Excel for Hydrology

Section 2
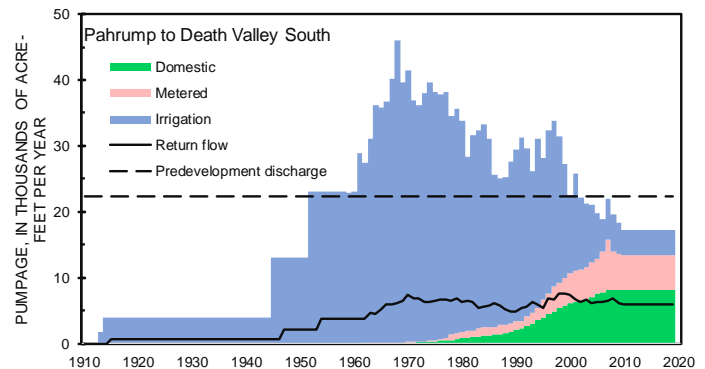
— • —

PLOTTING

Table of Contents

02_Plotting

Useful Chart types

Column, line, and XY charts the most useful with XY charts being most versatile. Column or bar charts are good for displaying regularly spaced data where showing the area under the curve facilitates interpretation.
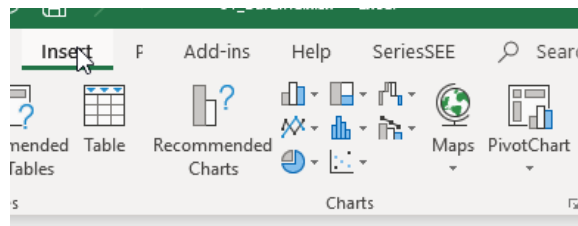
Stacked columns and lines – 01_BarLine.xlsx

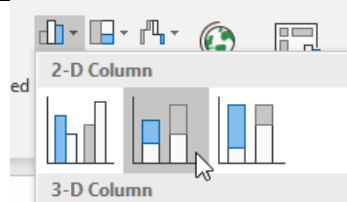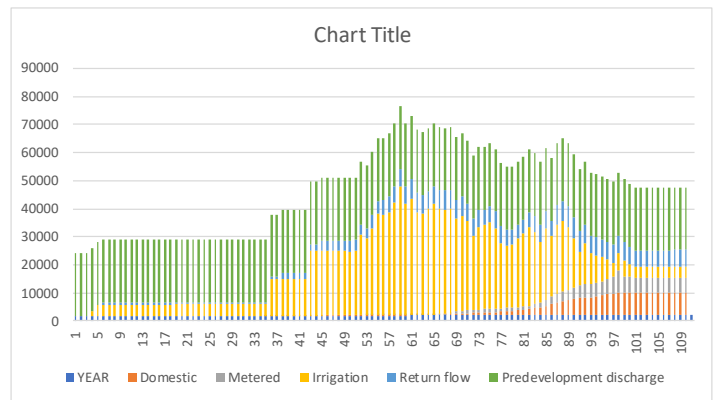|	
Creating basic elements of the adjacent plot from data in the file 01_BarLine.xlsx follow.	
Highlight range A16:F127.	
Select Insert tab on ribbon for chart options.	
Select stacked column format. Cut new chart and paste in cell A1.	

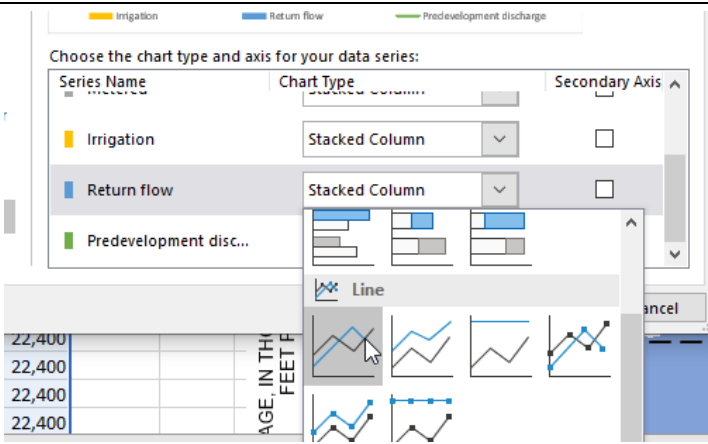|	
New chart appears as,	
Select "Predevelopment discharge" series. Right-click to activate dialog. Select "Change Series Chart Type..." from dialog.	
Change "Predevelopment discharge" series from "Stacked column" to "line".	
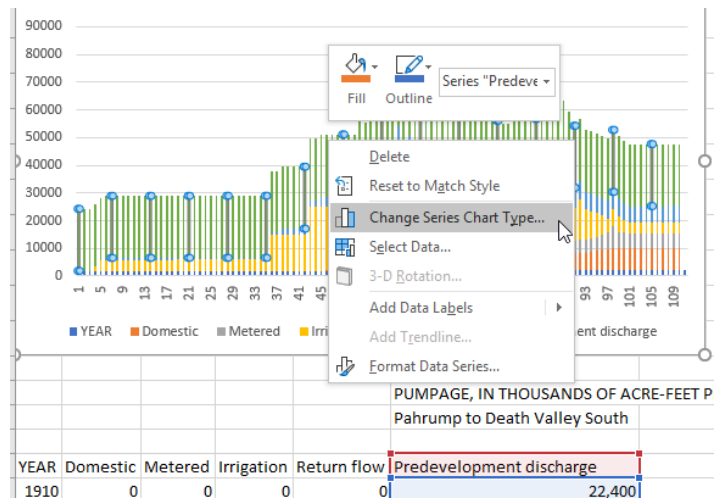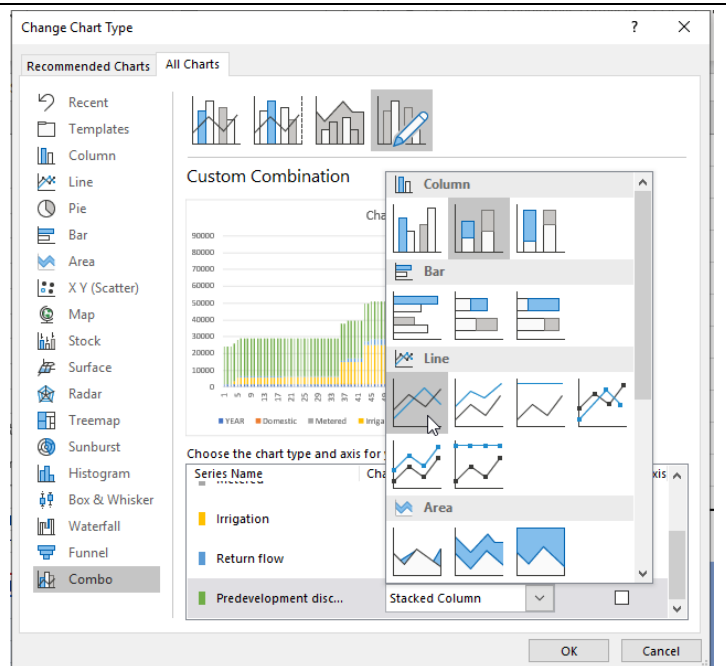
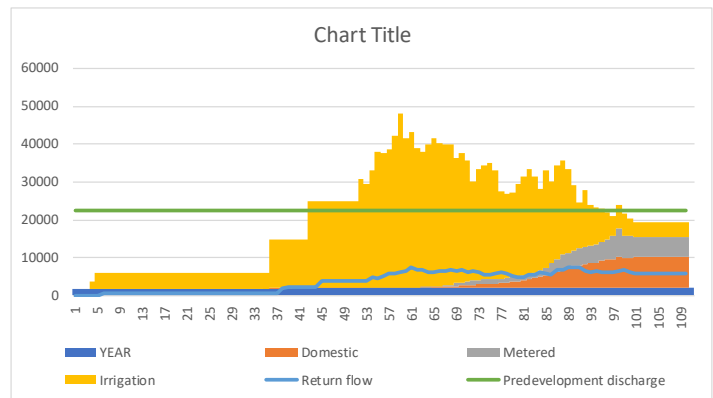|	
Also change "Return flow" series from "Stacked column" to "line".	
Select "Irrigation" series. Right-click to activate dialog. Select "Format Data Series…" from dialog.	
Select "Series Options," Rightmost symbol, Set "Gap Width" to 0%.	
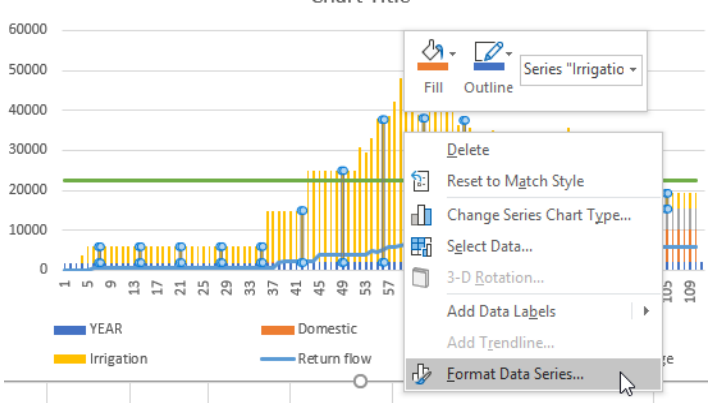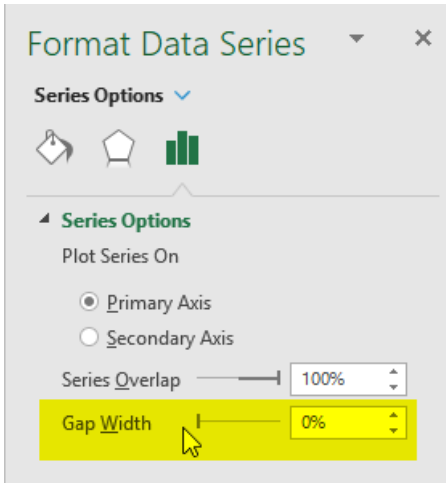
Basic elements exist, but X-axis is wrong. "YEAR" was interpreted as a time series rather than labels.	
Select chart so that "Chart Tools" appear in ribbon. Select "Select Data" from "Design" tab under "Chart Tools" "Select Data Source" form will appear.	
Select "YEAR" series on the "Select Data Source" form. Click "Remove" button to eliminate the "YEAR" series.	
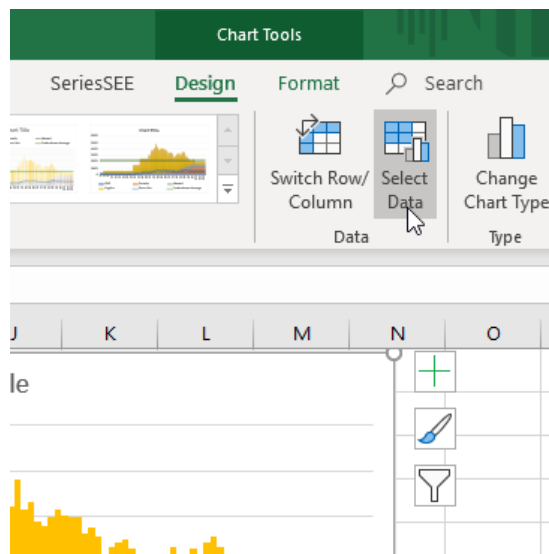
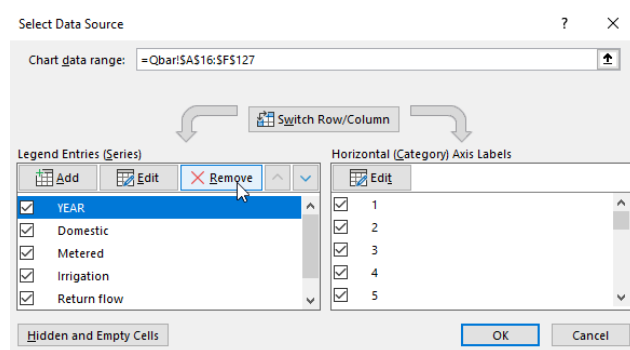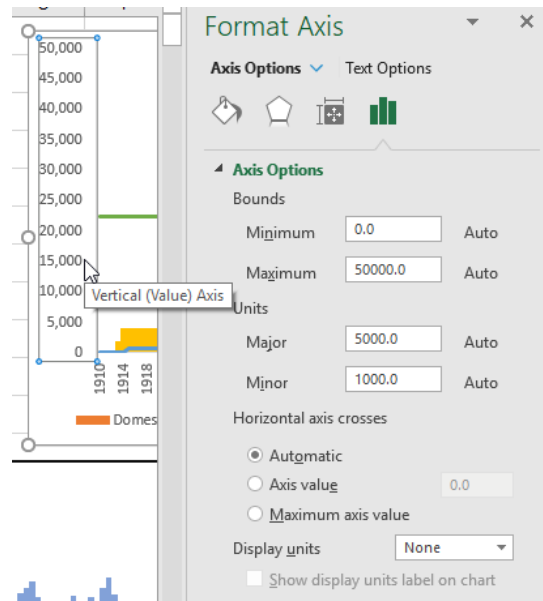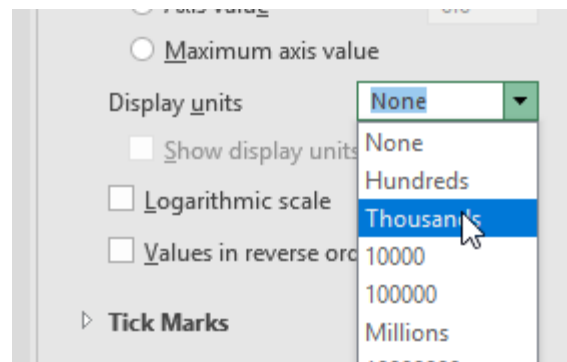|	
Select another series (Domestic in this example). Click "Edit" under "Horizontal Category Axis Labels.	
The "Axis Labels" form will appear.	
Graphically select or type the range "Qbar!\$A\$17:\$A\$127". Click "OK" on the "Axis Labels" and "Select Data Source" forms until all forms are closed.	
Select Y-axis. Activate "Format Axis" dialog by either, Right-clicking to activate dialog and selecting "Format Axis…" from dialog, or Type ctrl+1.	

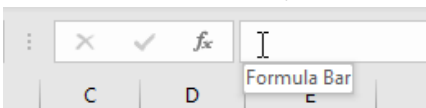|	
Select "Axis Options," and rightmost symbol, . Change "Display units."	**Format Axis** Axis Options ∨ Text Options ▲ **Axis Options** Bounds Minimum 0.0 Auto Maximum 50000.0 Auto Units Major 5000.0 Auto Minor 1000.0 Auto Horizontal axis crosses ⦿ Automatic ○ Axis value 0.0 ○ Maximum axis value Display units None ▼ ☐ Show display units label on chart
Select "Thousands" from menu.	○ Maximum axis value Display units None ▼ None ☐ Show display units Hundreds ☐ Logarithmic scale Thousands ☐ Values in reverse ord 10000 100000 ▷ **Tick Marks** Millions
Uncheck the "Show display units label on chart" option.	Display units Thousands ▼ ☐ Show display units label on chart
Select chart and click the that appear outside the upper, right corner of the chart.	
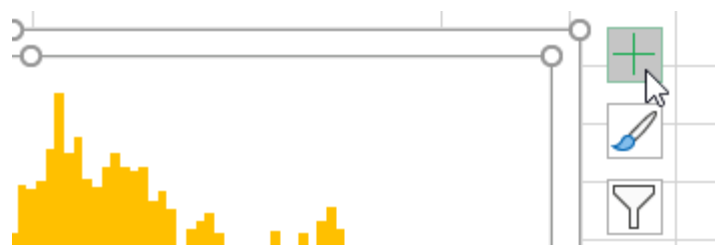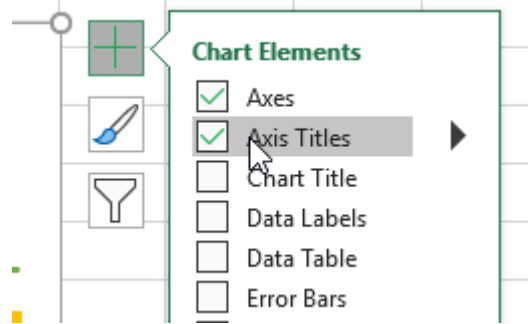
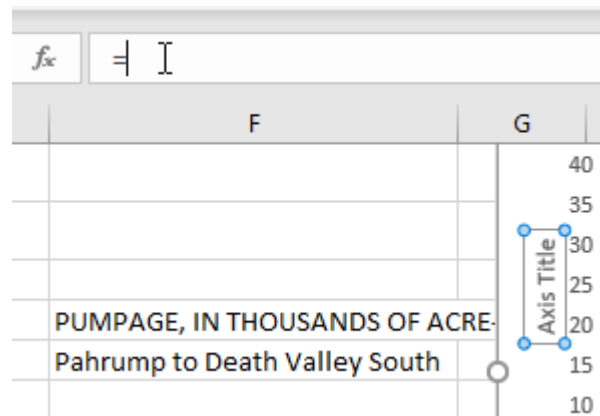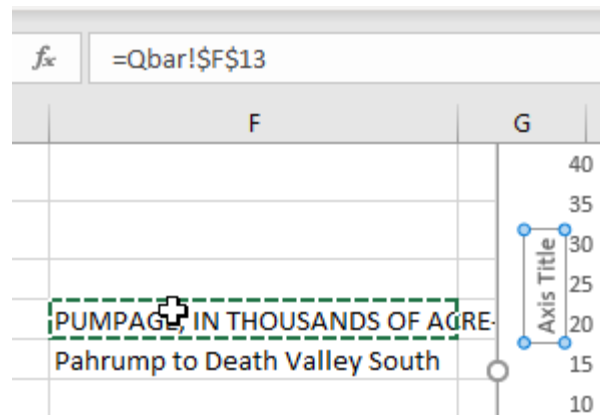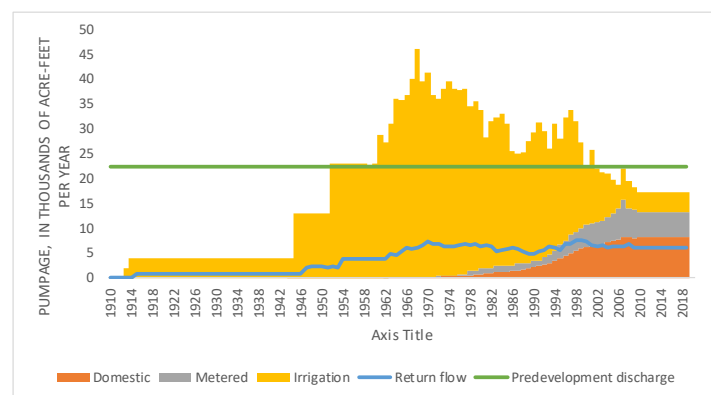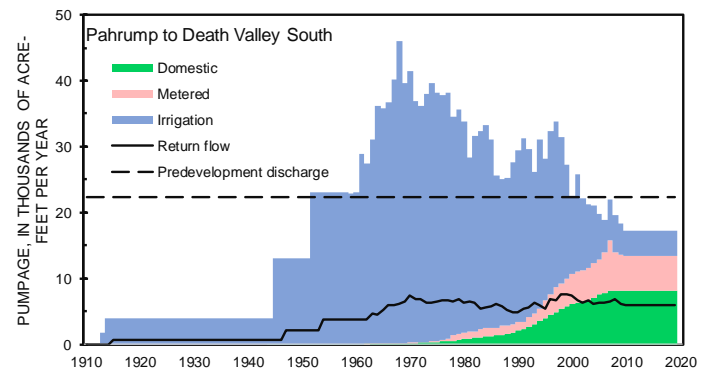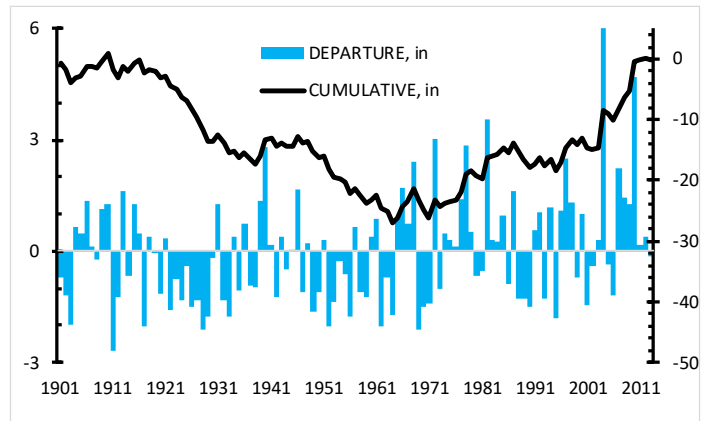|	
Add "Axis Titles."	
Select the new Y-axis title box that was added to the chart. Click in the Formula bar, Type "="	
Select cell F13 with your mouse and type Enter/Return. This defines the title through data in cell F13, which is easier to edit and revise.	
The chart should appear as, This covers most structural elements needed to recreate the mixed stacked column and line chart.	

Additional formatting is discussed in class.

Pahrump to Death Valley South

- Domestic
- Metered
- Irrigation
- Return flow
- Predevelopment discharge

PUMPAGE, IN THOUSANDS OF ACRE-FEET PER YEAR

Differentiate positive & negative columns – 02_Departure.xlsx

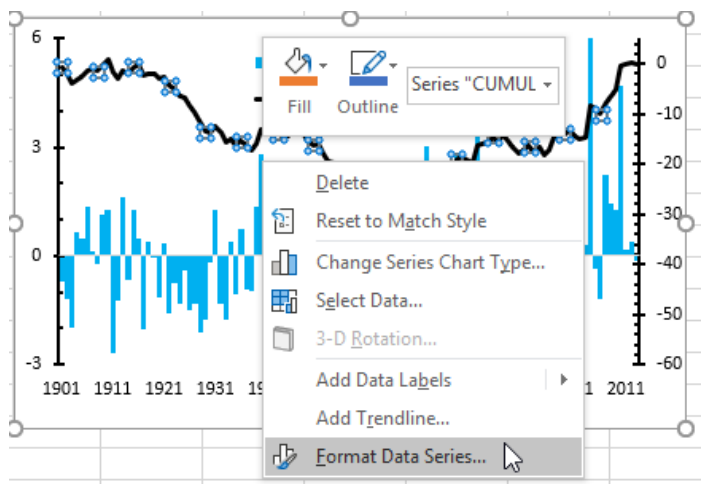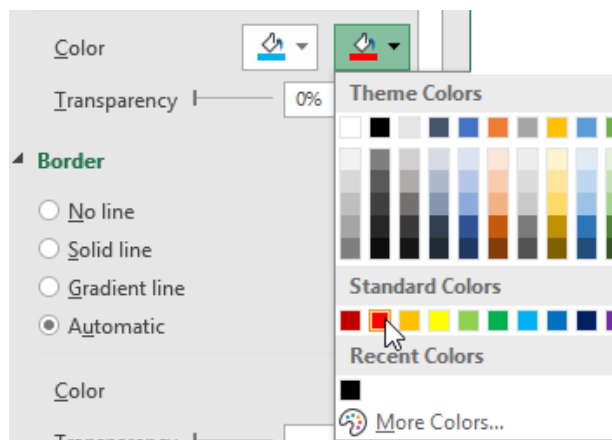|	
Departure and cumulative precipitation series are created in class. Chart is similar to previous example and creation is not repeated. Shading of the DEPARTURE series differs.	
Select "DEPARTURE" series. Right-click to activate dialog. Select "Format Data Series…" from dialog.	
Select "Series Options," Leftmost symbol, , Fill&Line Check "Invert if negative".	

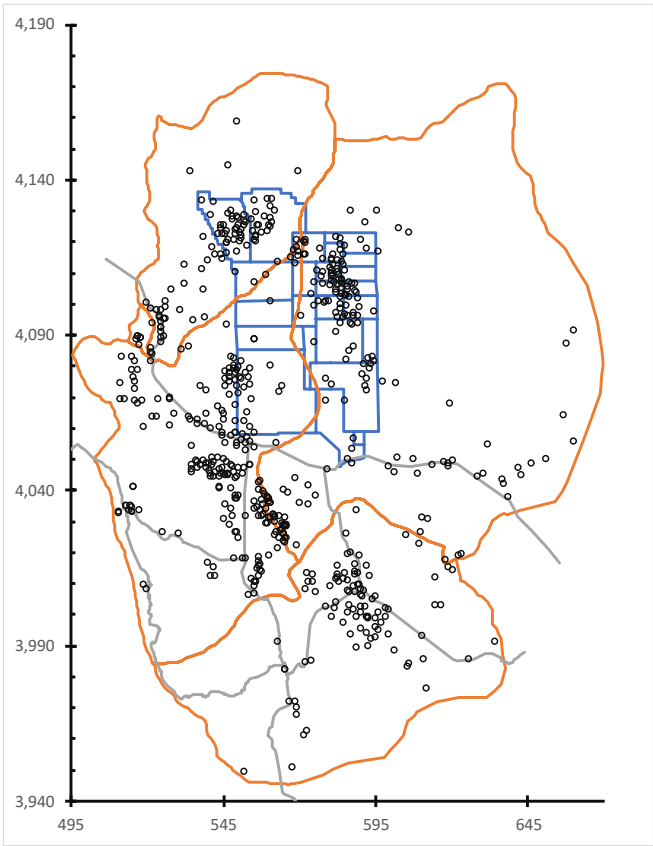|	
A second color fill dialog appears.	
Set the second color dialog to red.	
"DEPARTURE" series is now blue when positive and red when negative.	
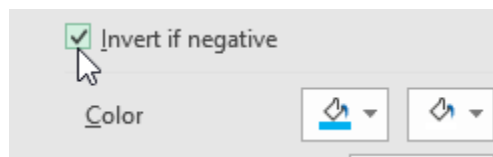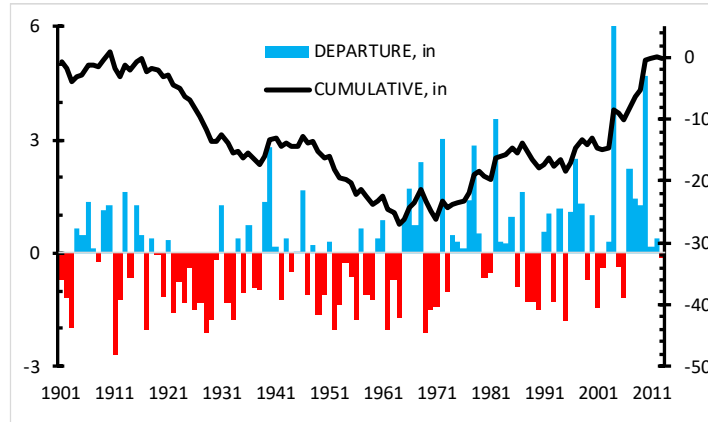
XY charts and adding series, Copy-paste & Direct entry– 03_XYmap.xlsx

Build a map in an XY plot to illustrate adding series from disparate ranges to a complex XY chart.	
Highlight range I31:J1135. Include headers.	
Select Insert tab on ribbon for chart options.	
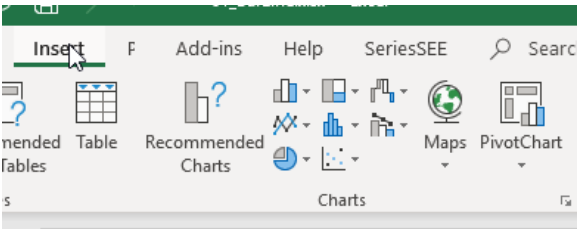
Select XY scatter with straight lines. Cut new chart and paste in cell A1.	
Set X-axis range. Minimum = 495,000. Maximum = 670,000.	
Set Y-axis range. Minimum = 3.94E6 Maximum = 4.18E6	
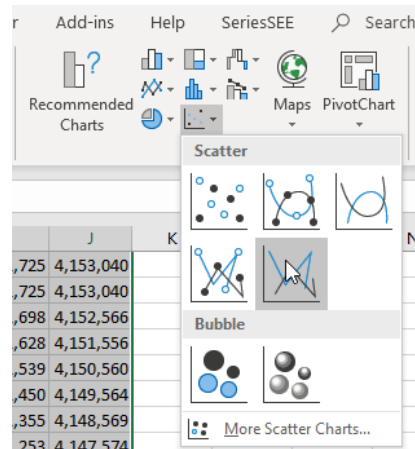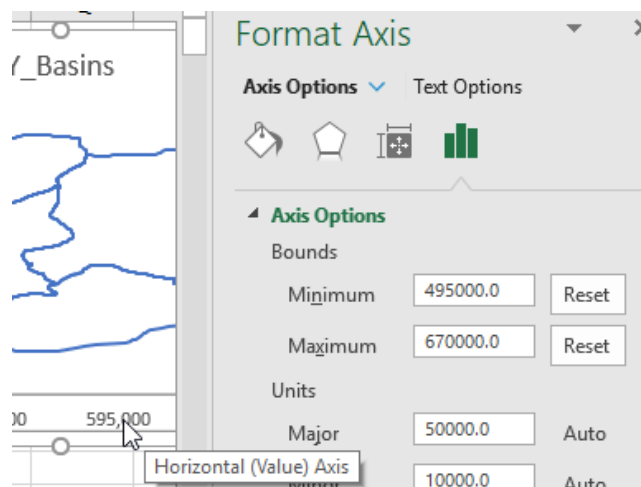
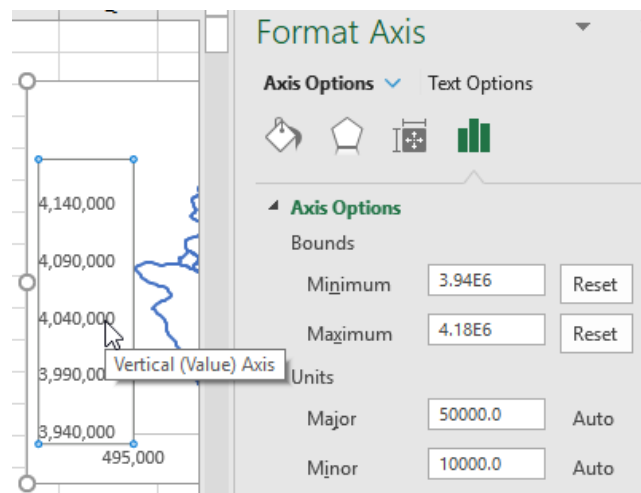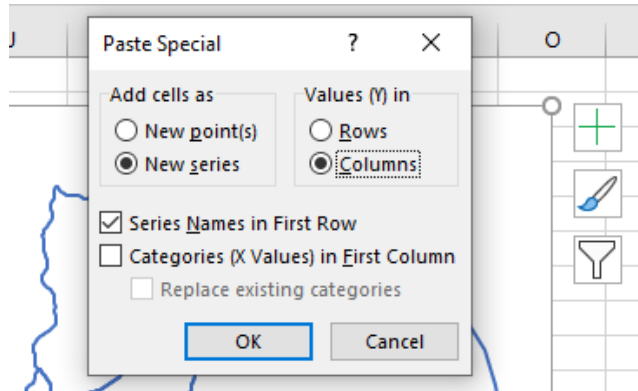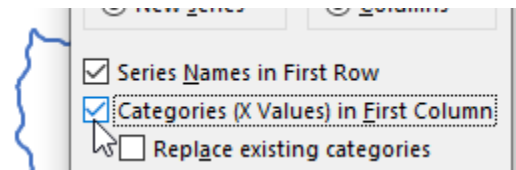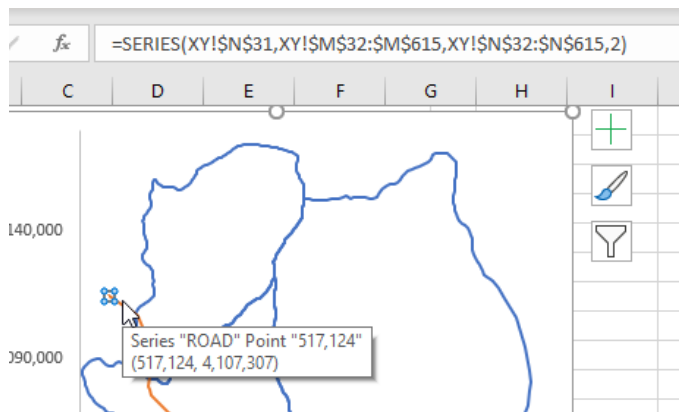|	
Highlight range M31:N615. Include headers. Copy range into memory, ctrl+C.	<table><tr><td></td><td>M</td><td>N</td></tr><tr><td>31</td><td>x</td><td>ROAD</td></tr><tr><td>32</td><td>506,437</td><td>4,114,597</td></tr><tr><td>33</td><td>517,124</td><td>4,107,307</td></tr><tr><td>614</td><td>544,957</td><td>544,957</td></tr><tr><td>615</td><td>552,495</td><td>552,495</td></tr></table>
Select chart and paste special.	**Paste Special** ? ✕ Add cells as Values (Y) in ○ New point(s) ○ Rows ● New series ● Columns ☑ Series Names in First Row ☐ Categories (X Values) in First Column ☐ Replace existing categories OK Cancel
Check, "Categories (X Values) in First Column." Click OK.	☑ Series Names in First Row ☑ Categories (X Values) in First Column ☐ Replace existing categories
Select the "ROAD" series.	*fx* =SERIES(XY!$N$31,XY!$M$32:$M$615,XY!$N$32:$N$615,2) Series "ROAD" Point "517,124" (517,124, 4,107,307)
Select the formula for the "ROAD" series in the function bar. Copy text of formula into memory, ctrl+C.	*fx* =SERIES(XY!$N$31,XY!$M$32:$M$615,XY!$N$32:$N$615,2) Insert Function
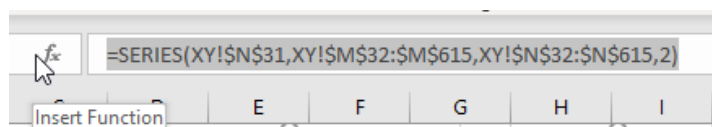
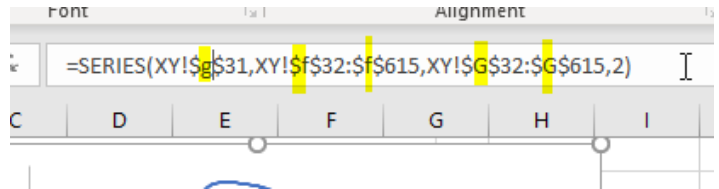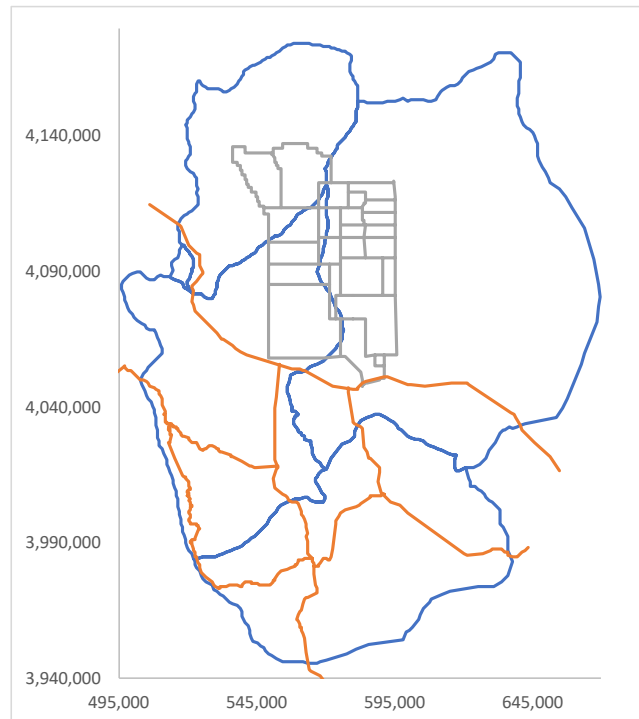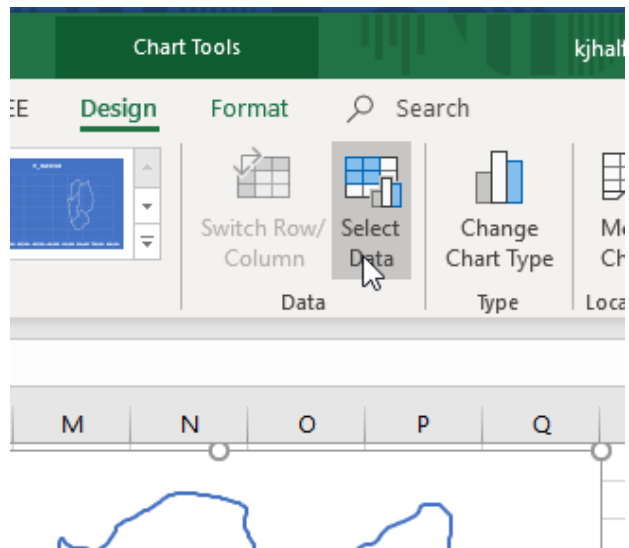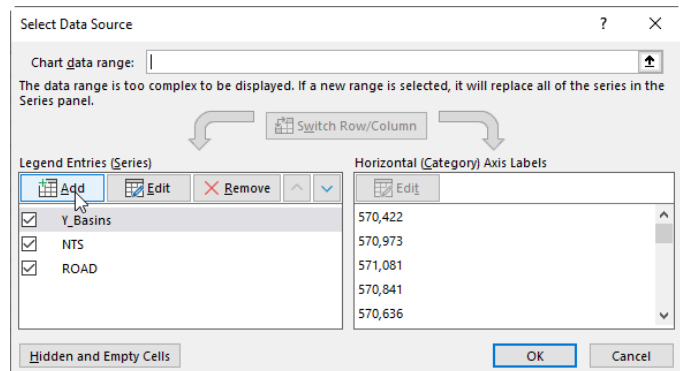|	
Exit function bar and select the chart.	
Select the function bar. Paste the formula for the "ROAD" series in the function bar, Ctrl+V. Type F2 function key for ease of editing. Change **N** to **G** and **M** to **F**. Type Enter/Return.	=SERIES(XY!g31,XY!f32:f615,XY!$G$32:$G$615,2)
The NTS series from columns **F** & **G** have been added.	

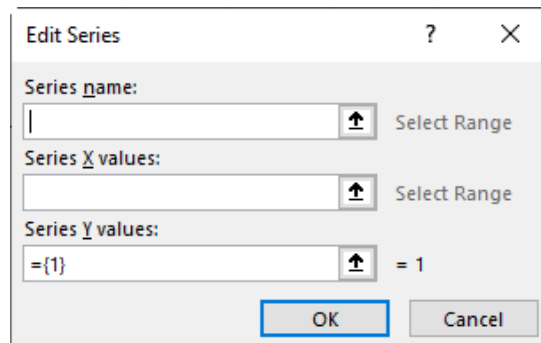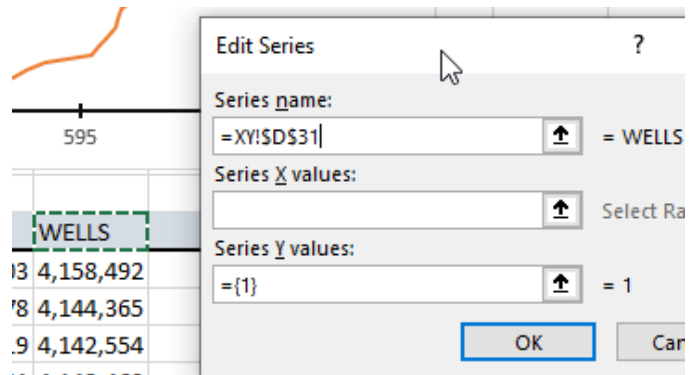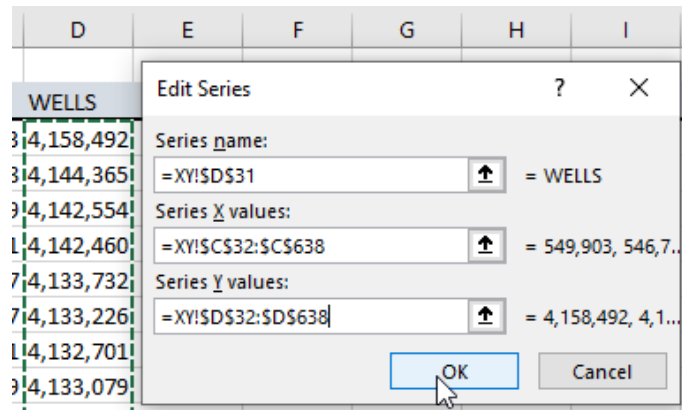|	
Select chart so that "Chart Tools" appear in ribbon. Select "Select Data" from "Design" tab under "Chart Tools" "Select Data Source" form will appear.	
Click "Add" button to create another series.	
The "Edit Series" form will appear.	

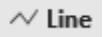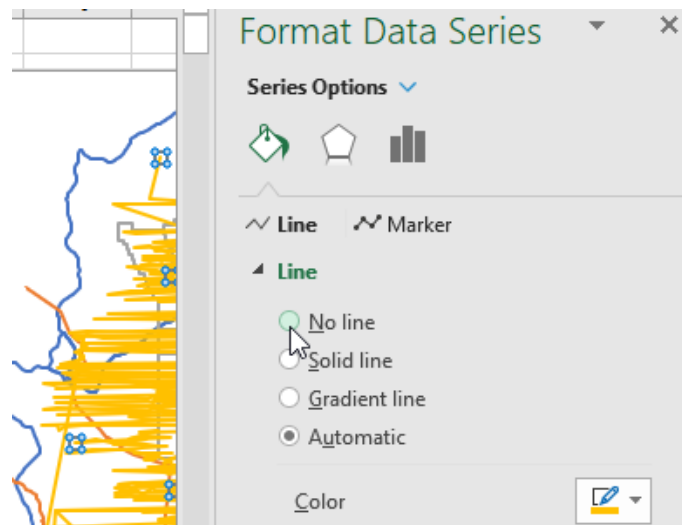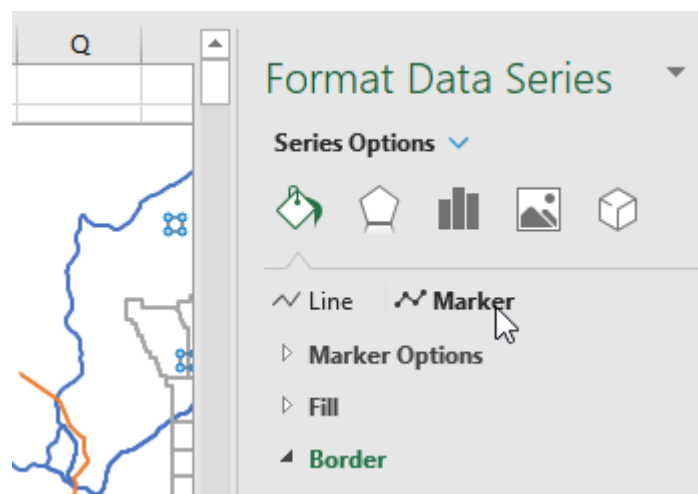|	
Select cell D31 for the series name.	
Select range C32:C638 for X values. Select range D32:D638 for Y values. Click "OK" to accept data for new series and "OK" on "Select Data Source" form until all forms are closed.	
The "WELLS" series has been added, but display remains incorrect. Select the "WELLS" series. Right-click to activate dialog. Select "Format Data Series…" from dialog.	

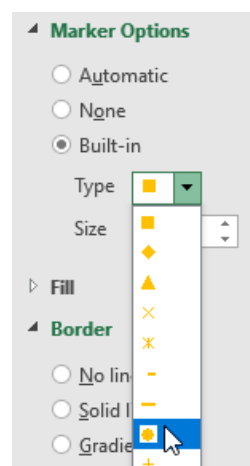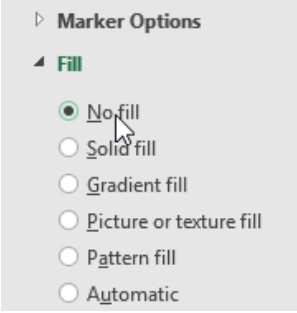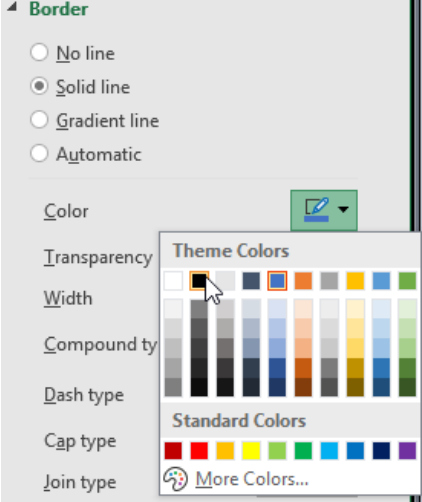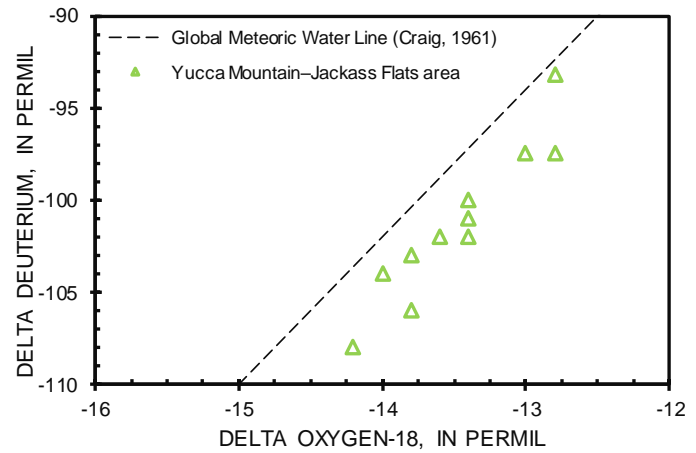|	
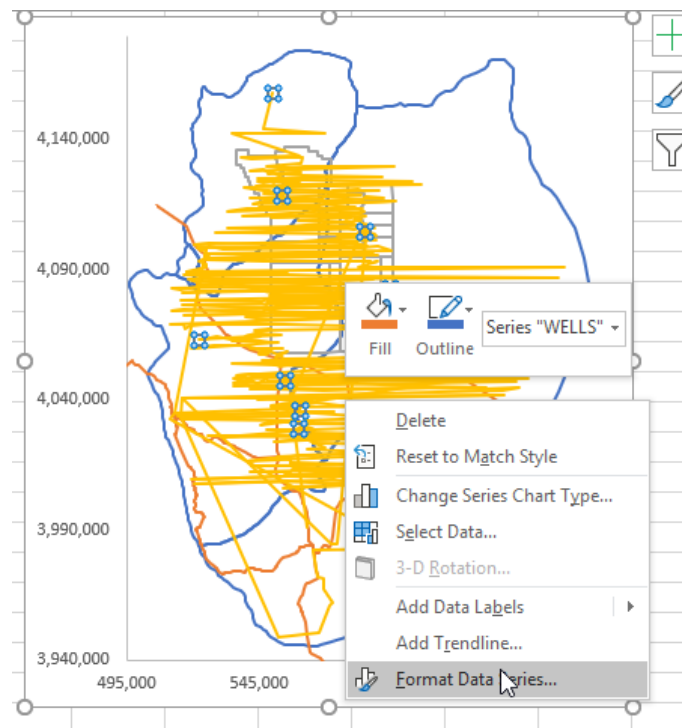
Select "Series Options,"
 	
Leftmost symbol, , Fill&Line
 	
Select "No Line" option for formatting Line option, Line , of series.
	Format Data Series
	Series Options ∨
	
	∿ Line ∿ Marker
	◢ Line
	  ○ No line
	  ○ Solid line
	  ○ Gradient line
	  ◉ Automatic
	
	  Color

Select Marker option, Marker .	**Format Data Series** Series Options ∨ ∿ Line ∿ **Marker** ▷ **Marker Options** ▷ **Fill** ◢ **Border**
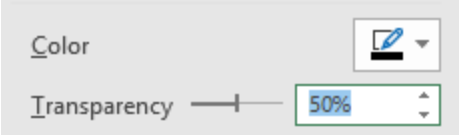
Expand Marker Options.
 	
Select a circle from the Built-in marker Type.
 	
Reduce the marker size to 4.
	◢ **Marker Options**
	  ○ Automatic
	  ○ None
	  ◉ Built-in
	    Type
	    Size
	▷ Fill
	◢ Border
	  ○ No lin
	  ○ Solid l
	  ○ Gradie

Expand Fill. Select "No Fill" option.	▷ **Marker Options** ◢ **Fill** 　⦿ No fill 　○ Solid fill 　○ Gradient fill 　○ Picture or texture fill 　○ Pattern fill 　○ Automatic
Expand Border. Select "Solid line." Pick a black color.	◢ **Border** 　○ No line 　⦿ Solid line 　○ Gradient line 　○ Automatic Color Transparency　Theme Colors Width Compound ty Dash type　Standard Colors Cap type Join type　🎨 More Colors...
Set transparency of line to 50%.	Color Transparency ——┤—— 50%

The map has been recreated in an XY chart and 4 methods of adding series were demonstrated.
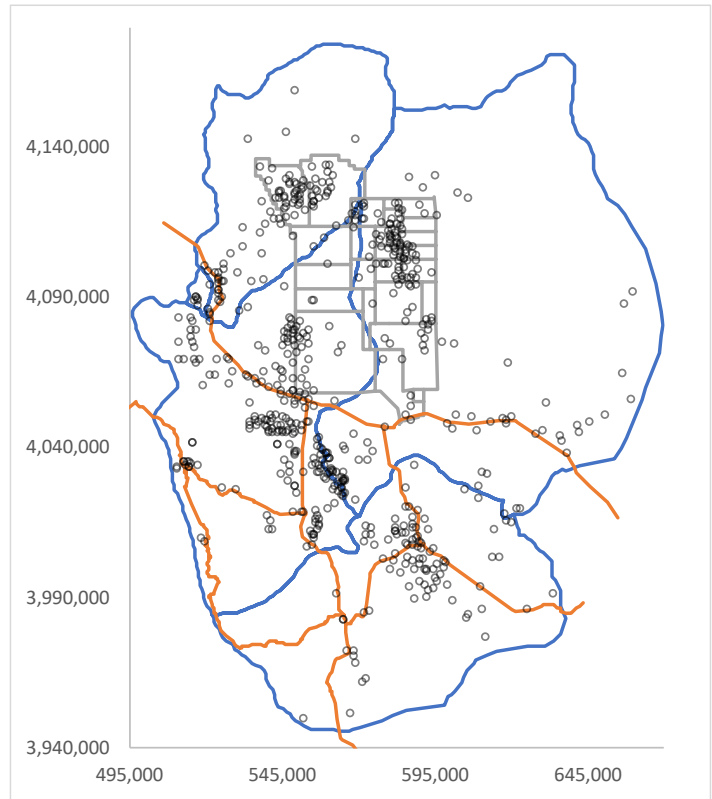
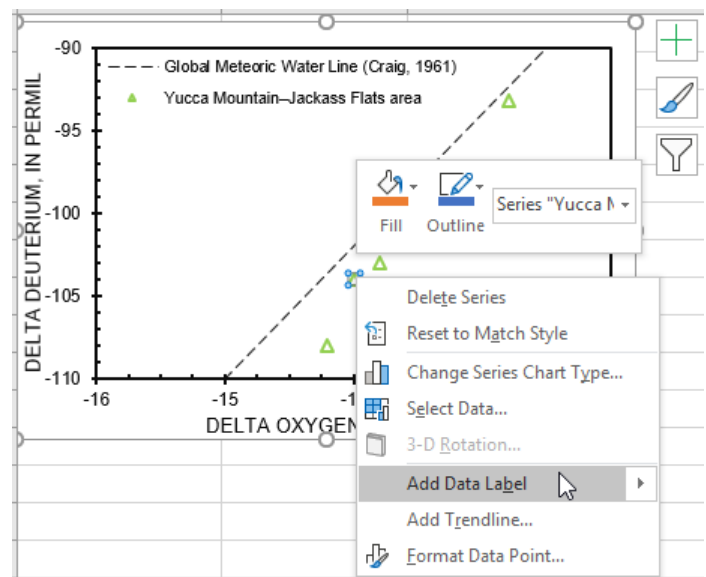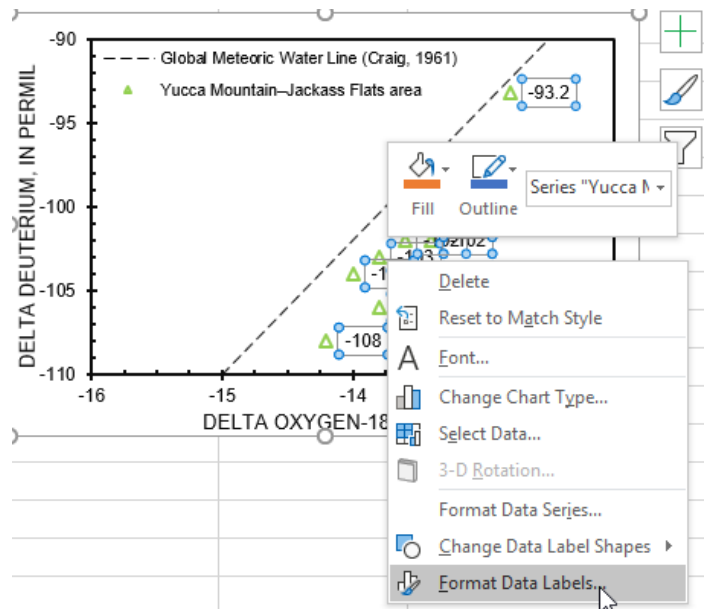# Specify labels from ranges – 04_FC_isotope_PAIRS.xlsx

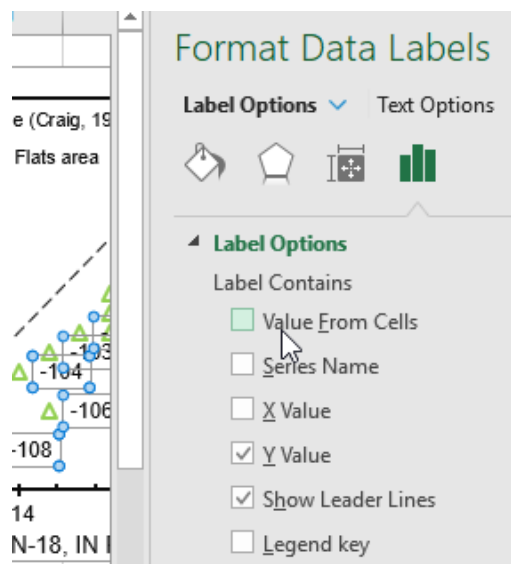|	
Stable isotopes are plotted, but sites are not identified.	
Select the "WELLS" series. Right-click to activate dialog. Select "Add Data Label" from dialog.	

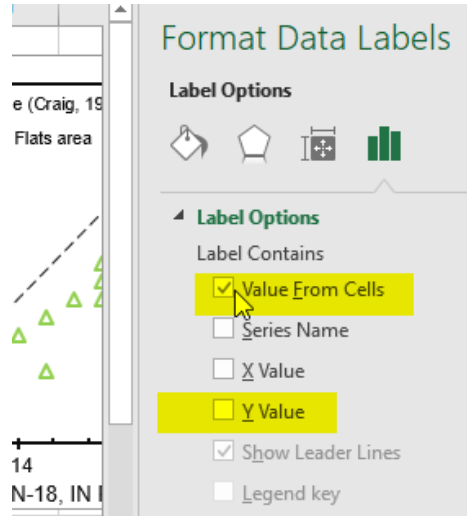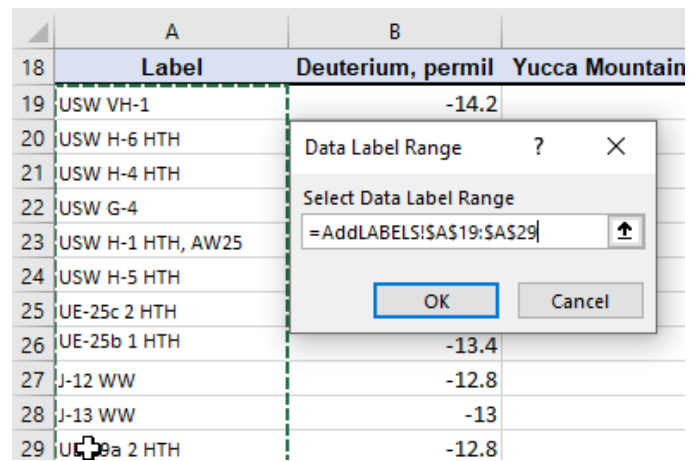|	
Select the new data labels. Right-click to activate dialog. Select "Format Data Labels…" from dialog.	
Select "Label Options," Rightmost symbol, Expand Label Options	

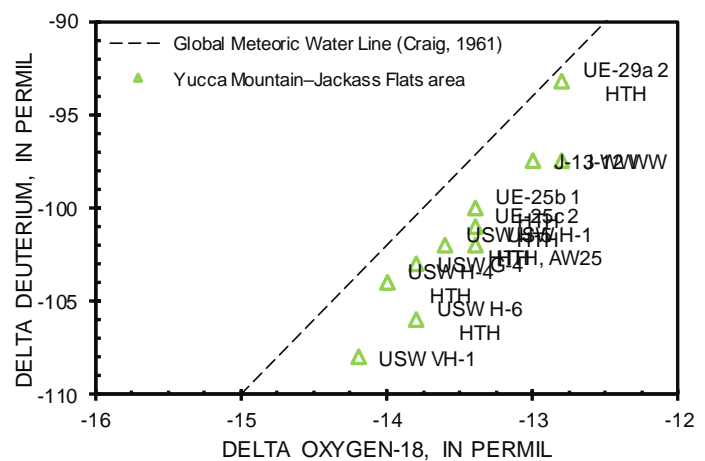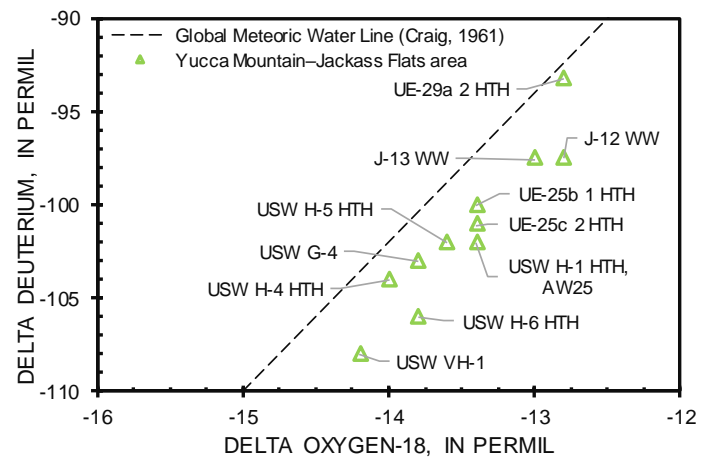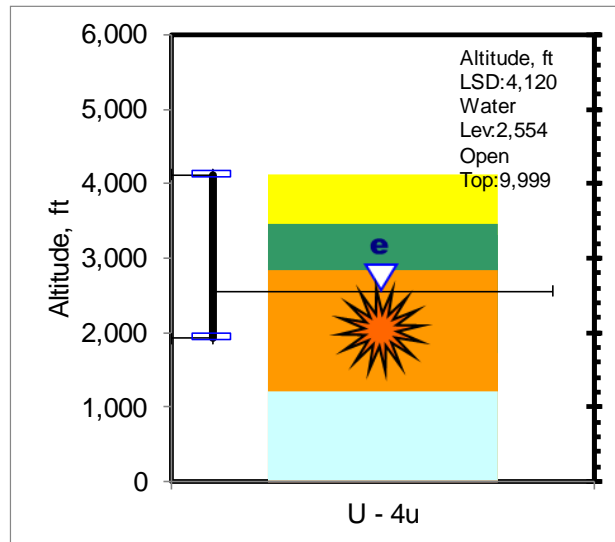|	
Uncheck Y Value. Check Value from Cells. "Data Label Range" form will appear.	
Select range A19:A29. Click OK.	
Names of wells appear in labels.	

Labels were moved manually for clarity.

Adding custom symbols – 05_sir2012-5196_app3.xlsm

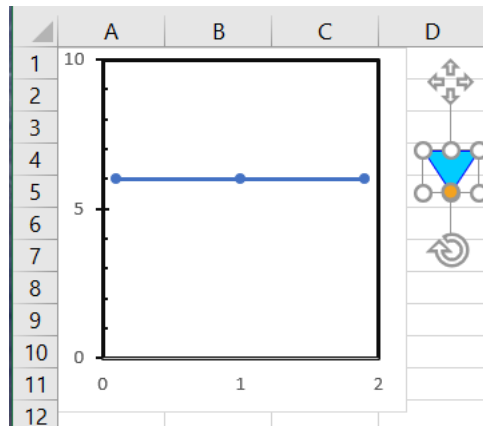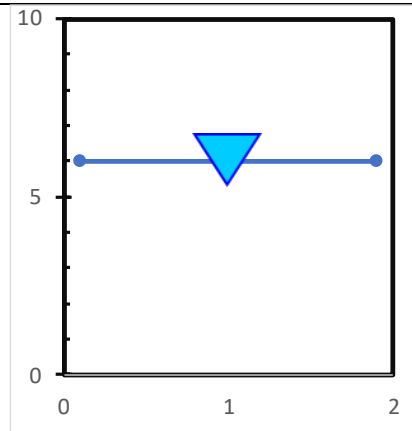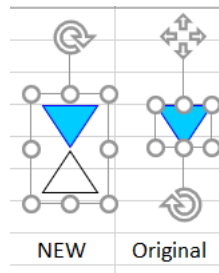|	
Custom markers can be created from pictures as shown in an example from Fenelon and others (2012). Nuclear detonations, [star symbol] , and estimated water levels, [triangle symbol], were depicted with illustration shapes.	[chart showing Altitude, ft vs U - 4u with colored bands, star and triangle symbols, and labels: Altitude, ft LSD:4,120 Water Lev:2,554 Open Top:9,999]
Copy, ctrl+c, a symbol into memory. Select a data point in a series or the whole series. Paste, ctrl+v, to selection.	[Excel spreadsheet with chart showing horizontal line at value 6, and a blue triangle symbol selected in column D]
Symbol is added, but result is wrong because triangle does not rest on line.	[chart showing horizontal blue line at value 6 with a large blue triangle centered on it]

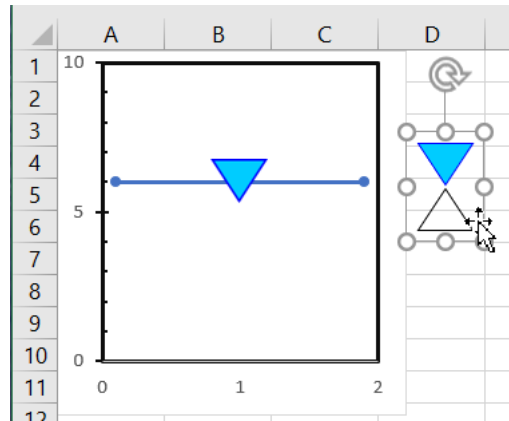|	
The original triangle is duplicated, flipped, and displaced to the bottom of the original triangle. Fill was removed and border would be removed for an application. A new symbol is created by grouping original and duplicated triangles.	 NEW Original
Copy, ctrl+c, new symbol into memory. Select old data point in series. Paste, ctrl+v, to selection.	
Triangle appears to rest on line with revised symbol.	
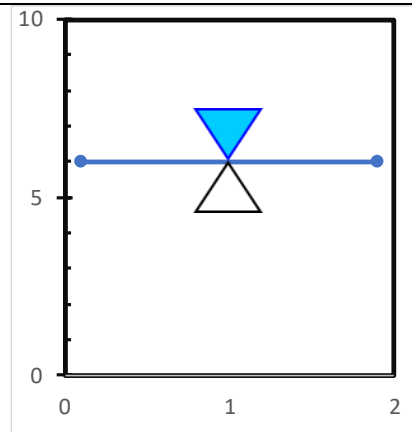
Effect is complete after removing border from lower balancing triangle.