

## **RATINGS TEAM**

### **Functional Requirements for Processing Ratings**

**August 11, 2005**

The USGS makes their ratings and discharge measurements available to RFCs on the USGS website. Each day, the USGS runs a program at each District office to transfer the current rating with appropriate shifts to this website. Procedures are in place to store all discharge measurements in the USGS NWIS system.

RFCs need a standard methodology to obtain these ratings and discharge measurements, update the NWSRFS database if appropriate, and then make these available to the appropriate WFO. Some procedures are already in place to perform these tasks. These procedures will provide a valuable starting point to develop a single set of standardized procedures. With a single set of agreed-to procedures, this functionality can then be implemented into baseline AWIPS software and the maintenance and support of these procedures can be taken over by OCWWS.

Processing of the rating curves and discharge measurements will involve the retrieval of this data from the USGS (or other agency), archival, a graphical user interface to allow a user to compare ratings from the USGS and NWSRFS and update the rating in NWSRFS, and transfer those ratings from the RFC to the WFO. RFCs will also need utilities to manage some of these processes and review log files. The ratings archived from NWSRFS will be the ratings that are provided to the WFOs for use in local hydrologic applications

The following capabilities are required for the processes that retrieve ratings and discharge measurements from the USGS:

- 1) Daily, all ratings needed by the RFC will be downloaded from the USGS and compared with the latest rating that is stored in the RFC Archive (RAX). If the rating downloaded from the USGS differs from the latest rating, it will be archived and listed as the most current rating. The user should be able to specify the time of the daily transfer.
- 2) Daily, all discharge measurements collected since the last transfer will be downloaded from the USGS computer and stored in the RAX.
- 3) Each day, this process should prepare a message for the RFC that lists the rating curves that were updated for that day and the discharge measurements that were added to the website.
- 4) The daily status message of updated ratings should be sent to AWIPS to alarm/alert the RFC of rating changes.
- 5) The daily status message should be archived on the RAX so the RFC can determine what ratings were updated by the USGS each day.

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- 6) This process should be modular so that if another agency allows access to their ratings, a similar/parallel process could be developed to retrieve/archive ratings.
- 7) This process should utilize accepted and approved methods for AWIPS to obtain external data (LDAD or its successor).
- 8) Necessary log files to monitor these processes should be updated daily as automated transfers occur. Log files should list the start and stop times of the transfer and list any new ratings that were moved into the archive.
- 9) When the discharge from a measurement differs by a specified percentage from the corresponding discharge measurement from the rating curve, an alarm message should be sent to the RFC AWIPS. The RFC should have the capability to set the percentage difference for this alarm.

The following capabilities are required for the archival of ratings:

- 1) All rating curves from the USGS should be archived and include the dates the rating was in effect.
- 2) All rating curves used in NWSRFS should be archived and include the dates the rating was in effect.
- 3) All discharge measurements made by the USGS should be archived with the stage, flow, date and time, and other pertinent comments.
- 4) The points used in defining the rating curve should be denoted in the archive.

The following capabilities are required for the GUI that allows a user to manipulate rating curves:

- 1) A user should be able to display the current rating in NWSRFS and a USGS rating for comparison. The default USGS rating will be the most recent but the user has the option to use any rating in the archive.
- 2) All metadata used in NWSRFS should be editable through the GUI.
- 3) A user should be able to “drag-n-drop” points to make changes in NWSRFS ratings.
- 4) A user should be able to manually enter a rating for locations where the USGS does not provide ratings.
- 5) A user should have an option to replace the current NWSRFS rating with the most recent USGS rating.
- 6) A tabular listing of the USGS and NWSRFS ratings should be available and the RFC forecaster should be able to make changes in the NWSRFS rating using the table.
- 7) The USGS rating is stored with points every 0.01 foot. When displaying the USGS rating, the user should be able to specify the frequency of rating points to be displayed – i.e. 0.01, 0.1, 0.2, 1.0, etc. The user should also be able to only display the points that were used in denoting the rating.
- 8) The user should have the capability of displaying recent discharge measurements along with the USGS and NWSRFS rating curves.

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- 9) RFCs should be able to automatically replace the current NWSRFS rating curve with the most recent USGS rating curve. IN this automated process, the user should be warned when the top of the USGS rating curve is below flood stage.
- 10) When ever a rating is updated in NWSRFS, the GUI should automatically archive this rating in the RAX.
- 11) When a rating is updated in NWSRFS, the GUI should automatically transfer the new rating to the RFC IHFS database. It should also do any processing to make data available to transfer to the WFO IHFS database.
- 12) A log file should list all changes made in rating curves in NWSRFS and include the date, time, and user who made the change.
- 13) When editing a rating, the user should be alerted with a warning when the top of the USGS rating curve is less than the flood stage.

The following capabilities are required for the procedures that transfer ratings from the RFC to the WFO:

- 1) When a rating is updated at the RFC, that update should be sent automatically to the WFO database daily.
- 2) The WFO should be able to choose between automatically loading the rating into IHFS (hands-off) or manually review the changes before they are made
- 3) A method is needed to allow a WFO to go back a month or more and make rating updates for those days. This capability is needed in the event that AWIPS is down for several days or the WFO elects to update ratings manually and this is only done weekly or monthly.
- 4) A log file is needed to track the rating updates made at the WFO.
- 5) When a rating is changed in the WFO IHFS database, the appropriate Service Hydrologist/Hydro Focal Point should be notified by email of the change. This notification should be optional and at the discretion of the WFO.

The following utilities are needed to help manage the data flow

- 1) A user should be able to view the log file of processes to obtain ratings from the USGS.
- 2) A user should be able to specify river gage and see the dates of USGS rating changes and NWSRFS changes
- 3) A user should be able to view/print a report that lists the last date the USGS was changed and the last date the NWSRFS rating was changed. This report should list all river gage sites of interest.
- 4) A user should be able to view the log file of all changes in NWSRFS ratings.
- 5) A user should be able to look at all flow measurements for a particular site.
- 6) A user at the RFC should be able to manually run the process to transfer rating curves from the RFCs to the WFO.
- 7) All of the above utilities should be accessible thru menu system such as Tcl/tk.

Some general design considerations include:

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- 1) Since some of these applications require a complete list of all locations to process ratings for, a single method of listing the sites should be developed and all applications utilize that list.
- 2) Where possible, all directories and filenames should be defined in .Apps\_defaults to minimize any changes in the code to tailor the processes for each RFC and WFO.