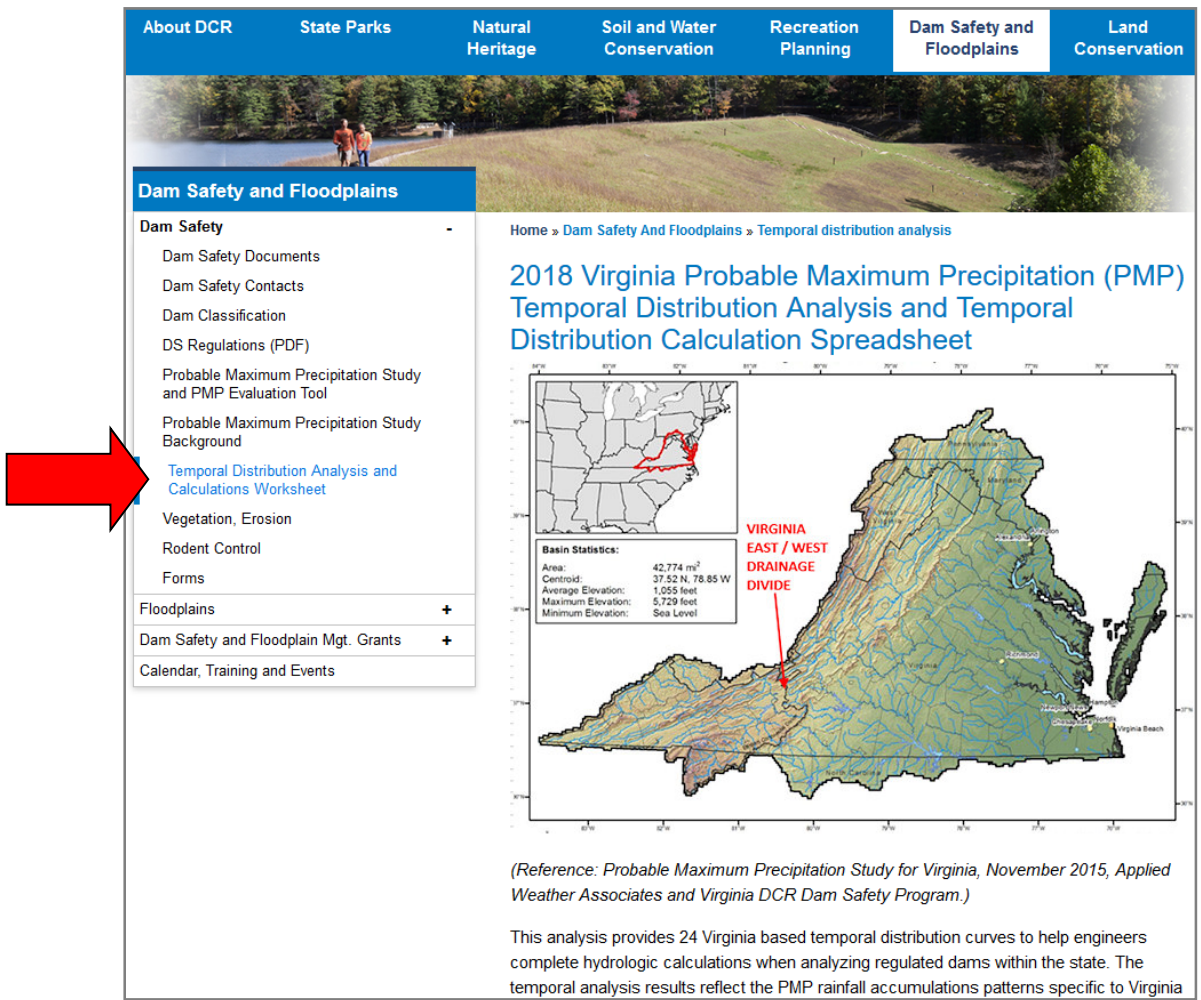


This document has been produced by the Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Management (VA DCR Dam Safety) to provide guidance to Dam Owners and the Engineering community when utilizing the new Virginia 2018 PMP Temporal Distribution Calculation Worksheet located on VA DCR’s Dam Safety website (see website link in step 1). This document shall provide users with a step-by-step guide and briefly discuss how to interpret results from the spreadsheet. All example information utilized in this training document is fictional and is for training purposes only.

In conjunction with the “2018 Virginia PMP Temporal Distribution Analysis” final report PDF and Virginia 2018 PMP Temporal Distribution Calculation Worksheet (Excel – Current Version) located on our website, VA DCR Dam Safety offers the following Training Document:

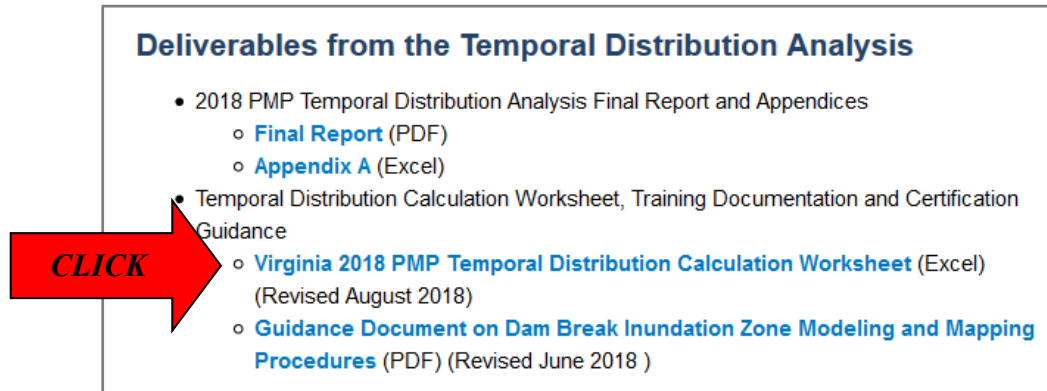
1. Open your Internet browser and Go to <http://www.dcr.virginia.gov/dam-safety-and-floodplains/dam-temp-analysis>. This will open a sub-webpage of the VA DCR Dam Safety main webpage named **2018 Virginia Probable Maximum Precipitation (PMP) Temporal Distribution Curve Analysis & Temporal Distribution Calculation Spreadsheet**. Please see graphic below.



The screenshot shows the website's navigation menu at the top: About DCR, State Parks, Natural Heritage, Soil and Water Conservation, Recreation Planning, Dam Safety and Floodplains, and Land Conservation. The 'Dam Safety and Floodplains' section is expanded, showing a sidebar with links such as 'Dam Safety Documents', 'Dam Safety Contacts', 'Dam Classification', 'DS Regulations (PDF)', 'Probable Maximum Precipitation Study and PMP Evaluation Tool', 'Probable Maximum Precipitation Study Background', and 'Temporal Distribution Analysis and Calculations Worksheet'. A red arrow points to the last link. The main content area displays the title '2018 Virginia Probable Maximum Precipitation (PMP) Temporal Distribution Analysis and Temporal Distribution Calculation Spreadsheet' and a map of Virginia with a red line indicating the 'VIRGINIA EAST / WEST DRAINAGE DIVIDE'. Below the map, there are basin statistics: Area: 42,774 mi², Centroid: 37.52 N, 78.85 W, Average Elevation: 1,055 feet, Maximum Elevation: 5,729 feet, and Minimum Elevation: Sea Level. A reference note and a paragraph about the analysis are also visible.

2. Scroll half way down the webpage and look for **Temporal Distribution Calculations Worksheet, Training Documentation and Certification Guidance** under the section named **Deliverables from the Temporal Distribution Analysis**.

3. Click on the **Virginia 2018 PMP Temporal Distribution Calculation Worksheet (Excel) (Rev. August 2018 or most recent revision)** link. Please see graphic below

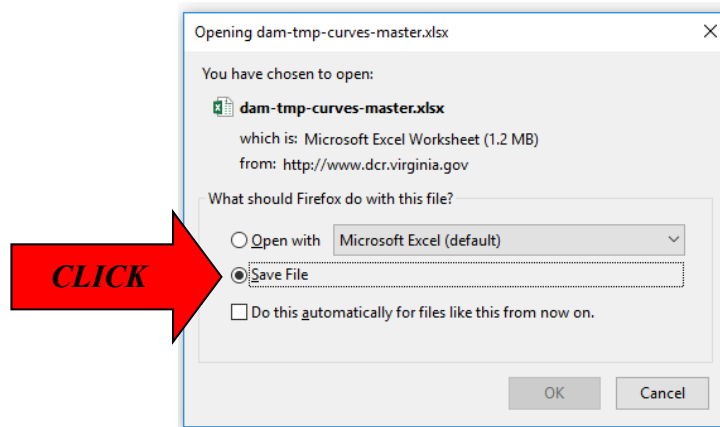


Deliverables from the Temporal Distribution Analysis

- 2018 PMP Temporal Distribution Analysis Final Report and Appendices
 - [Final Report](#) (PDF)
 - [Appendix A](#) (Excel)
- Temporal Distribution Calculation Worksheet, Training Documentation and Certification Guidance
 - [Virginia 2018 PMP Temporal Distribution Calculation Worksheet](#) (Excel) (Revised August 2018)
 - [Guidance Document on Dam Break Inundation Zone Modeling and Mapping Procedures](#) (PDF) (Revised June 2018)


A red arrow labeled "CLICK" points to the link for the "Virginia 2018 PMP Temporal Distribution Calculation Worksheet (Excel) (Revised August 2018)".

4. A **file save pop-up box** will open once the user has clicked on the link (see graphics below). Save the **dam-tmp-curves-master.xlsx** file to your computer and move the excel file to the desktop or a location of your choosing. For the purposes of this training document, the excel file was saved to the desktop.



Opening dam-tmp-curves-master.xlsx

You have chosen to open:

 **dam-tmp-curves-master.xlsx**
which is: Microsoft Excel Worksheet (1.2 MB)
from: <http://www.dcr.virginia.gov>

What should Firefox do with this file?

Open with Microsoft Excel (default)

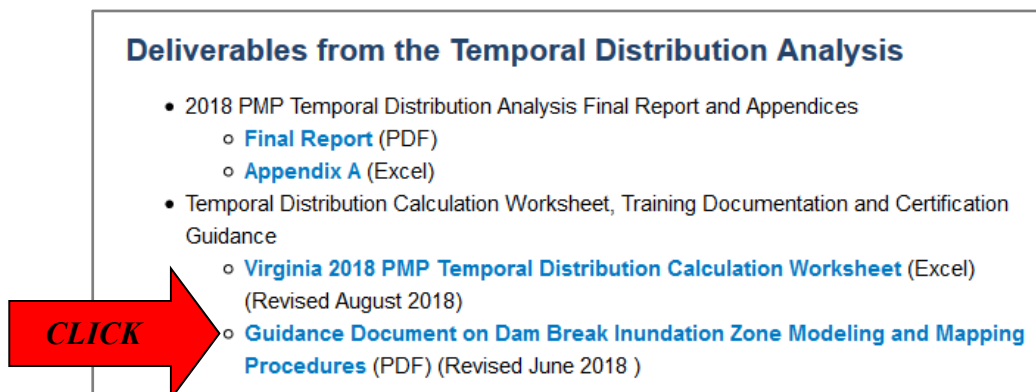
Save File

Do this automatically for files like this from now on.

OK Cancel

A red arrow labeled "CLICK" points to the "Save File" radio button.

5. Please note that the saving of this file could take up to 2 minutes (or longer) based on the user's internet connection.
6. Once the file has finished downloading, return to the **2018 Virginia Probable Maximum Precipitation (PMP) Temporal Distribution Curve Analysis & Temporal Distribution Calculation Spreadsheet** website (see **Step 1**) and click on the **Guidance Document on Dam Break Inundation Zone Modeling & Mapping Procedures (PDF)** link under the **Temporal Distribution Calculations Worksheet, Training Documentation and Certification Guidance** section of the webpage. Please see graphic below:

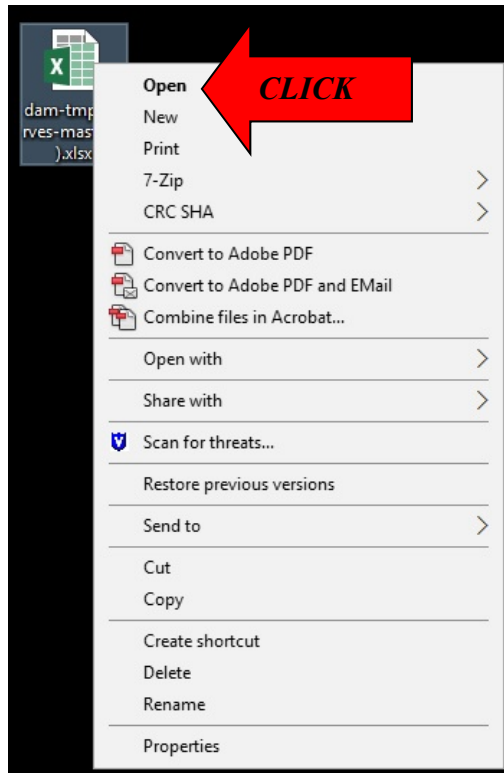


Deliverables from the Temporal Distribution Analysis

- 2018 PMP Temporal Distribution Analysis Final Report and Appendices
 - [Final Report](#) (PDF)
 - [Appendix A](#) (Excel)
- Temporal Distribution Calculation Worksheet, Training Documentation and Certification Guidance
 - [Virginia 2018 PMP Temporal Distribution Calculation Worksheet](#) (Excel) (Revised August 2018)
 - [Guidance Document on Dam Break Inundation Zone Modeling and Mapping Procedures](#) (PDF) (Revised June 2018)

A red arrow labeled "CLICK" points to the link for the "Guidance Document on Dam Break Inundation Zone Modeling and Mapping Procedures (PDF) (Revised June 2018)".

7. Save the Document to your computer for additional reference when using the **Virginia 2018 PMP Temporal Distribution Calculations Worksheet**.
8. Locate the **dam-tmp-curves-master.xlsx** file on your desktop (or saved location of your choice). Right click on the excel file and choose the **Open** option. See Graphic Below.



9. An excel spreadsheet should now be open called **Virginia 2018 PMP Temporal Distribution Calculations Worksheet (Temporal Distribution Worksheet)** with the page located in the **USER INPUT** tab. A total of eight different spreadsheet tabs will be utilized by the user when working in the **Temporal Distribution Worksheet** to determine which curves to use for the dam in question. The tabs include **USER INPUT**, **MAP TAB**, **East_General_Curve_OUTPUT**, **East_Local_Curve_OUTPUT**, **East_Tropical_Curve_OUTPUT**, **West_General_Curve_OUTPUT**, **West_Local_Curve_OUTPUT**, and **West_Tropical_Curve_OUTPUT**. The excel spreadsheet should look like the graphic below:

This sheet should be used in consultation with VA PMP Temporal Distribution Training Document, Guidance Doc. on Dam Break Inundation Zone Modeling & Mapping Procedures (current version), 2018 VA PMP Temporal Distribution Analysis (Effective June 28, 2018), and VA 2015 PMP Watershed Calculations Worksheet (current version) in conjunction with the PMP Evaluation Tool.

VA 2018 PMP Temporal Distribution Calculation Worksheet (Aug. 2018 Ver.)

Date: 05/01/18
 Dam: ABC Dam (Inventory #####)
 Dam Location: COUNTY / CITY / TOWN
 Company: XYZ Engineering
 Engineer: Bob Smith, PE

Calculation Section A - PMP Values from VA 2015 PMP Watershed Calculation Worksheet

Data for this section should be obtained from Section C of the VA 2015 PMP Watershed Calculations Worksheet (current version)

Average PMP Values by Storm Duration as Calculated through Virginia PMP Worksheet				
		6-Hour PMP	12-Hour PMP	24-Hour PMP
GENERAL STORM EVENTS:	Average PMP Values	16.0	20.0	22.0
LOCAL STORM EVENTS:	Average PMP Values	28.0	32.0	32.0
TROPICAL STORM EVENTS:	Average PMP Values	22.0	34.0	34.0

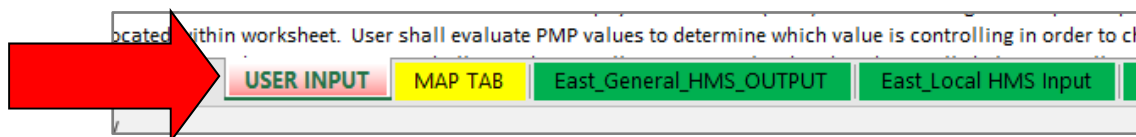
Governing PMP Values as Calculated through Virginia PMP Worksheet

	Governing 6 Hr. PMP	Governing 12 Hr. PMP	Governing 24 Hr. PMP
Governing PMP Values for Watershed	28.0	34.0	34.0
Governing Storm Type (General, Local, or Tropical)	Local	Tropical	Tropical

Calculation Section C - OUTPUT Information for Temporal Distribution Curve

East Tropical - 6 Hr., 12 Hr., & 24 Hr.

West General - 6 Hr., 12 Hr., & 24 Hr.



10. The **Temporal Distribution Worksheet** provides users with 24 distinct Virginia based Temporal Distribution Curves (multiple durations and types). As the user works through the **Temporal Distribution Worksheet**, the number of usable curves will decrease based on inputted information, specific parameters and hydrological calculations for the dam in question.

- It is recommended that the user familiarize themselves with the disclaimer language and required input sections of this spreadsheet before beginning work with the **Temporal Distribution Worksheet**. In addition, it is recommended moving forward that the excel spreadsheet be saved often as the user works through this training document.
- Starting in the **USER INPUT** tab, the cells highlighted with blue within the **Temporal Distribution Worksheet** require specific inputs by the user. The user should begin by filling in the date, generic information for the dam (dam name, inventory number, & location), and their own working information (company and name). See graphics below:

VA 2018 PMP Temporal Distribution Calculation Worksheet (Aug. 2018 Ver.)	
Date:	05/01/18
Dam:	ABC Dam (Inventory #####)
Dam Location:	COUNTY / CITY / TOWN
Company:	XYZ Engineering
Engineer:	Bob Smith, PE

FILL IN REQ. INFORMATION

Cells Requiring User Input / Selection are Highlighted in Blue
 Example Cell

- Once the user has filled out the required generic information as shown in step number 12 in the **USER TAB**, please navigate to the **Calculation Section A – PMP Values from VA 2015 PMP Watershed Calculation Worksheet (Calculation Section A)** portion of the worksheet also within the **USER INPUT** tab. Data for this section should be obtained from **Section C** of the **VA 2015 PMP Watershed Calculations Worksheet (current version)**. Please see the **PMP Evaluation Tool Training Document (PDF) (February 2016)** available for download on the **Probable Maximum Precipitation Study and Evaluation Tool** portion of the Virginia DCR Dam Safety Website for more information on how to calculate the required PMP values. The website in question can be found here: <http://www.dcr.virginia.gov/dam-safety-and-floodplains/pmp-tool>. See graphic below:

Calculation Section A - PMP Values from VA 2015 PMP Watershed Calculation Worksheet				
Data for this section should be obtained from Section C of the VA 2015 PMP Watershed Calculations Worksheet (current version)				
Average PMP Values by Storm Duration as Calculated through Virginia PMP Worksheet				
		6-Hour PMP	12-Hour PMP	24-Hour PMP
GENERAL STORM EVENTS:	Average PMP Values	16.0	20.0	22.0
LOCAL STORM EVENTS:	Average PMP Values	28.0	32.0	32.0
TROPICAL STORM EVENTS:	Average PMP Values	22.0	34.0	34.0
Governing PMP Values as Calculated through Virginia PMP Worksheet				
		Governing 6 Hr. PMP	Governing 12 Hr. PMP	Governing 24 Hr. PMP
Governing PMP Values for Watershed		28.0	34.0	34.0
Governing Storm Type (General, Local, or Tropical)		Local	Tropical	Tropical

- The first portion of **Calculation Section A** in the **USER INPUT** tab requires the user to input the average PMP values for the dam in question (blue highlighted cells). This information should be taken from the previously completed **VA 2015 PMP Watershed Calculations Worksheet (current version)** worksheet for the General, Local, and Tropical Storm events for all three required storm durations (6-hour PMP, 12-hour PMP, and 24-hour PMP. See graphic below:

Calculation Section A - PMP Values from VA 2015 PMP Watershed Calculation Worksheet				
Data for this section should be obtained from Section C of the VA 2015 PMP Watershed Calculations Worksheet (current version)				
Average PMP Values by Storm Duration as Calculated through Virginia PMP Worksheet				
		6-Hour PMP	12-Hour PMP	24-Hour PMP
GENERAL STORM EVENTS:	Average PMP Values	16.0	20.0	22.0
LOCAL STORM EVENTS:	Average PMP Values	28.0	32.0	32.0
TROPICAL STORM EVENTS:	Average PMP Values	22.0	34.0	34.0
Governing PMP Values as Calculated through Virginia PMP Worksheet				
		Governing 6 Hr. PMP	Governing 12 Hr. PMP	Governing 24 Hr. PMP
Governing PMP Values for Watershed		28.0	34.0	34.0
Governing Storm Type (General, Local, or Tropical)		Local	Tropical	Tropical

FILL IN REQ. INFORMATION

15. The second portion of **Calculation Section A** in the **USER INPUT** tab requires the user to input the governing PMP values for the dam in question in the blue highlighted cells from the previously completed **VA 2015 PMP Watershed Calculations Worksheet (current version)** worksheet for the for all three required storm durations (6-hour PMP, 12-hour PMP, and 24-hour PMP). In addition, the user must choose the correct storm type associated with the each governing PMP value from the provided pull-downs for each duration. The user should take note of the Governing PMP & Storm Type values inputted into **Calculation Section A** as these values will be utilized later in the calculations process to select the appropriate Temporal Distribution Curves from additional tabs within the worksheet in question. See graphic below:

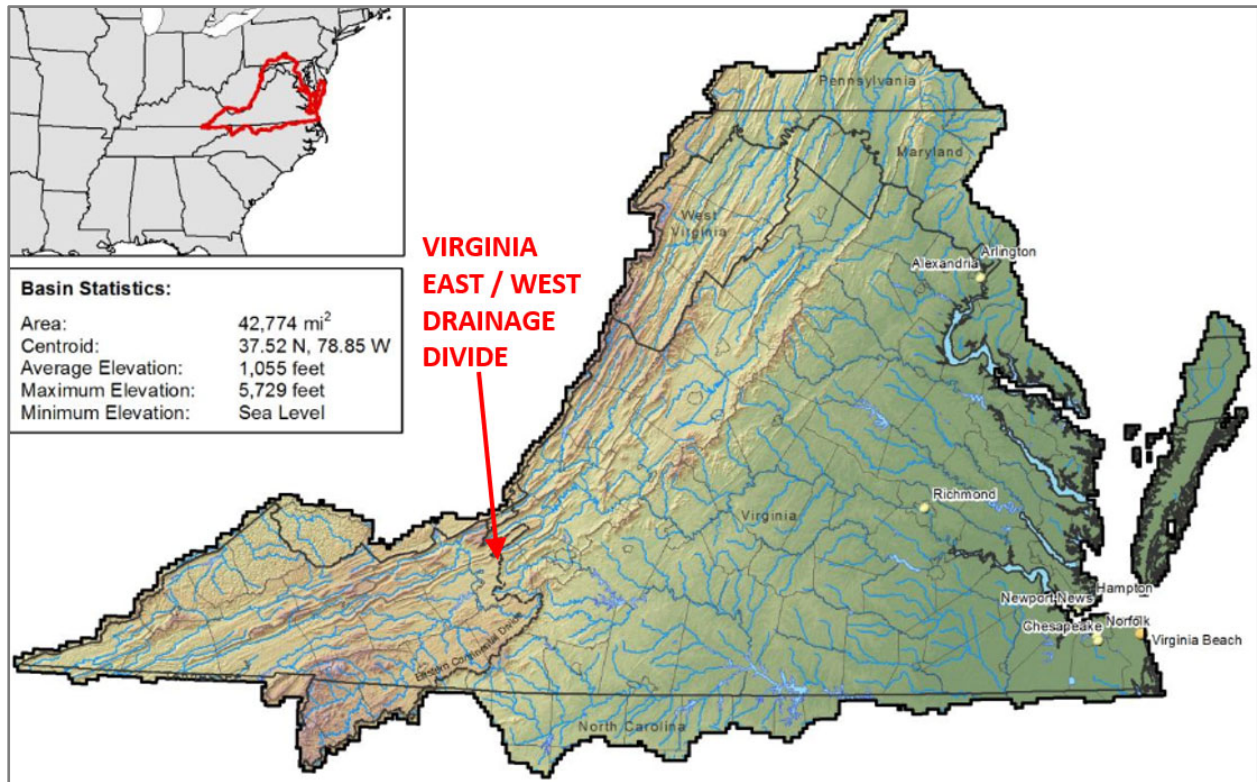
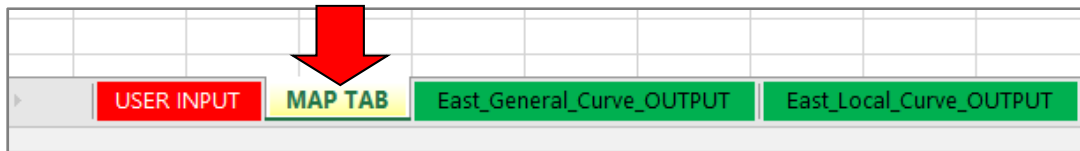
Calculation Section A - PMP Values from VA 2015 PMP Watershed Calculation Worksheet				
Data for this section should be obtained from Section C of the VA 2015 PMP Watershed Calculations Worksheet (current version)				
Average PMP Values by Storm Duration as Calculated through Virginia PMP Worksheet				
		6-Hour PMP	12-Hour PMP	24-Hour PMP
GENERAL STORM EVENTS:	Average PMP Values	16.0	20.0	22.0
LOCAL STORM EVENTS:	Average PMP Values	28.0	32.0	32.0
TROPICAL STORM EVENTS:	Average PMP Values	22.0	34.0	34.0
Governing PMP Values as Calculated through Virginia PMP Worksheet				
		Governing 6 Hr. PMP	Governing 12 Hr. PMP	Governing 24 Hr. PMP
	Governing PMP Values for Watershed	28.0	34.0	34.0
	Governing Storm Type (General, Local, or Tropical)	Local	Tropical	Tropical



16. At this point in the process, it is recommended the user save the **VA 2015 PMP Watershed Calculations Worksheet (current version)** worksheet.
17. Once the user has finished filling out the required PMP information as shown in step number 15 in the **USER TAB**, the information shown in **Calculation Section B – Required OUTPUT information for Temporal Distribution Curve (Calculation Section B)** portion of the worksheet within the **USER INPUT** tab will self-populate. **Calculation Section B** is an internal based section with the populated data coming directly from the user input information in **Calculation Section A**. The data for this section has been formatted to work with temporal distribution curve calculations in other tabs within the worksheet. No user input for **Calculation Section B** is required as this section is fully auto-populated by the spreadsheet. See graphic below:

Calculation Section B - Required PMP Input for Temporal Distribution Curve Calculations			
This section is for internal calculation purposes only & will be auto-filled with information from Calculation Section A of this worksheet.			
Duration (hr.)	General PMP (in)	Local PMP (in)	Tropical PMP (in)
6	16.00	28.00	22.00
12	20.00	32.00	34.00
24	22.00	32.00	34.00

18. After completing **Calculation Sections A & B**, the user will need determine the location of the dam in question from a statewide watershed perspective utilizing the provided **MAP TAB** (see below). The Eastern Continental Drainage Divide goes through the State of Virginia near the Blacksburg, Virginia / Christiansburg, Virginia areas with the eastern half of the state draining towards the Atlantic Ocean and the western portion of the state draining towards the Gulf of Mexico. The user should determine the general location of their dam and decide if the dam falls east or west of the Eastern Continental Drainage Divide (ECDD) line. If the user’s dam is located east of the ECDD line, the user will utilize the three EAST based curve tabs (**East_General_Curve_OUTPUT**, **East_Local_Curve_OUTPUT**, **East_Tropical_Curve_OUTPUT**) moving forward. If the user’s dam is located west of the ECDD line, the user will utilize the WEST based curve tabs (**West_General_Curve_OUTPUT**, **West_Local_Curve_OUTPUT**, **West_Tropical_Curve_OUTPUT**) moving forward. Should the user be unable to determine if their dam is located either east or west of the ECDD line as the dam is located too close to said line, please contact Virginia DCR Dam Safety for assistance. For the purposes of this training document, ABC dam will be located east of the ECDD line. The Virginia watershed map located in the **MAP TAB** should look like the graphic below:



PLEASE NOTE: As mentioned previously, this training document provides a step-by-step walk through of how to utilize the **Temporal Distribution Worksheet** with a dam located east of the ECDD line. If the user’s dam happened to be located west of the ECDD line, the user would follow the exact same process / directions as outlined below but would utilize the three West based curve tabs (**West_General_Curve_OUTPUT**, **West_Local_Curve_OUTPUT**, and **West_Tropical_Curve_OUTPUT**) instead of the three East based curve tabs.

- After determining the dam’s location within the **MAP TAB**, the user should return to the **USER TAB** and re-evaluate the Governing PMP & Storm Type values originally inputted into **Calculation Section A** of the calculations worksheet in step 15 of this training document. The Governing PMP and Storm Type values for 6-hour, 12-hour, and 24-hour durations will dictate which of the three remaining worksheet tabs (out of the total 6) will be utilized moving forward based on decisions from step 18. For the purposes of this training document, the following Governing PMP & Storm Type values will be utilized:

Governing PMP Values as Calculated through Virginia PMP Worksheet			
	Governing 6 Hr. PMP	Governing 12 Hr. PMP	Governing 24 Hr. PMP
Governing PMP Values for Watershed	28.0	34.0	34.0
Governing Storm Type (General, Local, or Tropical)	Local	Tropical	Tropical

The Virginia Temporal Distribution curve data needed for hydrologic calculations purposes has been embedded into the worksheet in six different tabs each labeled with their appropriate type and location. As discussed in step 18, the tabs have the following labels: (**East_General_Curve_OUTPUT**, **East_Local_Curve_OUTPUT**, **East_Tropical_Curve_OUTPUT**, (**West_General_Curve_OUTPUT**, **West_Local_Curve_OUTPUT**, and **West_Tropical_Curve_OUTPUT**). The six tabs are set up identically with the output curve information needed by the PEOR for distribution calculations highlighted (green & grey) and presented in 6-minute increments.

ABC Dam is located in the eastern portion of the State (See step 18) with the 6-hour Local storm event controlling based on inputted data from **Calculation Section A**. The user should navigate to the **East_Local_Curve_OUTPUT** tab and see the following information:

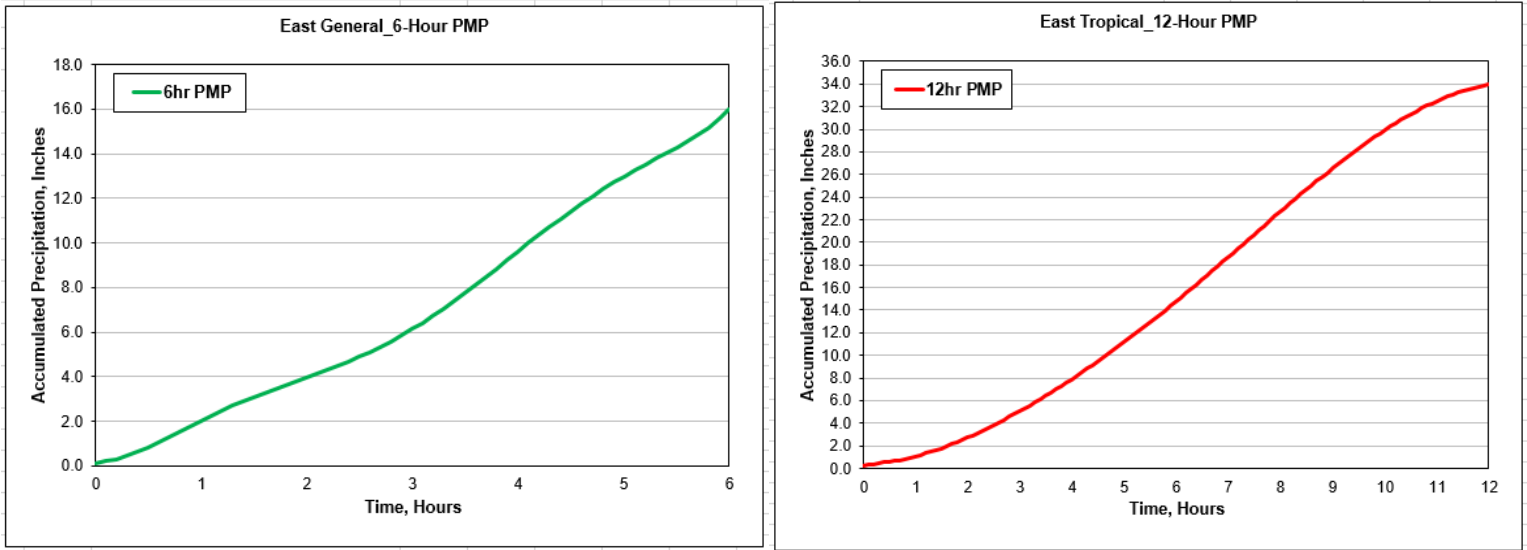
20. Each tab contains four separate temporal distribution curves for the storm type and location in question (currently working in the **East_Local_Curve_OUTPUT** tab). These curves represent the 6-hour, 12-hour, 24-hour A, and 24-hour B durations as required by the Virginia DCR Dam Safety Regulations. The differences between the 24-hour PMPa curve / 24-hour PMPb curve and when to utilize which curve will be discussed later within this training document.

As shown in the graphic below, certain excel cells have been highlighted (color-coded) to aid the user in interpreting the curve based information provided in this particular section of the **Temporal Distribution Worksheet**. In addition, a legend has also been included to help aid the user in deciphering the highlighted cells. The orange highlighted cells represent the actual duration storm based PMP values automatically taken from **Calculation Section A** in the **USER INPUT** tab. These PMP values directly correlate to the user input (linked) and will automatically update whenever information is changed in **Calculation Section A**.

The green highlighted cells represent the final Virginia temporal distribution curve output data based on input from the orange highlighted cells. One green highlighted column shows the time portion of the curve in 6-minute increments while the other green highlighted column represents the actual temporal distribution rainfall curve output data (each cell multiplied by the PMP data provided in the orange highlighted column for the duration in question).

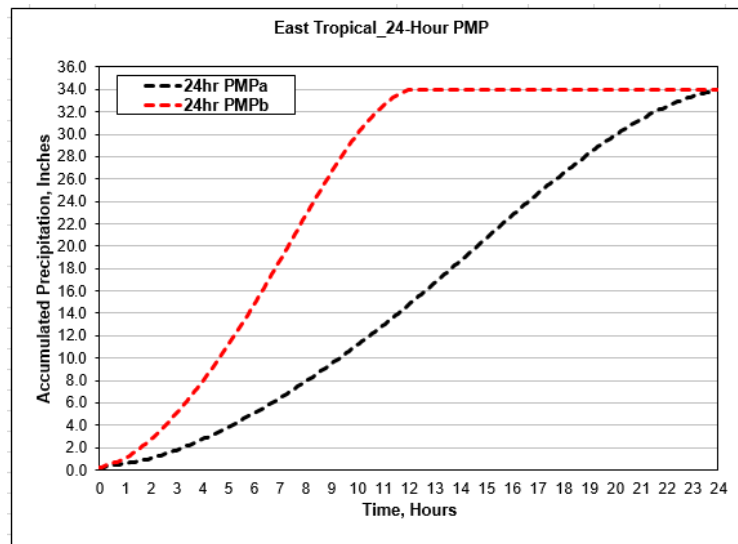
The output information provided in the green highlighted columns is the input data the PEOR should copy into HEC-HMS (or any other hydrologic based modeling program) to help aid in calculating the required PMF storm events per the duration in question. The user should ensure that all data for both columns is copied when transferring (copying) to another program.

21. In an effort to help the user utilize / interpret the temporal distribution curve output information in each of the 6 tabs included in the **Temporal Distribution Worksheet**, finalized output information has been provided in both tabular and graphical forms. The finalized temporal distribution curve output information (tabular) is located within the green / grey highlighted columns from which the graphs are also produced. Examples of the output curves in graphical information can be found below:



22. As discussed in the above steps, the **Temporal Distribution Worksheet** currently provides two curve options for the 24-hour storm event labeled “24-hr PMPa” and “24hr PMPb.” Based on current information from the 2015 AWA PMP Study, DCR has determined that the rainfall from most of the controlling large-scale PMP storm events which transpired in VA (or were transpositioned) occurred within 6 to 12 hours. As a result, the 12-hour and 24-hour PMP values submitted to DCR through the **VA 2015 PMP Watershed Calculation Worksheet** have been identical because all of the rainfall occurred in the first 12 hours of the storm when looking at a 24-hour duration (completely front-loaded with no rainfall on the back end of the storm). In the case where the controlling 12-hour and 24-hour PMP values are **identical**, the user should select the **24-hour PMPb** temporal distribution curve as their output curve for input into third party hydrologic calculation programs (i.e. HEC-HMS). In the case where the controlling 12-hour and 24-hour PMP values are **different**, the user should select the **24-hour PMPa** temporal distribution curve as their output curve for input into third party hydrologic calculation programs (i.e. HEC-HMS).

ABC Dam is located in the eastern portion of the State (see step 18) with identical controlling 12-hour and 24-hour PMP values based on inputted data from **Calculation Section A**. In this situation, the user would navigate to the **East_Tropical_Curve_OUTPUT** tab and select the **24-hr PMPb** temporal distribution curve for input into a third party hydrologic calculation program when analyzing ABC Dam’s 24-hour event. 24-hour curve output for ABC Dam can be found below (red colored line is the desired output):



23. At this point in the process, it is recommended the user save the **VA 2015 PMP Watershed Calculations Worksheet (current version)** worksheet.
24. The user should navigate back to the **USER INPUT** section of the **Temporal Distribution Worksheet. Calculation Section C – Required OUTPUT Information for Temporal Distribution Curve (Calculation Section C)** located at the bottom of the **Temporal Distribution Worksheet** requires the user to input previously determined dam location information (east or west) and the final selected 6-hour, 12-hour and 24-hour temporal distribution curves from provided pull downs. See graphic below:

Calculation Section C - Required OUTPUT Information for Temporal Distribution Curve	
Data for this section should be obtained from Dam's physical location (East / West of drainage divide per Map Tab) & curve tabs located within worksheet. User shall evaluate PMP values to determine which value is controlling in order to choose correct temporal distribution curve. User shall provide controlling curves utilized in dropdown cells below. Not all temporal distribution curves provided in this worksheet will be utilized. It is up to the user to determine which curves are applicable for their Dam.	
Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	6-Hour EAST Local Curve
12-Hour Temporal Distribution Curve Utilized:	12-Hour EAST Tropical Curve
24-Hour Temporal Distribution Curve Utilized:	24-Hour EAST Tropical Curve (B Distribution)

As discussed in the narrative section of **Calculation Section C**, it is up to the user to correctly evaluate the PMP / storm type information from the **Calculation Section A** to ensure that the correct temporal Distribution Curve tabs are utilized. Please note that not all temporal distribution curves provided in this worksheet will be utilized by the user.

25. Utilizing the information from step 18, the user will input the dam's location in the first required cell (blue highlighted) in **Calculation Section C** choosing either east or west from the pull down tabs. In an effort to provide assistance to the user while working through **Calculations Section C**, useful "pop-up" help narratives have been provided when the user clicks on an input cell in this section. See graphics below:

Calculation Section C - Required OUTPUT Information for Temporal Distribution Curve	
Data for this section should be obtained from Dam's physical location (East / West of drainage divide per Map Tab) & curve tabs located within worksheet. User shall evaluate PMP values to determine which value is controlling in order to choose correct temporal distribution curve. User shall provide controlling curves utilized in dropdown cells below. Not all temporal distribution curves provided in this worksheet will be utilized. It is up to the user to determine which curves are applicable for their Dam.	
Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	6-Hour EAST
12-Hour Temporal Distribution Curve Utilized:	12-Hour EAST
24-Hour Temporal Distribution Curve Utilized:	24-Hour EAST Tropical

1 of 4

Dam Location (Drainage Divide)
Please Select the Appropriate Dam Location from a State Drainage Divide Perspective from the List of Options

2018 Version

Data for this section should be obtained from Dam's physical location (East / West of drainage divide per Map Tab) & curve tabs located within worksheet. User shall evaluate PMP values to determine which value is controlling in order to choose correct temporal distribution curve. User shall provide controlling curves utilized in dropdown cells below. Not all temporal distribution curves provided in this worksheet will be utilized. It is up to the user to determine which curves are applicable for their Dam.	
Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	East
12-Hour Temporal Distribution Curve Utilized:	12-Hour EAST
24-Hour Temporal Distribution Curve Utilized:	24-Hour EAST Tropical

Please Select the Appropriate Dam Location from a State Drainage Divide Perspective from the List of Options

ABC Dam is located in the eastern portion of the State as dictated in step 18 of this training document. The user would choose the "East" option from the Dam Location (State Drainage Perspective) pull down choices based on the example presented in this training document.

26. After choosing the correct dam location as shown in step 24, the user will then input the 6-hour temporal distribution curve chosen based on the **Temporal Distribution Worksheet's** previous input requirements in the second required cell (blue highlighted) in **Calculation Section C**. The user will choose from the six pre-populated pull down tabs (see graphics below). In an effort to provide assistance to the user while working through **Calculations Section C**, useful "pop-up" help narratives have been provided when the user clicks on an input cell in this section. See graphics below:

Calculation Section C - Required OUTPUT Information for Temporal Distribution Curve	
Data for this section should be obtained from Dam's physical location (East / West of drainage divide per Map Tab) & curve tabs located within worksheet. User shall evaluate PMP values to determine which value is controlling in order to choose correct temporal distribution curve. User shall provide controlling curves utilized in dropdown cells below. Not all temporal distribution curves provided in this worksheet will be utilized. It is up to the user to determine which curves are applicable for their Dam.	
Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	6-Hour EAST Local Curve
12-Hour Temporal Distribution Curve Utilized:	12-Hour EAST
24-Hour Temporal Distribution Curve Utilized:	24-Hour EAST Tropical
1 of 4	
<div style="border: 1px solid black; padding: 5px; background-color: #ffffcc;"> 6-Hr Temporal Distribution Curve Please Select the 6-Hour Temporal Distribution Curve Utilized for the Dam in Question from the List of Options </div>	

018 Version

Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	6-Hour EAST Local Curve
12-Hour Temporal Distribution Curve Utilized:	<div style="border: 1px solid black; padding: 2px;"> 6-Hour EAST General Curve 6-Hour EAST Local Curve 6-Hour EAST Tropical Curve 6-Hour WEST General Curve 6-Hour WEST Local Curve 6-Hour WEST Tropical Curve </div>
24-Hour Temporal Distribution Curve Utilized:	

018 Version

As shown in steps 15, 18, and 19 of this training document, ABC Dam is located in the eastern portion of the State and was found to have a “Local” Governing Storm Type for the 6-hour storm event per the results from the **VA 2015 PMP Watershed Calculations Worksheet (current version)**. Based on this information, the user would then choose the “6-Hour EAST Local Curve” option from the “6-Hour Temporal Distribution Curve Utilized” pulldown choices based on the example presented in this training document.

27. After choosing the 6-hour temporal distribution curve utilized for the dam as shown in step 25, the user will input the 12-hour temporal distribution curve chosen based on the **Temporal Distribution Worksheet’s** previous input requirements in the third required cell (blue highlighted_ in **Calculation Section C**. The user will choose from the six pre-populated pulldown tabs (see graphics below). In an effort to provide assistance to the user while working through **Calculations Section C**, useful “pop-up” help narratives have been provided when the user clicks on an input cell in this section. See graphics below:

Calculation Section C - Required OUTPUT Information for Temporal Distribution Curve	
Data for this section should be obtained from Dam's physical location (East / West of drainage divide per Map Tab) & curve tabs located within worksheet. User shall evaluate PMP values to determine which value is controlling in order to choose correct temporal distribution curve. User shall provide controlling curves utilized in dropdown cells below. Not all temporal distribution curves provided in this worksheet will be utilized. It is up to the user to determine which curves are applicable for their Dam.	
Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	6-Hour EAST Local Curve
12-Hour Temporal Distribution Curve Utilized:	12-Hour EAST Tropical Curve
24-Hour Temporal Distribution Curve Utilized:	24-Hour EAST Tropical
1 of 4	
<div style="border: 1px solid black; padding: 5px; background-color: #ffffcc;"> 12Hr Temporal Distribution Curve Please Select the 12-Hour Temporal Distribution Curve Utilized for the Dam in Question from the List of Options </div>	

018 Version

Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	6-Hour EAST Local Curve
12-Hour Temporal Distribution Curve Utilized:	12-Hour EAST Tropical Curve
24-Hour Temporal Distribution Curve Utilized:	12-Hour EAST General Curve 12-Hour EAST Local Curve 12-Hour EAST Tropical Curve 12-Hour WEST General Curve 12-Hour WEST Local Curve 12-Hour WEST Tropical Curve

As shown in steps 15, 18, and 19 of this training document, ABC Dam is located in the eastern portion of the State and was found to have a “Tropical” Governing Storm Type for the 12-hour storm event per the results from the **VA 2015 PMP Watershed Calculations Worksheet (current version)**. Based on this information, the user would then choose the “12-Hour EAST Tropical Curve” option from the “12-Hour Temporal Distribution Curve Utilized” pulldown choices based on the example presented in this training document.

28. After choosing the 12-hour temporal distribution curve utilized for the dam as shown in step 26, the user will input the 24-hour temporal distribution curve chosen based on the **Temporal Distribution Worksheet’s** previous input requirements in the fourth final required cell (blue highlighted) in **Calculation Section C**. The user will choose from the twelve pre-populated pulldown tabs (see graphics below). As discussed in step 22, the user must determine whether the **24-hour PMPa** or **24-hour PMPb** is appropriate for their dam based on the PMP values from the **Temporal Distribution Worksheet**. In an effort to provide assistance to the user while working through **Calculations Section C**, useful “pop-up” help narratives have been provided when the user clicks on an input cell in this section. See graphics below:

Calculation Section C - Required OUTPUT Information for Temporal Distribution Curve

Data for this section should be obtained from Dam's physical location (East / West of drainage divide per Map Tab) & curve tabs located within worksheet. User shall evaluate PMP values to determine which value is controlling in order to choose correct temporal distribution curve. User shall provide controlling curves utilized in dropdown cells below. Not all temporal distribution curves provided in this worksheet will be utilized. It is up to the user to determine which curves are applicable for their Dam.

Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	6-Hour EAST Local Curve
12-Hour Temporal Distribution Curve Utilized:	12-Hour EAST Tropical Curve
24-Hour Temporal Distribution Curve Utilized:	24-Hour EAST Tropical Curve (B Distribution)

1 of 4

24Hr Temporal Distribution Curve
Please Select the 24-Hour Temporal Distribution Curve Utilized for the Dam in Question from the List of Options

Virginia Department of Conservation and Forestry
100 East Main Street, 24th Floor

Dam Location (State Drainage Perspective):	East
6-Hour Temporal Distribution Curve Utilized:	6-Hour EAST Local Curve
12-Hour Temporal Distribution Curve Utilized:	12-Hour EAST Tropical Curve
24-Hour Temporal Distribution Curve Utilized:	24-Hour EAST Tropical Curve (B Distribution)

24-Hour EAST General Curve (A Distribution) 24-Hour EAST Local Curve (A Distribution) 24-Hour EAST Tropical Curve (A Distribution) 24-Hour EAST General Curve (B Distribution) 24-Hour EAST Local Curve (B Distribution) 24-Hour EAST Tropical Curve (B Distribution) 24-Hour WEST General Curve (A Distribution) 24-Hour WEST Local Curve (A Distribution)
--

As shown in steps 15, 18, and 19 of this training document, ABC Dam is located in the eastern portion of the State and was found to have a “Tropical” Governing Storm Type for the 24-hour storm event per the results from the **VA 2015 PMP Watershed Calculations Worksheet (current version)**. As discussed in step 22, the 12-hour and 24-hour PMP values for ABC Dam are equal which results in the need for the “24-hour PMPb” curve option. Based on this information, the user would then choose the “24-Hour EAST Tropical Curve (Distribution B)” option from the “24-

Hour Temporal Distribution Curve Utilized” pulldown choices based on the example presented in this training document.

29. In an effort to aid the user in deciphering the temporal distribution output curve data, graphical representations for all curve durations based on the inputted data in the **Temporal Distribution Worksheet** have been provided in **Calculation Section D**. A total of six dynamic graphs are presented each with four durations (6-hour, 12-hour, 24-hourA, and 24-hourB) represented for each governing story type.
30. After completing the **Temporal Distribution Worksheet**, the user should print out the main worksheet in **USER TAB** and submit the print out (or digital PDF document) to VA DCR Dam Safety. This worksheet should be included with any relevant Dam related hydrological based calculations which requires the use of Temporal Distribution Cures.
31. This concludes our training document. If you have any questions or concerns, please contact:

Regional Dam Safety Engineer
(<https://www.dcr.virginia.gov/dam-safety-and-floodplains/dsfpmcontx>)
Division of Dam Safety & Floodplain Management
Virginia Department of Conservation & Recreation
600 East Main Street
Richmond, VA 23219

The Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Management (VA DCR Dam Safety) has provided this training document as a reference tool when utilizing the Virginia 2018 PMP Temporal Distribution Calculation Worksheet and should be treated as such. It is the responsibility of the Professional Engineer to understand and utilize the Virginia 2018 PMP Temporal Distribution Calculation Worksheet in its entirety correctly when completing required calculations. VA DCR Dam Safety takes no legal responsibility or liability for any of the information provided above or additional guidance documents / spreadsheets provided (see Disclaimer at <http://www.dcr.virginia.gov/dam-safety-and-floodplains/dam-temp-analysis>).