

## LESSON 1 GETTING STARTED

Knowing how to start CHPS and identify key parts of the Interactive Forecast Display (IFD) is the first step in using CHPS to create forecasts.

This lesson describes how to start CHPS to begin the forecast process and identifies the components of the default CHPS IFD.

By the end of this lesson, you should be able to:

- Identify CHPS users.
- List the components of CHPS.
- Open CHPS using the command line and optional methods.
- Describe what the user sees when the interface opens.
- Briefly describe the purpose of the interface components.
- Save a custom Interactive Forecast Display (IFD) layout.
- Locate additional resources.

## 1.2 CHPS USERS

You and your colleagues at River Forecast Centers are the primary users of CHPS. The CHPS community has other users, including NWS Weather Forecast Offices, research, academia, and water resource agencies.

The community users access the same interface, with editing privileges determined by the host RFC, and interact remotely with RFC forecasters.

**RFCs** - Forecasters at River Forecast Centers are the primary CHPS users. Forecasters have direct access to the system to run forecast models. The model output is used in flood forecasts at WFOs, Flash Flood Guidance (FFG), and supplemental forecast products, such as water supply forecasts. Forecasters run models at least daily.

**Water Resource Agencies** - Users at water resource agencies use CHPS to model water supply and water quality. Other uses include using the model output to schedule power generation or for research. Some agencies have their own system, and others access an NWS system.

**Research** - Academic and research users of CHPS generally access the system remotely. Uses for CHPS include research of water quality and quantity issues. Some users develop new river models and use CHPS in Stand Alone mode to test the results.

**WFOs** - Users at Weather Forecast Offices access an RFC's CHPS to provide input and feedback on the forecast. Use of CHPS is typically event-driven. For example, WFO personnel can provide input to RFC forecasts prior to a heavy precipitation event. Users have access through a Virtual Network Computing (VNC) connection.

## 1.3 CHPS SYSTEM REVIEW

Take a few minutes to review some the CHPS components necessary for beginning the forecast process.

Recall from Introduction to CHPS, the system is comprised of three physical servers, each with three virtualized servers.

These servers carry out forecast tasks, build the user interface, databases, a suite of software, and configuration files. Let's take a look at the system, beginning with the user interface.

**Interface** - You have the choice of logging into the Interactive Forecast Display (IFD) in the Operator Client (OC) (operational version of CHPS) or Stand Alone (SA) (test bed version of CHPS) mode.

The SA instance of CHPS is ideal for practicing and exploring. The SA does not have database connectivity, so forecasts cannot be saved or transmitted.

You must log into the Master Controller (a collection of processes, running on a server, that monitor and distribute forecasting tasks) in order to create forecast products!

**Servers** - When logging into CHPS in OC mode, you connect to the Master Controller (MC), one of the three virtual servers in a CHPS REP. The MC delegates tasks to the other CHPS virtual servers. Other servers run tasks and store data.

Each CHPS REP has three virtual servers:

- **REP1/Primary** (CHPS 1/2/3) – routinely carries out forecast tasks
- **REP2/Backup** (CHPS 4/5/6) – performs forecast tasks in the event REP1 failure
- **REP3/Tertiary** (CHPS 7/8/9) - typically used as a development server, with specific tasks varying by RFC

**Software** - CHPS uses commercial, off the shelf software to build interfaces and power tools to help with forecasting and troubleshooting tasks.

**Configuration Files** - Configuration files govern the appearance of CHPS and tell the system how to store data and in what format. For example, configuration files determine what maps are available as overlays and the color of the features on the map.

**Attention!** If any of these terms are unfamiliar, take a few minutes to review the prerequisite course, [Introduction to CHPS](#).

## 1.4 LAUNCHING CHPS

The first step in creating a forecast using CHPS is launching the application.

You can launch CHPS using one of two methods – from the command line or an application launcher. Both methods require you to be logged into AWIPS.

**Note:** The steps in launching the application menu may vary, depending on which version of AWIPS software your offices uses.

Using the Command Line	Using the Application Menu
<p>Use the following steps to launch CHPS from the command line:</p> <ol style="list-style-type: none"><li>1. Open an AWIPS terminal window.</li><li>2. Navigate to the user directory housing your OC instance. In the example below, the user is "fews". <b>cd /awips/chps_share/oc/fews</b></li><li>3. Type the command to start CHPS. Replace ntcc with your RFC's identifier. <b>./bin/fews.sh ntcc_oc&amp;</b></li></ol> <p>The commands may vary, depending on your office's directory structure and naming convention. Ask your CHPS System Manager if you need help logging in using the command line.</p>	<p>This method takes just a couple of clicks to log into CHPS!</p> <ol style="list-style-type: none"><li>1. Left click on the AWIPS background and select <b>AWIPS start-up menu</b>.</li><li>2. Scroll to the start application. In this example, it is called <b>abrfc_CHPS(localapp)</b>.</li></ol> <p>You should still know how to log in using the command line in case the local_apps menu at your office is overwritten.</p>

Take a few minutes to practice both techniques for launching CHPS before moving on to the next page.

### 1.4.1 LOGIN OPTIONS

When the CHPS Interactive Forecast Display (IFD) opens, a dialog box, similar to the one on the right, opens.

The first step is selecting a Master Controller from the **Select a Master Controller** portion of the GUI.

In most cases, click the primary MC, denoted as **KRFMC08** on this image. If the office is using the backup servers for operations, you would log into the secondary MC.

Next, choose a **synchronization profile** from one of the options in the Select a synchronization section.

Your choices are:

**Full** - obtains all of the data needed for a forecast and is the system default

**Minimal** - keeps only one day of logs vs. two for the others

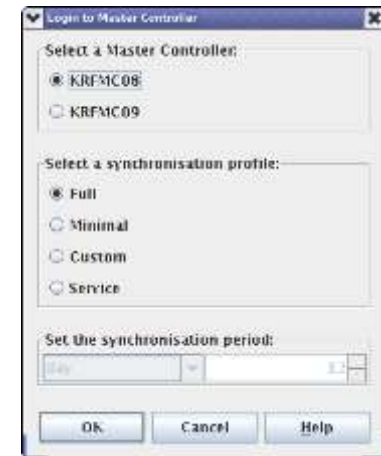
**Custom** - provides more days' worth of data (10 to 20 days is typical) and/or warm states. Offices use this when rebuilding the local data store. This adds to the initial synching time.

**Note:** the "synchronization period" section of the GUI is greyed out on the image at right.

If you selected the Custom profile, this option would be available.

When all of the settings are correct, click OK to log into a Master Controller so you can access system data.

Expect the process to take nearly 30 minutes before CHPS is ready to use, especially if you have been out of the office for several days.



## 1.4.2 SYNCHING

When you start CHPS, look for information at the bottom of the startup screen.

A box on the **Status Indicator**, shown in green on this image, indicates if the software and configuration files are loading normally.

While it synchronizes, the box at the bottom of the IFD goes from red (not logged in) to magenta (synchronizing), to green (synched).



The most current forecast for all groups downloads when you open an Operator Client instance. The time required to download the data varies, depending on how much data is downloaded.

The most current forecast for all groups download when you open an Operator Client instance. When the application starts, preprocessing also starts. Preprocessing tasks, which vary by office, include standardizing data such as merging time series with different time steps and stage-discharge conversions.

**Attention!** Make sure Rolling Barrel completes before trying to edit in the IFD, or you will get Firebird errors.

Use the following job sheet to help you log into CHPS. If you would like to start CHPS from the application menu, pass the second job sheet along to your ITO/ESA.

**Job Sheets:** [Opening CHPS](#) | [Creating a LocalApp Menu Item to Open CHPS](#)

## 1.5 INTERFACE

[Introduction to CHPS](#) gave you background on the history of the transition to this system, the hardware, and software. Now it is time to use CHPS to create a forecast!

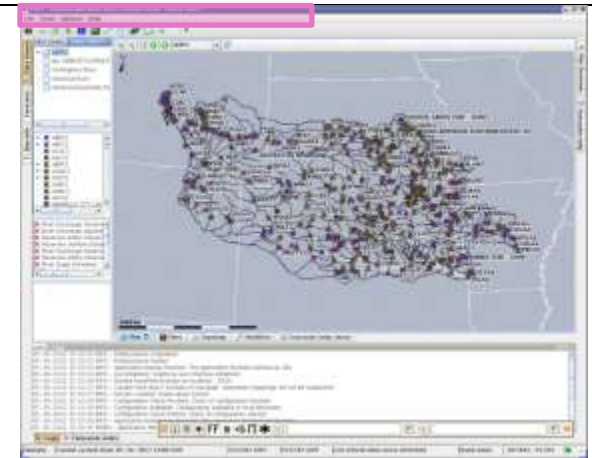
### The Interactive Forecast Display

You can use the IFD as a “first look” to compare forecast and observed data, modify data as needed, and to run and approve forecasts.

Quickly access displays and tools from the drop down menu, button bar, panels, tabs, and the status bar.

#### Drop Down Menu

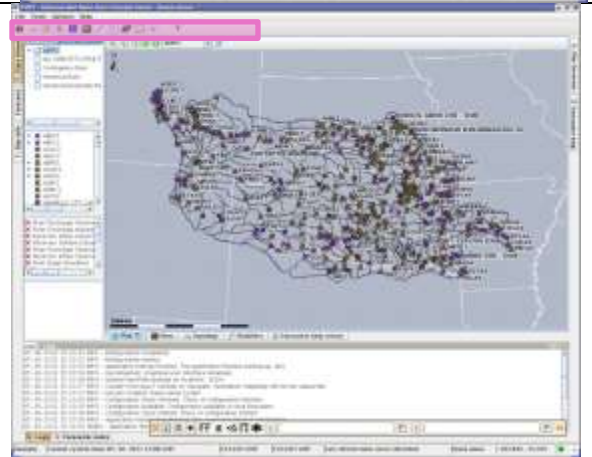
The **Drop Down Menu** is a list of available functions, tools, and options for using the IFD. The **Drop Down Menu** is highlighted in magenta.



#### Button Bar

The **Button Bar** is a row of clickable icons for quick access to frequently used tabs and tasks.

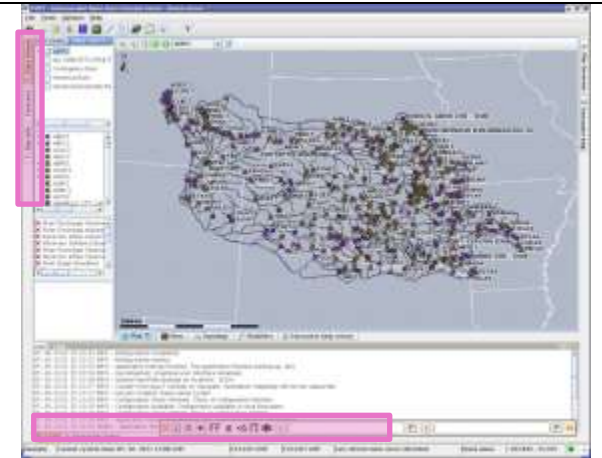
The **Button Bar** is highlighted in magenta.



## Panels

**Panels** provide a minimized view of data menus and tools.

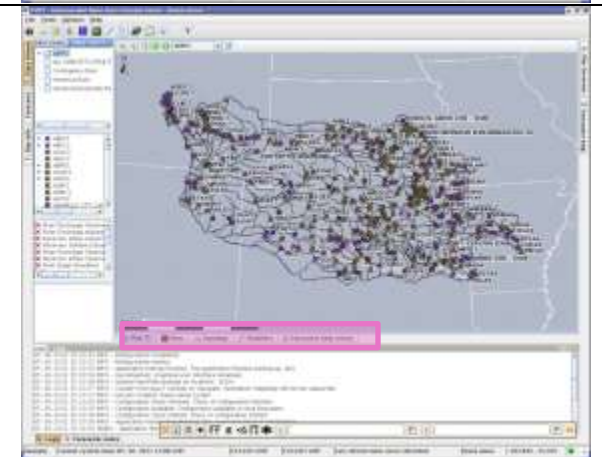
The **panels** are highlighted in magenta.



## Tabs

**Tabs** are a minimized view of data displays and editing tools

The **tabs** are highlighted in magenta.

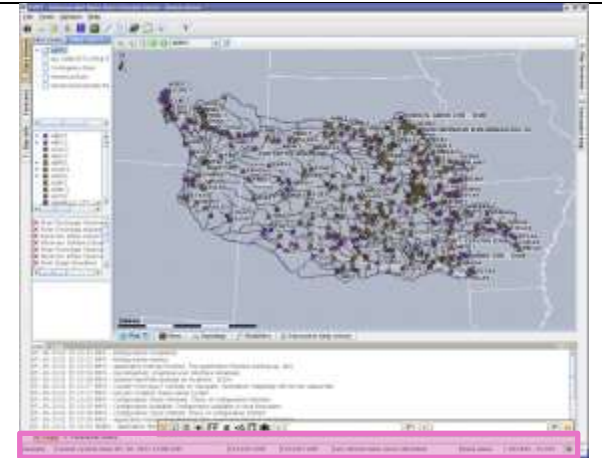




## Status Bar

The **Status Bar** contains information on the CHPS user, system time, and database connectivity status.

The **Status Bar** is highlighted in magenta.



**Explore!** This course only covers items used during the forecast process. The menu options change, depending on what panel you are on, or if you are in view or edit mode. Take time to explore the items on the Tools menu and the button bar on your own.

## 1.6 IFD PANELS AND TABS

The tabs and panels on the CHPS IFD will help you modify data and efficiently create forecasts.

<b>IFD Tabs and Panels</b>
This presentation provides an explanation of the IFD tabs and panels commonly used in the forecast process.
<b>Note:</b> The Configuration Focal Point at your office may have configured different IFD panels and tabs to appear by default.
Before we begin discussing specific tabs and panels, let's mention the numbers on the panels. <b>Note:</b> the image in the middle of the screen is a larger view of the left side Panel.
The numbers on the panels correspond to keyboard shortcuts.
For instance, if you press <b>Alt+8</b> on the keyboard, the Forecaster help panel opens.
Now we will divide the interface into four parts and explore each.
<b>Forecasts:</b> <b>Forecasts</b> is the primary panel for making and reviewing forecasts. This provides a list of the available forecast groups and forecast points. Selecting a forecast point runs the forecast point and any upstream locations.
<b>Data Viewer:</b> Determine what data sets are available to review in the <b>Data Viewer</b> . This panel contains several boxes. Choose a basin from the top one, a location from the next box down, and finally, select a parameter to plot. Systematically click through the boxes on the display to narrow down the choices for you.
<b>Plot Overview:</b> The <b>Plot Overview</b> is minimized by default on the interface. The interface uses a lot of space, but it provides a view of all of the data and forecast plots available at a site. These are supplemental plots supporting the forecast process. Click on a thumbnail to toggle into the main plot window.
<b>Map:</b> The <b>Map</b> tab provides a general overview of conditions. Points are color-coded based on flow conditions. During high flows, the river point coding is by flood category (moderate, major, or record). The Map display is typically zoomed to the RFC extent.
<b>Plots:</b> The <b>Plots</b> tab displays observed and forecast hydrograph plots. Change display characteristics, enable editing, and edit data in this tab. You have several data editing options, such as clicking and dragging points on the graph, editing in a table view, and by interpolating between points using either a linear or quadratic interpolation function.
<b>Topology:</b> The <b>Topology</b> tab provides a schematic of the river basin. This is a useful reference to see the connectivity between river sub basins but has limited utility for forecast operations. Not seeing any of the nodes when you click the Topology tab? Use the scrollbars – the site may have a large number of segments.

<b>Modifiers:</b> Make changes to the model parameters using the <b>Modifiers</b> tab.
<b>Forecaster help:</b> Use the <b>Forecaster help viewer</b> in conjunction with Document Viewer to display a variety of text and graphic documents associated with the forecast points.
<b>Logs:</b> Look on the <b>Logs</b> panel for information on the health of CHPS and the status of tasks and workflows. The level of detail for messages in this window is configurable. Ask the CHPS Configuration Focal Point if you want more or less detail in this panel.
<b>Run info:</b> The <b>Run info</b> panel provides general information about the last run made for a particular forecast group or point. This panel is minimized by default.
<b>Forecaster notes:</b> Use the <b>Forecaster notes</b> panel to put information passed between forecasters. Use this at the end of the “edit” step if you changed anything an oncoming shift needs to know about or to remind yourself of changes.

## 1.7 IFD CUSTOMIZATION

Make the CHPS workspace work for **you!**

**Default Layout** - The previous page explored the default CHPS IFD layout. Your IFD may be different, because offices have the option of creating a new, office-wide layout. The CHPS Configuration Focal Point at your office manages a set of CHPS configuration files. These files determine the default panels, tabs, and layout of the IFD.

**Custom Layout** - Consider rearranging the panels in your IFD to make forecasting more efficient for you. Explore the **Tools** menu to see if there are other panels you want to add to your customized layout. **Warning!** Custom layouts created in the Stand Alone instance are not available in the Operator Client.

**Rearranging the IFD** - Panels must be undocked prior to moving. Undock panels by clicking on the “undock” icon in the frame of the panel. Drag and drop the panels to other positions. Dock panels by clicking on the icon next to the “undock” icon (outlined in **orange** on the image).



Ask the AWIPS System Administrator to configure your workstation for a “spanning display”, also known as the “triple view”. In this AWIPS setting, the screens act as one, allowing the user to drag panels onto different screens.

**Note:** Although the time series graphs have an option for displaying text, backgrounds, and time series elements in user-selected colors, you cannot save those preferences for another IFD session.

Use the following job sheet to make sure you have the layout saved the way **you** want it!

**Job Sheet:** [Saving a Custom Display Layout](#)

## 1.8 RESOURCES

Do you have questions or want additional information? Connect with the CHPS community!

The following resources contain additional information about CHPS and CHPS-related issues.

**Note:** Some online resources require a login.

### Online Resources

The [RFC Support page](#) contains information on CHPS, user's manuals and documentation, and other resources.

The [Deltares Wiki](#) is the host site for Deltares training, documentation, and manuals. **Note:** You will need to ask the DOH at your office for the login information.

The [river model acronym](#) list spells out some of the abbreviations used in hydrologic modeling.

The [CHPS glossary](#) defines some of the terms used in the CHPS. Contact Teresa if you have suggestions for either the list of acronyms or the glossary.

### Additional Resources

The people who make up the CHPS community are an important resource, too!  
Try out [NWSSChat](#).

Join the discussion! Subscribe to [CHPS and hydrology forums on the NWS Listserv](#) (login required).

Talk to other CHPS users when you have questions, or feel free to e-mail me at [teresa.murphy@noaa.gov](mailto:teresa.murphy@noaa.gov).

**Caution!** The Help document (accessed by clicking the “?” icon from the IFD) is approximately five years old and contains information on the European version of the system.

## LESSON 2 DAILY FORECASTS

Being able to navigate the CHPS IFD confidently allows you to concentrate on hydrologic conditions and issuance of daily forecasts.

This lesson provides the basic procedure to creating daily forecast products with CHPS.

By the end of this lesson, you should be able to:

- List the steps for creating a forecast.
- Use several methods of analyzing data.
- List uses for the Plots tab.
- List several limitation of editing data in CHPS.
- Use different editing methods.
- Import updated ratings.
- Create modifiers.
- Verify transmission of the forecast.

### 2.2 BASIC PROCEDURE

Lesson 1 showed you how to open the CHPS IFD. Now the forecasting work begins! Creating a daily forecast uses this basic process:

1. Open the CHPS IFD and connect to a MC
2. Analyze data
3. Edit data
4. Create modifiers
5. Run and approve the forecast
6. Verify the forecast ran
7. Disconnect from the MC and close CHPS

Lesson 1 showed you how to log into CHPS (step one on the graphic). Lesson 2 describes the remaining steps in the process in more detail.

## 2.3 ANALYSIS METHODS

Analyzing hydrologic data is an easy task thanks to tools in the CHPS IFD. Forecasters use displays and tables to analyze data. You can open more than one of the Spatial Display and Plots tabs to assist you in the analysis task.

**Spatial Data** - The Spatial Data plot gives an RFC-wide view of parameters rather than on a segment-by-segment basis. This tab does not appear by default, so select this option from the Tools drop down menu. **Note:** The Spatial Display is view-only.

You can locate sites with suspect data or model parameters, but must use the editing tools in the Plots or Modifiers tabs. Sections 2.6 and 2.8 explore those options.

You can place your cursor over the display to get point values and the location name (typically configured for “value@location”) or you can click the “Labels” icon to overlay values.

**Data Viewer** - Data Viewer is a panel listing the data available for each location. This panel contains several boxes to help you systematically narrow down display choices.

For example, choose a basin from the top box, a location from the next one down, and finally, select a parameter to plot.

**Workflow Navigator** - The Workflow Navigator tab allows you to a glimpse of how CHPS operates. You can use this tool to gain a better understanding of the steps involved in processing data for each segment and which data sources are being used. Additionally, this tab allows you to view model output.

**Plots** - The Plots tab displays time series data. You can click through forecast groups one segment at a time in this interface. This tab includes a unique button bar. You can place your cursor over a button for a moment to view its function. You will learn more about this tab on the next page.

## 2.4 PLOTS TAB

Let's take a moment to examine the Plots Tab in greater detail since it offers both analysis and editing functions.

<b>A Closer Look at the Plots Tab</b>
<b>A Note About Button Labels and Button Status</b> Before exploring the functions of different buttons, here is some more information about labeling and status. <b>Button Label:</b> Each button has a label. Place your cursor over a button for a moment to display the button's name. <b>Button Status:</b> Many of these buttons have a toggle indicator. Buttons displayed in a light blue shade are currently active. Gray buttons are inactive buttons.
<b>Shortcuts</b> The <b>Shortcuts</b> button displays available data types for the location in list form.
<b>Table</b> The <b>Table</b> button opens a tabular view of the selected physical element in the time series. The pull down menu with this icon provides options to add comments, to indicate data was validated, and by whom.
<b>Chart</b> The <b>Chart</b> button gives options for scaling the data in the Plots Tab. The choices include - show all thresholds, relevant thresholds, or no thresholds.
<b>Rotate Splitter</b> The <b>Rotate splitter</b> button changes the orientation of the time series. This option is helpful if there are overlapping legends on the time series plot. <b>Hint:</b> When you are working in CHPS, click this icon and select the "horiz" option.
<b>Zoom</b> The first three buttons (from left to right) governing <b>Zoom</b> functions zoom the display in and out, and to the default extent. The next two (green arrows) zoom in and out. The buttons in this group move the view period back to the beginning of the view period, halfway back, halfway forward, and forward to the beginning of the view period. The last button in this group zooms out to show entire time series.
<b>Local Datum</b> The <b>Local datum</b> button displays the datum in use for the location.
<b>Display Time</b> The <b>Display time</b> button offers an option to view or change the date and time of the time series display.
<b>Copy and Paste</b> The <b>Copy</b> and <b>Paste</b> options work similarly to other software. Paste does offer the option of pasting a time series from previous selections (drop down from this menu).
<b>Save Changes and Run</b> The <b>Save changes and run</b> button redraws the time series using the edits you make to the currently displayed hydrograph.
<b>Undo Modifications</b>



<p>The <b>Undo modifications</b> button provides the option of undoing edits. <b>Warning! Undo</b> works several times, but not after clicking <b>Rerun</b> or <b>Save changes and run</b>.</p>
<p><b>Save Changes</b> The <b>Save changes</b> button saves the edits, but does not rerun the segment like <b>Save changes and run</b> does.</p>
<p><b>Edits</b> The <b>Edit the time series</b> button has four graphical editing options. See Lesson 2.6 for more information on each option.</p>
<p><b>Threshold Icons</b> The <b>Show threshold icons</b> button displays color-coded icons associated with hydrologic thresholds (only for data listed in <b>Shortcuts</b>).</p>
<p><b>Print</b> The <b>Print graph</b> button prints the selected time series graph.</p>
<p><b>Save</b> The <b>Save</b> button saves the graph to a user-selectable directory in AWIPS.</p>
<p><b>Show Scroller</b> The <b>Show Scroller</b> button displays a smaller version of the current time series graph so you can scroll back to view older data.</p>
<p><b>Search</b> The <b>Search</b> button displays up to five previous forecasts. <b>Hint:</b> use this to see forecast trends.</p>
<p><b>Mark Invisible</b> The <b>Mark series invisible...</b> button toggles physical elements off and on the time series plot.</p>

Take a few minutes to explore the button bar on the Plots Tab before moving to the next page.

## 2.5 DATA EDITING LIMITATIONS

At times, a bad data value might slip through your usual quality control procedures. Ideally, you would fix all errors before starting CHPS; however, the Plots tab does provide methods for correcting non-representative data or adding new data. You **must** be aware of the limitations.

**Data Management Limitations** - Edits made in CHPS will change your local datastore. These changes are not available for others in your office until you submit the forecast run. Your edits will not be available outside your office.

Ideally, you would complete your data quality control **and** fix all errors before starting CHPS. This way, the corrections get into **both** CHPS and the archive database.

Always work with the Development and Operations Hydrologist (DOH) at your office to make sure your data editing method conforms with office policy.

**Data Type Limitations** - You can only edit forcings and hydrologic parameters (stage, pool elevation, etc.) in the Plots tab.

You must edit the contents of the baseflow, for example, LZTWC (Lower Zone Tension Water) and UZTWC (Upper Zone Tension Water), using modifiers. See the next lesson for more information on modifiers.

## 2.6 DATA EDITING METHODS

The **Plots** tab offers two options: graphical and tabular editing. You can use either of these methods when you are compiling input to the forecast.

**Note:** The changes you make in this interface will not be saved or transmitted outside the RFC.

**Graphical Editing** - Options in the button bar become available after you click a physical element on the time series legend.

**Graphical Editing Options** - The options in the Graphic Editing drop down are described below.

- **Adjust by clicking** (default) on points on the time series plot where you want values (stage, flow, precipitation, etc.).
- **Move points** allow you to edit points in between the first and last ones selected. You cannot work on the last point you select!
- **Linear interpolate** provides a smooth transition between points.
- **Set missing between points** is a good option if you know the gage was out during certain dates.
- **Quadratic interpolate** is similar to the "linear" option, but this option performs a quadratic rather than linear interpolation.

**Hint:** If you like the hydrograph you "drew in", you can click the copy icon and paste the hydrograph elsewhere - even a different segment!

**Tabular Editing** - You must click the **Chart** button in the button bar to access the data table. The table is **view only** unless a physical element is selected on the time series legend.

**Tabular Editing Options** - Once the data table is open and in edit mode, you can edit the table by clicking the column heading to make it active. You can copy and paste information, add it using the keypad, or select cells to interpolate between points.

The values in the table are color-coded:

- **black** – original data
- **blue** – interpolated data
- **magenta** – data added via graphical editing
- **purple** – data added during tabular editing session (**Note:** Subtle difference between the purple and blue values)

Use the following job sheets to edit erroneous data in a data table or graphically.

**Job Sheets:** [Editing Data Graphically](#) | [Editing Data in the Table](#)

## 2.7 IMPORT RATINGS

You analyzed and edited the data, but the forecast is still not tracking correctly. You should take time to check the ratings.

**Purpose** - Ratings are the stage-discharge relation of a gage site. These relations change, and using the wrong one can cause you to issue inaccurate forecasts.

You **must** update the ratings if either of the following is occurring:

- you notice the models are producing unrepresentative output
- the stage values are inconsistent with those on the gage owner's web pages

Your office probably uses a program to obtain the new ratings from gage owners. The CHPS Configuration Focal Point at your office set up a workflow to pull in those ratings from a predetermined CHPS directory.

**Procedure** - Some offices allow all of the forecasters to update ratings. Other offices prefer only a few people update them. Check the policy at your office before updating ratings! If you have permission, select the Import Ratings workflow from the Manual Forecast tab to pull ratings from a directory in AWIPS or one of the CHPS servers. You can import more than one rating at a time. Some offices have programs to import ratings automatically into AWIPS.

**Considerations** - The update ratings workflow takes less than a minute to run. If it does take more than a few minutes, check the Administration Interface (see Lesson 4.4 for more information about the Administration Interface) to see if the workflow is still going. Another option is looking at the Import tab in the System Monitor to see if the workflow was successful and how many files imported.

## 2.8 CREATE MODIFIERS

Another component of accurate forecasts is up-to-date model states and representative physical elements. Create modifiers to adjust the model.

**Uses and Advantages** - Why do you create mods, rather than edit the data in the Plots window?

Modifiers adjust physical elements (stage, precipitation, etc.) over a longer term than editing in the Plots window.

You can change the water contents of the model's "buckets" in modifiers, but cannot by editing the time series plots.

**Example:** You discover a 100 cubic feet per second (cfs) discrepancy between the latest stage observation and the beginning of the model simulation.

Your office is using the SAC-SMA model, so use a CHNGBLEND (change blend) of "4" to interpolate over four forecast periods (typically 6 hours each) to spread out the 100 cfs difference a day.

**Color Coding** - Synchronizing modifiers saves them in the system and allows forecasters to share them. Modifiers are color-coded based on their status.

- **Green** – synchronized
- **Purple** – not synchronized
- **Grey** – expired (**Note:** the two modifiers in the image above are expired)

The modifiers you create remain in the list until deleted by a Rolling Barrel task, defined by the CHPS System Manager at your office.

Editing graphic and tabular data in Modifiers is the same procedure as it is in Plots. The only difference is you are limited to the edit by clicking option.

Practice making modifiers using the following job sheet as a guide. Remember to delete any practice modifiers you make!

**Job Sheet:** [Creating Modifiers](#)

**References:** [Examples and Applications of SAC-SMA Modifiers](#), [Examples and Applications of API Modifiers](#)

## 2.9 SAVE AND TRANSMIT THE FORECAST

Make sure you follow the procedure for saving and transmitting a forecast to avoid losing your work!

**Run the Forecast and View the Status** - After reviewing the data in each segment of the forecast group (and making necessary changes), you must run the forecast in order to save your work.

Use the following steps to run the forecast:

1. Select your forecast group folder in the **Forecasts** panel.
2. Click the **Run approved forecast** button.

At this point, the forecast group folder icon becomes an hourglass and then it will change to a green arrow while CHPS is processing your forecast.

Processing time varies, depending on how large the forecast group is and how many modifiers were made. Eventually, a green check mark will appear beside the forecast group folder.

**Warning!** Files are not locked while forecasting. You could overwrite someone's forecast if you went into his or her forecast group by mistake!

CHPS provides an option for viewing your forecast status. The Forecast Management tab lists all forecasts sent to the Central Database. Forecasts are marked with color-coded status icons.

**Format and Transmit Forecasts** - The previous steps have not formatted or transmitted your forecasts. You must still format and transmit. Offices use a variety of software applications to transmit forecasts. Work with your DOH to determine the method used at your office. After you have completed formatting and transmitting your forecast, look up the product in AWIPS to ensure it made it to other NWS users. Also, check your office's web page to see if the forecast updated and is available for external users.

Use the following job sheet as a guide when creating a forecast.

**Job Sheet:** [Creating a Forecast](#)

## LESSON 3 SUPPLEMENTAL FORECAST PRODUCTS

Your office probably sends out supplemental forecasts in addition to daily forecasts using a **similar** process. This lesson describes the procedural and content differences.

This lesson describes how to create supplemental forecast products using the CHPS IFD.

By the end of this lesson, you should be able to:

- List several supplemental forecasts.
- List several users of supplemental forecasts.
- List any procedural differences in creating these forecasts.

## 3.2 SUPPLEMENTAL FORECAST PRODUCTS

Sometimes your office may issue additional information to users. The following lesson describes of the differences between a daily forecast and these supplemental products.

Supplemental products include:

- contingency,
- long range,
- water supply,
- and ensemble forecasts.

**Water Cooler Break!** Take a few minutes and find out what kinds of forecasts (in addition to daily forecasts) your office produces. As a first step, see what products are available on your office's web page.

**Differences from Daily Forecasts** - Many of the differences in the procedures used to run supplemental forecasts occur in configuration of CHPS and external software. For instance, a special software setup is required in some of the software used to send forecasts.

**Considerations** - Some of these supplemental forecasts require additional information.

The CHPS Configuration Focal Point should have set up the workflows to pull in the data. Be sure and let the focal point know if you do not see the additional data needed for the forecast!

You may also need to change the dates. The **Date** radio button, **Calendar** icon, up and down arrows, or the drop down menu can be used to select a forecast period.

Update the cardinal time if the interface has been open for a while so the system ingests the latest data. Since you typically run the supplemental forecasts **after** the daily forecasts, the system may not have the latest data.

Use the following job sheet to create supplemental forecast products.

**Job Sheet:** [Creating Supplemental Forecast Products](#)



### 3.3 CONTINGENCY FORECASTS

CHPS has methods of evaluating the forecast possibilities and issuing contingency forecasts. These methods can be useful when you must consider a range of potential outcomes.

The two methods we will discuss here are creating **contingency forecasts**, and using **what-if scenarios**.

**Contingency Forecasts** - The first method uses contingency workflows to provide information to WFOs or external partners, such as emergency managers, on how the river would respond **if** another event occurred.

In other words, the forecast is contingent on another event (typically precipitation or snowmelt) occurring.

**Method** - River Forecast Centers usually use output from quantitative precipitation forecast (QPF) ensembles as input to contingency forecasts. The forecaster selects the duration (0 to 120 hours) to make a contingency forecast. This option **only** works if the CHPS Configuration Focal Points sets up contingency workflows to populate the QPF grids!

**What-If Scenarios** - Another option for scenario-based models run is called the **What-If Scenario**, an editor in CHPS. This tool can produce forecast time series for precipitation events or potential dam breaks.

**Example:** What happens to the flow time series when a user adds two inches of precipitation to a basin?

**Types of What-If Scenarios** - You can create one of four types of scenarios - transformation, user defined, module dataset, and module parameters. Be prudent about which scenarios you save. Editing and deleting scenarios is difficult and not all users have permission to do so.

**Hint:** Export scenarios for use later, or import scenarios you think are analogs to the forecast event. Keep in mind, this option does import or export ALL of the scenarios. You may end up with a lot of scenarios!

**Warning!** Toggle Delete permanently deletes What-If scenarios from the system! These scenarios are marked with (D) when the display is still open.

Before moving on to the next page, use the following job sheet to practice creating, using, and managing What-If Scenarios.

**Job Sheet:** [Using What-If Scenarios](#)

**Reference:** [What-If Scenario Display Configuration \(Deltares wiki\)](#)

## 3.4 WATER SUPPLY

Water supply forecasts are a valuable planning tool for many users of RFC products. Make sure you can create the products. The procedure for creating the supplemental forecast products is similar to a five-day forecast. Here is what makes water supply forecasts different.

### **What are Water Supply Forecasts?**

Water supply forecasts are a prediction of natural (no upstream influences) flow volumes during a specified season, typically spring and summer. The forecasts contain a range of values to reflect forecast uncertainty.

### **Users**

The users view water supply forecasts as a valuable planning tool. User types include:

- agriculture
- recreation
- wildlife management
- reservoir management
- power generation

### **Water Supply Forecast Differences**

**Data** – Water Supply forecasts require at least 20 year of historical data to run

**Model output** – The model output is a range of possible values, each with a specific probability of occurrence.

**Snowpack measurements** – Another key data source for water supply is snowpack measurements, which is usually not as important for daily forecasts.

**Water supply workflows** – Select a special water supply workflow. The configuration defaults to a daily forecast.

Keep in mind, both daily and water supply forecasts use other variables such as precipitation, antecedent soil conditions, groundwater, and temperature.

## 3.5 LONG RANGE

Long-range forecasts provide important hydrologic information for many commercial industries, and you are the forefront of the production of these forecast.

### **What are Long-Range Forecasts?**

Long-range forecasts are deterministic forecasts of stage or flow for longer than the typical five-day forecast period. **Example:** MBRFC issues a 28-day forecast for the Missouri River.

### **Users**

The navigation industry is the primary user of long-range forecasts. Other users include recreation and agriculture.

### **Differences from Daily Forecasts**

You must set the relative view period (time window of the displayed data) of the time series to 30 days and ensure reservoir outflows are reasonable for the entire forecast period.

Many users prefer the worst-case scenario for river flows, so the model does not use additional days of QPF. The 28-day run does include projected snowmelt runoff.

CHPS Configuration Focal Points have the workflows configured to pull in data for the right amount of time. You do not need to worry about setting the dates. Instead, focus on making sure the reservoir outflows are correct.

## 3.6 ENSEMBLE

Creating probabilistic forecasts provides users with another type of guidance on river conditions.

### **What are Ensemble Forecasts?**

Ensemble forecasts are probabilistic (rather than deterministic) forecasts of river stage and flow.

The image on the right is an example of an ensemble forecast plot of stage and flow.

### **Users**

The primary users of ensemble forecasts are agriculture and power generation interests.

### **Differences from Daily Forecasts**

Ensemble runs are automatic.

You **do** need to perform a quality control and quality assurance role.

If the ensemble run fails, go to the **Manual Forecast** tab and try running the ensemble workflow again. If this does not work, find an experienced forecaster and report the problem.

## LESSON 4 TROUBLESHOOTING

A basic understanding of troubleshooting techniques helps you narrow down possible issues, leading to a quicker resolution of CHPS problems.

This lesson describes how to troubleshoot CHPS to fix minor issues or submit an information-filled trouble ticket.

By the end of this lesson, you should be able to:

- Follow basic troubleshooting procedures.
- List several CHPS troubleshooting tools.
- Follow CHPS-specific troubleshooting steps.
- List the steps in creating a FogBugz ticket.

## 4.2 BASIC TROUBLESHOOTING

Troubleshooting is a **logical** and **systematic** search for the source of a problem. Following the steps helps ensure you approach all problems with clear logic, eliminating more common errors before beginning more complex investigations.

A timely diagnosis and a thorough write up of the issues generally leads to a quicker resolution of the problem!

**Note:** In most cases, you will not be asked to resolve any of these problems by yourself, but knowing about the different types of errors will help with the troubleshooting process.

**Work from Common to Rare Possibilities** - Identify and isolate the issue as a first step. Start with the most probable and common issue, and progress to the least probable and uncommon issue. Consider the chart on the right. If you have not seen this type of behavior previously, you should move from left to right and then top to bottom when searching for errors (User, Program, Computer, and System).

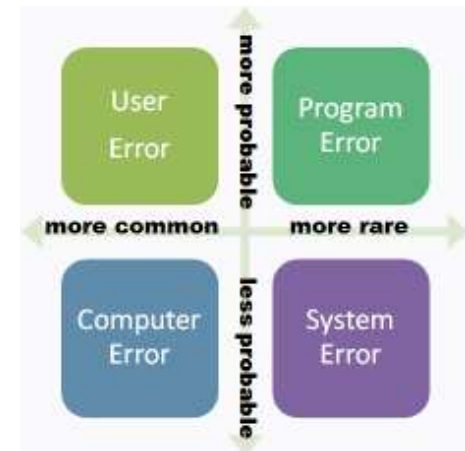
**Types of Errors** - You may need to troubleshoot several types of errors - **user**, **computer**, **system**, and **program** errors. Here are some tips for handling the various types of errors.

**User** errors are the most common and probable issues. User errors are typically incorrectly typing commands or not clicking the right part of a menu.

**Computer** errors typically occur on only one workstation. Ask one of the other forecasters if they are having the same problem. If all others are working correctly, the problem is likely related to the machine.

**System** errors are more widespread than user and computer errors, occurring on more than one workstation.

**Program** errors tend to occur after software upgrades. Like most software, CHPS is updated periodically.



## 4.3 TROUBLESHOOTING STEPS

Lesson 4.2 introduced you to basic troubleshooting concepts. Now let's look at the steps in the troubleshooting process.

Step 1 Avoid jumping to conclusions. Ask questions to identify or describe a problem:

- What is the problem affecting?
- What are the symptoms or indicators?
- Can the problem be recreated?
- Is it a known issue?

Step 2 Use the following question to isolate the issue:

- When did the problem begin?
- Were there any changes to the system recently?
- Do you see any warning or error messages?
- Do the log files indicate any specific errors?

Step 3 After identifying an issue, continue to use a logical and systematic approach to diagnose the situation.

- Look up the issue in the help menu.
- Use information from this course.
- Research for known issues on RFC listservs and FogBugz.
- Discuss the issue with your colleagues.

Step 4 After you determine a course of action:

- Document the steps you take (optional, but very helpful).
- Restart the application, if needed.
- Share what you learned with others.

## 4.4 CHPS TROUBLESHOOTING TOOLS

Troubleshooting CHPS-specific issues is a bit easier, thanks to several built-in tools.

**Administration Interface** - provides options for viewing and working with log files. View, purge, and download logs into a user-defined directory from this interface. **Note:** You may not have login credentials for this tool. Check with the CHPS System Manager about access to the Administration Interface and information on its usage policy.

**System Monitor** - Recall from Introduction to CHPS, an interface called the **System Monitor** is available through the Interactive Forecast Display (IFD). This interface also displays log files and breaks down the components into columns. Access the status without leaving to IFD to troubleshoot why tasks fail using this tool.

**Workflow Navigator** - displays the modules and segments in a workflow. Typically, the errors uncovered by the Workflow Navigator are configuration issues. Let the CHPS Configuration Focal Point know about any problems you find!



## 4.5 CHPS TROUBLESHOOTING

Here are a few places to look when you are having specific problems with CHPS. Recall from the previous section, CHPS has built-in troubleshooting tools. Use this as a reference when performing troubleshooting. If the first item on the list does not work, continue working through the numbered items.

Best Practice: Add information about problems to Forecaster Notes. It is a way to enhance communication and pass along important information.

Problem	Application	Action
Rolling Barrel is very slow or not completing	Admin Interface	<ol style="list-style-type: none"> <li>1. Ensure the Rolling Barrel processes are staggered.</li> <li>2. See FogBugz ticket 709.</li> </ol>
Workflows are not completing	Admin Interface, Workflow Navigator	<ol style="list-style-type: none"> <li>1. Look for a log entry corresponding to the failed process (Admin Interface).</li> <li>2. Ensure the workflow is mapped (Admin Interface).</li> <li>3. Make sure the workflow is on the Workflow Navigator list.</li> <li>4. Ensure the workflow is registered in the proper configuration file.</li> </ol>
The OC or SA will not open	AWIPS terminal window	<ol style="list-style-type: none"> <li>1. Log out and log back into CHPS.</li> <li>2. Rename the current local datastore, then rebuild a fresh one.</li> </ol>
Forecast output has the wrong date	IFD, other software	<ol style="list-style-type: none"> <li>1. Did you accidentally send out the wrong forecast?</li> <li>2. Check the CHPS system time. It may be incorrect or not moved forward.</li> <li>3. Check the formatters used to create the forecasts.</li> </ol>
Data in the IFD is outdated	Database Viewer	<ol style="list-style-type: none"> <li>1. Did the forecaster advance the system time in the IFD?</li> <li>2. Check the model run time in Database Viewer.</li> </ol>
Data is missing	Database Viewer	<ol style="list-style-type: none"> <li>1. Is the site configured to display the data?</li> <li>2. Check the Database Viewer to see exactly what time series are stored in the database.</li> <li>3. Consider the possibility of an AWIPS ingest issue or a problem with the gage.</li> </ol>

## 4.6 REPORTING PROBLEMS

You located the problem in the system, checked resources for a solution, but could not find one. Now what do you do? Report the problem on [FogBugz](#).

**Note:** Before submitting a ticket, check into your office's policy. Some RFCs have one person submit all tickets.

**FogBugz** - a bug tracking system built by Fog Creek Software. You can learn more about the company at their website, [Fogcreek.com](#). FogBugz provides a platform to report problems and receive consistent feedback with headquarters and other RFCs. You can also browse the cases to see if another RFC had a similar problem.

**Best Practice:** Keep your Administration Interface open. If you encounter problems with a forecast run, it can help you construct a good, information-filled trouble ticket.

For more information on how to report a problem using FogBugz, use the instructions in the job sheet below. The FogBugz site also has links to OHD-created materials.

**Job Sheet:** [Reporting Problems on FogBugz](#)

## COURSE SUMMARY

**Lesson 1** introduced you to CHPS users, reviewed the system, and discussed the interface.

- 1 System for all users
- 2 Ways of accessing CHPS
- 3 Tasks performed by the IFD
- 4 Types of CHPS users
- 5 Ways of accessing displays and tools

**Lesson 2** showed you the steps in the basic forecast procedure.

1. Open the CHPS IFD and connect to a MC
2. Analyze data
3. Edit data
4. Create modifiers
5. Run and approve the forecast
6. Verify the forecast ran
7. Disconnect from the MC and close CHPS

**Lesson 3** provided information on supplemental forecasts and the forecast users.

**Contingency** – the forecast is contingent on an event occurring.

**Water Supply** – a prediction of natural flow volumes for a season

**Long-Range** – a deterministic forecast of stage or flow for an extended time period.

**Ensemble** – a probabilistic forecast of stage or flow.

**Lesson 4** described basic and CHPS-specific techniques. The System Monitor, Admin Interface, and Workflow Navigator are a few of the troubleshooting tools built into CHPS.

**Congratulations.** You reached the end of the course material!