

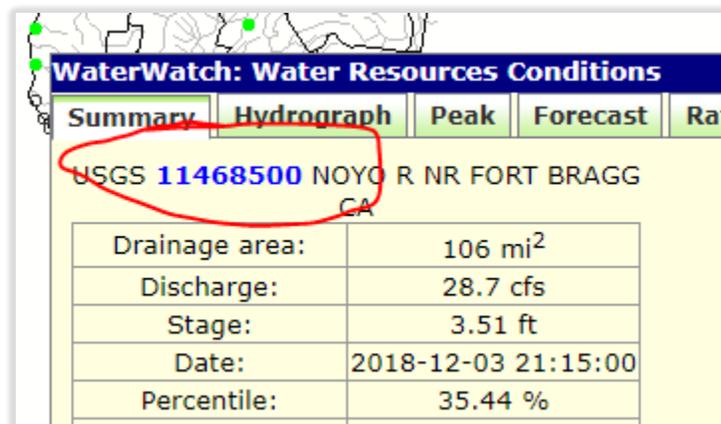
Obtaining Gauge Station Data for VELMA 2.0

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VELMA uses gauge station data to validate its simulation outputs. We will need to download the gauge station data and convert the flow into mm/day.

Obtaining USGS Gauge Station Data

1. Navigate to the USGS WaterWatch streamflow page (<https://waterwatch.usgs.gov/?m=real&r=ca>)
2. If you are not modeling California, use the drop down menu to change the state
3. Using your cursor hover over the dots to display info on the gauge station
4. For more information, click on the dot. A pop up window will display more information
5. When you find the gauge station you want, click on the gauge station number



6. This will take you to the Gauge stations page
7. In the "Available Data" Table, select "Daily Data"

AVAILABLE DATA:	
Data Type	
Current / Historical Observations (availability statement)	
Daily Data	
Temperature, water, degrees Celsius	
Discharge, cubic feet per second	

8. Under "Available Parameters" make sure only "Discharge (mean)" is checked
9. Adjust the Begin and End date to correspond with your precipitation and temperature date range. (Make sure you are going from January 1st of your beginning year to December 31st of your ending year)

- Change the "Output format" to tab separated
- Click GO

Available Parameters

All 2 Available Parameters for this site

00010 Temperature, water(Max.,Min.,Ins.)

00060 Discharge(Mean)

Period of Record

1965-12-08 1979-02-14

1951-10-01 2018-12-02

Output format

Graph

Graph w/ stats

Graph w/ meas

Graph w/ (up to 3) parms

Table

Tab-separated

Days (2921)

-- OR --

Begin date

2010-01-01

End date

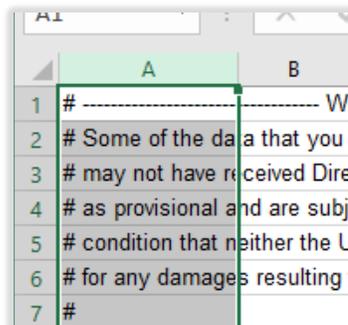
2017-12-31

Summary of all available data for this site

- A new page with a lot of text follow by the data will pop up
- Click CTRL and A at the same time to Select all the info
- Click CTRL and C at the same time to copy all of the information
- Open up a blank notebook in Microsoft Excel
- In Excel, click CTRL and V at the same time to paste all the info

Format and Locate the Gauge Station Data

- Now we need to properly separate the data. Click on the top of Column A to highlight the entire column



- Under the Data tab, select "Text to Columns"
- In the pop up "Convert Text to Columns Wizard" window, choose the file type as "Fixed Width"
- Click Finish
- The data should now be separated into different columns

0	USGS	11468500	1/1/2010	84.3 A
1	USGS	11468500	1/2/2010	196 A
2	USGS	11468500	1/3/2010	152 A
3	USGS	11468500	1/4/2010	109 A
4	USGS	11468500	1/5/2010	82 A

6. Locate your gauge station flow data. It should be located in column D, that is the data we will need to convert

	A	B	C	D
30	USGS	11468500	1/1/2010	84.3 A
31	USGS	11468500	1/2/2010	196 A
32	USGS	11468500	1/3/2010	152 A
33	USGS	11468500	1/4/2010	109 A
34	USGS	11468500	1/5/2010	82 A
35	USGS	11468500	1/6/2010	65.1 A
36	USGS	11468500	1/7/2010	53.7 A

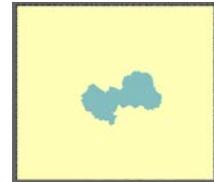
Find your Watershed's mm per day Factor

Each watershed will have its own mm/day factor based on its size. To find this, we will need to know the number of cells in the watershed and the cell size.

1. Open the "Watershed_Gauge_Calculator". Check to make sure you are on the "Find your mm per day factor" tab
2. The green cells indicate cells that you will need to input info into, the orange cell indicates your final output

LEI	0.0007	300.3174200	0.00021473436	0.0003200330.00	00400	3.32000E-07	0.000302302
			0.00	0.00	86400	#DIV/0!	#DIV/0!

3. In cell B9, type the name of the watershed
4. In cell C9, type the number of cells in your watershed
5. In cell D9, type in the cell size of the watershed raster
 -Note: you can find this information by looking at the watershed raster that we exported while making the DEM in a GIS software such as BlueSpray or ArcMap
6. Once this info in input, cell I9 (indicated by orange) will have your watershed's calculated mm per day factor



LEI	0.0007	300.3174200	0.00021473436	0.0003200330.00	00400	3.32000E-07	0.000302302
Made-up place	55452	200.125536	2220865362.79	23905172678.57	86400	3.61428E-06	0.001101633

Convert your Gauge Station data to mm per day

Now we will use the watershed's calculated mm per day factor to convert all the gauge station data to mm per day.

1. Navigate to the "Convert data to mm day tab", your mm/Day factor should have been populated in cell D3
2. Copy and paste all of your gauge station data into the "Discharge" column starting at cell A3
3. Cell B3 should now be populated with the output mm/day

- Click on cell B3, then double click on the bottom right hand corner of the cell to auto populate the cells with the calculated results

	A	B	C	D
	Paste in your gauge station data here	This will be your calculated output for VELMA		Paste in your mm/Day conversion from the other tab
1				
2	Discharge (cfs)	mm/day		mm/Day
3	1000	1.101632703		0.001101633
4	1221			
5	1101			
6	1101			
7	1000			
8	1000			
9	1221			
10	1101			
11	1221			

	A	B	C	D
	Paste in your gauge station data here	This will be your calculated output for VELMA		Paste in your mm/Day conversion from the other tab
1				
2	Discharge (cfs)	mm/day		mm/Day
3	1000	1.101632703		0.001101633
4	1221	1.345093531		
5	1101	1.212897606		
6	1101	1.212897606		
7	1000	1.101632703		
8	1000	1.101632703		
9	1221	1.345093531		
10	1101	1.212897606		
11	1221	1.345093531		

- Column B now contains the gauge station data in the correct units needed for VELMA!
- Put the output data in a new excel file with ONLY the data and save it as a CSV

	A	B
1	1.74578	
2	1.5945	
3	3.358434	
4	12.67733	
5	11.10401	
6	6.293281	
7	4.417399	
8	4.840985	

Your Gauge station data is now ready for VELMA!!