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SWREVIEW
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Contents:

1-OVERVIEW

Swreview is the surface-water portion (and currently the GW-level portion) of the larger auto_review program that automates the production of record packets and assists with record checking, reviewing, and electronic archival for multiple record types. Swreview is designed to work for standard stage-discharge continuous record stations, but will also produce output for CSG, slope, velocity, and stage-only SW stations with varying degrees of success (newer version also produce output for reservoir and continuous GW-level stations). Swreview requires stations to have a recognized data-descriptor and processor. Swreview does not currently support non-USGS/non-database 01 stations, although it's hoped to add support for those at some point along with better output options for tidal and index-velocity continuous record sites.

The program produces a number of plots and tables that have traditionally been included in SW records packets as well as some based on other programs and scripts such as Baseplot (written by Lamar Sanders), shifplot (written by Wil Sadler), and various other plotting scripts written by other USGS personnel (Lucky Sultz, Joe Nielsen, Ed Fisher, etc...). Program can be run interactively and output sent to the screen as tkg2 plots/text tables, sent straight to printers, or stored as files in a central output/archival area located at /SWR on the NWIS machine where installed (generally in PDF format, although other options are available - output location is also optional). The output area can then be set up to display within the Windows environment of users' PC's via SAMBA and/or set up to display on the web via a local webserver with links automatically added to station's SIMS/RMS pages or viewed via local website (see the New England website at http://me.water.usgs.gov/usgs/AUTOSWR/ or WI website at http://privusgs1.er.usgs.gov/pls/apex/f?p=125:1:3910960099889031). Output is separated into directories as /SWR/stationID/WY, or optionally /SWR/station_list_name/stationID/WY, where stationID is the valid numerical ID for the station, WY is the water year for that set of output, and station_list_name is the name of a file of station IDs maintained within swreview that usually corresponds to a field office station list, but could also be a WSC station list if multiple WSCs share a server (or it could even be a list of stations individual personnel are responsible for or any other type of desired station division). Note that SIMS/RMS Auto_Review links require no station_list's be used - an option can be set to maintain 2 output areas, one for SIMS/RMS display with no station_list divisions and another for local filesystem access with station_list divisions if desired. Contact gs-w-OSW_scripts for information on that option.

The program can also be run in pseudo-batch mode off of control files containing multiple stations and water years using the swreview_bat script. These batch runs can be run manually or can be timed as cron processes. The swreview_bat script can also be run with a "c" command line argument so that it only updates plots and tables for stations in the control file that have had significant updates made since the last time it was run. Cron processes can be set up and timed to try and keep plots and tables in the output area automatically updated with recent record work. If updates are wanted sooner, they can always be repulled manually at any time.

Beyond the obvious time-savings of having one program automatically produce the bulk of the materials in a record packet, swreview also provides an electronic records packet that should help facilitate the checking and reviewing of records between field offices within a WSC, between WSCs, and even with the discipline offices. Once the output area is mapped to a user's PC, it also becomes quite easy to add photos, scanned or electronic measurement and level notes, station analyses, station descriptions, GRSAT xml files, etc... to the area to create a complete electronic record packet. This would allow the bulk of WSC or discipline-office routine reviews to be carried out remotely, saving the hassle and expense of much of the on-site visit. On-site visits could be performed

simply to review equipment and facilities. The packets also provide an easily accessible
on-site archive of the records that can either be kept on-hand or placed on storage-media
for retrieval. The feasability of producing PDF 1-a electronic archivable files is also
being researched. These files could be electonically archived at the national archives although
the usefulness of this is questionable given the fact the NWIS database has been designated
a NARA approved archive itself.

END OVERVIEW

2-DIRECTORY STRUCTURE

The Swreview portion of the Auto_Review package consists of the following main
directories at /usr/opt/Auto_Review:
/Controlfiles - Contains directories of files that tell swreview what sites/water years
                to retrieve during batch/cron runs (via swreview_bat) and how to organize
                the resultant output into field offices, WSCs, or other lists.
/Crons - Contains an example cron file. Can be used as a repository for Cron files used
         to run swreview within the WSC.
/Logs - Contains a log of each station's last batch/cron run via swreview_bat as well
        as runtime info. from the last swreview_bat c run, and a listing of all stations,
        water years, processors, etc... that have been run in swreview since this version
        was installed. The last log can be extremely beneficial in later years when trying
        to assemble station lists for past water years.
/Programs - Contains programs/scripts necessary for the base functions of swreview.
/Settings - Contains configurable files that dictate a wide range of options relating
            to system-wide required settings, default station settings, and
            user-configurable station-specific settings.
/Templates - Contains the tkg2 templates necessary for swreview plotting.
/Utilities - Contains support scripts and various utilities that assist with
             maintenance and creation of control files and perform various functions
             that couldn't be reasonably incorporated into the swreview script itself.
Contents of these directories will be discussed in more detail in their respective
sections below.

OUTPUT DIRECTORY
Default file output is produced in the /SWR/ directory.

Sub-directories are created under this main directory for field office/WSC (optionally),
station ID, and water year.

i.e. /SWR/Pueblo/07109500/2007/ would be the output directory for a 2007 water year
retrieval for station 07109500 (if 07109500 was included in the list of stations
contained in the /usr/opt/Auto_Review/Swreview/Controlfiles/Fieldoffice/Pueblo file).
See the /Fieldoffices directory below for more information on field office/WSC station
division lists and output directory structure.

Non-water year retrievals will be place directly in the station-named directory (not a
water year-named directory). This allows users to produce a sub-set of plots with
different settings for a particular period, that won't get over-written by cron or batch
processes running by water year. These plots with different settings can then be
manually renamed and placed in the appropriate water year directory for retention if
desired. For example, you may want to include UV plots with water or air temperature
during winter months in addition to the normal discharge reference data from another
station you include for the entire year.

END DIRECTORY STRUCTURE

3-/Settings

The swreview Settings directory contains an swr_settings file which controls
global/WSC-wide settings, a default.config file which controls the default
station-specific settings for sites that haven't had specialized settings saved for
them, a required.config file which prevents any listed settings from being changed
as default settings, and a Stationspecific directory which contains all of the saved
individualized station-specific settings for individual sites.

****
swr_settings
****
After installing the Auto-Review program, users will need to set up their swr_settings file with settings appropriate for their WSC/server. These are global settings that will affect all retrievals performed with swreview. The file itself contains detailed descriptions of the settings and the various options for each. Care should be taken to try and make sure the options set are valid and that the options are completely enclosed in quotes if quotes are used around the option. Having only one quote on either side of an option or setting an incorrect option will likely cause the program to function improperly or not function at all.

****
required.config
****
The required.config file allows a WSC to maintain whatever settings are included within it as the default settings for every station. While these settings can be changed by users for individual retrievals, the changes cannot be saved as the defaults for that station - the default settings for every station will be whatever is specified in the required.config file. If an individual field office (or WSC on shared servers) wants to maintain a constant setting that other offices/WSCs don't want or want set differently, the required.config file can be copied to a file called require.config.field_office, where field office is the exact name of the office's/WSC's field office file located in usr/opt/Auto_Review/Swreview/Controlfiles/Fieldoffices/. When a new setting is placed in one of these files, users will be prompted to save their settings every time they run a station until the settings are either manually saved during a run or until the station gets run via command line (swreview automatically saves the settings for batch, cron, or other command line runs). See the default.config section below for the complete list of station settings that can be used in these files.

****
default.config
****
The default.config file simply contains the default station-specific settings the swreview program uses for sites that don't have a configuration file saved for them yet. These are the settings users manually set at the swreview main menu when running the program interactively. The settings can be saved during manual swreview runs for each station, but if particular settings are desired for every station in a WSC, they should be set in the default.config and required.config files prior to general use. Please note that the default settings for each station can be overwritten by users during interactive runs. If there are settings that a WSC absolutely doesn't want changed, those settings should be added to the required.config file(s) discussed above. Below are descriptions of the settings used in the default.config file and what the various options for setting them to are:

uvprinter=$LPDEST - the uvprinter option controls what printer uv plots are sent to if the output option is set to (p)rinter. The $LPDEST option sets the printer to whatever the individual's default printer is on that server and should work for the vast majority of installations. It can also be set to any available network printer accessible from that server.

dvprinter=$LPDEST - same as the uvprinter except this controls the printer for DV hydrographs.

vprinter=$LPDEST - same as the other printer options, except for V-diagrams instead.

ratprinter=$LPDEST - same as the other printer options, except for ratings instead.

adapsprinter=$LPDEST - same as the other printer options, except for Adaps tables instead.

plotqm=y - (y or n) Plot measurements on rating plots or not. This is somewhat of a remnant from the days when swreview didn't divide rating plots up into 8 shift curves per plot and rating plots could get extremely messy for a full year of data at some sites or when looking at shift curves over a period of several years. It still remains as an option if users don't want them.

skipUV=n - (y or n) Skip all UV/DV hydrograph plots or not. The name of this setting is somewhat misleading as it is a remnant from the days when swreview only had options to plot monthly UV plots. Should generally be set to n, but

can be set to y if no hydrograph plots (DV, UV, peak) are wanted at all. If set to Y, overrides the settings of wantbigplot, wantdvplot, wantpeakplot, and uvplotopt.

wantbigplot=y - (y or n) Plot the long, large UV plot for the entire period. This plot is best viewed on-screen and is difficult to print, but has the added benefits of having a fixed scale for the entire period and shows continuous UV data for the period unlike the monthly UV plots. This can be a useful addition when records are checked/reviewed partially or fully electronically.

wantdvplot=y - (y or n) Plot a DV hydrograph for the period or not.

uvplotopt=1 - (1, 2, s) Plot monthly UV plots in (1) or (2) month increments or (s)kip altogether. WSCs with completely electronic records processes may choose to skip the monthly UV plots altogether and only produce the big entire period UV plots to save file space, avoid clutter, and cut down substantially on swreview station-processing time. WSCs printing out hard-copies will need to keep the monthly plots, but may consider using 2 month plots if stations aren't too complex to save some paper and processing time.

dvheight=11 - (height in inches) Set this to the desired height of DV hydrographs in inches.

dvwidth=17 - (width in inches) Same as above except width.

uvheight=8.5 - (height in inches) Monthly UV plot height (Big entire period UV plot dimensions are fixed and not adjustable).

uvwidth=11 - (width in inches) Same as above except width.

ratheight=8.5 - (height in inches) Rating plot height.

ratwidth=11 - (width in inches) Same as above except width.

vheight=11 - (height in inches) V-diagram plot height.

vwidth=8.5 - (width in inches) Same as above except width.

pkheight=8.5 - (height in inches) UV one-day peak plot height.

pkwidth=11 - (width in inches) Same as above except width.

ice=n - (y or n) Plot measurements with ice cover/shore ice on ratings/V-diagrams. Set to n to keep ice measurements from sticking out on ratings and V-diagrams. May want to include them if ice is completely bridged or shore ice isn't affecting ght and open-water records can at least partially be computed based on the measurement shifts or if record is estimated based on ice-shifts using the shifting-control (Stout) method of ice-estimation.

skipADAPS=n - (y or n) Skip all adaps tabling or not. Setting to y overrides the setting for skipPRIM (but not the setting for wantmeasprim which isn't an Adaps product.) Should generally be set to n.

skipPRIM=y - (y or n) Skip primary recomputation and generation or not. Generally should be set to n so that primary computations are done prior to tabling/plotting which ensures that the data being looked at truly reflect what is in the database. Also helps avoid data consistency errors when changing data-aging status. Will recompute statistics for complete years of data after running to avoid stat-recomputation warnings.

wantpeakplot=y - (y or n) Plot one-day UV plots of the 5 highest peaks during the period or not. Plots can be very useful for flashy sites where a lot is often happening in a very short period of time during short-lived peaks. Plots help to review shift/DC timing, UV estimations, etc... as well as help judge whether the peak may have occurred between the recording interval (usually indicated by a plateau instead of a sharp peak.) For larger-order stations the plots may not be very useful and can be turned off by setting this option to "n".

wantmeasprim=y - (y or n) Include inspection primaries for days of inspections/

measurements or not. Tables are very useful for verifying field notes, checking shift and data correction entry, checking measurement entry, and checking UV editing/estimation on days of measurements/inspections. should generally be set to y.

timestep=60 - (Allowable time between data values in minutes or s) Expected time-increment in minutes between consecutive data values. This option tells Tkg2 when to "lift the pen" when drawing lines between consecutive unit-values. Must be set at least as high as the recording interval at the site or Tkg2 will never see two data values close enough in time to actually draw a line for the unit-value trace. Can enter s to skip the gap checking altogether, but then a line is drawn between data values regardless of how far apart in time they may be. 60 minutes is generally a safe starting/default setting as most stations have at least a 60 minute recording interval and gaps less than 60 minutes can often be considered inconsequential.

square=y - (y or n) Square rating axes or not. This option controls whether swreview should try to plot rating axes with the same number of log cycles per inch on each axis as the Adaps program ratplot does. Generally, the swreview square axis code does a fair job of approximating this, but occasionally it fails for some ratings when swreview estimates a bad 1st y-axis increment, miscalculates how many log cycles Tkg2 auto-scaling will add to the x-axis, or if funny plot dimensions are chosen. Generally this should be set to y initially to prevent Tkg2 auto-scaling from distorting rating shapes, but if portions of ratings end up being cut off or there ends up being insufficient resolution on the rating plots to make out necessary detail, the option should be set to n for those sites.

remarks=y - (y or n) Include shift and data correction remarks on UV plots at the times corresponding to their entry. This option is very valuable when an explanation for the timing of the shift or data correction entry is provided in the Adaps shift or data correction remark field. Should generally be set to y, but can be set to n if the Adaps remark fields aren't used or if shift/DC entry is so frequent at a station the remarks run together and become illegible. The origin points for the remarks are set by the date/time of the entries and the shiftline and dcline options (regardless of the wantind setting) which are set and explained in the swr_settings file.

wantind=l - (l or p) Indicate shift and data correction entry on UV plots as actual shift/DC entry (p)oints or just simple timing (l)ines. With the p option, each shift or DC entry has each gage height input point plotted at the time of the entry along with a text label corresponding to the shift or DC value associated with that gage height input point. This is a good option to use when using complex shift or DC curves that use more than 3 points and you want to see when gage heights get above or below the bounds of the currently applied portion of that shift/DC (you want to make sure you have the correct points entered for the range of gage height for the period). This is also a good option for simpler sites where the added detail doesn't obscure more important portions of the plot. Generally the l option is a safe default that simply plots a vertical bar at the time of the shift at a shift/DC value set by the shiftline/dcline option respectively in the swr_settings file (see that file for more explanation of those settings).

dc=e - (e or c) Plot (e)dited UV gage heights or actual UV data (c)orrections on the gage height portion of UV plots. The c option generally allows more detail to be seen with UV data corrections and allows the user to better identify exactly what data correction is being applied at any point in time. The e option makes it easier to see exactly how the edited data was changed due to the applied data correction. It's also generally easier to visualize potential timing errors and allows for the evaluation of edited data that has been assigned an X remark code and isn't available as a computed value. If the e option is used, it's suggested that obviously bad gage height values that would blow the scales of the UV plot be deleted instead of X'd out, while more questionable values that don't blow scales be assigned an X remark code so that they can be evaluated during the check/review process on the plots. The e option is generally preferable due to the added benefits of being able to evaluate data with an X remark code.

histmstyrs=2 - (any reasonable number of years) Number of years of historical

measurements for swreview to display on the first rating and V-diagram plots (swreview won't display them on any plots after the first if multiple plots are produced). 1 or 2 is generally a good default, but should be modified for each site depending on recent rating stability, the age of measurements defining current shifts, etc...

WARNING - These last four settings generally should not be altered in the default.config file unless you want every station to start out with the same reference data stations - if so, then additional settings would need to be added.

compare=n - (y or n) Plot UV comparison data on discharge portion of UV plots. This should generally always be set to n in the default config file. This is a very site-specific option and should be set up for each station individually when running swreview interactively.

refstation=none - (none or valid station ID) Again, this should always be left set as none in the default.config file. Should be set for each station individually when running swreview interactively.

comparedv=n (y or n) Same as compare, except for DV hydrographs.

dvrefstation=none - (none or valid station ID) Same as refstation, except for DV hydrographs.

END SETTINGS

4-/Programs

The scripts below perform the base functions of swreview. Without these, the program wouldn't function:

****
*swreview
****

This is the base swreview script that produces all of the station output.

Usage: swreview station Qdd WY
where:
station = station ID
DDQ = discharge DD
WY = water year for retrievals

If the command line arguments are not given they are prompted for within the script and the user is given the option to run on a period other than a specific water year.

All other program options are set within the station-specific config files that can be updated to the settings chosen from the swreview main menu (run without any command-line arguments). Please see the /Settings section for detailed information on program settings.

You are also given the option to only plot the unit values plots and adaps tables for a subset of the dates that are used for the rating plot and v-diagram (adaps table dates can be set to any dates regardless of initial date entry, but can't cross more than one water year boundary/encompass more than 2 water years). Due to a known bug, monthly UV plots do not come out correctly when dates are chosen that cross a water year boundary.

The program can also be run in batch mode using the swreview_bat script which passes the command line arguments from a control file to the swreview script itself.

Output overview (all output except the rating and V-diagram plots can be toggled on and off via the main menu settings). Output will vary depending on DD parameter and processor detected:
1.Monthly unit value plots:
Monthly or bimonthly plots of unit values are generated for every month with data during the analysis. Each plot will contain two graphs, an upper graph showing discharge data and a lower graph showing stage data for the same period. Both graphs have many standard and optional plotting elements including such things as edited and

computed unit values, shift and data correction unit values, daily values, measurements with error bars, optimum shifts with error bars, reference site data, shift entry and remarks, data correction entry and remarks, and rating start start times. Data aging of the daily values is shown via color coding of the daily value plotting symbol (an X) as well as with tic marks (tkg2 "rugging") at the bottom of the graph.

2.Annual unit-value plot:
This plot is the same as the monthly plot except that the entire analysis period is put on one 130 inch wide tkg2 plot rather than broken into months. Although this plot is not printable, it does facilitate easier review of an entire year of data on screen and maintains constant scaling for the entire year.

3.Unit-value "peak plots":
These are one-day unit value plots identical to those above, plotted only for the 5 days containing the highest UV discharges of the period. Useful for flashy sites to identify "missed" peaks and to allow more detail to be seen during periods that often contain a lot of shift, data correction, and rating entries. Pdf formatted plots are concatenated into one five-page file.

4.Daily-value hydrograph:
A standard DV hydrograph showing final DV discharge, maximum instantaneous discharge for the period, measurements, and an optional reference DV discharge. Good for looking at the "whole picture" and also provides an opportunity to provide an additional reference station beyond the unit-value plot reference station.

5.V-diagram of all shifts started during the analysis:
One to five plots showing a stage-shift diagram of the type produced by the ADAPS program shift_analysis. Up to eight shifts are included on each plot (40 shifts maximum for period). Included on the plot are the following elements:
- A tabular listing of the shifts used during the year. Included in the listing are the rating used, the shift start date, the shift points, and a numerical designation of unique shifts corresponding with the graphical display.
- A V-diagram of each unique shift started during the period indicated on the plot. Each shift is given a unique color and is annotated with a numerical designation matching that used in the tabular listing.
- All measurements made during the period indicated on the plot with appropriate error bars. Ice measurement display can be toggled on or off (current bug causes ice measurements to still be used to set axes even when not displayed).
- The max and min UV gage height encountered during the period indicated on the plot will be displayed as a horizontal red line on the gage height axis.
- A variable number of years of historical measurements with error bars can be displayed on the first V-diagram plot.

6.Ratings used during the analysis period:
One to five plots showing all ratings used during the year, both shifted and unshifted, plotted on a common stage-discharge plot. The offset used will be that of the last unshifted rating of the period (1st y-increment is guesstimated by swreview). Included on the plot are the following elements:
-Unshifted ratings will be plotted in black and will be labeled with their rating number (most recent will be solid - older ratings will be dashed).
-Shifted ratings will be plotted in the same color as that used for the same shift on the corresponding V-diagram plot and the numerical designation for that shift will be shown in the rating plot explanation. As with the V-diagrams, up to eight shifted ratings are included on each plot with a maximum of five plots (40 shifted ratings).
-A variable number of years of historical measurements can be displayed on the first rating plot as unlabeled black points.
-Measurements made during the period indicated on the plot can be displayed as red points labeled with measurement number (can be toggled off).
-The highest ten measurements made during the last ten years will be plotted as unlabeled green points.
-The max and min UV gage height encountered during the period indicated on the plot will be displayed as a horizontal red line at those gage heights.

7.Adaps tables:
A set of commonly used ADAPS tables can also be included in the output:
-uv inventory tables of edited gage height and computed discharge
-shift analysis
-site visit reports (based on swr_settings file options)
-DV table (including all stats set up to be stored in the DD processor)
-EOY summary
-Adaps station analysis with additional section added to it by swreview
-primary report (optional) - swreview will recompute the record to make sure that periods being displayed truly reflect the data contained in the database and to help avoid errors during the data-aging process. Swreview will also recompute summary stats after doing this for complete years of data to avoid stat recomputation errors in DV tables (configurable in the swr_settings file).

8.Inspection primaries:
  New in version 3.0 are a series of inspection primaries. These tables give an almost
  complete summary of data contained in the database on the days of inspections and
  measurements when a great deal of data entry and manipulation generally happens.
  Reports allow for a detailed check and review of applied shifts and data corrections,
  verification of field data contained in field notes, and the checking of manually
  edited values based on field readings. Output is concatenated into one file.

****
*swreview_bat
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This script runs swreview in pseudo-batch mode by passing command-line arguments
contained in a swreview.control file on to swreview. This allows swreview to be run on
large numbers of stations and water years as a batch or cron process (xvfb is required
to run swreview in the background or as a batch or cron process as tkg2 needs an
X-display for the tk toolkit).

Usage: swreview_bat c
      Inclusion of the c indicates script is being run as a cron process and only
      stations that have been updated in ADAPS since the last time it successfully ran
      should be processed. The first time the script runs, it scans the Adaps logs for
      updates made that day. If the cron process goes down for a few days, the
      script will pick back up from where it left off and scan for updates made since
      the last time it successfully ran. You can modify the date in
      /usr/opt/Auto_Review/Swreview/Logs/Adaps_log_scan_date.txt to manipulate the program
      to scan for updates from any point in time desired.

Script requires creation of a control file called 'swreview.control' which contains
columns of-
   station DDQ WY
   where:
         station = station ID
         DDQ = discharge DD
         WY = water year for retrievals

Multiple water years can be retrieved by repeating the station information for multiple
water years.

   Example: 01010000 6 2005
              01010000 6 2006
              01022500 2 2005
              01022500 2 2006

The script first scans for a valid swreview.control file in the directory where it was
executed. If not found, it then tries to run off of the master swreview.control file
that should be located at /usr/opt/Auto_Review/Swreview/Controlfiles/Mastercontrol. See
the /Controlfiles section below for more information on the master swreview.control file.

Swreview.control files can be created and edited with the 'auto_control_builder' script.
See the /Utilities section below for information on that script.

****
*fastgaprdb.pl
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This is a script that manipulates the rdb data files to insert characters denoting gaps
in data. When retrieved from the database, the rdb data files used in swreview do not
indicate when gaps in data occur; therefore, tkg2 just connects adjacent data values in
time-series plots regardless of the time between adjacent data values. This script scans
the time-series data files for gaps in data greater than the gap set by the user in the
time-gap setting, which then tells tkg2 to "lift the pen" and create a visible gap in
the line on the plot denoting a gap in data. The script was written specifically for the
gap checks done in swreview by Wil Asquith (TKG2) as the gap-checking utility included
with Tkg2 tended to be relatively slow (but much more robust). Below is the help file
for the script which can be run externally from swreview and may be included with a
future version of tkg2. Script is largely untested external from swreview.

fastgaprdb.pl -- Fast Date Time Gap RDB

```
  A utility to insert fake missing records based on defined jumps of time for RDB files.

  by William H. Asquith

fastgaprdb.pl takes an rdb file and if and only if there is a column that matches
DATETIME, scans the file and inserts a record of the missing value string if the interval
between two consecutive date-time values is larger than a user defined value. This is a
handy utility because Tkg2 does not know how to read file headers to determine whether or
not a file has a constant time step. The fake missing values line cause tkg2 to 'lift the
pen' when drawing line points.

This program is optimized for speed. If you want general gapping in an RDB file, consult
the program dtgaprdb.pl instead. The general nature of dtgaprdb.pl involves general
parsing of the DATETIME value. For the fastgaprdb.pl program the DATETIME value follows
this convention: YYYYMMDDHHMMSS.

Finally, if you have a data file that in fact has seen variable time intervals, your
mileage will vary.

The options are of course optional, the infile and outfiles are also optional. If the
infile is absent, standard input is read instead, and if the outfile is absent, standard
output is written to.

Usage:  fastgaprdb.pl <options> <infile> <outfile>

Options:

   --help             This help.

   --missval=string   The missing value string to insert in all the columns. Defaults to
                      an empty string "".

   --version          The version of the program is printed and followed by an exit.

Option Aliases:

   --mv=string        Same as -missval. Although if --missval is also present then the
                      string with --missval is used instead.

Examples:

  fastgaprdb.pl original.rdb > my_converted.rdb

  cat my.rdb | fastgaprdb.pl > my_converted.rdb

  fastgaprdb.pl original.rdb my_converted.rdb

  fastgaprdb.pl -missval=-- in.rdb out.rdb

  fastgaprdb.pl -missval=-9999 in.rdb out.rdb

**********
*ascii2pdf
**********

This is a simple ascii text to portable document format (pdf) converter available under
the GNU public license.  Swreview uses this to convert text files to pdf files. Can be a
handy script external of swreview for converting text/tables to pdf files for web
display, presentations, or delivery to cooperators/data users.

Requires the PDF::Create perl module that is installed as part of the Auto_Review
installation (there is a directory related to this located in the /Programs area).

Sun-TAC is supposed to be adding both to their supported software pages.

Released under the GNU GPL.
Copyright 2000 Michael Arndt

Usage: ascii2pdf [options] file.txt
Where [options] are:
  -l for landscape
  -f <font> is Courier or Helvetica (default: Courier)
```

```
  -p <point size> is the point size (default: 10)
  -s <side margin> is # pixels for the left margin (default: 10)
  -t <top margin> is # pixels for the top margin (default: 30)

output is file.pdf


Example:

ascii2pdf -l -p8 example.txt  - would create the pdf file example.pdf with a landscape
                                orientation and a point size of 8.
------------
END PROGRAMS
------------



---------------
5-/Controlfiles
---------------
**************
/Mastercontrol
**************

The Mastercontrol directory contains the master swreview.control file that is used to
control the stations and water years that are pulled during batch or cron runs using the
program swreview_bat. The swreview_bat script first looks in the current working
directory for a valid swreview.control file.  If not found there, it then looks in
this directory for the master file. This allows individual users to produce their own
smaller swreview.control files that can be used to only retrieve small sub-sets of
stations or earlier water years of interest. The files are best produced using the
auto_control_builder script included in this software package, but they can be produced
manually or by using separate sql database queries for certain site types of interest.
The files are tab or space-delimited and consist of any number of comment lines (must be
preceeded with a # symbol) followed by any number of lines containing station ID,
discharge data-descriptor, and water year to be retrieved.

Example of October Colorado swreview.control file where both 2007 and 2008 water years
are being retrieved:
# swreview control file used to run swreview as batch or cron process in swreview_bat
#
# This file edited 200710020728 by walker
#
#station        Q_dd    WY
06614800        1       2007
06614800        1       2008
06696980        4       2007
06696980        4       2008
06697100        2       2007
06697100        2       2008

See the 6-/Utilities section below for more information on the auto_control_builder
script.

*************
/Fieldoffices
*************

This directory should (optionally) contain field office named files that contain all of
the stations ran by that particular field office (or WSC if on a server shared between
WSCs - or any other sort of station division desired). File simply needs a list of
station numbers somewhere within the file (format is mostly open - just needs to be a
text file). Additional text beside station IDs shouldn't hurt if it is present.  Files
can easily be created from lists maintained in SIMS or RMS (just copy and paste the list
from RMS or SIMS into a Unix text editor file). The name of the field office file will be
used as the name of the output directory in the main SWR/ output area for all of the
contained stations. A new directory will be created if it doesn't already exist. This
also means that if the name of the file is changed, a new directory with that new name
will also be created. These field office, WSC, etc... station lists are optional.  If the
lists aren't included, stations will be output to the main /SWR output directory.
Similarly, if a station isn't on any of the field office station lists, it will be output
to the main /SWR output directory instead of a field office sub-directory.
```

Examples:
Files in /usr/opt/Auto_Review/Swreview/Controlfiles/Fieldoffices/:
Pueblo

File Pueblo's contents:
this is a station list for the Pueblo, CO field office
07106000
07106300
07106500 07108900 07109500
3815151043519000713410007126200

If water year 2008 was run for station 07109500 in swreview, it would place output
in this directory:
/SWR/Pueblo/07109500/2008/

If water year 2008 were run for station 07103700 (not on any list), it would place
output in this directory:
/SWR/07103700/2008/

NOTE: If a non-water year period were run, such as 11 01 2007 to 03 31 2008, output
would be sent to the stationID-named directory instead of a water year directory. Using
the examples above, the output would go to:
/SWR/Pueblo/07109500/ and
/SWR/07103700/2008/ respectively.
See 3-Directory Structure section above for more details.

END CONTROLFILES

6-/Utilities

This directory contains various scripts that assist with the operation and maintenance
of swreview or that couldn't be easily fit into the swreview program itself.

****
*auto_control_builder
****

The auto_control_builder script facilitates the quick creation and editing of
swreview.control files for use with the swreview_bat script. Script can create or
edit personal swreview.control files or the master swreview.control file if user has
permissions to do so. Script performs the following functions based on user choices and
input:
-Create a new swreview.control file using a variety of different methods (explained
 later). Useful when initially setting swreview up or when wanting to run a large
 number of stations for earlier water years.
-Add a particular water year entry for every station already contained in an existing
 swreview.control file. Useful when adding a new water year entry after Oct. 1 every
 year.
-Remove a particular water year entry for every station already contained in an existing
 swreview.control file. Can be used to remove old water years after all of the records
 for that year have been completed and approved.
-Append additional stations/WYs to an existing swreview.control file manually. Useful
 for adding new stations. Discontinued stations can just be deleted manually using a
 text editor.

The last three options are relatively straight forward and additional discussion likely
isn't warranted. The auto_control_builder swreview.control file creation options could
likely use a little explanation as to how they differ and why you may choose one option
over another:

File creation option descriptions:

Use option 1 to create a control file by manually typing in station numbers and then
selecting the discharge DD from a list. Use this option when you have a small number of
sites or when you have a very specific list of sites to create a control file for.

Use option 2 to create a control file for only published continuous-record discharge
sites with telemetry. This will eliminate any sites that are not published/publicly
displayed, as well as any non real-time sites, partial-record CSG or measurement-only

sites, or stage-only sites. Useful for more formal retrievals where non-published or non-continuous sites are not wanted or of interest.

Use option 3 to pull continuous-record discharge sites with any DVs stored in the database. Useful for running historical years since the other options are based on current station listings. Will not pull partial-record CSG, measurement-only, or stage-only sites, but will pull non-telemetered and non-published continuous sites.

Use option 4 to pull all stations that are listed in the field office station lists at /usr/opt/Auto_Review/Swreview/Controlfiles/Fieldoffices and that have a primary discharge DD. Will pull all site-types as long as they meet the swreview requirements of having a gage height and discharge DD and a Q processor set up. A good option for initial master control file creation for normal WSC daily swreview retrievals after the field office files have been copied from SIMS, RMS, or a locally maintained spreadsheet of stations for each office.

See the /Mastercontrol section above for more information on the format of the swreview.control files.

****
*swr_convert_controlfile
****

This script is simply used to convert pre-version 3.0 swreview.control files to the current format. Previous versions contained many more options in the files that are now stored in station-specific config files.

To run the script, type swr_convert_controlfile in the directory containing the swreview.control file you want to convert to the new format.

****
*get_pdf_rating_table
****

An easy means of including an Adaps expanded rating table for all ratings active during the period within swreview has yet to be figured out. Eventually this will likely be added to the swreview program, but for now the get_pdf_rating_table script can be used to retrieve and convert a text Adaps rating table to a pdf rating table placed in the station's current water year directory.

Simply type get_pdf_rating_table from an NWIS prompt and enter the correct responses as requested and the pdf table will be output to the station's current year output directory. Files can then be copied and moved to other water year directories as desired.

END UTILITIES

7-/Crons

Cron jobs execute files automatically. You will want to set up a cron job for swreview so that it runs at least hourly (or more frequently - default is every 15 minutes). This cron process should be run as user swreview to prevent Adaps process conflicts.

Prior to starting up a cron job for swreview - a master swreview.control file needs to be built. The file can be produced using the auto_control_builder script. Please see the /Mastercontrol and /Utilities - auto_control_builder sections for more information.

A base swreview cron file called swreview.cron is included with the auto_review package in /usr/opt/Auto_Review/Swreview/Crons which can be used to start the cron process. To use the default 15-minute swreview cron, as user swreview type the following:
crontab /usr/opt/Auto_Review/Swreview/Crons/swreview.cron

(Note: No swreview.control file should reside in the swreview user's home directory - if one is located there the program will use that control file instead of the master swreview.control file.)

Or use the example below and create your own cron with timing and options of your choice. The actual cron command from the swreview.cron file (with an explanatory comment line) is

included below as a starting point:

```
# min hr day mo DoW command > output_file
00,15,30,45 * * * * nohup /usr/opt/Auto_Review/Swreview/Programs/swreview_bat c > /usr/opt/Auto_Review/Swreview/Logs/swr_last_cron.log
```

Other cron options besides the standard Adaps update cron:

While the standard cron process keeps station updated routinely enough for usual records checking and reviewing, many WSCs may want to have all stations updated routinely regardless of whether they've had recent Adaps updates made for them or not. This makes the output more useful for routine records working - not just checking, reviewing, and archival.

1. One way of doing this with only the swreview user is to set up the standard cron as explained initially, except only run it Monday-Thursday or Friday and have another cron command set up to repull all stations every Friday or Saturday so that it would refresh all stations over the weekend. By leaving off the "c" command line argument in the swreview_bat command, you can direct swreview_bat to repull all stations instead of only those with Adaps updates. Depending on server speed, number of stations, and swreview station options, there is a possibility the weekend cron process could continue to run into Monday and beyond, which would then prevent the normal cron from running until it finished (full retrievals generally take 1-4 days).

   Example crontab entry for the above setup - the first entry only repulls stations that have had Adaps updates Mon-Thurs, while the second entry starts repulling all stations on Friday mornings.

```
# min hr day mo DoW command > output_file
00,15,30,45 * * * 1-4 nohup /usr/opt/Auto_Review/Swreview/Programs/swreview_bat c > /usr/opt/Auto_Review/Swreview/Logs/swr_last_updateonly_cron.log
05 00 * * 5 nohup /usr/opt/Auto_Review/Swreview/Programs/swreview_bat > /usr/opt/Auto_Review/Swreview/Logs/swr_last_full_cron.log
```

2. Another option to keep all output more up to date would be to just omit the "c" command line argument from the standard cron. This would cause swreview_bat to just continually loop through all stations, updating them one at time, one after the other on a nearly continual basis. With this setup, station ouput would likely be updated every 1-4 days totally regardless of any Adaps updates. If station output was wanted prior to that time, the station would just have to be manually refreshed by the user. The downside of this is that it would keep a swreview process running nearly constantly which can put a strain on some servers. Database/server maintenance can also interfere with the runs causing some site updates to be postponed for a considerable amount of time (although they could still be manually refreshed). With the Adaps-update only process, swreview should only be repulling stations as needed, saving system resources for truly useful station processing.

   Example crontab entry for this setup (identical to the standard one, except omitting the "c" swreview_bat command line argument):

```
# min hr day mo DoW command > output_file
00,15,30,45 * * * * nohup /usr/opt/Auto_Review/Swreview/Programs/swreview_bat > /usr/opt/Auto_Review/Swreview/Logs/swr_last_cron.log
```

If a second swreview-specific user is created (swreview2 or the like) some hybrids of the above options could also be used:

3. Use swreview to run the standard Adaps-update only cron like normal, then use swreview2 to do the weekly full retrieval for all stations either over the weekend or during the week. Having the second user prevents the full retrieval from ever interrupting the Adaps-update retrievals, while still providing flexible weekly updates of all stations.

   Example "swreview"-user crontab entry (the standard cron):

```
# min hr day mo DoW command > output_file
00,15,30,45 * * * * nohup /usr/opt/Auto_Review/Swreview/Programs/swreview_bat c > /usr/opt/Auto_Review/Swreview/Logs/swr_last_cron.log
```

   Example "swreview2"-user crontab entry for full refresh starting on Friday:

```
# min hr day mo DoW command > output_file
05 00 * * 5 nohup /usr/opt/Auto_Review/Swreview/Programs/swreview_bat > /usr/opt/Auto_Review/Swreview/Logs/swr_last_full_cron.log
```

4. If output was wanted to stay as updated as possible, you could run a setup similar to 3 above, but keep the full retrieval running almost constantly as in #2. User swreview would be running the normal Adaps-update only cron process, while user swreview2 kept a full swreview_bat retrieval of all sites going almost constantly. Downside of this would be the drain on system resources the two processes would likely cause, but would give the most updated output (even more users could be added to do full retrievals and their timing could be staggered to keep all stations' output updated even more frequently, but the load on system resources would increase with each one.)

Example "swreview"-user crontab entry (the standard cron):
 # min hr day mo DoW command > output_file
 00,15,30,45 * * * * nohup /usr/opt/Auto_Review/Swreview/Programs/swreview_bat c > /usr/opt/Auto_Review/Swreview/Logs/swr_last_cron.log

Example "swreview2"-user crontab entry for nearly constant full refresh of all stations:
 # min hr day mo DoW command > output_file
 00,15,30,45 * * * * nohup /usr/opt/Auto_Review/Swreview/Programs/swreview_bat > /usr/opt/Auto_Review/Swreview/Logs/swr_last_full_cron.log

Note that the 2 user setups may cause some complications with a few of the log files. Shouldn't cause any real problems, but a few of the logs may get a little garbled...

Cron comments:
Enter "man crontab" at a Unix prompt for a detailed description of the cron file syntax.

The nohup preceding the swreview_bat c command is included to prevent the HUP (hangup) signal sent to all child processes when logging off from terminating the process.

It's suggested that normal users not be used to run swreview_bat cron processes since swreview uses Adaps tabling programs that can conflict with users' routine Adaps work.

The output redirection ("> /usr/opt/Auto_Review/Swreview/Logs/swr_last_cron.log") creates the listed file which contains all non-redirected output, error messages, etc... from each cron run. Most output is already redirected into the swreview_bat_log.txt file located in that same /Logs directory. The swreview_bat_log.txt file contains more information and can be emailed to all users specified in the swr_settings file. If you do not redirect output to a file, cron will attempt to email output to the user running the cron process. It's recommended to have at least one person in the WSC receive the swreview_bat_log.txt emails in case of problems. Mail rules can be set up in Lotus Notes to automatically move these emails to a folder and clean them up after a set amount of time. This way the files can be ignored most of the time, but will be available for troubleshooting purposes if problems are encountered.

The swreview_bat c process will scan the Adaps logs for any updates made to stations since it last ran and only update those stations (or just look for updates made so far that day if it can't detect the last time it ran). If no new updates are seen, no stations' output is refreshed.

Stations can take up to 15 minutes or more to refresh in swreview. For each swreview_bat c run, the stations with Adaps updates are all pulled individually one after the other. This means that if you have 4 updated stations found by the swreview_bat c cron process, the last station in the list may not get updated until an hour later, even though the cron is running every 15 minutes or more frequently. Additionally, only one swreview or swreview_bat process can run under any one user ID. This would mean that any Adaps updates made while those 4 stations were updating wouldn't be detected by the swreview_bat c process until those 4 stations had finished refreshing (any cron swreview_bat c processes that try to start while a previous cron is still running will abort). If 4 more stations were updated in that period of time, it may be several hours before they are updated. In this way frequency of updates is really tied into how many Adaps updates are being made at any point in time more than the frequency with which the swreview_bat cron process runs. If not many Adaps updates are being made, the timing of the cron processes would have an effect on update frequency, though. Manual retrievals by users are always possible if updates are required immediately.

END CRONS

8-/Logs

This directory contains all the various logs written by the swreview program.

The station.swr.log files (where station is a valid station ID) contain the runtime info. from the last batch (swreview_bat) swreview run for that station. This file is used for troubleshooting purposes.

The swreview_bat_log.txt file contains the swreview_bat runtime info from the last swreview_bat execution that was run with the c command line argument (swreview_bat c). This log gets mailed to all users specified in the swr_settings file in /usr/opt/Auto_Review/Swreview/Settings/ .

The master.station.log.txt file contains a list of all stations, dds, wateryears, station types, etc... run in swreview since it was installed. It's thought that this

log will be very useful for constructing control files for older water years depending
on how long this log has/will be maintained.

END LOGS

9-/Templates

This directory contains tkg2 templates for all the plots produced in the swreview
program. Templates can be modified and re-saved using tkg2, but caution should be
used as improper changes can cause the templates to become unusable (keep copies).
Future Auto_Review updates may also overwrite any modifications made, causing updates
to be lost. See the Tkg2 documentation for more information on template modification.

END TEMPLATES

Please contact GS-W_OSW_Scripts@usgs.gov if you have any questions, comments, requests, etc...

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END SWREVIEW
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