

## 06\_ReducingDATA

Data frequently are added or retrieved from data bases in a 3-column format. For example, groundwater levels from multiple sites might be retrieved as, Site, Date, and water level. 3-column format is more useful where a table is populated sparsely as with water-quality (QW) data.

### Populate table from 3-column data – 01\_3columnQW.xlsx

# Define Table Guides

Our QW example is in the form.  
Site Name, Constituent, and Value.

A table with all constituents from each site on a single row will be created from the 3-column data.

	B	C	D
3	Site Name	Constituent	Value
4	Cave Spring #1	Ca, mg/L	51
5	Cave Spring #1	Cl, mg/L	0.6
6	Cave Spring #1	F, mg/L	0.2
7	Cave Spring #1	HCO3, mg/L	200
8	Cave Spring #1	K, mg/L	0.4
9	Cave Spring #1	Mg, mg/L	10
10	Cave Spring #1	Na, mg/L	1
11	Cave Spring #1	Silica, mg/L	3.9
12	Cave Spring #1	SO4, mg/L	3.4
13	Cave Spring #1	Specific Conductance, uS/cm	240
14	Cave Spring #1	Temperature, deg C	5.3
15	Clark Spring	Ca, mg/L	75
16	Clark Spring	Cl, mg/L	1.5

Copy site names with heading.

Open a new workbook (**Alt, F, N, L**).

Paste Special as values in new book.

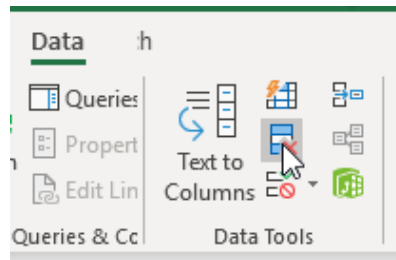
	A
1	Site Name
2	Cave Spring #1
3	Cave Spring #1
4	Cave Spring #1
5	Cave Spring #1
6	Cave Spring #1
7	Cave Spring #1
8	Cave Spring #1
9	Cave Spring #1
10	Cave Spring #1
11	Cave Spring #1
12	Cave Spring #1
13	Clark Spring
14	Clark Spring
15	Clark Spring
16	Clark Spring

Select pasted range.

Select Data tab on ribbon,

Select “Remove Duplicates” tool,

(Alt, A, M)



“Remove Duplicates” form will appear.

Check “My data has headers.

Click OK.

Dismiss message box.

Copy range **A1:A37**.

A screenshot of an Excel spreadsheet. Column A is selected, and rows 1 through 12 are visible. The data in column A is as follows:

1	Site Name
2	Cave Spring #1
3	Clark Spring
4	Craig Ranch Country Club #2
5	Deer Cr Picnic Area Spg
6	Deer Creek Spring #1
7	Deer Creek Spring #2
8	East Spring #2
9	G.P. Apex Well
10	Gilbert Well
11	Grapevine Springs
12	GS-13 Franklin Lake Nr Death Valley

Return to workbook,  
01\_3columnQW.xlsx.

Paste Special as Values in cell G3.

A screenshot of an Excel spreadsheet. The 'Paste Special' dialog box is open, and the 'Values' option is selected under the 'Paste' section. The dialog box is positioned over a spreadsheet where column G is selected, and rows 3 through 7 are visible. The data in column G is as follows:

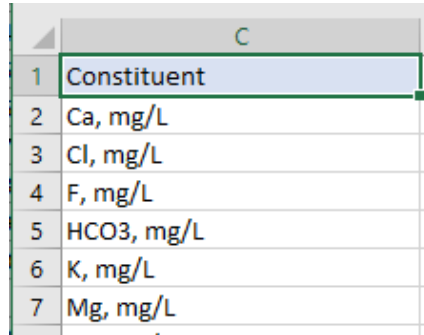
3	Site Name
4	Cave Spring #1
5	Clark Spring
6	Craig Ranch Country Club #2
7	Deer Cr Picnic Area Spg

Copy Constituents from range **C2:C529**  
on QW page in 01\_3columnQW.xlsx.

A screenshot of an Excel spreadsheet. Column C is selected, and rows 3 through 11 are visible. The data in column C is as follows:

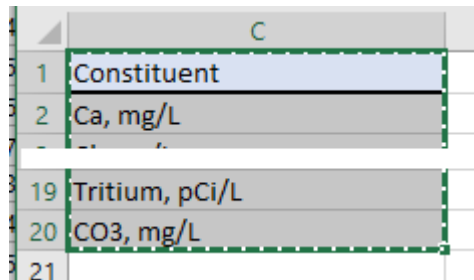
3	Constituent
4	Ca, mg/L
5	Cl, mg/L
6	F, mg/L
7	HCO3, mg/L
8	K, mg/L
9	Mg, mg/L
10	Na, mg/L
11	Silica, mg/L

Select cell C1 in new workbook.  
Paste Special as values in new book.



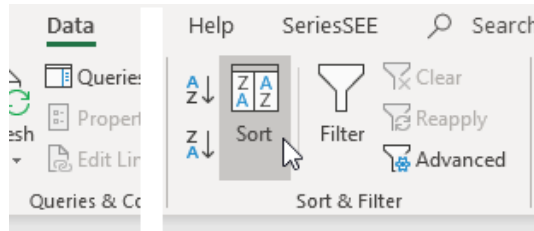
1	Constituent
2	Ca, mg/L
3	Cl, mg/L
4	F, mg/L
5	HCO3, mg/L
6	K, mg/L
7	Mg, mg/L

Reduce to list of unique constituents with  
"Remove Duplicates"  
Select range **C1:C20**.

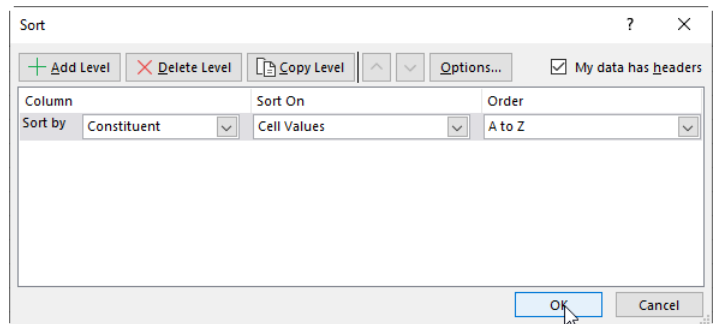


1	Constituent
2	Ca, mg/L
...	...
19	Tritium, pCi/L
20	CO3, mg/L
21	

Select Data tab on ribbon,  
Select "Remove Duplicates" tool,  
(Alt, A, SS)

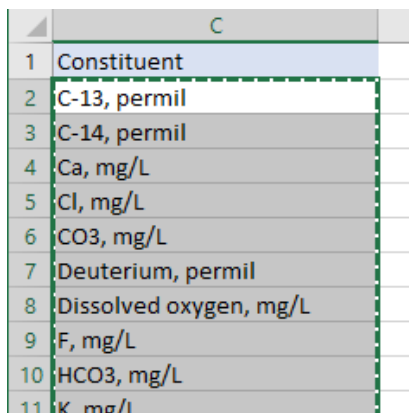


Click OK on "Sort" form to sort.



Copy range **C2:C20** into memory.

Do NOT include header, **C1**.



A screenshot of an Excel spreadsheet. Column C is selected, and the range C2:C20 is highlighted with a green dashed border. The cells contain the following text:

1	Constituent
2	C-13, permil
3	C-14, permil
4	Ca, mg/L
5	Cl, mg/L
6	CO3, mg/L
7	Deuterium, permil
8	Dissolved oxygen, mg/L
9	F, mg/L
10	HCO3, mg/L
11	K, mg/L

Return to workbook,  
01\_3columnQW.xlsx.

Paste Special to cell H3.

Select as Values and Transpose.

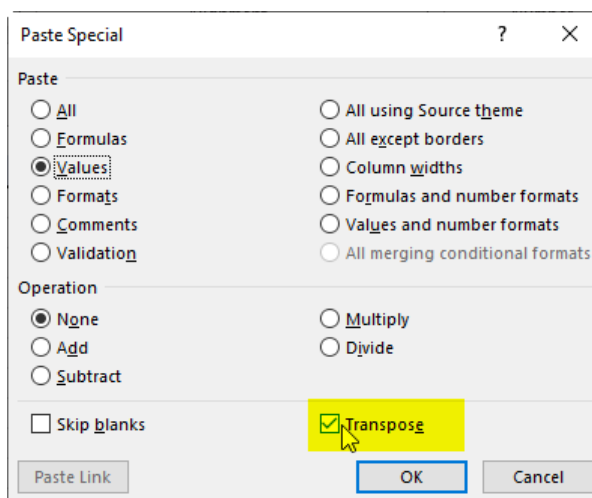
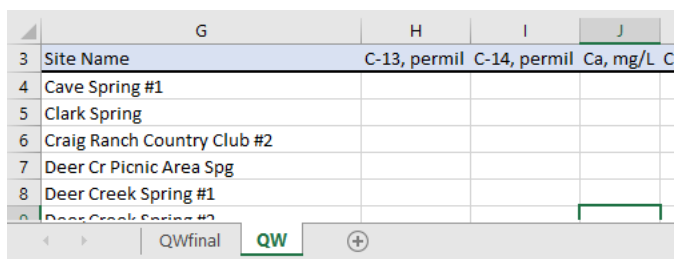


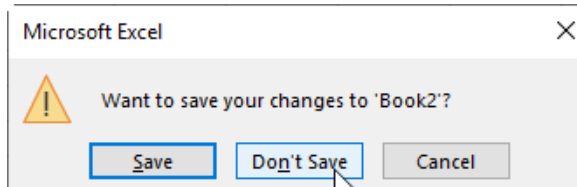
Table guides are defined.



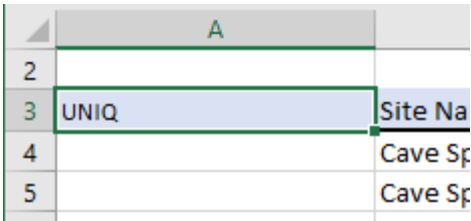
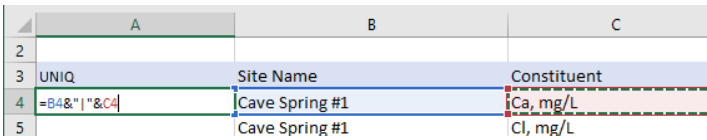
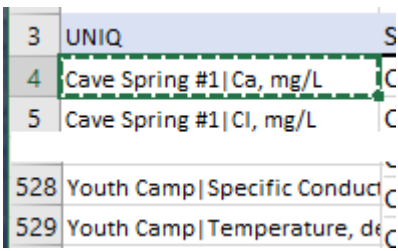
A screenshot of an Excel spreadsheet showing a table with 4 columns (G, H, I, J) and 8 rows (3-10). The table contains the following data:

3	Site Name	C-13, permil	C-14, permil	Ca, mg/L	Cl, mg/L
4	Cave Spring #1				
5	Clark Spring				
6	Craig Ranch Country Club #2				
7	Deer Cr Picnic Area Spg				
8	Deer Creek Spring #1				
9	Deer Creek Spring #2				
10	Deer Creek Spring #3				

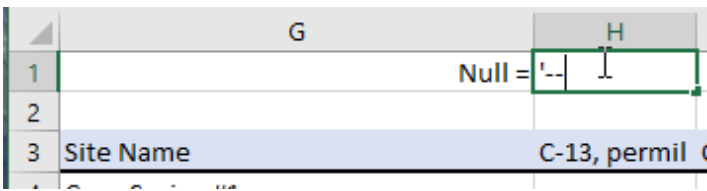
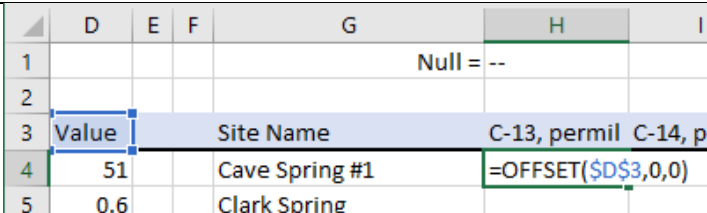
Close the new workbook without saving.

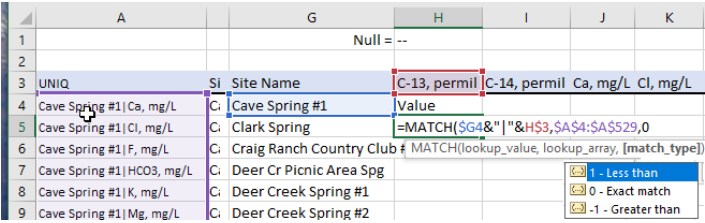
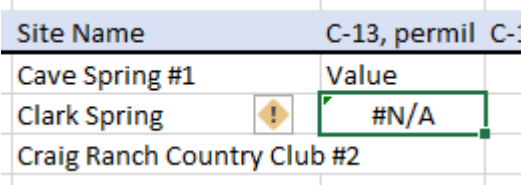
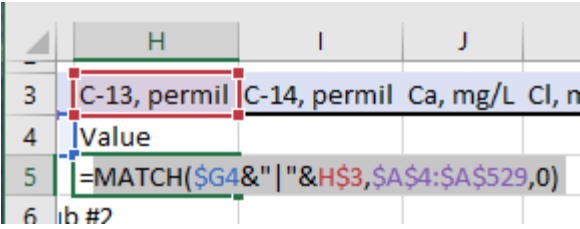
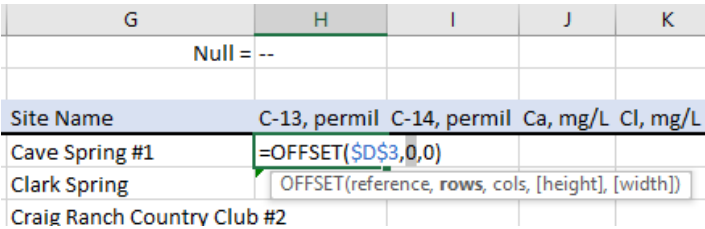
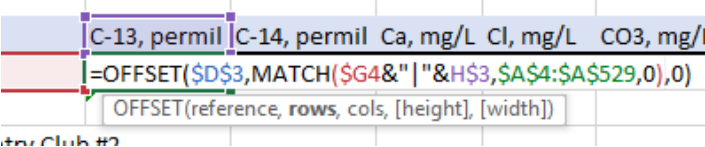
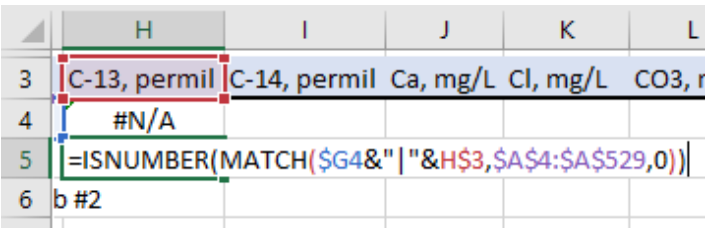


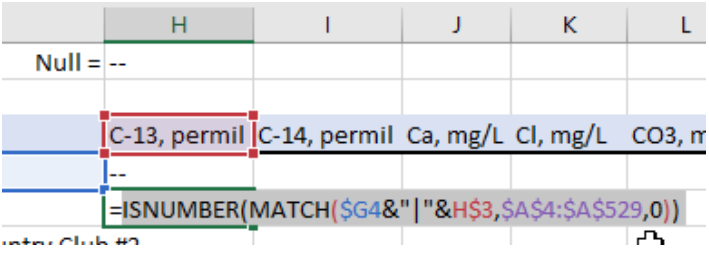
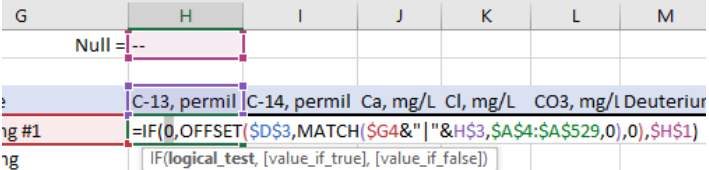
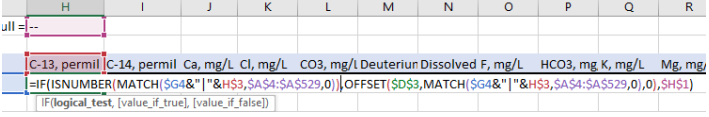
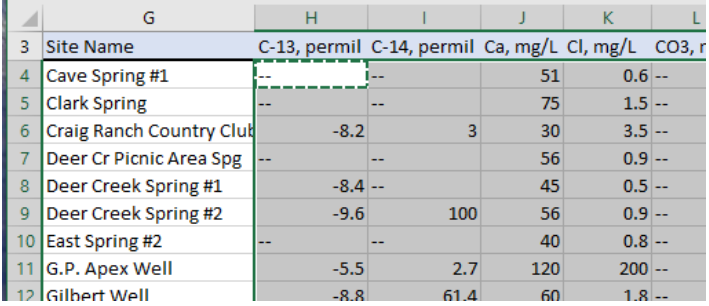
## Populate table from 3-column data – 01\_3columnQW.xlsx

Add Unique Identifiers to 3-Column Data	
Label new column "UNIQ" in cell <b>A3</b> .	
Concatenate Site Name and Constituent in column <b>A</b> . Add formula, " <code>=B4&amp;" "&amp;C4</code> " to cell <b>A4</b> .	
Copy cell <b>A4</b> . Paste to range <b>A4:A529</b> .	

## Populate table from 3-column data – 01\_3columnQW.xlsx

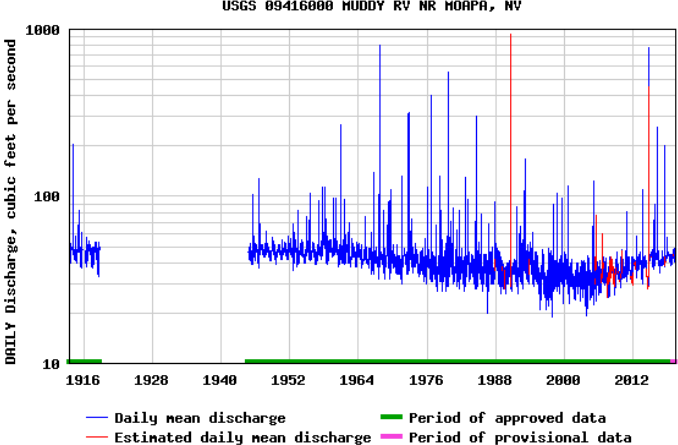
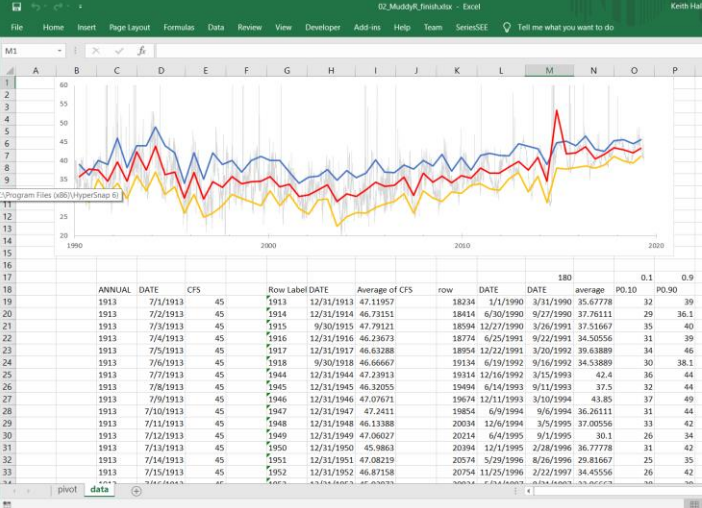
Populate table from 3-Column Data	
Define null value in cell <b>H1</b> . Note leading apostrophe (') before – Define with "Null =" in cell <b>G1</b> .	
Add indirect reference to cell <b>H4</b> , " <code>=OFFSET(\$D\$3,0,0)</code> ".	

<p>Add equation to find entry in 3-column data in cell <b>H5</b>,  <code>"=MATCH(\$G4&amp;" "&amp;H\$3,\$A\$4:\$A\$529,0)"</code>.</p> <p>Absolute and relative references mixed because of guides spanning columns and rows.</p> <p><b>Note:</b> Equation is on wrong row. This is a temporary location as we build parts for final equation.</p>	
<p>MATCH returns an error because, Cave Spring #1 C-13, permit does not exist.</p>	
<p>Open cell <b>H5</b> for editing with F2.</p> <p>Highlight equation without = sign, <code>"MATCH(\$G4&amp;" "&amp;H\$3,\$A\$4:\$A\$529,0)"</code></p> <p>Copy, <b>ctrl+c</b>, text string into memory.</p> <p>Close cell <b>H5</b>.</p>	
<p>Open cell <b>H4</b> for editing with F2.</p> <p>Highlight rows entry in OFFSET function.</p>	
<p>Paste, <b>ctrl+v</b>, text string into rows entry.</p> <p>Close cell <b>H4</b>.</p>	
<p>Open cell <b>H5</b> for editing with F2.</p> <p>Expand formula by encapsulating with ISNUMBER function, <code>"=ISNUMBER(MATCH(\$G4&amp;" "&amp;H\$3,\$A\$4:\$A\$529,0))"</code></p> <p>Close cell <b>H5</b>.</p>	

<p>Open cell <b>H4</b> for editing with F2.</p> <p>Expand formula by encapsulating with IF function,</p> <p><b>"=IF(0,</b>  <b>OFFSET(\$D\$3,MATCH(\$G4&amp;" "&amp;H\$3,\$A\$4:\$A\$529,0),0)</b>  <b>,SH\$1)"</b></p> <p>Close cell <b>H4</b>.</p>	
<p>Open cell <b>H5</b> for editing with F2.</p> <p>Highlight equation without = sign,  <b>"ISNUMBER(MATCH(\$G4&amp;" "&amp;H\$3,\$A\$4:\$A\$529,0))"</b></p> <p>Copy, <b>ctrl+c</b>, text string into memory.</p> <p>Close cell <b>H5</b>.</p>	
<p>Open cell <b>H4</b> for editing with F2.</p> <p>Highlight logical_test entry in IF function.</p>	
<p>Paste, <b>ctrl+v</b>, text string into logical_test entry.</p> <p>Resulting formula is,  <b>"=IF(ISNUMBER(MATCH(\$G4&amp;" "&amp;H\$3,\$A\$4:\$A\$529,0)),OFF</b>  <b>SET(\$D\$3,MATCH(\$G4&amp;" "&amp;H\$3,\$A\$4:\$A\$529,0),0),SH\$1)"</b></p> <p>Close cell <b>H4</b>.</p>	
<p>Copy cell <b>H4</b>.</p> <p>Paste to range <b>H4:Z39</b>.</p> <p>Table is populated with null entries if a constituent is absent at a site.</p>	

Data from browsers or text files frequently must be parsed into columns for analysis. are added or retrieved from data bases in a 3-column format. Daily discharges from the gage [09416000 MUDDY RV NR MOAPA, NV](#) are parsed with [text to columns](#) function as an example.

## Reduce daily data with Pivot table & Match+Offset – 02\_MuddyR\_finish.xlsx

Get and Parse Data	
<p>Get discharge data for gage, <a href="#">09416000 MUDDY RV NR MOAPA, NV</a></p>	
<p>Open 02_MuddyR_finish.xlsx as a guide and open Excel.</p>	



Open a new workbook (**Alt, F, N, L**).

Select cell **A1**.

	A	B	C	D
1				
2				
3				
4				
5				
6				

Put cursor in browser window.

Type **Ctrl+A** to select all.

Type **Ctrl+C** to copy selection.

https://waterdata.usgs.gov/nwis/ x +  
← → ↻ https://waterdata.usgs.gov/nwis/dv?cb\_00060=on&format=rdb&site\_no=09416000&referr

```
#----- WARNING -----  
# Some of the data that you have obtained from this U.S. Geological Survey database  
# may not have received Director's approval. Any such data values are qualified  
# as provisional and are subject to revision. Provisional data are released on the  
# condition that neither the USGS nor the United States Government may be held liable  
# for any damages resulting from its use.  
# Additional info: https://help.waterdata.usgs.gov/policies/provisional-data-statement  
# File-format description: https://help.waterdata.usgs.gov/faq/about-tab-delimited-output  
# Automated-retrieval info: https://help.waterdata.usgs.gov/faq/automated-retrievals  
# Contact: gs-w_support_nwisweb@usgs.gov  
# retrieved: 2019-06-05 20:21:58 EDT (cann02)  
# Data for the following 1 site(s) are contained in this file  
# USGS 09416000 MUDDY RV NR MOAPA, NV  
#-----  
# Data provided for site 09416000  
# TS parameter statistic Description  
# 102236 00060 00003 Discharge, cubic feet per second (Mean)  
#-----  
# Data-value qualification codes included in this output:  
# A Approved for publication -- Processing and review completed.  
# P Provisional data subject to revision.  
# e Value has been estimated.  
#  
agency_cd site_no datetime 102236 00060 00003 102236 00060 00003 cd  
ps 15s 20d 14n 10s  
USGS 09416000 1913-07-01 45.0 A  
USGS 09416000 1913-07-02 45.0 A  
USGS 09416000 1913-07-03 45.0 A  
USGS 09416000 1913-07-04 45.0 A  
USGS 09416000 1913-07-05 45.0 A  
USGS 09416000 1913-07-06 45.0 A  
USGS 09416000 1913-07-07 45.0 A
```

Paste **Ctrl+v** to new workbook.

	A	B
1	#	
2	# Some of the data that y	
3	# may not have received	
4	# as provisional and are s	
5	# condition that neither th	
6	# for any damages resulti	
7	#	
8	# Additional info: https://h	
9	#	

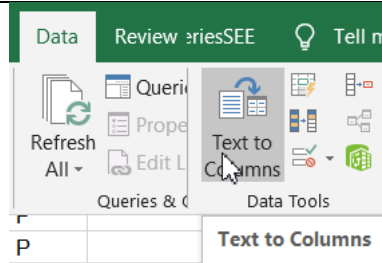
Delete range **A1:A31**.

	A	B	C	D	E
1	#				WARNING
2	# Some of the data that you have obtained from this l				
31	5s 15s	20d 14n 10s			
32	USGS 09416000	1913-07-01	45.0	A	

Select range **A32:A38721**.

	A	B	C	D	E
32	USGS	09416000	1913-07-01	45.0	A
33	USGS	09416000	1913-07-02	45.0	A
38720	USGS	09416000	2019-06-03	40.5	F
38721	USGS	09416000	2019-06-04	40.4	F

Select Data tab on ribbon,  
Select “Text to Columns” tool,  
(Alt, A, E)



“Convert Text to Columns Wizard” form will appear.

Select Delimited.

Click Next.

Convert Text to Columns Wizard - Step 1 of 3

The Text Wizard has determined that your data is Fixed Width.  
If this is correct, choose Next, or choose the data type that best describes your data.

Original data type

Choose the file type that best describes your data:

☒ Delimited - Characters such as commas or tabs separate each field.  
☐ Fixed width - Fields are aligned in columns with spaces between each field.

Preview of selected data:

32	USGS	09416000	1913-07-01	45.0	A
33	USGS	09416000	1913-07-02	45.0	A
34	USGS	09416000	1913-07-03	45.0	A
35	USGS	09416000	1913-07-04	45.0	A
36	USGS	09416000	1913-07-05	45.0	A
37	USGS	09416000	1913-07-06	45.0	A

Cancel < Back Next > Finish

Check Space.

Click Next.

Convert Text to Columns Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

☒ Tab  
☐ Semicolon  
☐ Comma  
☒ Space  
☐ Other:

☒ Treat consecutive delimiters as one

Text qualifier: " " >

Data preview

USGS	09416000	1913-07-01	45.0	A
USGS	09416000	1913-07-02	45.0	A
USGS	09416000	1913-07-03	45.0	A
USGS	09416000	1913-07-04	45.0	A
USGS	09416000	1913-07-05	45.0	A
USGS	09416000	1913-07-06	45.0	A

Cancel < Back Next > Finish

Click Finish on step 3 of 3 in  
“Convert Text to Columns Wizard” form.

Convert Text to Columns Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

☒ Tab  
☐ Semicolon  
☐ Comma  
☒ Space  
☐ Other:

☒ Treat consecutive delimiters as one

Text qualifier: "


Data preview

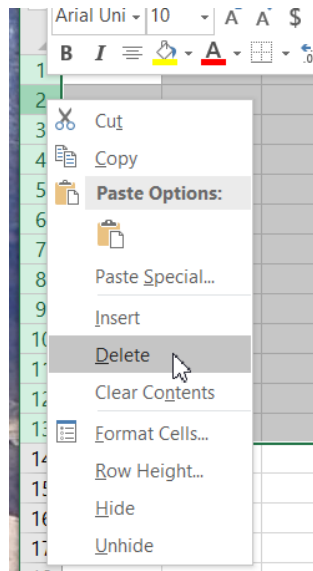
USGS	09416000	1913-07-01	45.0	A
USGS	09416000	1913-07-02	45.0	A
USGS	09416000	1913-07-03	45.0	A
USGS	09416000	1913-07-04	45.0	A
USGS	09416000	1913-07-05	45.0	A
USGS	09416000	1913-07-06	45.0	A

Cancel < Back Next > Finish

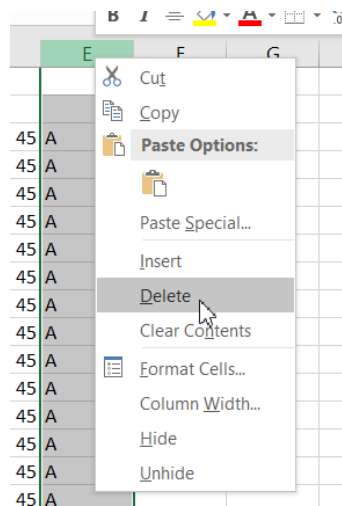
Delete first 13 rows by  
Highlighting rows 1 and 13.

	A	B	C
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Right-click while arrow (  ) appears.  
Select Delete option on form.



Delete column E



Select range **A19:B38708**.

Clear contents.

38703	USGS	9416000	#####
38704	USGS	9416000	#####
38705	USGS	9416000	6/1/2019
38706	USGS	9416000	6/2/2019
38707	USGS	9416000	6/3/2019
38708	USGS	9416000	6/4/2019
38709			

Add headers DATE and CFS to cells **C18** and **D18**.

	C	D
18	DATE	CFS
19	7/1/1913	45

Select range **C18:D38708**.

	C	D
18	DATE	CFS
19	7/1/1913	45
20	7/2/1913	45
38707	6/3/2019	40.5
38708	6/4/2019	40.4

Sort data by CFS.

Go to last cell in CFS column after sorting, cell **D28998**.

	C	D
28997	9/7/1967	810
28998	8/16/1990	930
28999	10/1/1915	
29000	10/2/1915	

Select dates without flow data and delete.

Range **C28999:C38708**.

	C
38707	9/29/1944
38708	9/30/1944

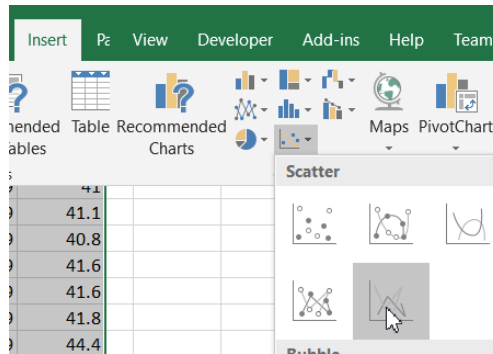
Select range **C18: D28998**.

	C	D
18	DATE	CFS
19	10/10/1997	19
20	10/6/2003	19.4
21	10/7/2003	19.6
22	10/13/2003	19.7

Sort data by DATE.

	C	D
17		
18	DATE	CFS
19	7/1/1913	45
20	7/2/1913	45
21	7/3/1913	45
22	7/4/1913	45

Add XY chart of DATE and CFS.  
Select "Scatter with Straight Lines."



Format X-axis.  
Begin 1/3/1910,  
End 1/15/2020,  
Major units, 3653.  
Minor units, 1826.5

**Axis Options**

Bounds

Minimum 3656.0 Reset

Maximum 43845.0 Reset

Units

Major 3653.0 Reset

Minor 1826.5 Reset

Custom format X-axis number to "yyyy".

**Number**

Category Custom

Type yyyy

Format Code yyyy

☐ Linked to source

Add

Format Y-axis.

Minimum = 20

Maximum = 60.

Axis Options

Bounds

Minimum 20.0 Reset

Maximum 60.0 Reset

Format data series.

Light grey color with a weight of 0.25 pts.

Line

☐ No line

☒ Solid line

☐ Gradient line

☐ Automatic

Color

Transparency

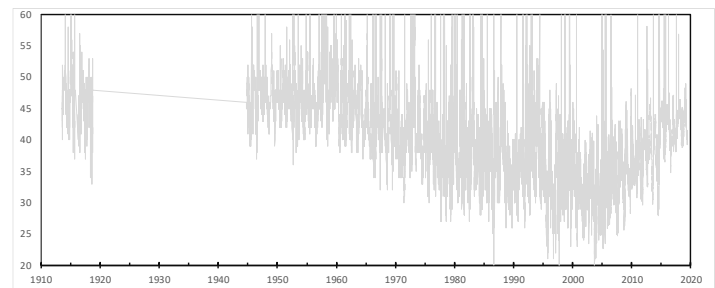
Width

Compound type

Dash type

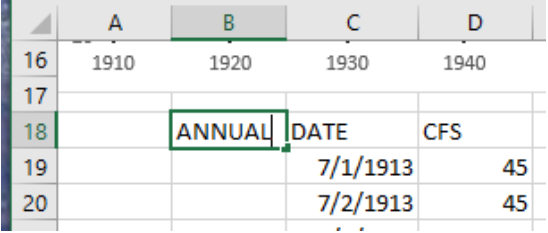
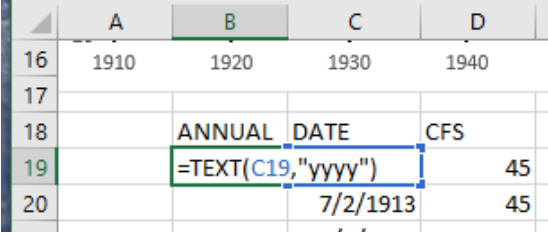
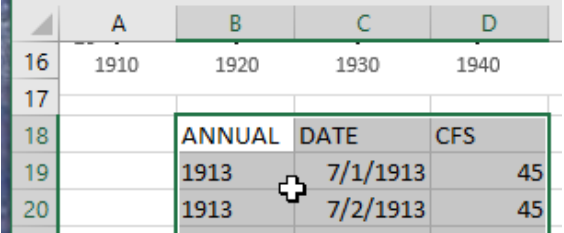
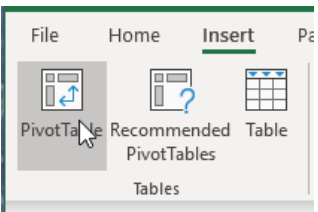
Theme Colors

Finished plot before reducing data.



Pivot tables are a fast approach for reducing data and work best when desired outcome is known *a priori*. Data reduction with pivot tables is limited to sum, count, max, min, product, count numbers, standard deviation, and variance.

## Reduce daily data with Pivot table & Match+Offset – 02\_MuddyR\_finish.xlsx

Reduce to Annual Average Discharges with Pivot Table	
Add header "ANNUAL" in cell <b>B18</b> .	
Add equation, <code>=TEXT(C19,"yyyy")</code> to cell <b>B19</b> .  Copy B19 with equation to range <b>B19:B28998</b> .	
Select range <b>B19:D28998</b> .	
Select Insert tab on ribbon, Select "Pivot Table" tool, <b>(Alt, N, V)</b>	

"Create Pivot Table" form will appear.

A new worksheet will be added with Pivot table after clicking OK.

New worksheet with Pivot table.

Drag ANNUAL field to Rows.



Add DATE and CFS fields to Values in lower, right corner.

Select “Count of DATE”  
Select “Value Field Settings...” from dialog.

“Value Field Settings” form will appear.  
Change Count to Average.  
Click OK.

Change “Sum of CFS” to “Average of CFS”.

Select range **Sheet2!B3:C85**.

Copy into memory.

	A	B	C
3	Row Labels	Average of DATE	Average of CFS
4	1913	5022.5	47.11956522
5	1914	5297	46.73150685
...	...	...	...
84	2018	43283	42.57150685
85	2019	43543	43.22322581

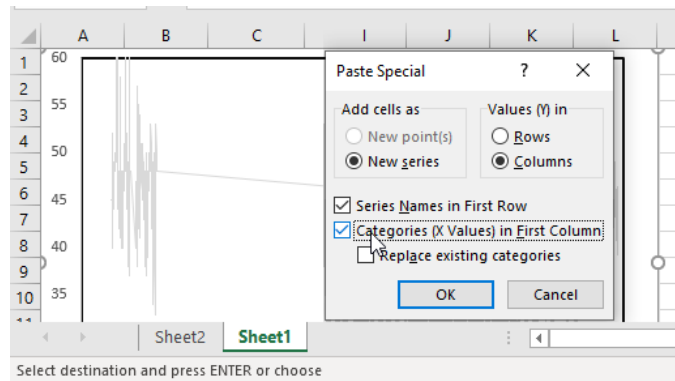
Select Sheet1.

Select XY chart on Sheet1 and paste special.

Check,

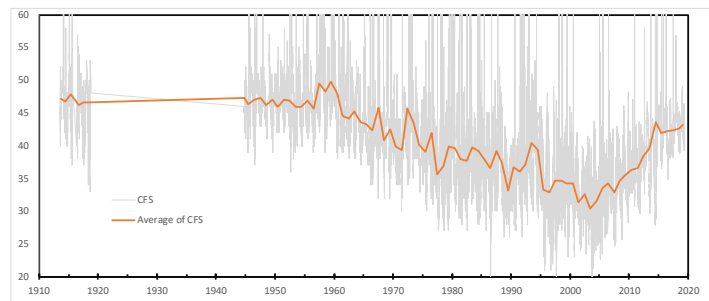
“Categories (X Values) in First Column.”

Click OK.



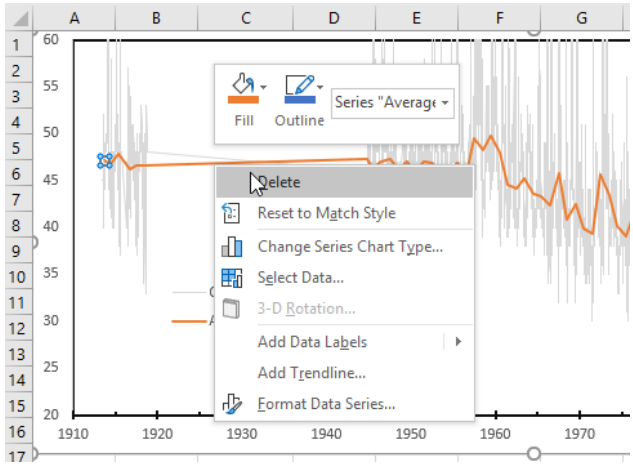
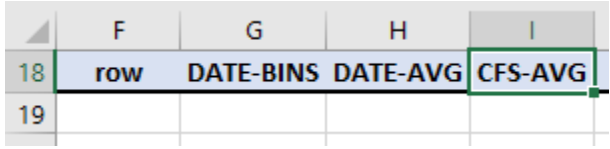
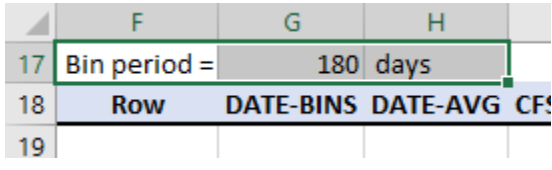
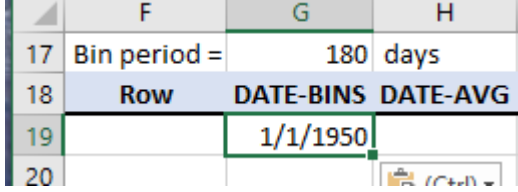
Add Legend.

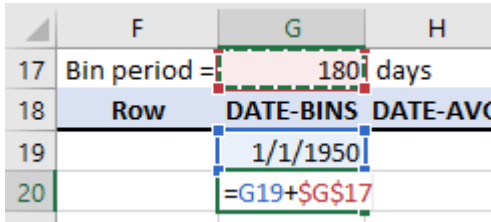
Chart with daily and average annual discharges appears as,

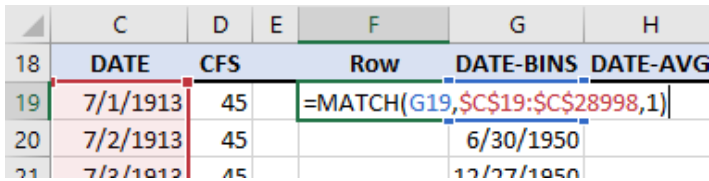


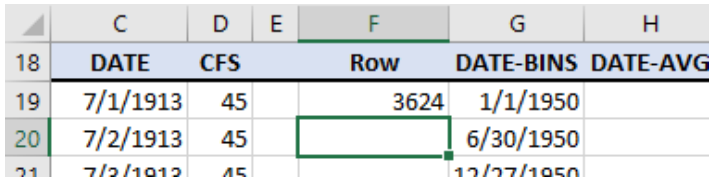
Pivot tables are fast, but not as well suited to quick experimentation. MATCH and OFFSET functions allow for flexibly defining ranges, which allows reduction with any statistical function in Excel. Volatile calculation is both a benefit and penalty. This translates into instantaneous results with “small” data sets and never seeing an answer with “large” data sets. Small and large are defined by each user’s threshold for pain as latency increases. Waiting more than a couple of seconds qualifies as painfully large for me.

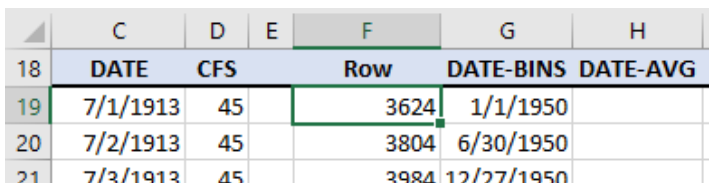
## Reduce daily data with Pivot table & Match+Offset – 02\_MuddyR\_finish.xlsx

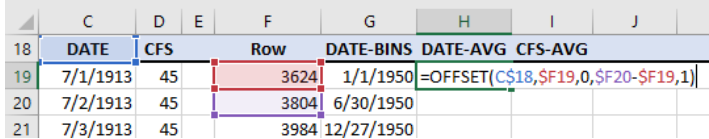
Reduce Arbitrary Average Discharges with MATCH+OFFSET	
Delete “Average of CFS” from previous exercise.	
Add headers, Row, DATE-BINS, DATE-AVG, and CFS-AVG to range F18:I18.	
Label and define bin periods in days. Add, Bin period =, 180, and “ days” to range F17:H17.	
Specify beginning of period of analysis in cell G19, 1/1/1950	

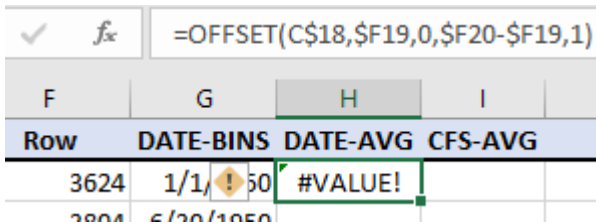
Increment bin edges with equation, “=G19+\$G\$17” in cell <b>G20</b> .	
Copy cell <b>G20</b> .	
Paste to range <b>G20:G239</b> .	

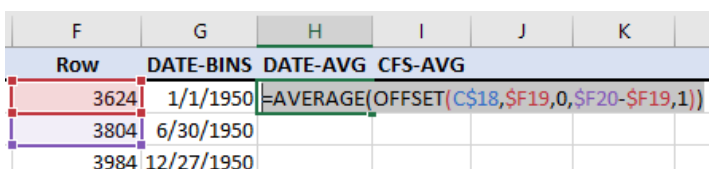
Find occurrence of edges in original data set, range <b>C19: C28998</b> with MATCH function.	
Add “=MATCH(G19,\$C\$19:\$C\$28998,1)” to cell <b>F19</b> .	

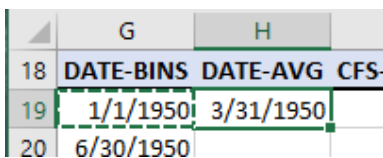
Response of indicates that 1/1/1950 equals 3,624 <sup>th</sup> row in the range <b>\$C\$19:\$C\$28998</b> or falls between values in 3,624 <sup>th</sup> and 3,625 <sup>th</sup> rows.	
--	--

Copy cell <b>F19</b> .	
Paste to range <b>F19:F239</b> .	

Range of times in first bin is defined in cell <b>H19</b> , =OFFSET(C\$18,\$F19,0,\$F20-\$F19,1).	
---	--

This returns an error, #VALUE!, because the range references 200 cells without being reduced by a statistical function.	
---	--

Type F2 to open cell <b>H19</b> for editing.	
Revise equation to, “=AVERAGE(OFFSET(C\$18,\$F19,0,\$F20-\$F19,1))”, where bold characters were added to formula.	

Copy cell <b>G19</b> .	
Paste Special formats to cell <b>H19</b> . (Alt H, V, S, t, return)	

Copy cell **H19**.

Paste Special formulas to cell **I19**.  
(Alt H, V, S, f, return)

Copy range **H19:I19**.

Paste to range **H19:I239**.

	G	H	I
18	DATE-BINS	DATE-AVG	CFS-AVG
19	1/1/1950	3/31/1950	46.35
20	6/30/1950		
21	9/27/1950		

Copy range **H18:I239**.

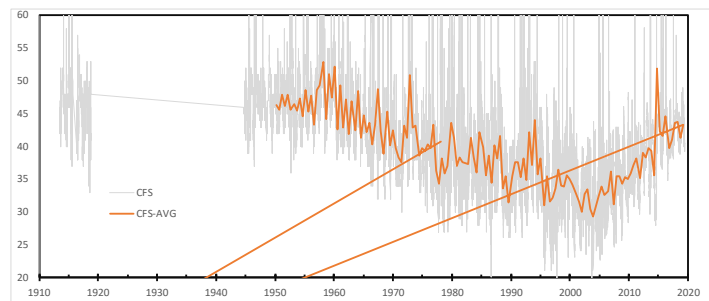
Select XY chart and paste special.

Check, "Categories (X Values) in First Column."

Click OK.

	H	I
17	days	
18	DATE-AVG	CFS-AVG
19	3/31/1950	46.35
20	9/27/1950	45.59444
21	3/26/1951	47.85556
22	6/22/1951	46.15

New series resembles expected averages except for 2 lines that appear to go to (0,0).



2 lines results from errors when bin edges extend beyond available data.

#REF! is returned because we asked for an average with N=0.

Need to revise equations with IF function to trap errors.

	F	G	H	I	J	K	L
158	28644	7/3/2018	9/30/2018	41.29778			
159	28824	12/30/2018	3/17/2019	43.25833			
160	28980	6/28/2019	=AVERAGE(OFFSET(C\$18,\$F160,0,\$F161-\$F160,1))				
161	28980	12/25/2019	#REF!	#REF!			
162	28980	6/22/2020	#REF!	#REF!			

Type F2 to open cell **H19** for editing.

Revise equation to, "**=IF(\$F20>\$F19, AVERAGE(OFFSET(C\$18,\$F19,0,\$F20-\$F19,1)),H18)**", where bold characters were added to formula.

	F	G	H	I	J	K	L	M
18	Row	DATE-BINS	DATE-AVG	CFS-AVG				
19	3624	1/1/1950	=IF(\$F20>\$F19,AVERAGE(OFFSET(C\$18,\$F19,0,\$F20-\$F19,1)),H18)					
20	3804	6/30/1950	9/27/1950	45.59444				
21	3984	12/27/1950	3/26/1951	47.85556				
22	4164	6/25/1951	9/22/1951	46.15				

Copy cell **H19**.

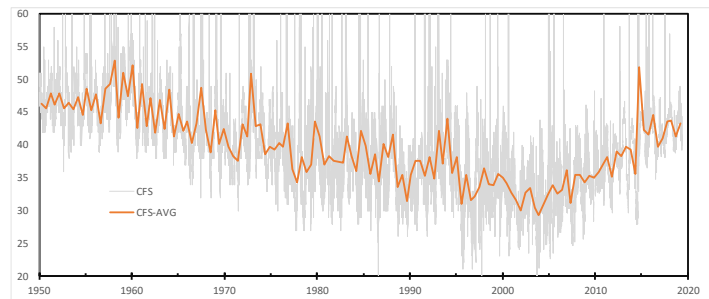
Paste Special formulas to range **H19:I239**.  
(Alt H, V, S, f, return)

Error is trapped with revised formula and last valid calculation is repeated when bin edges extend beyond available data.

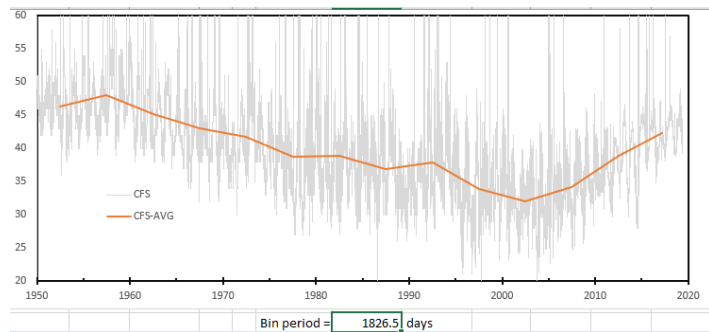
	F	G	H	I	J
158	28644	7/3/2018	9/30/2018	41.29778	
159	28824	12/30/2018	3/17/2019	43.25833	
160	28980	6/28/2019	3/17/2019	=IF(\$F161>\$F160,A\	
161	28980	12/25/2019	3/17/2019	43.25833	
162	28980	6/22/2020	3/17/2019	43.25833	
163	28980	12/19/2020	3/17/2019	43.25833	

Erroneous lines were removed from XY chart.

**NOTE:** Format of X-axis revised to begin 1/3/1950 to coincide with period of analysis.



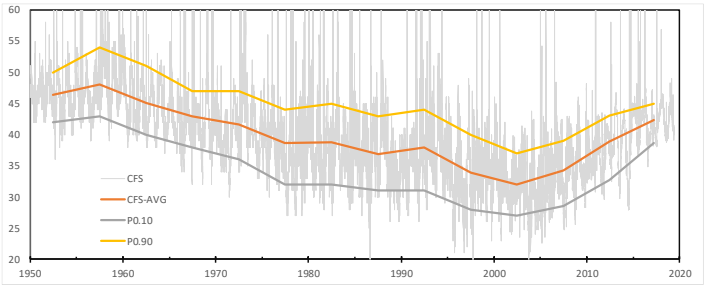
Changing Bin period to 1826.5 days instantly shows 5-year averages instead of the previous 0.5-year averages.



## Reduce daily data with Pivot table & Match+Offset – 02\_MuddyR\_finish.xlsx

Reduce Discharges with Other Statistics	
<p>Daily data also can be reduced with percentiles.</p> <p>Add lower bound in cell <b>J17</b>.</p>	
<p>Add header to cell <b>J18</b> with an equation that reports specified percentile,  <code>"=P"&amp;TEXT(J17,"0.00")</code></p>	
<p>Add formula to cell <b>J19</b>,  <code>"=IF(\$F20&gt;\$F19,PERCENTILE.INC(OFFSET(\$D\$18,\$F19,0,\$F20-\$F19,1),J\$17),J18)"</code></p> <p>Formula similar to averages but changed where bold.</p>	
<p>Add upper bound in cell <b>K17</b> with,  <code>"=1-J17"</code>.</p>	
<p>Copy header and percentile equations in range <b>J18:J19</b>.</p> <p>Paste to range <b>K18:K19</b>.</p>	
<p>Copy percentile equations in range <b>J19:K19</b>.</p> <p>Paste to range <b>J19:K239</b>.</p>	

Add series to XY chart.



Changing percentiles from  
0.100—0.900 to  
0.025—0.975 is reflected instantly.

