
General processing/instrumentation history

- WY 1953-1959
 - Stevens Type A Chart Recorder (A-35) , WS 1, 2, 3
 - Charts were originally only summarized on a daily basis using manual scanning techniques, but were re-digitized at FSL-Corvallis using the Summagraphics digitizer in 1988.
- WY 1960-1966
 - Stevens Type A Chart Recorder (A-35) , WS 1, 2, 3
 - Given the small number of points representing each year, it is surmised that these years were also hand edited from the charts with points established at key changes in the slope of stage height. Points are saved at a timestep rounded to the nearest 15 minutes (:00, :15, :30, :45).
 - It is possible that these charts were actually digitized at Coweeta, but a differing computer card format and 15 minute time-step suggest otherwise
 - Belfort water level recording charts were used the first years of WS 6, 7, 8 from WY 1963-WY 1966
- WY 1967-1975
 - Fischer-Porter punched tape recorders were used to capture record at WS 1, 2, 3
 - These were edited at FSL-Corvallis and sent to Coweeta Hydrologic Lab (CHL) in NC for processing
 - Tapes were read using a Fischer-Porter tape-to-card translator. The tapes were punched at every 15 minute interval but points were reduced at CHL when difference between readings was less than prescribed limit, .001, i.e., when stage did not change
 - This technology was known as analog-to-digital recorder (ADR) tapes
 - Output from this process was punched onto computer cards and sent to the PNW-Portland for discharge calculation
 - More than 5 times as many points were saved per year on average compared to WY 1960-1966.
 - Stevens Type A Chart Recorder (A-35) charts were still recorded as backup
 - Stevens Type A Chart Recorders (A-35) were used at WS 6, 7, 8, 9, 10
- WY 1976-1985
 - Stevens Type A Chart Recorder (A-35)
 - Charts were prepared for digitizing in FSL-Corvallis and sent to Coweeta CHL for digitizing. Stage height data are reduced in this digitizing method where only "key (turning) points", that is, points where the slope or trajectory of stage height changes are saved.
 - Output from this process was punched onto computer cards and sent to the PNW-Portland for discharge calculation
 - Nearly 2 times as many points were saved per year on average through this processing compared to WY 1960-1966.
- WY 1986-1998
 - Stevens Type A Chart Recorder (A-35)

- Charts are prepared and digitized in FSL-Corvallis using a Summagraphics MM1812 digitizer
- Point reduction from the digitizer utilized a very similar method to the digitizing done at Coweeta and the number of points saved per year were the same or slightly greater on average.
- In October of 1996 a Model 2 Stevens Instruments Position Analog Transmitter (PAT) and a Campbell Scientific CR-10X datalogger were installed at WS#1 in addition to the Stevens Type A recorder already present
- WY 1999-WY 2017
 - The PAT with CR10X data loggers replaces the A-35 charts as the primary record in WY 1999.
 - Points are evaluated every 5 minutes for output beginning WY 1999. The original algorithm only saved points where the slope of the stage height measurements was changing more than .003 ft. threshold. This algorithm was subsequently changed in 2002 to save any points where the gage height changed by .001 ft. from previous 5 minute value. Charts from WS 2 and 3 were hand re-digitized 1999-2001 to better capture diurnal flux at these watersheds that had been missed by the original algorithm.
 - In October 2011 data collection was output every 5 minutes, (for WS1, this occurred at 10-26-2011@14:15)
 - In April-May 2015 all Campbell Scientific's CR10X's were replaced with CR1000's except for Lookout Creek, where replacement occurred followed with a CR1000 in March 2016.

Weir physical descriptions and change history:

WS# 1,2,3: Current dimensions

- Bottom width = 9"
- Angle from horizontal = 25 deg. (65 from vertical)
- V-notch angle = 120 deg.

WS1

- Trapezoidal flume established October 1952.
 - Flume had 18 inch bottom
 - Flume was damaged in a storm and rebuilt in August 1956
 - Rating curve: Equation set A
- The original flume was rebuilt in summer 1956 and operational on 1 Sep 1956.
 - Flume dimensions are still current today:
 - Bottom width = 9"
 - Angle from horizontal = 25 deg. (65 from vertical)
 - Rating curve: Equation set B
- A v-notch plate is attached for the measurement of low flow beginning 12 July 1999
 - The v-notch plate is typically installed in June and removed in October.
 - V-notch angle = 120 deg.
 - Rating curve: Equation set C

In October of 1996 a Model 2 Stevens Instruments Position Analog Transmitter (PAT) and a Campbell Scientific CR-10X datalogger were installed at WS#1 in addition to the Stevens Type chart recorder.

WS2

Trapezoidal flume established October 1952. A v-notch plate is attached during summers for the measurement of low streamflow beginning July 1999. The v-notch plate is typically installed in June and removed in October.

WS3

Trapezoidal flume established October 1952. The stream gauging station was destroyed in a debris torrent in Dec 1964 and was reestablished in Jan 1966. The stream gauging station was destroyed in another large debris avalanche/torrent that occurred during a major flood event in Feb 1996. The station site was buried by 11-12 feet of debris, and it was early Sep 1996 before the original flume was excavated. The original shelter, stilling wells, and hook gage were destroyed and the station was rebuilt in Sep 1998. A v-notch plate is attached during summers for the measurement of low streamflow beginning July 1999. The v-notch plate is typically installed in June and removed in October.

WS# 6,7,8: Current dimensions

Bottom width = 4"

Angle from horizontal = 60 deg. (30 from vertical)

V-notch angle = 90 deg.

WS6

An H flume was installed Oct 1963. In Oct 1997 the H flume was replaced with a trapezoidal flume and the station was remodeled. A v-notch plate is attached during summers for the measurement of low streamflow beginning June 1998. The v-notch plate is typically installed in June and removed in October.

WS7

An H flume was installed Oct 1963. In Nov 1997 the H flume was replaced with a trapezoidal flume and the station was remodeled. A v-notch plate is attached during summers for the measurement of low streamflow beginning June 1998. The v-notch plate is typically installed in June and removed in October.

WS8

An H flume was installed Oct 1963. In Oct 1987 the H flume was replaced with a trapezoidal flume. A v-notch plate is attached during summers for the measurement of low streamflow beginning June 1997. The v-notch plate is typically installed in June and removed in October.

WS# 9 & 10

Bottom width = 3"

Angle from horizontal = 60 deg. (30 from vertical)
V-notch angle = 90 deg.

WS9

An H flume was installed Oct 1968. In August 1973 the H flume was replaced with a trapezoidal flume. A v-notch plate was installed for measurement of low flows during summers only beginning Aug 1973 until Oct 1979. A new v-notch plate is attached during summers for the measurement of low streamflow beginning June 1997. The v-notch plate is typically installed in June and removed in October.

WS10

An H flume was installed Oct 1968. In August 1973 the H flume was replaced with a trapezoidal flume. A v-notch plate was installed for measurement of low flows during summers only beginning Aug 1973 until Oct 1979. The gauging station was destroyed in a debris torrent in Feb 1986. A new v-notch plate is attached during summers for the measurement of low streamflow beginning June 1997. The v-notch plate is typically installed in June and removed in October.

Mack Creek flume: Current dimensions from construction drawings

Bottom width = 18"

Angle from horizontal = 14.5 deg. (75.5 deg. from vertical)

Actual angle varies with height above bottom

Mack fish passage compound weir: Current dimensions

120 degree v-notch .577 ft. high

With 2.5 ft.-wide rectangular section above v-notch