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GWREVIEW
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Contents:

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1-OVERVIEW
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Gwreview is 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. Gwreview is designed to work for
standard continuous record GW-level stations, and requires stations to have a
recognized data-descriptor and processor. Gwreview does not currently
support non-USGS/non-database 01 stations, although it's hoped to add support for those
at some point. It should be noted that gwreview really just runs the swreview script, so
many setup and configuration files are shared by these two components of the Auto_Review.

The program produces a number of plots and tables that have traditionally been included
in GW 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, gwreview also provides an electronic records packet
that should help facilitate the checking and reviewing of records between field offices
within a WSC, between WSC's, 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.

NOTE: the gwreview program actually just runs the swreview program and shares nearly all
configuration files, control files, etc... with that program. GW-level stations are basically
run identically to stage-only stations in swreview with a few additions and changes. Documentation
below largely mirrors that of swreview and some user, program names, etc... reference "swreview"
since swreview is actually really the program being run. Nearly everything referenced in the
swreview documentation should be mirrored and nearly identical here (aside from some SW/GW-specific
outpus). The "gwreview" program was really just created in an effort to make manual updates less
confusing for GW users and encourage use of the software for continuous GW-level stations.

END OVERVIEW

2-DIRECTORY STRUCTURE

The Gwreview portion of the Auto_Review package consists of the following main
directories at /usr/opt/Auto_Review/Gwreview:
/Controlfiles - Contains the GWSI control file that controls the GWSI tabling of gwreview.
                File can be modified, but gs-w-OSW_Scripts@usgs.gov should be contacted first.
/Programs - Contains programs/scripts necessary for the base functions of gwreview.

Swreview releated files also control aspects of gwreview operation (since gwreview really just
runs the base swreview code...) and those files are located in
/usr/opt/Auto_Review/Swreview:
/Templates - Contains the tkg2 templates necessary for gwreview/swreview plotting.
/Crons - Contains an example cron file. Can be used as a repository for Cron files used
         to run swreview_bat within the WSC (which runs GW-level stations and SW stations).
/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/gwreview since this
        log was added. The last log can be extremely beneficial in later years when trying
        to assemble station lists for past water years.
/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.
/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 retrieval scripts themselves.
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 placed 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

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3-/Settings
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The swreview/gwreview 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 and gwreview. 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/WSC's 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/gwreview 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 and gwreview programs use for sites that don't have a configuration file saved
for them yet.  These are the settings users manually set at the swreview/gwreview main
menu when running the program interactively. The settings can be saved during manual
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. Note that this is only a partial list of settings for GW stations.
To see the complete list refer to the readme.swreview.txt file:

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.

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

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
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             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.

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.

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.

remarks=y - (y or n) Include 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 a data correction entry is
             provided in the Adaps 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 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 dcline options
             (regardless of the wantind setting) which are set and explained in the
             swr_settings file.
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wantind=l - (l or p) Indicate data correction entry on UV plots as actual
            DC entry (p)oints or just simple timing (l)ines. With the p option,
            each DC entry has each water level input point plotted at the time
            of the entry along with a text label corresponding to the DC
            value associated with that water level input point. This is a good option
            to use when using complex DC curves that use more than 3 points
            and you want to see when water levels get above or below the bounds of the
            currently applied portion of that DC (you want to make sure you have
            the correct points entered for the range of water levels 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 DC at
            a DC value  set by the dcline option in the swr_settings file (see that file
            for more explanation of those settings).

dc=e - (e or c) Plot (e)dited UV water levels or actual UV data (c)orrections on the
       lower 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 were 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 water level 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.


*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.

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END SETTINGS
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4-/Programs
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The scripts below perform the base functions of gwreview.  Without these, the program
wouldn't function:

*********
*gwreview
*********


This is the base gwreview script that actually runs the swreview code to produce all of
the station output.

Usage: gwreview station GWdd WY
            where:
                   station = station ID
                   GWdd = water-level 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 gwreview 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 overall retrieval dates (adaps/gwsi 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 gwreview/swreview script itself.

Output overview (all output can be toggled on and off via the main menu settings).
Output may 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
  output data and a lower graph showing input data and data correction information for
  the same period. Both graphs have many standard and optional plotting elements
  including such things as edited and computed unit values, data correction unit values,
  daily values, reference sensor readings with error bars, GWSI water level measurements,
  reference site data, and data correction entry and remarks. 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
  generally not printable, it does facilitate easier review of an entire year of data on
  screen and maintains constant scaling for the entire year. The "loupe" tool of many pdf
  readers can be used to create a constant "fixed" scale for any axis of the plot.
3.Daily-value hydrograph:
  A standard DV hydrograph showing final DV discharge, max/min instantaneous GW-levels for
  the period, GWSI measurements, primary reference sensor sensor inspections, and an optional
  reference DV GW-level plot. Good for looking at "whole picture" for the period and also
  provides an opportunity to provide an additional reference station beyond the unit-value
  plot reference station.
4.10-year or period of record daily-value hydrograph:
  A 10 year (or period of record if shorter than 10 years...) simple daily value hydrograph
  for getting a bigger picture view of ground water levels over a longer historical period.
  Plot only includes daily values with the current retrieval period DV's highlighted on the
  plots. The second Y-axis will toggle to various converted measures depending on parameter
  and available data for station (water level elevation for BLS parameters with altitude in
  site file, etc...)
5.Adaps and GWSI tables:
  A set of commonly used ADAPS tables can also be included in the output:
  -uv inventory tables of edited and computed water-levels
  -site visit reports (Water level summary and sensor reading summary)
  -DV table (including all stats set up to be stored in the DD processor)
  -EOY summary
  -Basic GWSI water level table
  -Adaps station analysis with additional section added to it by gwreview
  -primary report (optional) - gwreview 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.
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 primary reference
  sensor readings in site visit when a great deal of data entry and manipulation generally
  happens. Reports allow for a detailed check and review of applied 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. Report does
  not currently trigger on GWSI water level entries - water levels must be entered as primary
  reference sensor readings in Site Visit at this point (Version 4.11-4+).

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*swreview_bat

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This script runs gwreview in pseudo-batch mode by passing command-line arguments
contained in a swreview.control file on to gwreview. This allows gwreview to be run on
large numbers of stations and water years as a batch or cron process (xvfb is required
to run gwreview 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/GWSI since the last time it successfully ran
      should be processed. The first time the script runs, it scans the database 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 DD WY
    where:
         station = station ID
         DD = water level 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
**************

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 gwreview 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 gwreview 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 gwreview and may be included with a
future version of tkg2.  Script is largely untested external from gwreview.

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. Gwreview uses this to convert text files to pdf files. Can be a
handy script external of gwreview 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.

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END PROGRAMS
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5-/Controlfiles
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**************
/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,
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
WSC's - or any other sort of station division desired). File simply needs to be 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
381515104351900071341000713126200
```

```
If water year 2008 was run for station 07109500 in gwreview, 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
----------------


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6-/Utilities
------------
This directory contains various scripts that assist with the operation and maintenance
of swreview/gwreview or that couldn't be easily fit into the swreview/gwreview 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.
-Append all stage-only, reservoir, and GW-level stations displayed on NWISWeb to an existing
 swreview.control file (this option was added as support for those station types was added).
 WSC's likely already had discharge stations in the files, but needed to add these.

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, stage, elevation, reservoir contents, or water-level 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,
stage-only, reservoir contents/elevation, or water-level 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. 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, stage-only, reservoir contents/elevation,
or water-level  sites with any DV's 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 or measurement-only sites but will pull non-telemetered and
non-published continuous sites. Other sites can be manually appended as necessary

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

END UTILITIES

7-/Crons

Cron jobs execute files automatically. You will want to set up a cron job for
gwreview/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 gwreview/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/gwreview 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 WSC's may want to have all stations updated
    routinely regardless of whether they've had recent Adaps/GWSI 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 database updates. Depending on server speed, number of stations, and
    swreview/gwreview 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 database updates Mon-Thurs, while the second entry starts pulling
     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 database 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/gwreview 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/gwreview 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 database-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 database-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 database-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/gwreview 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 gwreview (usually closer to about 7 minutes
for a full water year retrieval - shorter for shorter periods...). For each swreview_bat c run,
the stations with database 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 gwreview or swreview_bat process can run under
any one user ID. This would mean that any database 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 database updates are
being made at any point in time more than the frequency with which the swreview_bat cron process
runs. If not many database 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 auto_review 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/gwreview
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 GWREVIEW
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