

User Guide for

Forecast Event Awareness Tool

A GFE Procedure within CAVE
Updated February 2017

Prototype release - use with CAVE Build 16.4 or greater (see * [Installation Guide](#))

Outline of Contents

- [Overview](#)
- [Getting Started](#)
- [Software Installation Guide](#)
- [Events Guide](#)
- [Event Awareness](#)

Overview

The purpose and function of the *Forecaster Event Awareness Tool (FEAT)* is to alert the forecaster via *visual cues* to weather events of significance within the forecast grids. The application window shows the occurrence of significant weather events with color. The small boxes, representing gridded forecast data, when color indicated show areas of the probability of significant weather events occurring. Rules defining significant weather events are used to process the forecast models grids. When the rule is satisfied, the grid box has a distinct color indication.

If the rule is met for a grid area, the color of the grid box is flagged.

For example:

- The rule for Dense Fog is defined by: *Visibility* \leq .25
- High Wind rule is: *Wind* \geq 40.0 or *Wind Gust* \geq 58.0

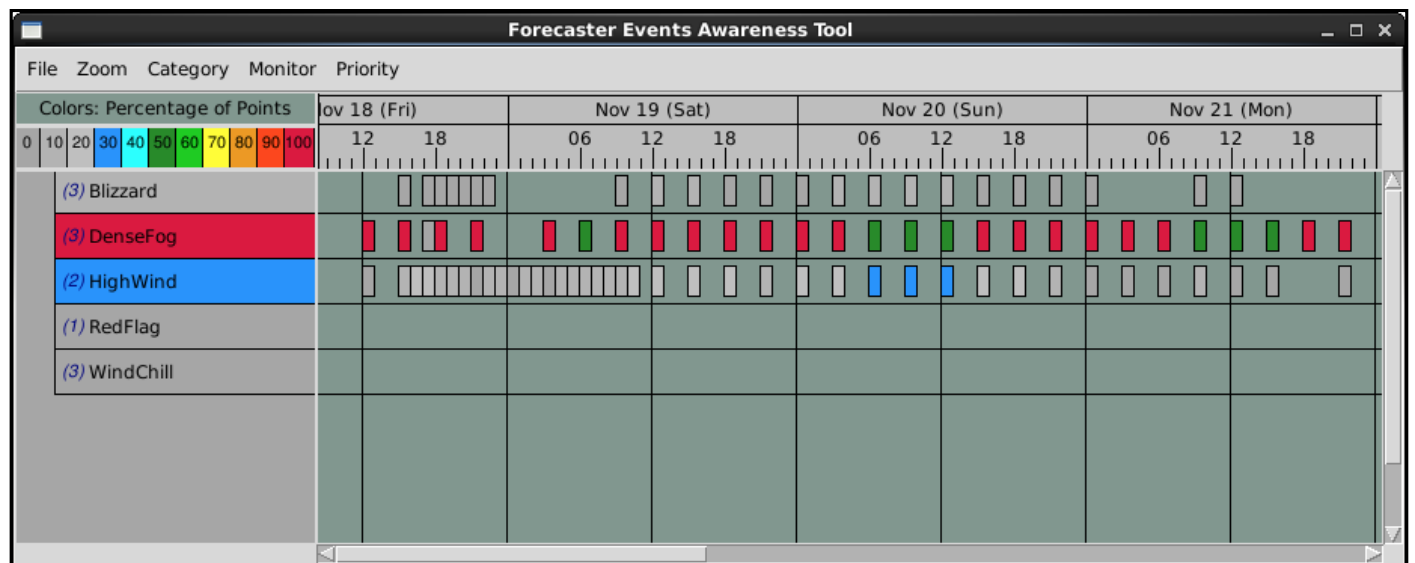


Figure 1: Forecast Events Awareness Tool (FEAT) application. At a glance, the red grid boxes (right panel) get your attention to a possible significant weather event.

Event Details

When you click on a specific Event name label, like 'Dense Fog', an information window will pop up. Rules defining significant weather events are used to process the forecast models grids. When the rule is satisfied, the grid box has a distinct color indication.

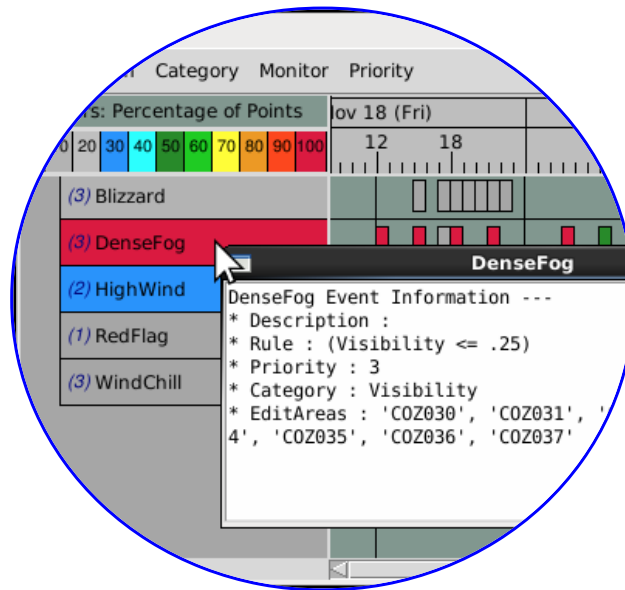


Figure 1.1: Event database details can be displayed, including the rule used to evaluate the gridded data.

The grid boxes displayed in the right panel are colored and will display a brief summary in a pop up window when touched with the mouse cursor, showing more detail like how many models predicted the event, or the percentage of grid points that met the criteria. The dominant color of the grids on the right is also used to color the background of Event name label (left) associated with the row.

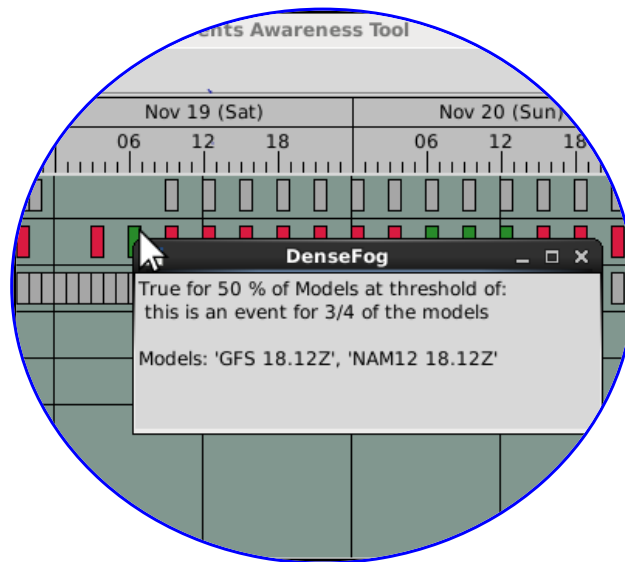


Figure 1.2: Event detail summary can be displayed, for each grid box.

The purpose and function of FEAT is to alert the forecaster to weather events of significance within the forecast grids. The application window shows the occurrence of significant weather events with color. The evaluation approach below is to calculate the percentage of grid points that met the criteria are compared to the total grid points possible. This indicates the probability of the occurrence of a significant event on a scale of 100%. In this GFE Procedure its referred to as 'Percentage of Points'.

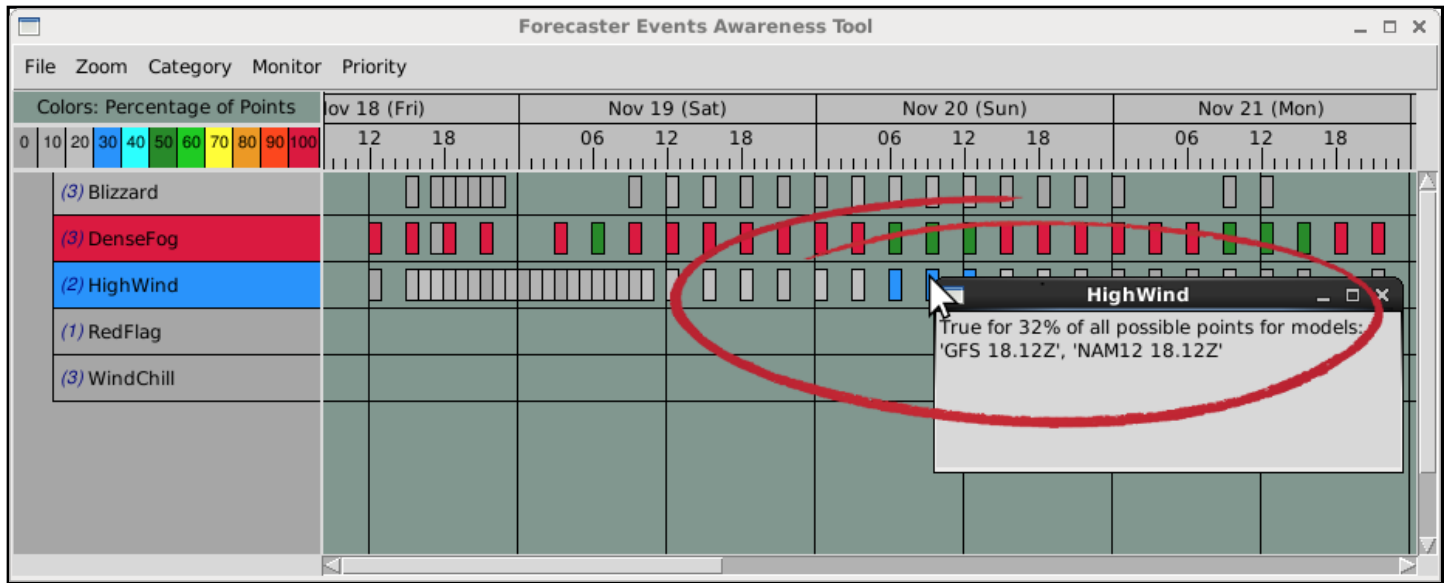


Figure 1.3: The small boxes, representing gridded forecast data, show areas of the probability of significant weather events occurring.

Getting Started

The software is experimental and has two (2) separate components. One part is a software package that runs outside of CAVE via a cron script to generate Event data multiple times per day. The second part is a set of code that works within CAVE as a GFE Procedure. An installation script is available. See [Software Installation Guide](#)

Once FEAT is installed, and the event generation script runs and successfully creates data, from the GFE *Populate* menu, select 'ForecastEventsAwareness'.

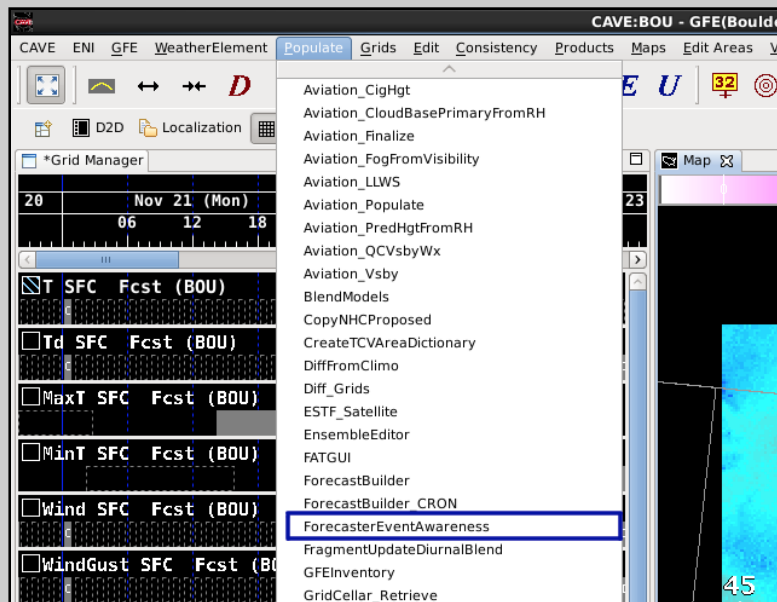


Figure 2: How to start the GFE Procedure: Forecast Events Awareness Tool (FEAT).

Menubar Options

The *File* lists the options to read Case Event data or Realtime Event data (default).

The *Zoom* has the option to expand or compress the data that is displayed within the application window.

The *Category* option simply shows the event category of interest. For example, select the 'Winter' option to list all winter-related weather events.

The *Monitor* option is more complicated and the core of FEAT. It is explained in the one of the next sections.

The *Priority List* option allows listing and sorting of the weather events by their priority rank.

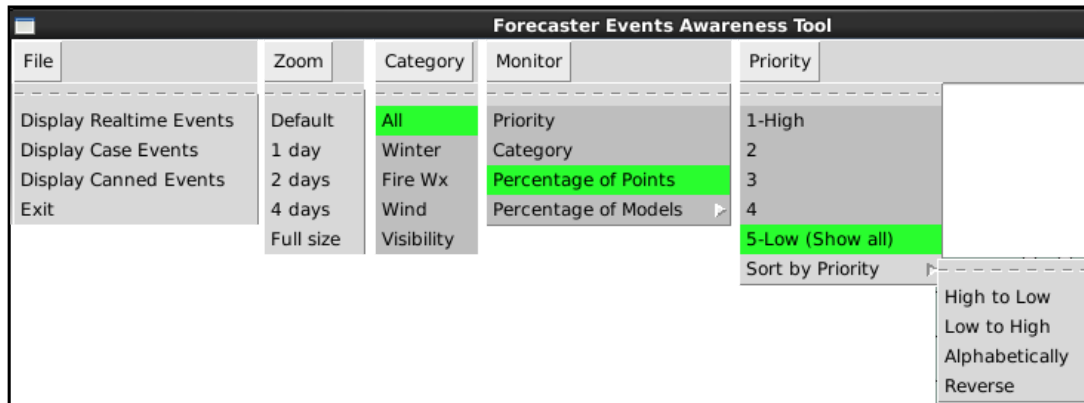


Figure 3: FEAT menu bar showing main menu and sub-menu options: File, Zoom, Category, Monitor, and Priority.

Event Awareness: Percentage of Points

FEAT alerts the forecaster to weather events of significance within the forecast grids. The percentage of grid points that meet the criteria are compared to the total grid points possible. This indicates the probability of the occurrence of a significant event on a scale of 100%. In this GFE Procedure its referred to as 'Percentage of Points'. See Figure 1.3.

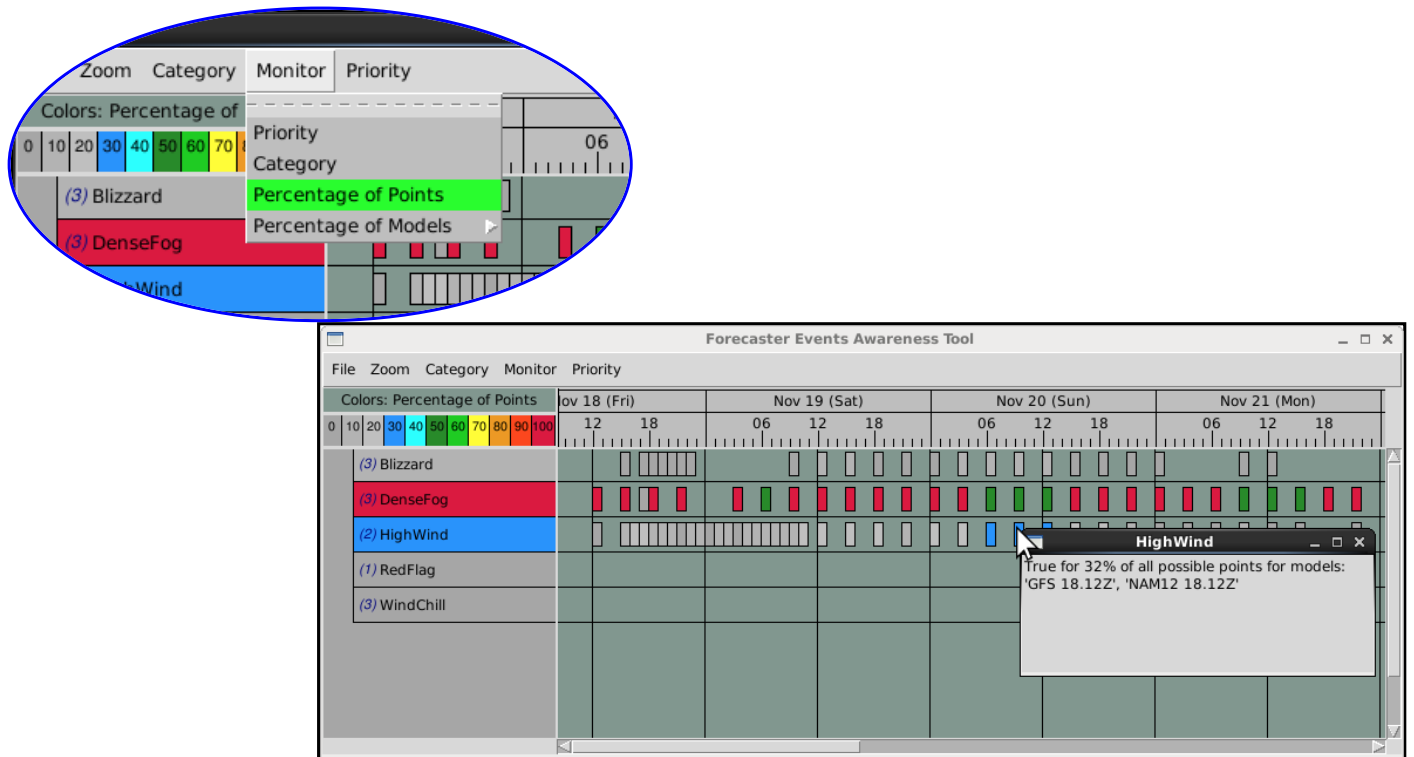


Figure 4: FEAT default mode: Percent of Points to bring attention to any significant events in the forecast area.

Event Awareness: Percentage of Models

The option 'Percentage of Models' shows how many models predicted the event with a particular threshold value, an example is shown in Figure 5.0.

Figures 5.1 through Figure 5.4 below, as the threshold changes, the color indication changes. In Figure 5.4, the pointer at one particular grid box shows "True for 50% of all model runs for a threshold of this event for 3/4 of all the models..."

Also compare and contrast with see Figure 4 above.

When the forecaster selects a threshold for points, any model that meets or exceeds this threshold should be considered. In other words, the threshold of points must be met before it is considered "an event" color indication other than gray.

	0%	25%	50%	75%	100%
NAM				X	
GFS			X		
HRRR		X			
RUC		X			

Figure 5.0: True for 100% of models with a threshold of 1/4 (25%) points meeting criteria.

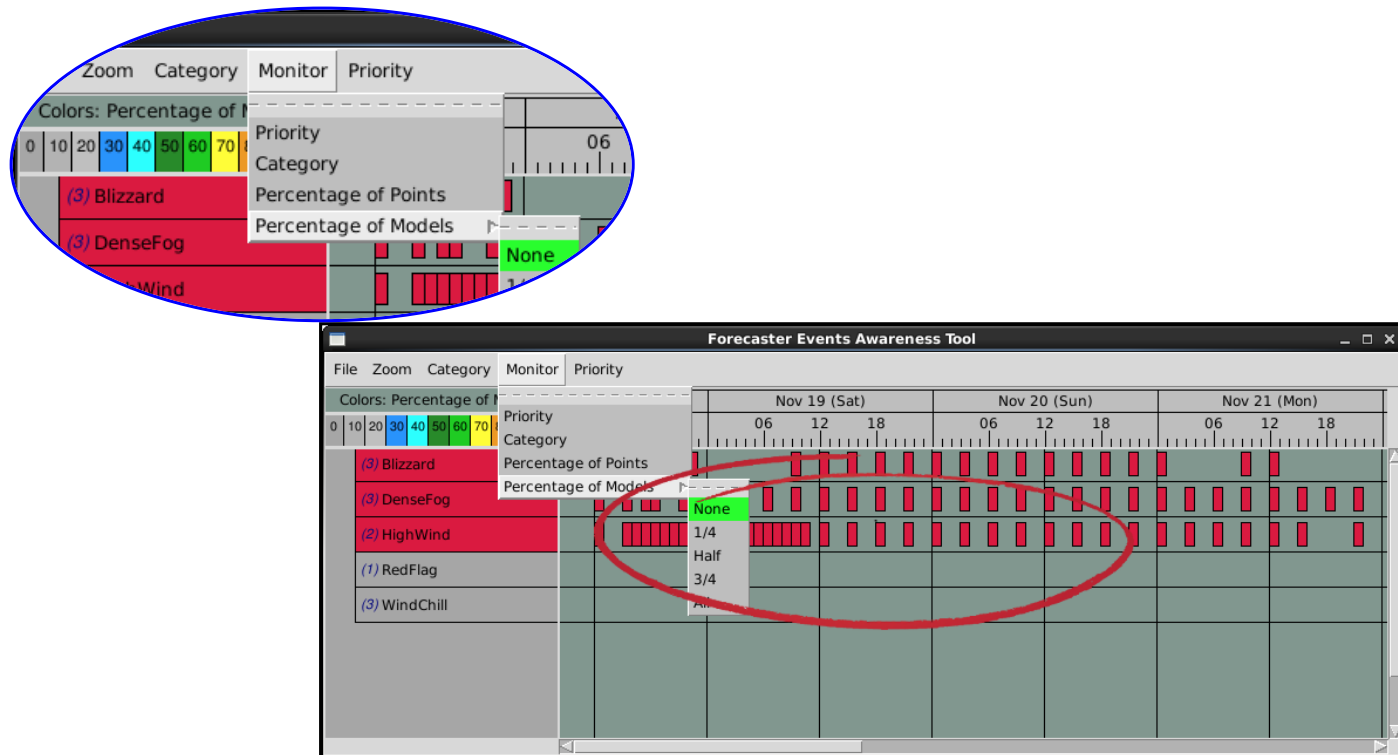


Figure 5.1: True for the color indicated % of models with a threshold of "This is an event for no models".

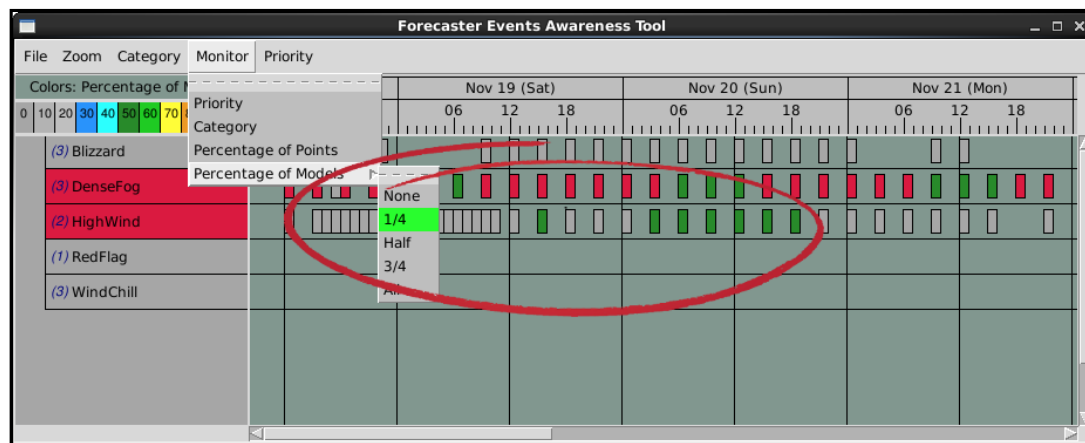


Figure 5.2: True for the color indicated % of models with a threshold of "This is an event for 1/4 of all models".

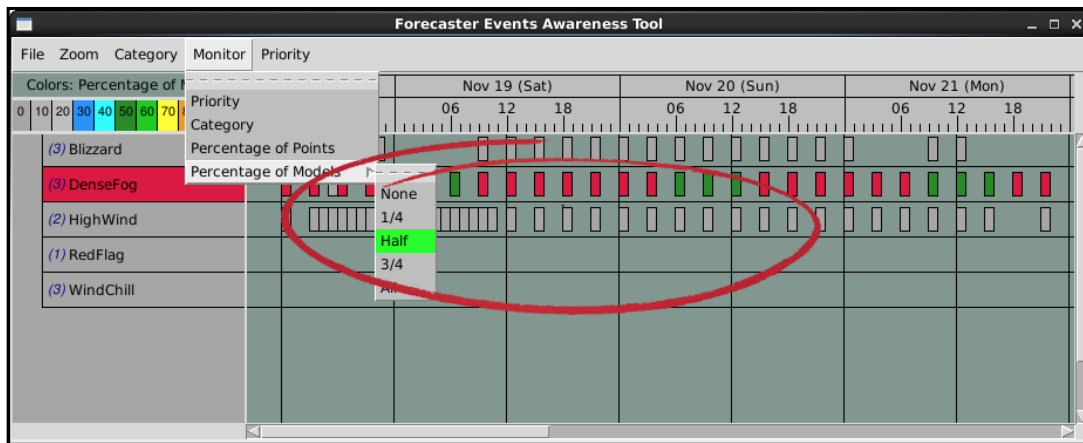


Figure 5.3: True for the color indicated % of models with a threshold of "This is an event for 1/2 of all models".

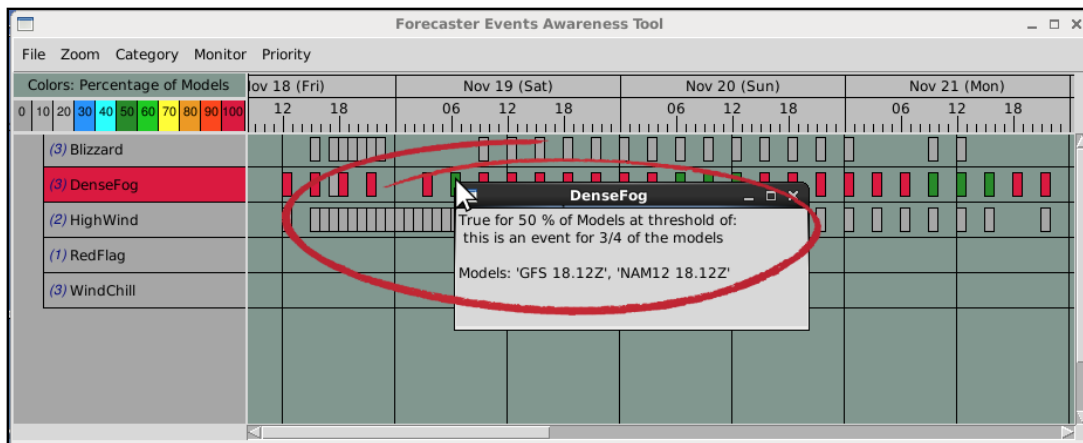
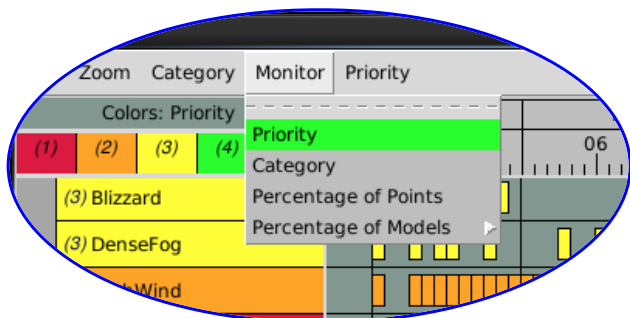


Figure 5.4: True for the color indicated % of models with a threshold of "This is an event for 3/4 of all models".

Event Awareness: Two (2) Additional Color Options

Any number of rules can be added to the database of events. Each event entry includes a *Name*, a *Description* of the event, a *Rule* to evaluate the event, a *Priority* rank (1-5), and a *Category* type. See Figure 1.1 . An additional document, the [Events Guide](#) gives instructions on how to enter an event into the software package. Note: the list of Events can be colored by the *Priority* level of the Event found within the event database, or colored by the *Category* type of the Event. The rows of Events can also be sorted by the Priority level or alphabetically. See Figure 8.



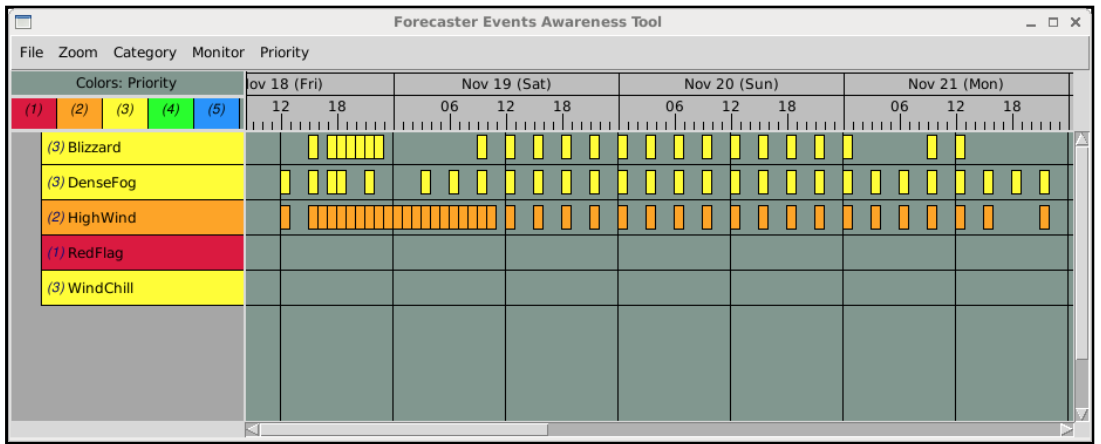


Figure 6.1: The rows of entries are colored by value of the Event's priority level (1=red is the highest).

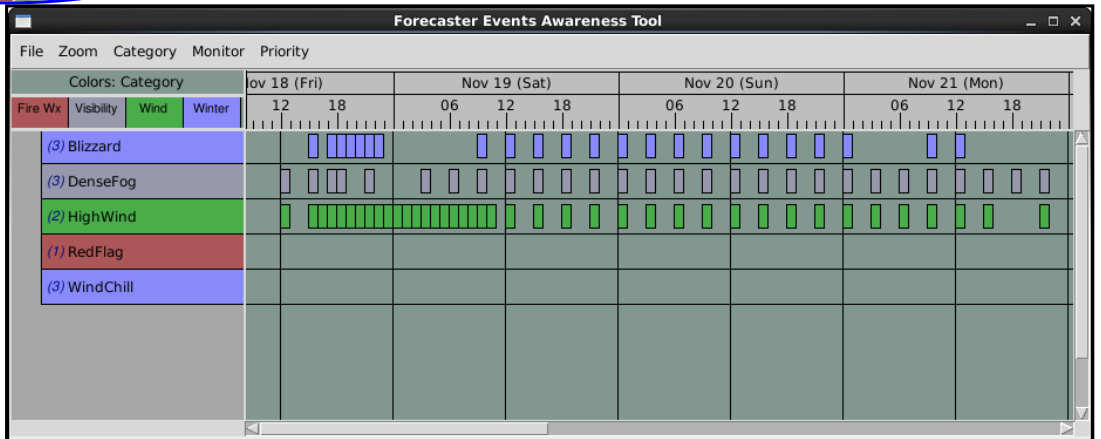
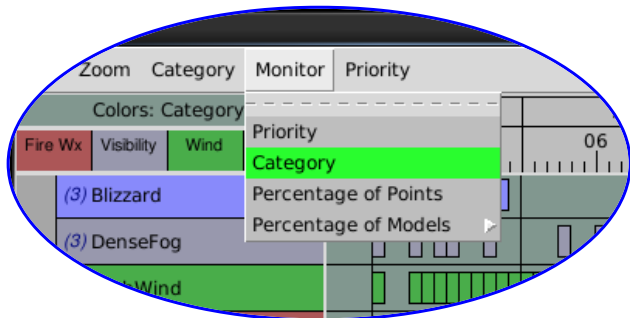


Figure 6.2: The rows of entries are colored by value of the Event's category type (gray, for example is the color for Visibility)

Event Awareness Color Legends

Tracking significant events will vary based on options selected from the *Event Awareness Monitor* menu found on the main menu bar. The grid boxes can be colored in a way that is effective for evaluation. The grid boxes can be colored as a function of the percentage of points found to meet the rule on a scale of 100%, or by the percentages of models that have agreement, and more.

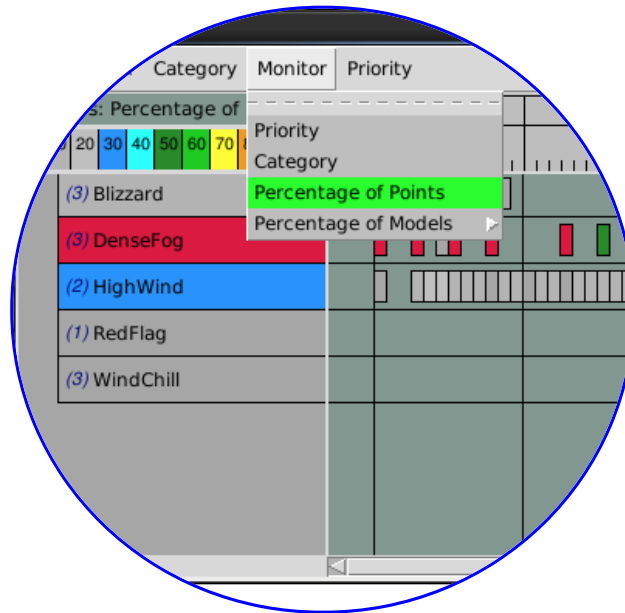


Figure 7: Monitor menu options:
 1) Priority (1 high - 5 low),
 2) Category type,
 3) Percent of points compared to the total grid points,
 4) Percent of models in agreement,

You can track the significance of the events by selecting one of the options from the **Monitor** menu list of options, there is a color scheme and color legend associated with each choice.

- Color the events by order of importance by selecting **Priority** from the **Monitor** menu options. (Section 6.1, above.)

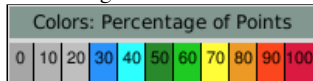


(To reorder the events by priority rank, see Section 8 below "List Sorting Options".)

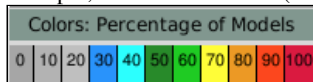
- Color the grids by type or **Category**. This is typically only used to identify the category of, for example, winter events. (See Section 6.2 above.)



- Color the grid boxes as a function of the **Percentage of points** found on a scale of 100%. (Section 4)



- Color the grid boxes by the percentages of models that have agreement. Select **Percentages of Models**, then a secondary threshold, for example, **Half** of all models. (Section 5)



Priority List Sorting Options

The *Priority List* option allows listing and sorting of the weather events by their priority rank. This value is entered in the Rule database. A rank of (1) is the highest priority. The options allow display of only the priorities of interest. The list of rules, indicated by a name like 'High Wind' can be sorted alphabetically, too. This can help in searching for the weather event of interest.

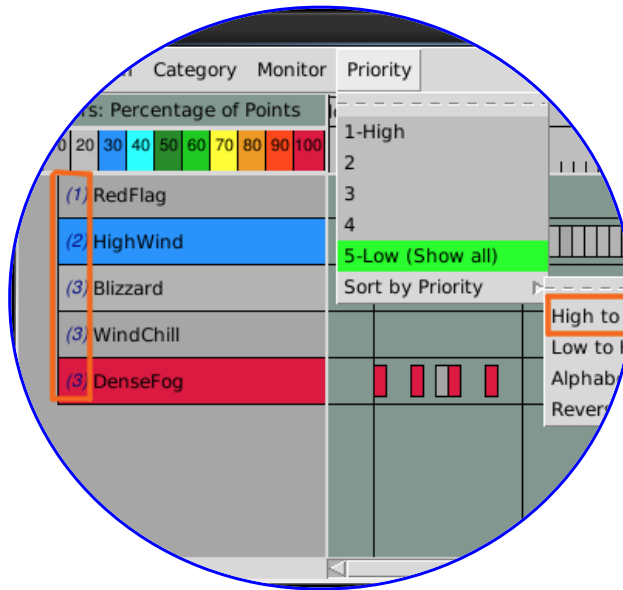


Figure 8: FEAT: Priority menu. Sort by Priority: High to Low is selected for demonstration purposes.

Zoom Option

The *Zoom* options allow viewing choice alternatives.

Note: the scroll bar allows the user to examine forecast information that is outside the FEAT window.

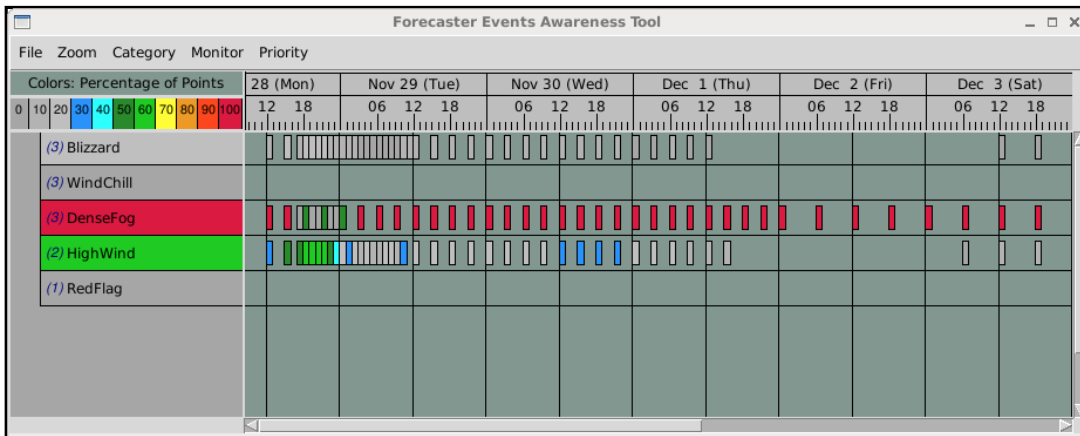


Figure 9: FEAT: Demonstration of 'Full' zoom.