

LESSON 1 GETTING STARTED

Let's get started with CHPS by logging into the Interactive Forecast Display, an interface you will use frequently to provide forecast input to the River Forecast Center.

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.
- Describe the purpose of using CHPS at a WFO.
- Open CHPS via a Virtual Network Computing (VNC) connection.
- Describe what the user sees when the interface opens.
- Briefly describe the purpose of these components.
- Save a custom Interactive Forecast Display (IFD) layout.

1.2 CHPS USERS

You learned the basics of CHPS from when you took the [Introduction to CHPS](#) course. This course will tell you how CHPS can be used as a collaboration tool.

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.

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.

1.3 CHPS USE AT THE WFO

You can access an RFC's CHPS using a Virtual Network Computing (VNC) connection.

WFOs typically connect to CHPS via an AWIPS workstation, but it is also possible using a Linux machine. You do not need to download software in order to connect using VNC.

You can use CHPS prior to and during flood events to assess impacts of precipitation and snowmelt. CHPS also has applications during low flow or drought. CHPS is always available, even if it after the RFC's hours of operation.

Scenario: Erika is a Service Hydrologist, and the snowpack in her office's Hydrologic Service Area is starting to melt during the day, but refreeze at night.

A 3 to 5 inch precipitation event is forecast for later this week with temperatures in the lower 40s, so she logs into the servicing RFC's CHPS to test several different scenarios.

Existing Tool

WFOs have an application in AWIPS, called the Site Specific Hydrologic Predictor (SSHP) to assess the impacts of precipitation on river stage. The application is not as powerful a tool, and is only for a limited number of sites. Here is a link to the [SSHP course](#) if you wish to find out more.

Action! Let the RFC know if you notice a difference between what you have for an action or flood stage and the value the RFC uses.

1.4 LAUNCHING CHPS

Coordinating with hydrologists at a River Forecast Center often occurs during a time-critical situation. Being able to log into CHPS quickly helps you get to the coordination efforts for events.

The first step in creating a forecast using CHPS is launching the application. Ask your Service Hydrologist (SH) or Hydrologic Program Manager (HPM) if you do not have the log in credentials.

Note: Only one user can be logged into each office's VNC client. Multiple offices can log into the same machine at the RFC. Be aware the system will run slower with multiple users working from the same machine at the RFC.

Start VNC Session

Enter commands in the terminal window to start the VNC session and input the IP address and login credentials. The job sheet on the next page will provide detailed instructions on this task.

Caution! If you are logging in using an AWIPS workstation, enter commands on a graphics workstation not running any other processes (such as D2D or CAVE).

Best Practice: Obtain an account for your service backup sites or offices where you provide hydrologic support.

Login and Synch Profiles

When the IFD opens, you get a GUI asking you to select a login profile for the Master Controller (MC) so you can access the data from the system.

1.4.1 LOGGING IN

When you launch the CHPS Interactive Forecast Display (IFD), 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 (**not** service backup) for operations, you would log into the secondary MC.

Some RFCs have the login screen configured to where only one Master Controller name appears in this GUI.

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

Your choices are:

- **Full** - option obtains all of the data needed for a forecast and is the system default.
- **Minimal** - option keeps only one day of logs in this profile (vs. two days for the others).
- **Custom** - option provides more days' worth of data (10 to 20 days is typical) and/or warm states. Offices use this when rebuilding the local datastore. 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.

Best Practice: If you have been out of the office for several days, expect the process to take nearly half an hour before CHPS is ready to use!



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!

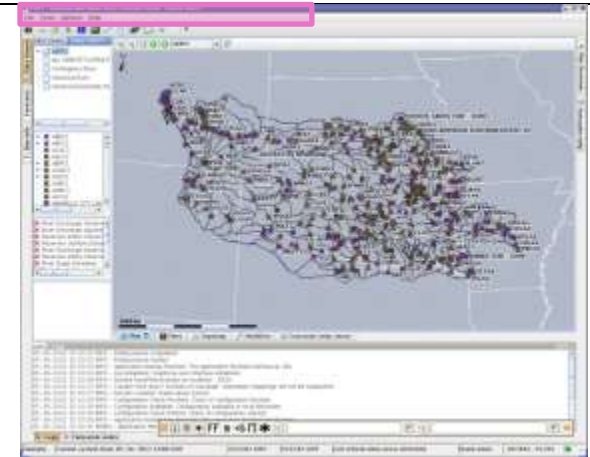
The Interactive Forecast Display

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

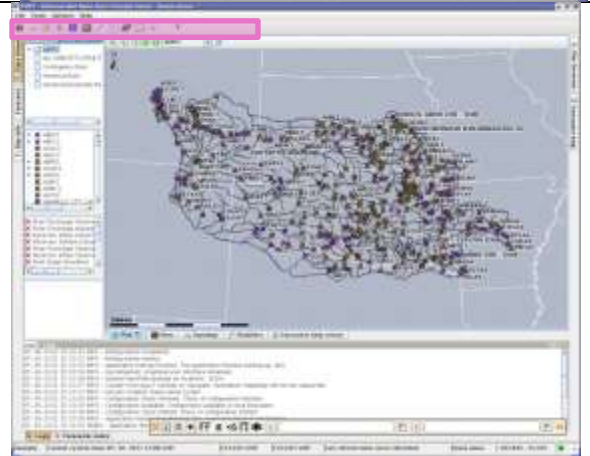
The **Drop Down Menu** is a list of available functions, tools, and options for using the IFD. The **Drop Down Menu** is highlighted in magenta.



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.

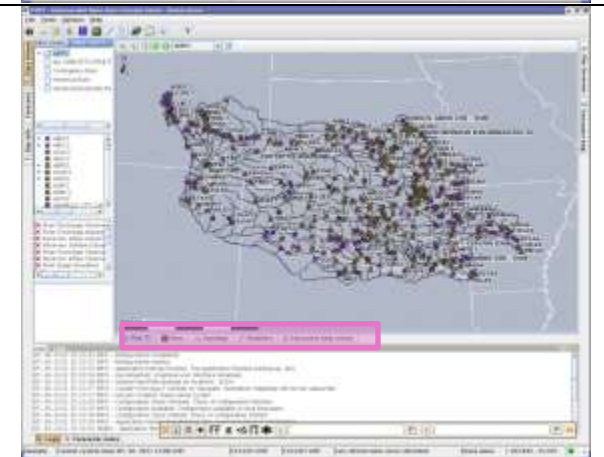
The **panels** are highlighted in magenta.



Tabs

Tabs are a minimized view of data displays and editing tools

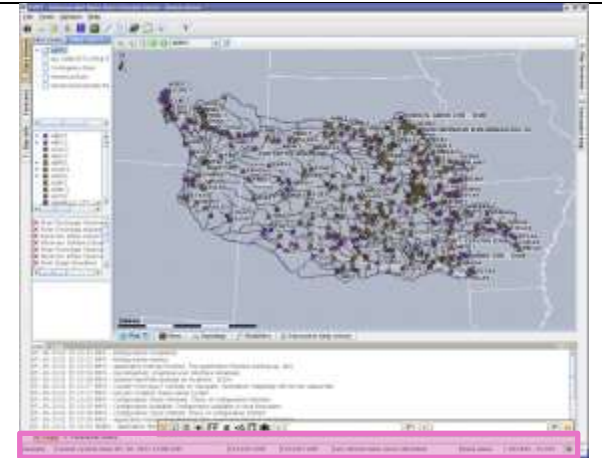
The **tabs** are highlighted in magenta.



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.

IFD Tabs and Panels
This presentation provides an explanation of the IFD tabs and panels commonly used in the forecast process.
Note: 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. Note: 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 Alt+8 on the keyboard, the Forecaster help panel opens.
Now we will divide the interface into four parts and explore each.
Forecasts: Forecasts 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.
Data Viewer: Determine what data sets are available to review in the Data Viewer . 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.
Plot Overview: The Plot Overview 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.
Map: The Map 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.
Plots: The Plots 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.
Topology: The Topology 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.

Modifiers: Make changes to the model parameters using the Modifiers tab.
Forecaster help: Use the Forecaster help viewer in conjunction with Document Viewer to display a variety of text and graphic documents associated with the forecast points.
Logs: Look on the Logs 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.
Run info: The Run info panel provides general information about the last run made for a particular forecast group or point. This panel is minimized by default.
Forecaster notes: Use the Forecaster notes 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](#)

LESSON 2 PROVIDING FORECAST INPUT

Utilizing the same forecast preparation system as your servicing River Forecast Centers will help you coordinate during adverse hydrologic events and improve services to NWS customers.

This lesson describes how to use CHPS at WFOs to provide forecast input to RFC hydrologic forecasters.

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

- List the steps in creating forecast input.
- Describe several methods of analyzing data.
- Describe different editing methods.
- Create modifiers to test forecast sensitivity.
- Provide feedback to RFCs on forecasts.
- Exit CHPS and the VNC connection.
- Identify sources of hydrologic training information.

2.2 BASIC FORECAST INPUT STEPS

The steps in creating forecast input for a hydrologic forecast is similar to writing a meteorological forecast. Here is an overview of the steps in the process.

1. Analyze data
2. Edit data
3. Create modifiers
4. Provide forecast input

The first lesson covered opening a VNC session. The following pages in this lesson cover the remaining steps 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.

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

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

Ideally, you would complete your data quality control **and** fix all errors before starting CHPS. This way, the corrections are available for products, such as the RTP, and CHPS.

Always work with your office's SH or HPM to make sure your data editing method conforms with office policy.

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

You may also need to edit the model forcings (for example, RRICNG [modifier used to adjust precipitation by directly changing the value, applying a multiplier, or applying an additive value] which can only be done by using modifiers). See Lesson 2.7 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 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](#)

2.8 PROVIDING FORECAST INPUT

Providing Forecast Input

The forecasters at the RFC need to know how you determined the forecast input.

Let the forecaster know about any edits you made to time series data.

Discuss the impact of any modifications you made. Note any mods currently valid for the location, even if they were made at the RFC. **Warning!** Do not delete any modifiers made by the RFC!

Take this opportunity to mention any other significant issues such as calls from people living near ungaged locations.

NWSChat is instant messaging interface used by the NWS to share information with external partners, particularly during warning situations. NWSChat is good for discussing forecast input and other information. Annual training is required for all NWSChat users!

Recall Erika, the Service Hydrologist, from Lesson 1. She opens an NWSChat window and lets Rodney, the RFC forecaster, know she is ready to talk about the forecast.

Erika also indicates she wants Rodney to review suggested tweaks to forcings.

12Planet is commercial chat software integrated into AWIPS. Due to its use in AWIPS, communications are restricted to NWS offices.

Google Chat is yet another option, available through the NWS e-mail interface. No training is required to use Google Chat. **Note:** You must know the name of the forecaster you wish to chat with in order to use Google Chat.

Hydrometeorological Coordination Message

- Internal NWS product
- Issued by RFCs and WFOs
- Discussion of hydrologic issues
 - For example, an RFC message indicating no evening updates are needed

Note: Click the link in the References to see HCM examples.

It is easy to miss nuances in written communication. When in doubt, pick up the phone and discuss the issue.

You reached the end of this presentation. Please use your regular course navigation to continue.

Job Sheet: [Creating Forecast Input](#)

References: [HCM Examples](#); [NWSChat Annual Training](#); [NWS Directive on WFO-RFC Communication](#)

2.9 EXIT CHPS

The last step in the forecast input process is shutting down the connections. An orderly shutdown prevents problems with forecasts from the RFC.

Modifiers - Check to make sure you deleted any modifiers before exiting CHPS. Be sure and delete any modifiers **you** made after coordinating with the RFC. Do not delete any modifiers you did not make!

Closing and reopening the VNC session does **not** clear out modifiers. The modifiers are still in effect when the CHPS client reopens. Old modifiers adversely affect forecasts from the RFC!

Disconnect from the Master Controller - The Master Controller connects a CHPS user to the Central Database.

You **must** disconnect from the Master Controller before exiting CHPS or you may not be able to login to another session. Unless you select **Log out** from the **File** menu, the system still thinks you are connected.

It is safe to close the CHPS Operator Client session when the Status Indicator at the bottom right of the GUI turns red.

End VNC Session - Disconnect from the VNC session by clicking the “X” at the top right of the VNC screen. Your session disconnects if you skip this step and another user from your office tries to log into CHPS.

LESSON 3 RESOURCES AND TROUBLESHOOTING

Learn more about the science behind hydrologic forecasts and basic CHPS troubleshooting techniques to be a more confident user of CHPS.

This lesson lists additional training, CHPS resources, and troubleshooting techniques. By the end of this lesson, you should be able to:

- Locate hydrologic training and CHPS-related resources.
- List basic troubleshooting techniques.
- Perform the steps in the troubleshooting process.
- Perform limited CHPS-specific troubleshooting.

3.2 RESOURCES

The terminology used in CHPS may be unfamiliar. Bookmark http://www.nwstc.noaa.gov/CHPS/wfo_user/lesson3/resources.html for quick reference. The following resources contain additional information about river forecasting and CHPS. Take a few minutes to learn more about the training and collaboration resources available. Note: Some online resources require a login.

Hydro Science - Log into the NWS Learning Management System (LMS) and peruse the courses in the [Basic Hydrology](#) section.

Some examples of courses include:

- Basic Hydrologic Sciences Course
- Runoff Processes
- Snowmelt Processes

CHPS/Forecasting

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

[HEC-RAS](#) is an external model some offices are using the CHPS framework.

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

Learn more about the [SACSMA](#) and [API](#) modifiers.

The [CHPS glossary](#) defines some of the terms used in the CHPS.

The [Deltares Wiki](#) is the host site for Deltares training, documentation, and manuals.

CHPS [Manuals and How-To's](#) and [Support Documents](#) are located on the FogBugz page.

Additional Resources - The people who make up the CHPS community are an important resource, too!

Try out [NWChat](#). Join the discussion! Subscribe to [CHPS and hydrology forums on the NWS Listserv](#) (login required). Email me at teresa.murphy@noaa.gov with questions, or suggestions for the CHPS glossary or acronym list.

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

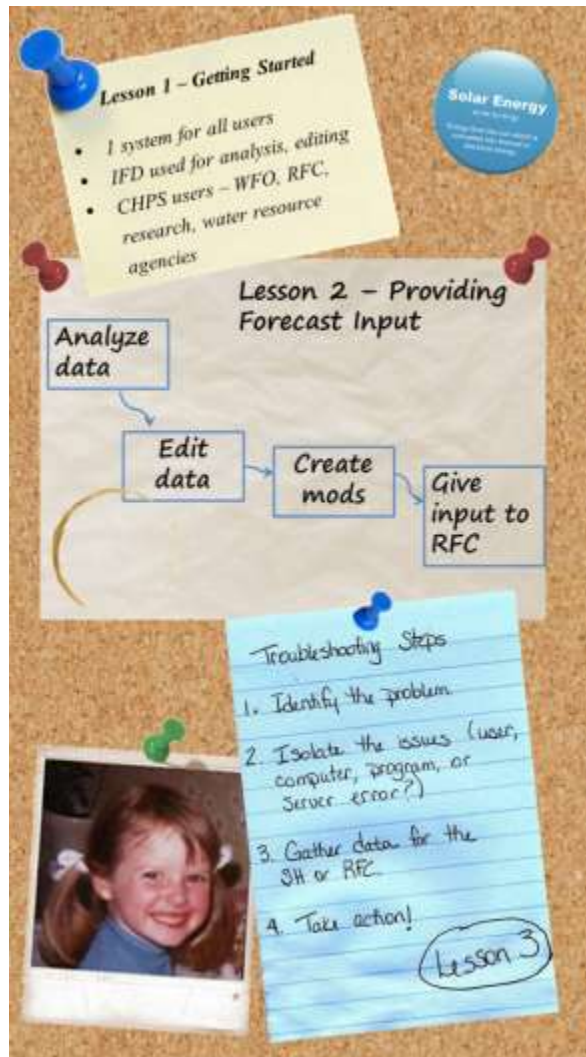
Ask the Service Hydrologist or Hydrologic Focal Point at your office about the policy for reporting problems with the VNC or CHPS.

Error Messages - Some of the error messages in the log panel will not cause problems with the system or the forecast. When in doubt, let the SH/HFP and the forecaster at the RFC know about the error.

Example: If data is missing for a site, but the configuration stipulates the workflow cannot run if there is missing data, you will see an error.

Problem	Solution
Cannot make a connection via VNC	<ol style="list-style-type: none">1. Make sure you are using the correct user name and password.2. Contact the RFC to see if CHPS is down.
Cannot edit time series data graphically	<ol style="list-style-type: none">1. Make sure you click on the physical element in the time series legend before clicking the edit button.2. Check to make sure you are using the correct editing option.3. Ask the RFC if this option is editable. Some of the data is configure to not be edited!
Cannot edit tabular time series data	<ol style="list-style-type: none">1. Make sure you click on the physical element in the time series legend before clicking the edit button.2. Ask the RFC if this option is editable. Some of the data is configure to not be edited!
Some modifiers not available	<ol style="list-style-type: none">1. Modifiers are governed by the configuration files. Only the modifiers applicable for the site are available.2. Ask the RFC if you have any questions about modifiers for a particular site.

COURSE SUMMARY



Congratulations. You reached the end of the course material!