

## LEGEND OPTIONS USING MULTIPLE PLOT STATEMENTS IN PROC GPLOT

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### ABSTRACT

A graph with both left and right vertical axes is easy to construct using SAS/GRAPH® PROC GPLOT with multiple plot statements. Producing a correct legend requires some additional coding. Options for creating the legend are provided in this paper. Using the LEGEND statement requires an extraneous plot be hidden, thus providing information for the legend. This option is useful if you can hide a symbol within a symbol (i.e., dashed line and solid line or circle and dot). Another option is to use the FOOTNOTE statement to simulate a legend. For this option to work, symbols used in the graph must be reproduced in the footnote legend.

### INTRODUCTION

Producing a graph with multiple plot statements using PROC GPLOT can cause the LEGEND option to print an incomplete list. Three options are given for creating a complete legend when using multiple plot statements and the OVERLAY option. The first option is to create an extra plot grouping which will complete the legend. Another option is to use symbols that can be added to the FOOTNOTE statement; this will appear as the legend. The final option, which is not a great solution, is to produce the correct graph with no legend and then paste a correct legend from an incorrect graph.

The specific examples in this paper use variables Year (YEAR), Observed Count (OBS), Expected Count (EST), Temperature Adjusted Count (TEMP) and Water Level (WLEV). The expected counts and water levels are shown as joined symbols (polylines). Observed and expected counts are shown as symbols only.

### METHOD

#### Option A – Hidden symbol

Two of the plotting pairs (displayed using different symbols) on the first plot statement must be identical in order to produce a correct legend. For this example, one of the symbols is a solid line and the other a dashed line. When the completed graph is viewed the solid line conceals the duplicate dashed line. The dashed line that is seen in the graph is actually from the second plot statement. The plot statements look like:

```
PLOT EST*YEAR=1 OBS*YEAR=2
TEMP*YEAR=3 EST*YEAR=4 / OVERLAY
HAXIS=AXIS1 VAXIS=AXIS2
LEGEND=LEGEND1;
```

```
PLOT2 WLEV*YEAR=5 / HAXIS=AXIS1
VAXIS=AXIS3;
```

Note:	Symbol 1	diamonds joined by solid line
	Symbol 2	dot
	Symbol 3	circle
	Symbol 4	dashed line
	Symbol 5	dashed line

Creating the legend is a simple matter of specifying the correct labels. The dashed line shown in the legend is actually produced due to the hidden line but is labeled with the variable name in the second plot statement. The legend statement specifies variable labels as well as positioning the legend.

```
LEGEND1 LABEL=(POSITION=(BOTTOM
RIGHT)) VALUE=('PREDICTED' 'OBSERVED'
'TEMPERATURE ADJ.' 'WATER LEVEL');
```

Plot A shows the graph produced from this coding structure.

#### Option B – Footnote

It is difficult to reproduce the exact look of the generated legend but a footnote can be set to show symbols and corresponding variable names. Use symbols that are obtainable on the keyboard, do not use dot or circle, as these are not readily available.

The FOOTNOTE statement can be structured in the desired format. Because the legend will be incomplete, the graph is produced using the NOLEGEND option. The following code shows the necessary statements.

```
PLOT EST*YEAR OBS*YEAR TEMP*YEAR/
OVERLAY NOLEGEND HAXIS=AXIS1
VAXIS=AXIS2;
PLOT2 WLEV*YEAR / NOLEGEND
HAXIS=AXIS1 VAXIS=AXIS3;
```

The symbols used can be defined in the symbol statements or assigned as macro variables and referenced in the symbol and footnote statements.

Peter Ruzsa at SAS Institute provided the original code for this option; I have modified the code for use in this paper. Plot B demonstrates the output form for this type of coding.

#### Option C – Paste

The last resort option is to produce the correct graph with two plot statements using the NOLEGEND option. Then produce a graph with one plot statement and LEGEND option. Use this correct legend and paste it on to the graph. Plot C first shows the correct graph and then the incorrect graph with correct legend. Pasting can be

accomplished the old fashioned way or with Proc Annotate.

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The SAS code for options A and B is given in Appendices A and B.

## SUMMARY

Options for producing a correct legend when overlaying plots within a graph are to either "hide" a symbol that can appear in the legend or use a footnote to produce a legend. In the first option, a dashed line (hidden) and solid line represent the same plotting pair. Symbol pairs where one masks the other must be used. Another option is to use the FOOTNOTE statement in place of the standard legend. The appearance can be structured as desired but must utilize available keyboard symbols.

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## REFERENCES

SAS Institute Inc., *SAS/GRAPH® Software: Usage, Version 6, First Edition*, Cary, NC: SAS Institute Inc., 1991.

SAS Institute Inc., *SAS/GRAPH® Software: Reference, Version 6, First Edition, Volume 1*, Cary, NC: SAS Institute Inc., 1990.

SAS Institute Inc., *SAS/GRAPH® Software: Reference, Version 6, First Edition, Volume 2*, Cary, NC: SAS Institute Inc., 1990.

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## ACKNOWLEDGMENTS

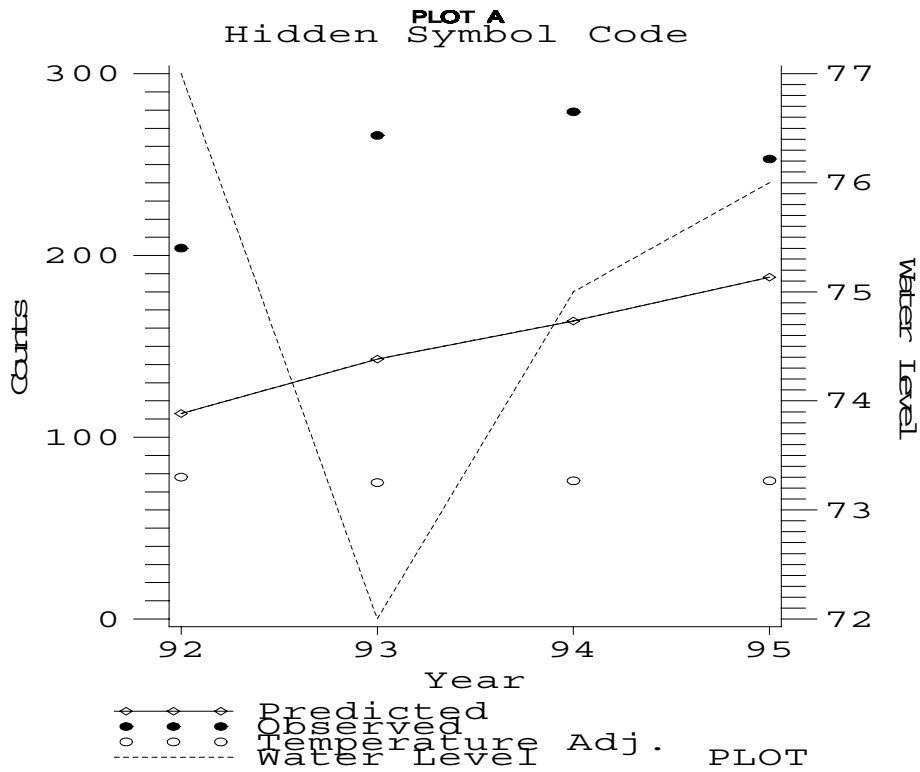
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## CONTACT INFORMATION

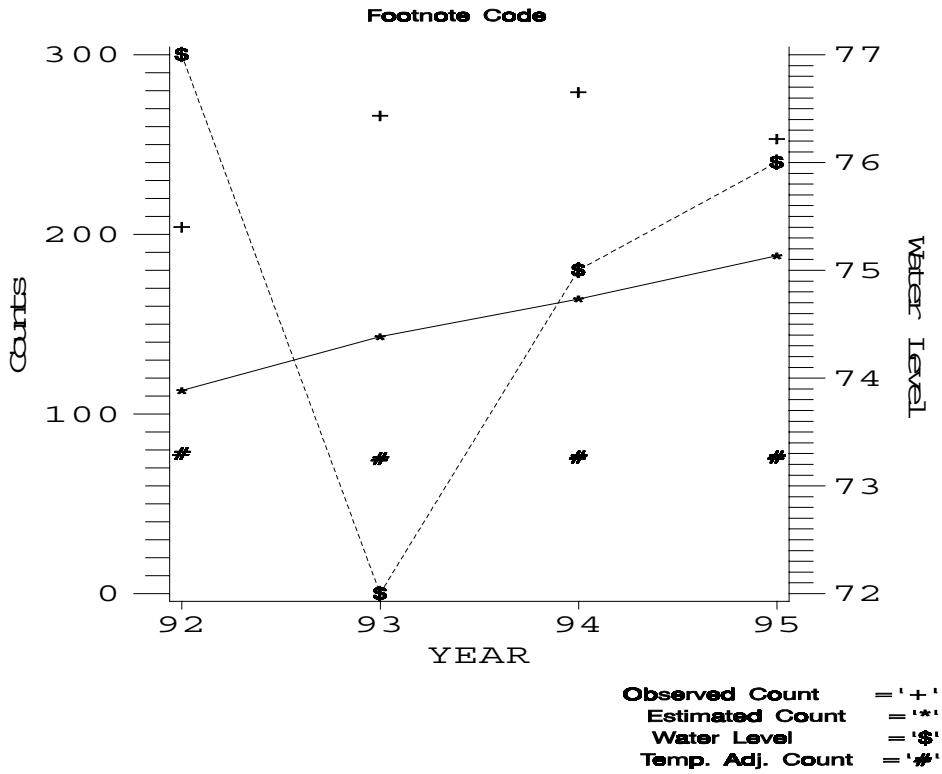
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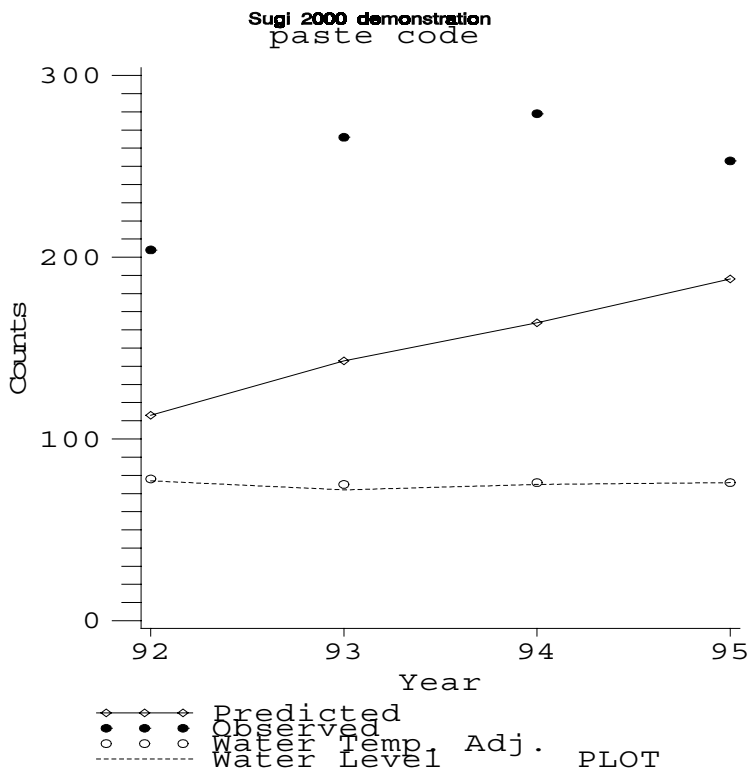
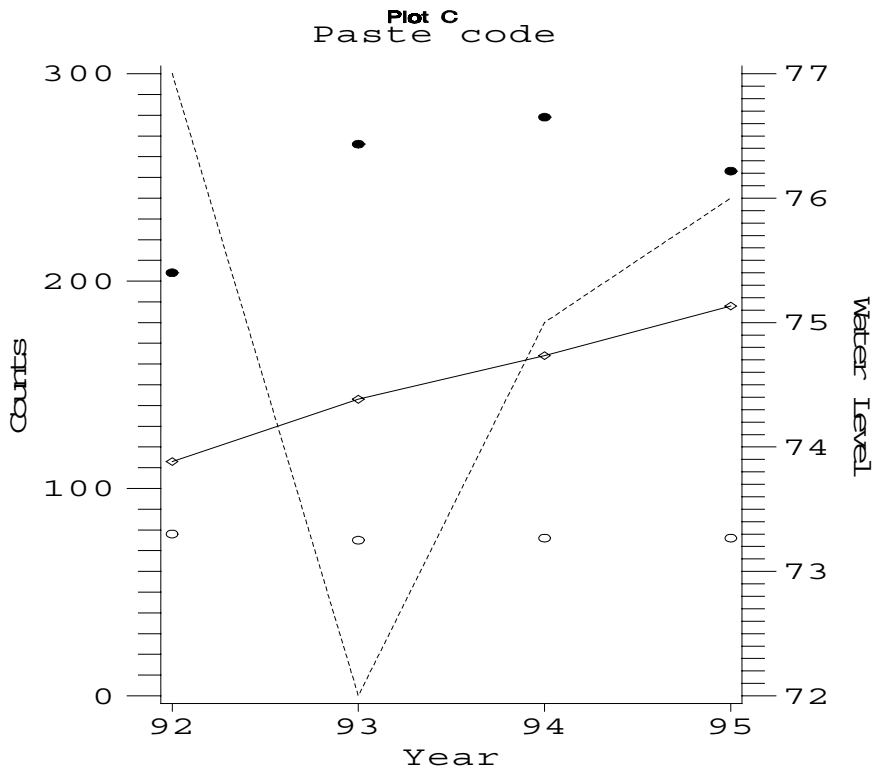
Plot A



Plot B



Plot C



Adj. PLOT

## Appendix A

```

/***** Hidden Symbol plot*****/
/***** create data set *****/
options linesize=80 pagesize=60;
data option;
input year wlev obs est temp;
cards;
92 77 204 113 78
93 72 266 143 75
94 75 279 164 76
95 76 253 188 76
;

/***** plot options *****/
filename grapha 'plota.cgm';
goptions device=cgmwp
          gsflen=80
          gsfmode=replace
          gsfname=grapha
          htext=1.0;

title1 ' PLOT A ';
title2 'Hidden Symbol Code';
symbol1 interpol=join value=diamond height=1;
symbol2 interpol=none value=dot height=1;
symbol3 interpol=none value=circle height=1;
symbol4 interpol=join line=2 value=none height=1;
symbol5 interpol=join line=2 value=none height=1;

axis1 minor=none label=(justify=center 'Year');
axis2 minor=(height=1) major=(height=1.5)
      label=(angle=90 rotate=0 'Counts');
axis3 minor=(height=1) major=(height=1.5)
      label=(justify=center angle=-90 rotate=0 'Water Level');
legend1 label=(position=(bottom right)) value=('Predicted'
        'Observed' 'Temperature Adj.' 'Water Level');

proc gplot data=option;
plot est*year=1 obs*year=2 temp*year=3 est*year=4
     /overlay haxis=axis1 vaxis=axis2 legend=legend1;
plot2 wlev*year=5 / haxis=axis1 vaxis=axis3 nolegend;
run;
/***** End of code *****/

```

```

***** SUGI 2000 9-7-99 *****
***** Footnote Code *****
***** Data set *****
options = linesize =80 pagesize = 60;
data stuff;
input year wlev obs est temp;
cards;
92 77 204 113 78
93 72 266 143 75
94 75 279 164 76
95 76 253 188 76
;
/*****plot code*****/
filename graphb 'plotbb.cgm';
goptions device=cgmwp
          gsflen=80
          gsfmode=replace
          gsfname=graphb
          htext=1.0;

title1 'PLOT B ';
title1 'Footnote Code ';
%let sym1 = '*';
%let sym2 = '+';
%let sym3 = '#';
%let sym4 = '$';

proc gplot;
axis1 minor=none label=(justify=center 'YEAR');
axis2 minor=(height=1) major=(height=1.5)
      label=(angle=90 rotate=0 'Counts' );
axis3 minor=(height=1) major=(height=1.5)
      label=(justify=center angle=-90 rotate=0 'Water Level' );
plot est * year obs * year temp * year / overlay nolegend haxis=axis1
vaxis=axis2;
plot2 wlev * year / nolegend haxis=axis1 vaxis=axis3;
symbol1 f=swiss interpol=join value=&sym1;
symbol2 f=swiss value=&sym2;
symbol3 f=swiss value=&sym3;
symbol4 f=swiss interpol=join line=2 value=&sym4;
footnote f=swiss j=right 'Estimated Count   =' '&sym1"
          f=swiss j=right 'Observed Count    =' '&sym2";
footnote2 f=swiss j=right 'Temp. Adj. Count  =' '&sym3"
           f=swiss j=right 'Water Level     =' '&sym4";
run;

```