arc.
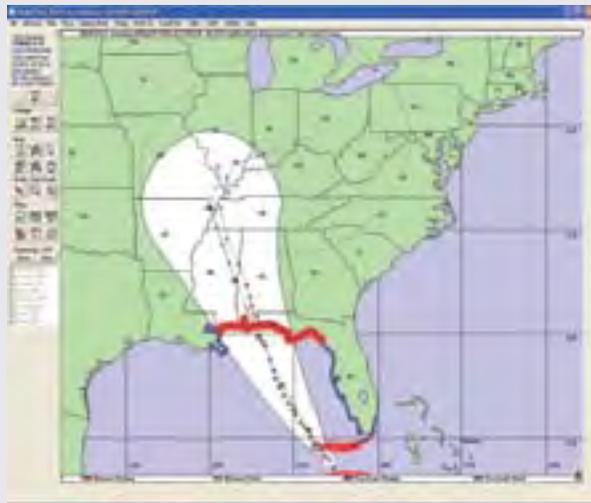
Error Cones

The error cone represents the uncertainty associated with the position of the National Hurricane Center forecast track for 72 hours (shown in white) and 120 hours prior to predicted landfall.

six tabs in the General Setup window and cover the following topics.

- Internet – set Internet connection information
- Color – set map and data layer colors
- Time Zone – set the local time zone
- Initial Map – set the initial map display when the program loads
- Localities – limit scans to certain counties or parishes
- Miscellaneous – point HURREVAC to external display programs

GIS Export Capabilities

Within HURREVAC, users can export certain data to a geographic information system (GIS) format. This functionality allows users to view warning and forecast information from HURREVAC with community-specific GIS data, such as structure information, shelter locations, topographic maps, and aerial photos. These data are often more detailed

than the data contained in HURREVAC and provide further analysis of storm information and the potential impact to a community.

The GIS Export feature, located under the **File > Export Field(s) to GIS File** menu, helps emergency managers assess the situation specific to their community and make timely decisions that save lives and minimize property damage from hurricanes.

HURREVAC Component Summaries

Advisory Text Viewer

Forecasts of tropical cyclone positions, as well as current motion and intensities, are issued every six hours, or every two to three hours when watches or warnings are in effect, by hurricane specialists at NOAA's National Hurricane Center. The Advisory Text Viewer displays these text advisories (Public Advisory and Forecast/Advisory) for a selected storm. In the advisory, storm positions are given in latitude and longitude coordinates and distance from a selected land point or island. Details on current storm strength include maximum sustained winds in miles per hour (mph) and estimated or measured minimum central pressure in millibars and inches.

The Advisory Text Viewer also displays the Tropical Outlook and a Rainfall Discussion. The advisory information about strength of tropical systems and their current and forecast locations is used by officials to plan and initiate evacuation, to open and staff shelters, and to stage post-storm recovery efforts.

The Advisory Text Viewer is available under the **Utilities** menu in HURREVAC. Selecting this item will open a separate window that displays the advisory files (Public Advisory, Forecast/Advisory files, the Tropical Weather Outlook, and the Rainfall Discussion). Archived advisory text files are located by default in the "text" subdirectory under the HURREVAC 2000 directory (where the program is set up on the user's machine), if they have been downloaded. To download these files, go to *www.hurrevac.com/archives.htm* and follow the directions listed there.

Wind Fields

The Wind Fields display allows users to see the current and forecast strength and estimated extent of a storm's winds. Each storm's wind fields are color-coded with rings around the eye of the storm: blue is greater than 39 mph (tropical storm-force sustained winds); yellow is greater than 58 mph sustained winds; red is greater than 74 mph (hurricane-force sustained winds). When information about a storm is loading, the wind ring (radii) setting is the default view of the storm.

Wind radii show the estimated extent of the storm's specific wind fields and strength of sustained winds at each advisory location for the storm. Wind swath shows projected wind strengths that would follow the projected path of the storm. This option helps users see if their area will be affected by storm winds and what strength those winds might be as a storm approaches. However, the actual winds are not limited to the boundaries displayed in HURREVAC. Areas outside the labeled wind field may experience winds of greater strength. Also, the display may become less accurate as a storm approaches land because of interpolation between forecast points. In reality, winds may be maintaining or even increasing in intensity upon landfall. To switch between the wind radii and the wind swath, use the **Display Mode** menu, or choose one of the three buttons under Mode-Error Swath on the left side bar.

Wind Timing

The Wind Timing interface, located under the **Timing** menu, allows users to see when different wind fields of a tropical cyclone are expected at certain locations.

On the wind timing charts, locations marked in blue are areas forecast to experience tropical storm force winds (greater than 39 mph); locations marked in yellow are forecast to experience tropical storm force winds greater than 58 mph; and locations marked in red are forecast to experience hurricane force winds (greater than 74 mph). In the All Affected Areas and Local Areas, the color coding is based on the peak wind speed at that location. For Details at a Single Location, the color coding is based on the wind speed at that time.

After a specific location is selected (**All**, **Local**, or **Single Location**), a dialog box appears. Choose one state from the **State** drop-down list and one county (or parish) from the **County** drop-down list. Click **OK** and the detail list for that county will appear.
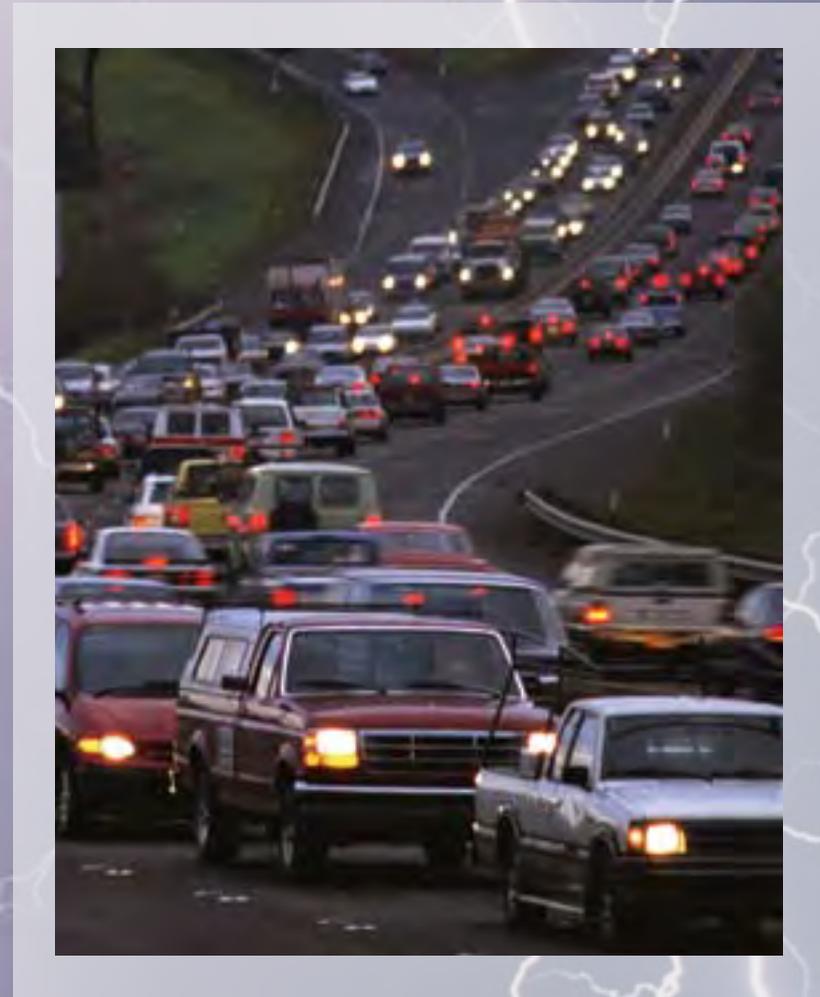
Evacuation Timing

The Evacuation Timing option provides timing charts that depict the amount of time left before wind fields are expected to enter different areas. All evacuation timing options assume that a hurricane will directly hit the selected areas. This information helps emergency managers decide when to evacuate those areas.

The Evacuation Decision Time does not imply or suggest that any particular action should be taken—but does suggest to emergency preparedness officials when certain decisions should be made. Typically, all evacuations are halted once sustained tropical storm force winds move onshore.

Evacuation Timing options are located under the **Timing** menu. Select **Evacuation Options Settings** to adjust settings for the area in question. The Evacuation Timing (All Available Areas) table displays evacuation timeline information for all locations that have evacuation data file plug-ins (see "Plug-ins" section in this guide). This table lists evacuation scenarios, when decisions should be made, the Saffir-Simpson category of the storm, the time frame of approaching winds, and the distance of the winds from the eye of the storm for each location.

To see a specific area, use the **Single Location** option under **Evacuation Timing**. The table lists possible actions and the times those decisions should be made within the current advisory. The table also lists the time remaining to make a decision, the distance of different strength winds, and whether the possible action will take place during the day or at night. Another option is a bar graph that displays evacuation times, pre-landfall hazards, and the time the eye of the storm is predicted to arrive by county.

Decision Arc

The Decision Arc tool graphically depicts the decision time for evacuation. Decision time means the time at which the decision about a possible evacuation should be made.

The tool uses evacuation clearance timetables developed using the transportation analysis from the hurricane evacuation studies for a specific area. These studies are conducted by the Federal Emergency Management Agency, U.S. Army Corps of Engineers, NOAA, and state emergency management agencies. The program uses the forecast forward speed of a storm to compute how long it would take 34-knot winds to reach a location, assuming a direct hit.

The volatile nature of hurricanes, however, means changes in a hurricane track and intensity can occur from one advisory to the next, with increases or decreases in wind range, storm speed, and storm category, resulting in longer or shorter evacuation clearance times and a potentially wider Decision Arc. Therefore, the Decision Arc should be checked after each new forecast has been released.

Decision Arc is found under the **Timing** menu and requires a setup before it can be used. The user must select an evacuation location and choose details for the evacuation, such as Saffir-Simpson category, tourist occupancy, and response rate. The program uses the evacuation clearance time from the available clearance timetable plug-ins and the settings (such as Occupancy, Response, Storm Category) that can be found under the Timing menu. Select **Graphical Timing (Decision Arc)** and then **Decision Arc Setup**.

Error Cones

HURREVAC allows users to display the Average Error Swath (or Cone of Uncertainty) associated with a National Hurricane Center (NHC) forecast. An average error swath represents NHC's average forecast error for forecast path and times over the recent years. This information is combined with a current forecast storm path and helps users see where the storm might go within the forecast period.

The Average Error Swath has two components: the three-day and five-day swaths. The white cone represents the three-day swath, meaning that the eye of the storm should track within this cone over the next 72 hours. A solid gray line marks the five-day (or 120-hour) swath. The 120-hour forecast is not available for storms that occurred before the 2003 season.

A community in or near the Average Error Swath would find it helpful to examine the Wind Decay Model Maximum Envelope of Wind (MEOW) for the storm and attempt to assess the potential risk of storm-force winds. To access these, go to **What-Ifs** in the menu bar and select **Wind Decay Model Envelopes**. When a storm is approaching an area, emergency managers should view the error cones frequently to determine if the storm could be a potential threat.

Rainfall Forecast

Rainfall forecasts are an important component in assessing potential storm risks. The NOAA Hydrometeorological Prediction Center issues 24-hour rainfall forecasts for the three days before a storm's landfall. These forecasts are issued twice a day around 8 a.m. and 8 p.m. eastern time (standard or daylight savings). Since inland flooding is a great risk even with smaller, weaker storms, emergency managers should view the Rainfall Forecast daily as a storm approaches to determine if their area is expected to receive heavy rains.

Rain amounts less than one inch in 24 hours are displayed in light green, and amounts greater than one inch are in darker green for emphasis. Rainfall forecasts can be found by either right-clicking on the **Rain** icon, by selecting from the **Rain** menu, or by pressing **Ctrl+F1**, **Ctrl+F2**, or **Ctrl+F3** (for days 1, 2, and 3). Once the rainfall forecast is displayed, the user can select the **Affected Areas List** (under the **Rain/River** menu) to scan **ALL** or **LOCAL** counties.

River Flood Outlooks

River Flood Outlook uses data from the National Weather Service and is helpful for forecasting storm-associated flooding. Areas of potential flooding are represented by color-coded polygons on a map, indicating if flooding is possible (black), likely (blue), or imminent or occurring (red). In addition to showing flood potential, the map gives projected flooding dates.

Flood forecast data are downloaded with each download of storm information. The data are available from two locations: the **Rain/River** menu and the **NWS River Forecast** button to the left of the map. Under the **Rain/River** menu, users can also display an **Affected Areas List for Flood Outlook**. This display lists the location of the flood outlook, the type of flood threat (possibility of flooding), and the time frame of the threat.
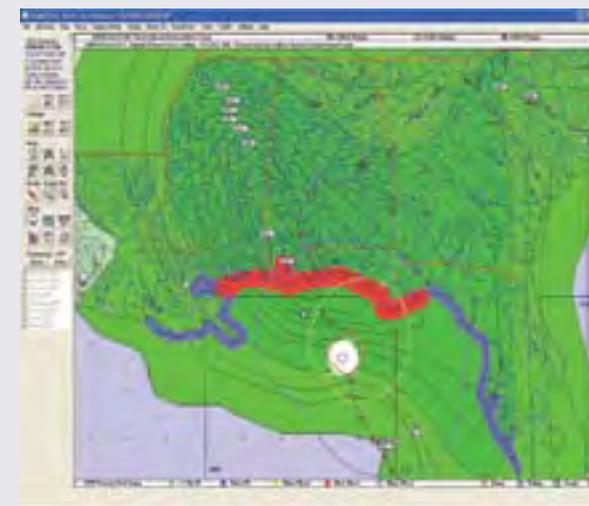
Rainfall Forecasts and River Gages

Rainfall forecasts and river gages can be viewed simultaneously to see which areas are forecast to receive heavy rains and how the rivers will be affected.

River Gages

To monitor river flooding, users can view river heights at various gage locations. **River Gage Observations and Forecasts** are accessed in two ways: through the **Rain/River** menu and the **NWS River Gages** button to the left of the map. Users can see if a gage is experiencing river stages of major, moderate, or minor flooding, or is below flood stage. Also available is the water-level forecast for each gage, including whether water levels will fall, rise, or remain steady.

Selecting an individual gage opens the River Gage Browser window for that gage, and a hydrograph is the default view. The hydrograph reveals observed and forecast river stages at that gage location. Additionally, the non-default options in the River Gage Browser are Impacts, Crests, and Map (if available) for that gage location (see "Plug-ins" section in this guide for information on downloading inundation maps for gage locations).

Emergency managers can compare the river stages to potential impacts and determine what actions, if any, need to be taken. Users can also check the Advanced Hydrologic Prediction Service Web site for more detailed and up-to-date impact and crest information. Go to *www.weather. gov/ahps/* to find this information. This option must be used with HURREVAC's Hydrometeorological Prediction Center rain forecast to monitor rain activity in the emergency manager's area, as well as upstream.

Tide Gages

When a storm is approaching land, the Tide Browser within HURREVAC allows users to monitor tidal cycles at a local tide gage and see information associated with the estimated time of a storm's landfall. Because storm surge will be much greater if a storm approaches land at high tide, knowing the tide stage at landfall could change the need for areas to be evacuated.

River Gage Hydrograph

River gage hydrographs display observed and forecast river heights. In the River Gage Browser window, users can also view impacts, crests, and inundation maps (where available).

Tide gages are accessed by selecting **Show NOAA Tide Gages** under the **Tides** menu. The tide gages will appear on the map. Gage readings are available along the coast from Maine to Texas, including major bays and estuaries. Right-click on an individual gage to open the Tide Browser for that gage. The browser shows the astronomically predicted and observed tide levels. The browser does not display predicted storm surge, but will display observed storm surge.

Traffic and Evacuation Tool

The Evacuation Traffic Information System is a product of the Southeast U.S. Hurricane Evacuation Study. The system consists of a Traffic Demand Forecast Model that accepts input from many states on storm category (1 to 5), counties planning evacuation, participation or compliance rate, and tourist occupancy information. From this information, the Traffic Model estimates the traffic on the evacuation routes of the southeastern U.S. roadway system.
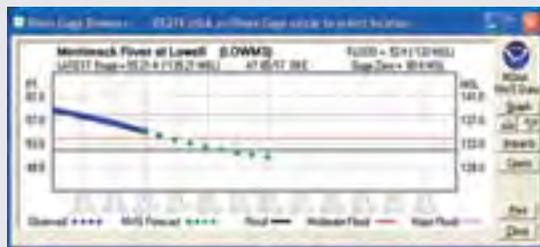
Although the model can estimate the traffic along such routes, the model does not show actual existing traffic data except when specific traffic count statistics are present. The system's plot option within HURREVAC displays and labels the road network using the latest data file download. The legend that is present in the browser window shows the colors the map uses to display current levels of congestion. The Plot and Browser displays other information, such as which counties are reported as evacuating, state-to-state traffic estimation, route closures, and lane closures. All traffic and Evacuation Tool options are located under the **Traffic** menu.

Shelter Database

The Shelter Database helps users monitor the capacity and capabilities of shelters in a county or parish.

The database stores information about each shelter, such as the address, phone number, point of contact, staff, shelter capacity, and meal capabilities. In responding to an emergency event, this information is useful for monitoring the population and other logistical information for each shelter. As a situation develops, users can continually update the database to reflect changes in the capacity of a shelter. In the preparedness phase and off season, users can coordinate with emergency support function agencies, such as the Red Cross, to populate and update the shelter database.

The tool is located under the **Utilities** menu. Once opened, it allows users to select a county or parish, view or update information about existing shelters, and add new shelters to the database. Status reports can be created and printed by clicking either the **Status List** or **Print Report** buttons.
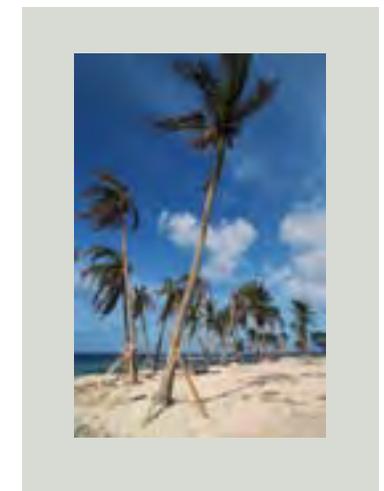
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