

## **J-4. display\_rc**

### **1.0 General Information**

#### **1.1 Application Description**

The purpose of the display\_rc program is to give a tabular and graphic display of rating curves from the database. It also allows the user to input a stage (or flow) and have the program return the flow (or stage). This program is written in Tcl/Tk using the BLT package.

#### **1.2 Design Considerations**

This program handles multiple rating curve/shift definitions. It will automatically bring up the latest version, but allows the user to page through previous ones.

The rating curve is 'cleaned up' before it is displayed by eliminating pairs where the stage and/or flow is the same or less than the previous pair. In other words, it expects the stage and flow to continuously increase.

The displayed rating curve has had the current shifts applied to it. The value of the Datum Adjustment is displayed, but not applied to either the displayed rating or to requested stage/flow values.

Extrapolation for points above the defined curve, and interpolation between positive stage values, is logarithmic. Extrapolation for points below the defined curve, and interpolation between points with negative stage values, is linear. These extrapolation/interpolation schemes are used in the text window for requested stage/flow values and for the points added above the curve. However, please note that lines drawn between points on the graph are linear.

Shifts are applied in the following manner:

- If the first stage in the shift table is above the zero flow stage of the rating table, the program adds a shift of zero for the stage corresponding to zero flow to the bottom of the shift table (see Attachment A).
- The first shift value is applied to any stage less than the first shift table stage.
- A linearly interpolated shift value is applied to any stage that falls between shift table stages.
- The last shift value is applied to any stage greater than the last shift table stage.

#### **1.3 Application Assumptions**

The program will look for any, and all, pe1-pe2 combinations defined in the database

table *rating* (i.e. HG, HP, HS) for the given lid. In order for the program to display a rating curve, there must be a corresponding entry in the database table *ratingshift*.

The end of the shift table is determined by finding the last non-zero pair as well.

The program looks for critical stages, and their flags, in the database table *rivercrit*. The values defined in the 'q' columns of this table are interpreted as follows:

- E – E-19
- P – Personal Communication
- M – Memo
- I – Internal

## 1.4 Enhancements/Bug Fixes/Changes

### **Build OB7.2**

This application was updated to take into account the change in the version of Tcl/Tk, the upgrade of the OS in ob7.2, the change in RDBMS from Informix to Postgres, and the changes in the *rating* and *ratingshift* table structures. These changes are as follows:

- Table *rating* changed in ob7.2 to accommodate a request from the National RATINGS team led by Dave Reed. Part of the change takes advantage of a feature that exists in Postgres but not in Informix, i.e. having a column as an array.
- Table *ratingshift* has a couple of changes due to the new *rating* table structure. These are: added column "src" and changed the primary key to be in sync with the *rating* table.

Documentation was updated to reflect these changes.

Known limitation: Zoom capability that existed in previous builds no longer exists. It does not work with the version of Tcl/Tk that is available in ob7.2.

### **Build OB5**

#### ***Enhancements***

Library used by display\_rc was changed to take into account Build OB5 archive database changes to tables *rivercrit* and *rating*.

### **Build OB4**

#### ***Enhancements***

- As part of the task, the programmer found it more effective to rewrite the entire application.
- The plot changed to be stage vs. flow instead of the current flow vs. stage.

- Only the actual rating curve points are shown in the graph. It is fine if the table shows the extrapolated values.
- Since this app displays storage-elevation curves for reservoirs, graph and tabular data are now labeled properly.
- Display\_rc now has the ability to display spillway ratings for reservoirs, SHEF PE code HS.

## 2.0 Configuration Information

The following apps\_defaults token is used:

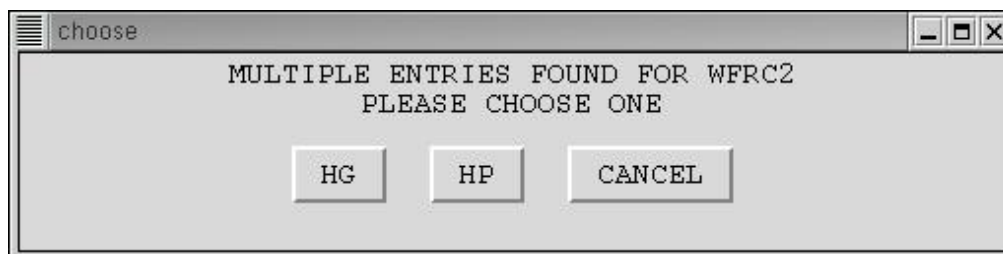
adb\_name        archive database name

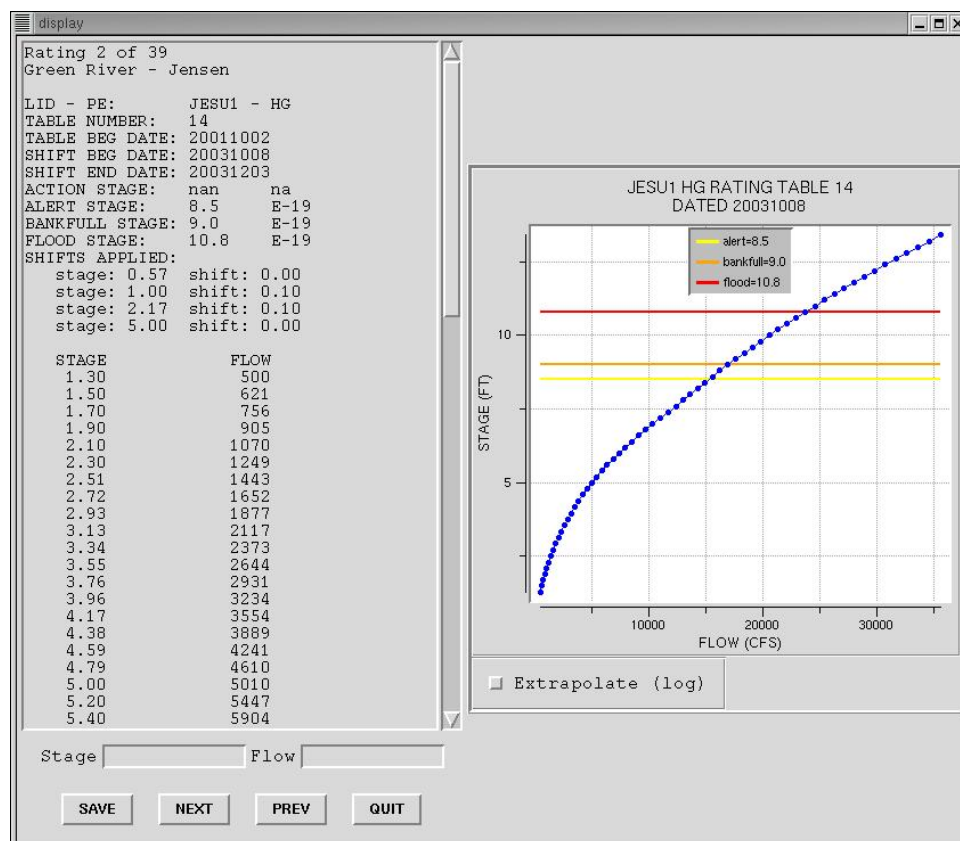
## 3.0 User How-To

This program can be run either through the *arcmenu* main menu, or on the command line by simply typing *display\_rc*. A small window will pop up asking the user to input the lid of the rating curve to be viewed.



Type in the lid of the rating curve you wish to view and hit the carriage return or click on the "OK" button. If the id has multiple types of curves defined for it (i.e. HP and HG), a window will pop up to allow you to choose which you wish to view. After choosing a curve type, or if only one type is defined, a window will appear with a graphic and tabular display of the most recent rating table for that site.





The top of the text window tells you how many versions were found, along with which one you are viewing, and the name of the site as retrieved from the *location* table. The following is a brief explanation of some of the other information displayed:

- TABLE BEG DATE: date stored in the *rating* table.
- SHIFT BEG DATE: date stored in the *ratingshift* table.
- SHIFT END DATE: date that the next shift begins; -1 if it is the latest.
- ACTION, ALERT, BANKFULL, FLOOD STAGES: retrieved from the *rivercrit* table; the second column is retrieved from the corresponding 'q' columns of the *rivercrit* table (see explanation under Application Assumptions).
- SHIFTS APPLIED: lists all defined shifts as well as the 'zero shift' value calculated by the program (see explanation under Design Considerations).
- DATUM ADJ: displays the "dadj" column from *ratingshift* if non-zero (not shown in example below (above??)).

The user may view previous rating curve/shift definitions by using the "PREV" button, and then go back to the later version with the "NEXT" button. The user may also enter either a stage or a flow value in the area provided and hit carriage return to have the program return either the flow or stage computed using the displayed rating. The contents of the text window may be saved to a file with the "SAVE" button.

In the text window the program displays extrapolated stage/flow pairs for 10 feet above the defined table at  $\frac{1}{2}$  foot increments. These pairs may be viewed on the graph by selecting the "Extrapolate (log)" button under the graph. The extrapolated points will be displayed in purple.

## 4.0 Troubleshooting Information

If a site is not displaying, check to make sure it has corresponding entries in both the *rating* and *ratingshift* tables of the archive database (i.e. have the same table versions). Action, alert, bankfull and flood stages are retrieved from the *rivercrit* database table. Contact the RFC Support Group if you continue to have problems.

## Attachment A

### Example 1: no shift pair added

Rating table:

Stage	Flow
6.2	0
6.3	19
6.8	164

Original shift table:

Stage	Shift
6.15	0.5
8.00	0.0
11.74	-1.0

The first stage in the shift table (6.15) is less than the zero flow stage of the rating table (6.2) so no pair will be added to the given shift table. In this case, any stage less than 6.15 will be shifted by the constant value of 0.5.

### Example 2: shift pair added

Rating table:

Stage	Flow
0.6	0
1.4	500
1.6	621

Original shift table:

Stage	Shift
1.00	0.1
2.17	0.1
5.00	0.0

The first stage in the shift table (1.0) is greater than the zero flow stage of the rating table (0.6) so a zero shift pair will be added to the bottom of the shift table.

New shift table:

Stage	Shift
0.60	0.0
1.00	0.1
2.17	0.1
5.00	0.0

In this case, stages between 0.6 and 1.0 will be shifted by a linearly interpolated value between 0.0 and 0.1. Any stage less than 0.6 will not be shifted.