5.15 Tip Sheet: How do I make boxplots of my data?

This tip sheet describes the basic steps to make boxplots of data using a program available within QWDATA. If you would like to retrieve data from QWDATA and use a graphics program available outside of QWDATA, please refer to *TipSheet 5.7*. Links to sections in the documentation that contain details for certain topics are included. The user should refer to those sections for details that are not presented in this tip sheet.

❖ All graphics programs within QWDATA are available from option 5 – 'Graphs' in the main QWDATA menu. Details for all the options in this menu are available in *Section 3.5* of the documentation. That option will show the following menu:

```
        QW DATA PROCESSING ROUTINE    REV NWIS-4.3.2-20030527

 YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

         Graphs

 1 -- X,Y Plot
 2 -- Boxplots
 3 -- Stiff Diagrams
 4 -- Piper Diagrams
 5 -- Regression Plots
 6 -- Summary Statistics Table
 7 -- Detection Limits Table

98 -- Exit menu

99 -- Exit system

Please enter a number from the above list or a Unix command:
```

❖ Option 2 from the graphics menu creates a boxplot in two stages: *(1)* retrieves data from the QW database that are written to an ASCII file and *(2)* uses data in the ASCII file to create the plot in a separate graphics (S-Plus) window and write the output to a file.
   o You should check that your UNIX display environment variable is set correctly. If you need help with this step, please contact you local system administrator.

   o The first query is asking for the name of a file of record numbers to identify what samples will be included in the plot. All graphical programs require an input file of record numbers to operate. The format of this file is one record number per line in columns 1-8 and can be generated through QWDATA (see *Section 3.3.1*) or created with an editor. Examples of this input file are shown in *Appendix G*.

   o The next query asks for the name of the ASCII data output file. The ASCII files produced from S-Plus programs will be saved to the directory where you started QWDATA . Any other files that are produced while using this program (for example, pdf or postscript) will be saved in a directory named NWIS_Swork that is created in your home directory.

o The next query will allow you to select the type of boxplot for output from the following three options:

```
-----------------------------------------------
 Data-retrieval options                    Code
-----------------------------------------------
 One station with one or more parameters    1
 Multiple stations with one parameter       2
 Multiple stations treated as one           3
-----------------------------------------------
    Enter code for option, <cr> = 3      >
```

o Enter the desired parameter code(s) when prompted.
o After the data are retrieved, a table of summary information appears on the screen for your review:

```
RETRIEVING DATA ... RETRIEVAL COMPLETED

 RETRIEVAL OPTION 2: PARAMETER CODE 00915 FOR  1 STATIONS
 -------------------------------------------
 GROUPS RETRIEVED   1     MIN VALUE    13.000
 GROUPS WITH DATA   1     MAX VALUE    19.000
 -------------------------------------------

 SUMMARY OF VALUES BY GROUP:
 -------------------------------------------------------------------------------
 GROUP          NUM OF                25TH                 75TH
 IDENTIFIER     VALUES    MINIMUM     PCTILE     MEDIAN    PCTILE    MAXIMUM
 -------------------------------------------------------------------------------
 05016000          3*     13.000      14.000     15.000    17.000    19.000
 -------------------------------------------------------------------------------

 LIST THE DATA?  Ans: y / n, <cr> = n >
```

o If any censored values are found in the retrieved data, the next query will ask the user if these values should be estimated and what method should be used. More information about the two different methods is available in: *Statistical Methods in Water Resources* by D.R. Helsel and R.M. Hirsch.

o The next prompt, 'List the Data?', allows you to display all the data to the screen.

o The next prompt, 'Plot the Data?', asks if you want to plot the retrieved data. If you answer 'y' then you will choose between a schematic and a truncated boxplot for output. Details about each of these plots are available in *Section 3.5.2* of the user documentation.

o The next set of queries will allow you to customize the plot title and the axes labels.

o The next query will allow you to choose an S-Plus output option.

The output options are printing the plot to a separate x-window or a Tektronix window; or save the plot as a pdf, HP Laserjet, encapsulated postscript (EPS), or a postscript file. For specific details on these output options, please refer to *Section 3.5*. If option (1) is selected, a separate S-Plus window appears that includes the plot. To exit cleanly from this window, the user should include all responses in the UNIX window, not in the S-Plus window.

o The next query will allow you to use a different output option for the same plot.
o If you select 'n' and hit <CR> you will be returned to the main graphics menu.