Title: Stream discharge in gaged watersheds at the HJ Andrews Experimental Forest, 1949 to present

Abstract:
Streamflow from selected small watersheds has been continuously monitored at the Andrews Forest beginning in November 1952 and the Lookout Creek Gauging Station has been maintained by the USGS since October, 1949. The objectives of this study include: (1) to evaluate long-term changes in hydrology associated with various management treatments, notably clearcut logging, selective logging, and burning; (2) to provide baseline data for affiliated precipitation and stream water chemistry and sediment transport studies; and (3) to characterize the hydrologic regime of old-growth forests at different elevations. Streamflow records from small watersheds began in November 1952 at WS 1, 2, and 3 (60 to 100 ha), 1963 at WS 6, 7, and 8 (15 to 22 ha) 1968 at WS 9 and 10 (9 and 10 ha), 1980 at Mack Creek (580 ha), and 1949 at Lookout Creek (6242 ha). Data have been collected continuously since the start of data collection for all watersheds, with the exception of WS7, which was shut down as a cost-saving maneuver from WY1988 through WY1994. See https://andrewsforest.oregonstate.edu/research/infrastructure/watersheds for other information.

Keywords: hydrology; silviculture; floods; radio telemetry; disturbance; hydrologic processes; stream discharge; streamflow; long term monitoring; timber harvest; water; runoff; forest ecosystems; experimental forests; watersheds; streams; long term studies;

Date data commenced: 1949-10-01
Date data terminated: 2019-09-30

Principal Investigator: Sherri L. Johnson

List of Entities:
1. Corrected instantaneous stage height with flow calculations
2. Daily streamflow summaries
3. Monthly streamflow summaries
4. Annual streamflow summaries by wateryear (October 1 - September 30)
5. Instantaneous and total discharge for requested time intervals
6. Flow summaries for sediment and nutrient sampling periods
7. Discharge data calculated from discontinued rating curves (5 minute frequency data)

1. Corrected instantaneous stage height with flow calculations

Only Lookout Creek streamflow data is available here. Please use Entity 5 (the interactive FLOW program) to download high temporal resolution streamflow data for all other Andrews small watersheds. Lookout Creek data available here: 1) Hourly data has been reconstructed from USGS and USFS streamflow charts and punch tapes (1950-1986), 2) USGS 30 minute data (1986-2010), and 3) USGS 15 minute data (2010-present).

Attribute List:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Type</th>
<th>Description</th>
<th>Range</th>
<th>Date Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>STCODE</td>
<td>N N char(5)</td>
<td>enum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORMAT</td>
<td>N N numeric(2,0)</td>
<td>range</td>
<td>1.0000 1.0000</td>
<td>number</td>
</tr>
<tr>
<td>SITECODE</td>
<td>Y N char(6)</td>
<td>place</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WATERYEAR</td>
<td>N N numeric(4,0)</td>
<td>range</td>
<td>1950.0000@2019.0000</td>
<td>number</td>
</tr>
<tr>
<td>DATE_TIME</td>
<td>Y N datetime</td>
<td>range</td>
<td>10/1/1949@10/1/2019</td>
<td>YYYY-MM-DD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12:00:00 2:30:00 AM PM</td>
<td>hh:mm:ss</td>
</tr>
<tr>
<td>EQN_SET_CODE</td>
<td>N N char(3)</td>
<td>enum</td>
<td>1.0000 37.0000</td>
<td></td>
</tr>
<tr>
<td>Attribute</td>
<td>Data Type</td>
<td>Range</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td>---------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>STAGE</td>
<td>numeric</td>
<td>0.0000 - 10.0300 ft</td>
<td>Stage</td>
<td></td>
</tr>
<tr>
<td>INST_Q</td>
<td>numeric</td>
<td>0.0000 - 8000.0000 cfs</td>
<td>Instantaneous flow</td>
<td></td>
</tr>
<tr>
<td>INST_Q_AREA</td>
<td>numeric</td>
<td>0.0000 - 332.0000 cfsm</td>
<td>Instantaneous flow area</td>
<td></td>
</tr>
<tr>
<td>INTERVAL</td>
<td>numeric</td>
<td>0.0000 - 1440.0000 min</td>
<td>Interval</td>
<td></td>
</tr>
<tr>
<td>MEAN_Q</td>
<td>numeric</td>
<td>0.0000 - 6605.0000 cfs</td>
<td>Mean flow</td>
<td></td>
</tr>
<tr>
<td>MEAN_Q_AREA</td>
<td>numeric</td>
<td>0.0000 - 275.0000 cfsm</td>
<td>Mean flow area</td>
<td></td>
</tr>
<tr>
<td>TOTAL_Q_INT</td>
<td>numeric</td>
<td>0.0000 - 2.1000 in</td>
<td>Total integrated flow</td>
<td></td>
</tr>
</tbody>
</table>

### Attribute List:

#### Daily Streamflow Summaries

Daily data can also be interactively viewed, downloaded, and graphically displayed using [ClimDB/HydroDB](https://climhy.lternet.edu/).

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STCODE</td>
<td>char(5)</td>
<td>enum</td>
</tr>
<tr>
<td>FORMAT</td>
<td>numeric(2,0)</td>
<td>range 2.0000 - 2.0000</td>
</tr>
<tr>
<td>SITECODE</td>
<td>char(6)</td>
<td>place</td>
</tr>
<tr>
<td>WATERYEAR</td>
<td>numeric(4,0)</td>
<td>range 1950-2019</td>
</tr>
<tr>
<td>DATE</td>
<td>datetime</td>
<td>YYYY-MM-DD</td>
</tr>
<tr>
<td>MEAN_Q</td>
<td>numeric(8,3)</td>
<td>range 0.0000 - 4890.0000</td>
</tr>
<tr>
<td>MAX_Q</td>
<td>numeric(8,3)</td>
<td>range 0.0000 - 8000.0000</td>
</tr>
<tr>
<td>MIN_Q</td>
<td>numeric(8,3)</td>
<td>range 0.0000 - 2415.0000</td>
</tr>
<tr>
<td>MEAN_Q_AREA</td>
<td>numeric(7,3)</td>
<td>range 0.0000 - 202.9200</td>
</tr>
<tr>
<td>TOTAL_Q_AREA</td>
<td>numeric(7,3)</td>
<td>range 0.0000 - 7.5430</td>
</tr>
</tbody>
</table>

#### Monthly Streamflow Summaries

Monthly data can also be interactively viewed, downloaded, and graphically displayed using [ClimDB/HydroDB](https://climhy.lternet.edu/).

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STCODE</td>
<td>char(5)</td>
<td>enum</td>
</tr>
<tr>
<td>FORMAT</td>
<td>numeric(2,0)</td>
<td>range 3.0000 - 3.0000</td>
</tr>
<tr>
<td>SITECODE</td>
<td>char(6)</td>
<td>place</td>
</tr>
<tr>
<td>WATERYEAR</td>
<td>numeric(4,0)</td>
<td>range 1950-2019</td>
</tr>
<tr>
<td>YEAR</td>
<td>numeric(4,0)</td>
<td>range 1949-2019</td>
</tr>
<tr>
<td>MONTH</td>
<td>numeric(2,0)</td>
<td>range 1.0000 - 12.0000</td>
</tr>
<tr>
<td>MEAN_Q</td>
<td>numeric(8,3)</td>
<td>range 0.0000 - 794.1290</td>
</tr>
<tr>
<td>MAX_Q</td>
<td>numeric(8,3)</td>
<td>range 0.0000 - 8000.0000</td>
</tr>
</tbody>
</table>
### 4. Annual streamflow summaries by wateryear (October 1 - September 30)

Annual data can also be interactively viewed, downloaded, and graphically displayed using [ClimDB/HydroDB](https://climhy.lternet.edu/).  

**Attribute List:**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Format</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STCODE</td>
<td>N N</td>
<td>char(5)</td>
<td>enum</td>
</tr>
<tr>
<td>WATERYEAR</td>
<td>Y N</td>
<td>numeric(4,0)</td>
<td>range 1950.0000-2019.0000</td>
</tr>
<tr>
<td>MEAN_Q</td>
<td>N Y</td>
<td>numeric(8,3)</td>
<td>range 0.0340-207.1000</td>
</tr>
<tr>
<td>MAX_Q</td>
<td>N Y</td>
<td>numeric(8,3)</td>
<td>range 0.4130-8000.0000</td>
</tr>
<tr>
<td>MIN_Q</td>
<td>N Y</td>
<td>numeric(8,3)</td>
<td>range 0.0000-15.0000</td>
</tr>
<tr>
<td>MEAN_Q_AREA</td>
<td>N Y</td>
<td>numeric(7,3)</td>
<td>range 0.0180-8.9380</td>
</tr>
<tr>
<td>TOTAL_Q_AREA</td>
<td>N Y</td>
<td>numeric(7,3)</td>
<td>range 0.2490-116.6000</td>
</tr>
<tr>
<td>ESTCODE</td>
<td>N N</td>
<td>char(1)</td>
<td>enum</td>
</tr>
<tr>
<td>ESTDAYS</td>
<td>N N</td>
<td>numeric(3,0)</td>
<td>range 0.0000-150.0000</td>
</tr>
<tr>
<td>TOTAL_DAYS</td>
<td>N N</td>
<td>numeric(3,0)</td>
<td>range 0.0000-366.0000</td>
</tr>
</tbody>
</table>

### 5. Instantaneous and total discharge for requested time intervals

This is the interactive FLOW program which allows downloads of all Andrews small watersheds for any time period at user-specified time intervals. Rating equations can also be displayed.

**Attribute List:**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Format</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STCODE</td>
<td>N N</td>
<td>char(5)</td>
<td>enum</td>
</tr>
<tr>
<td>SITECODE</td>
<td>Y N</td>
<td>char(6)</td>
<td>place</td>
</tr>
<tr>
<td>DATE_TIME</td>
<td>Y N</td>
<td>datetime</td>
<td>range 10/1/1952-10/1/2018</td>
</tr>
<tr>
<td>STAGE</td>
<td>N Y</td>
<td>numeric(6,3)</td>
<td>range 0.0000-2.5000</td>
</tr>
<tr>
<td>INST_Q</td>
<td>N Y</td>
<td>numeric(8,3)</td>
<td>range 0.0000-8000.0000</td>
</tr>
<tr>
<td>MEAN_Q</td>
<td>N Y</td>
<td>numeric(8,3)</td>
<td>range 0.0000-500.0000</td>
</tr>
<tr>
<td>MEAN_Q_AREA</td>
<td>N Y</td>
<td>numeric(7,3)</td>
<td>range 0.0000-400.0000</td>
</tr>
<tr>
<td>TOTAL_Q_INT</td>
<td>N Y</td>
<td>numeric(8,6)</td>
<td>range 0.0000-2.0000</td>
</tr>
</tbody>
</table>
### 6. Flow summaries for sediment and nutrient sampling periods

Total flow is summarized, generally in 3 week periods, for inclusion with stream sampling data in CF002.

**Attribute List:**

- **STCODE**: `N N` char(5) enum
- **FORMAT**: `N N` numeric(2,0) range 6.0000 6.0000 number
- **SITECODE**: `Y N` char(6) place
- **WATERYEAR**: `N N` numeric(4,0) range 1969.0000 2019.0000 number
- **BEGIN_DATETIME**: `Y N` datetime range 10/1/1968 12:00:00 AM 9/25/2019 5:00:00 PM
- **END_DATETIME**: `N N` datetime range 10/9/1968 12:00:00 PM 10/1/2019 5:15:00 PM
- **TOTAL_Q_SMPL**: `N Y` numeric(7,3) range 0.0000 68.8390 in

### 7. Discharge data calculated from discontinued rating curves (5 minute frequency data)

This data was online previously but has been deprecated in favor of new rating equations: WS1, 2, 3 (WY1999-2016); WS 8 (WY 1988-2016); and WS10 (WY 1997 - 2016)

**Attribute List:**

- **STCODE**: `N N` char(5) enum
- **FORMAT**: `N N` numeric(2,0) range 7.0000 7.0000 number
- **SITECODE**: `Y N` char(6) place
- **WATERYEAR**: `N N` numeric(4,0) range 1988.0000 2016.0000 number
- **DATE_TIME**: `Y N` datetime range 10/1/1987 12:00:00 AM 10/1/2016 12:00:00 AM
- **EQN_SET_CODE**: `N N` char(3) enum
- **STAGE**: `N Y` numeric(6,3) range 0.0010 1.6300 ft
- **INST_Q**: `N Y` numeric(8,3) range 0.0000 53.0500 cfs
- **INST_Q_AREA**: `N Y` numeric(7,3) range 0.0000 168.4200 cfsm
- **INTERVAL**: `N Y` numeric(4,0) range 5.0000 5.0000 min
- **MEAN_Q**: `N Y` numeric(8,3) range 0.0000 52.0700 cfs
- **MEAN_Q_AREA**: `N Y` numeric(7,3) range 0.0010 168.2900 cfsm
- **TOTAL_Q_INT**: `N Y` numeric(8,6) range 0.0000 0.0220 in
- **ESTCODE**: `N N` char(1) enum
- **EVENT_CODE**: `N N` char(6) enum

**Attributes Definitions:**

BEGIN_DATETIME
Beginning date and time of proportional sampling period

DATE
  Date

DATE_TIME
  Date and time (PST) of stage height measurement

END_DATE_TIME
  Ending date and time of proportional sampling period

EQN_SET_CODE
  Equation set code describes the rating equation set and version used to calculate streamflow

ESTCODE
  Estimate code

ESTDAYS
  Number of days estimated in the summary period

EVENT_CODE
  Indicates that a comment exists independently for this date and time, and is typically the installation or removal of a v-notch or other change in rating curves used, or a site maintenance visit

FORMAT
  Entity number

INST_Q
  Instantaneous flow as cubic feet per second (cfs)

INST_Q_AREA
  Instantaneous flow as cubic feet per second per square mile (cfsm)

INTERVAL
  Time interval in minutes (length of time since previous stage value)

MAX_Q
  Maximum cubic feet per second (cfs) for this date (entity 2) or month (entity 3) or year (entity 4)

MEAN_Q
  Mean flow as cubic feet per second (cfs) for the preceding time interval (entity 1, 5) or this date (entity 2) or month (entity 3) or year (entity 4)

MEAN_Q_AREA
  Mean flow as cubic feet per second per square mile (cfsm) for the preceding time interval (entity 1, 5) or this date (entity 2) or month (entity 3) or year (entity 4)

MIN_Q
  Minimum cubic feet per second (cfs) for this date (entity 2) or month (entity 3) or year (entity 4)

MONTH
  Calendar month

SITECODE
  Site code

STAGE
Stage height

STCODE
Study code

TOTAL_DAYS
Total days of non-missing record included in the summary period

TOTAL_Q
Total flow in cubic feet for the preceding time interval

TOTAL_Q_AREA
Total flow as inches of water (over the watershed area) for this date (entity 2) or month (entity 3) or year (entity 4)

TOTAL_Q_INT
Total flow as inches of water (over the watershed area) for the preceding time interval

TOTAL_Q_SMPL
Total flow as inches of water during proportional sampling period (over the watershed area)

WATERYEAR
Wateryear: October 1 - September 30

YEAR
Calendar year

Enumerated Domains:

Enumerated Domain for Attribute: ESTCODE
A Accepted value
M Missing value
E Estimated value
P Provisional data (subject to change)
Q Questionable value
S Proportional nutrient sample removed

Enumerated Domain for Attribute: STCODE
HF004 Study code HF004

Enumerated Domain for Attribute: EQN_SET_CODE
1 GSWS01, Equation set A, version 1, current version, original flume 1952-1956
2 GSWS01, Equation set B, version 1, current version, main flume 1956-Present
3 GSWS01, Equation set C, version 1, current version, v-notch 1999-Present summers only
4 GSWS02, Equation set A, version 1, current version, main flume 1952-Present
5 GSWS02, Equation set B, version 1, current version, v-notch 1999-Present summers only
6 GSWS03, Equation set A, version 1, current version, main flume 1952-Present
7 GSWS03, Equation set B, version 1, current version, main flume post-flood 1964-1966
8 GSWS03, Equation set C, version 1, current version, v-notch 1999-Present summers only
9 GSWS06, Equation set A, version 1, current version, original H-flume 1963-1997
10 GSWS06, Equation set B, version 1, current version, main flume 1997-Present
11 GSWS06, Equation set C, version 1, current version, v-notch 1998-Present summers only
13 GSWS07, Equation set B, version 1, current version, main flume 1997-Present
14 GSWS07, Equation set C, version 1, current version, v-notch 1998-Present summers only
15 GSWS08, Equation set A, version 1, current version, original H-flume 1963-1987
16 GSWS08, Equation set B, version 1, old version, main flume 1987-Present
17 GSWS08, Equation set B, version 2, current version, main flume 1987-Present
18 GSWS08, Equation set C, version 1, current version, v-notch 1997-Present summers only
19 GSWS09, Equation set A, version 1, current version, original H-flume 1968-1973
20 GSWS09, Equation set B, version 1, old version, original v-notch 1973-1979 summers only
21 GSWS09, Equation set B, version 2, current version, original v-notch 1973-1979 summers only
22 GSWS09, Equation set C, version 1, old version, main flume 1973-Present
23 GSWS09, Equation set C, version 2, current version, main flume 1973-Present
24 GSWS09, Equation set D, version 1, current version, v-notch 1997-Present summers only
25 GSWS10, Equation set A, version 1, current version, original H-flume 1968-1973
26 GSWS10, Equation set B, version 1, current version, original v-notch 1973-1979 summers only
27 GSWS10, Equation set C, version 1, old version, main flume 1973-Present
28 GSWS10, Equation set C, version 2, current version, main flume 1973-Present
29 GSWS10, Equation set D, version 1, current version, v-notch 1997-Present summers only
30 GSWSMA, Equation set A, version 1, older version, main flume 1979-1995
31 GSWSMA, Equation set A, version 2, old version, main flume 1979-1995
32 GSWSMA, Equation set A, version 3, old version, main flume 1979-1995 prior to fish ladder
33 GSWSMF, Equation set A, version 1, old version, fish ladder 1995-Present
34 GSWSMF, Equation set A, version 2, current version, fish ladder 1995-Present
35 GSWSMA, Equation set A, version 4, current version, main flume 1995-Present represents concurrent fish ladder operation; equations are the same as version 3
36 GSWSMC, combined Mack Creek main flume + fish ladder (sum of eqn sets 34-35)
37 GSLOOK, USGS rating tables for Lookout Creek near Blue River (14161500)
38 GSTIDB, USGS rating tables for Blue River below Tidbits Creek (14161100)
39 GSLOOK, USGS rating table a for Lookout Creek near Blue River (14161500); reconstructed rating curve 0
40 GSLOOK, USGS rating table b for Lookout Creek near Blue River (14161500); reconstructed rating curve 1
41 GSLOOK, USGS rating table c for Lookout Creek near Blue River (14161500); reconstructed rating curve 2
42 GSLOOK, USGS rating table d for Lookout Creek near Blue River (14161500); reconstructed rating curve 3
43 GSLOOK, USGS rating table e for Lookout Creek near Blue River (14161500); reconstructed rating curve 4
44 GSLOOK, USGS rating table f for Lookout Creek near Blue River (14161500); original version; extended forward through WY 1956
45 GSLOOK, USGS rating table f for Lookout Creek near Blue River (14161500); reconstructed rating curve 5; extended forward through WY 1956
46 GSLOOK, USFS rating table g for Lookout Creek near Blue River (14161500); original version
47 GSLOOK, USFS rating table g for Lookout Creek near Blue River (14161500); reconstructed rating curve 6
48 GSLOOK, USGS rating table h for Lookout Creek near Blue River (14161500); reconstructed rating curve 7
49 GSLOOK, USGS rating table h for Lookout Creek near Blue River (14161500); reconstructed rating curve 8
50 GSLOOK, USGS rating table i for Lookout Creek near Blue River (14161500); reconstructed rating curve 9
51 GSLOOK, USGS rating table i for Lookout Creek near Blue River (14161500); reconstructed rating curve 10
52 GSLOOK, USGS rating table j for Lookout Creek near Blue River (14161500); reconstructed rating curve 11
53 GSLOOK, USGS rating table j for Lookout Creek near Blue River (14161500); reconstructed rating curve 12
54 GSLOOK, USGS rating table k for Lookout Creek near Blue River (14161500); reconstructed rating curve 13
55 GSLOOK, USGS rating table k for Lookout Creek near Blue River (14161500); reconstructed rating curve 14
56 GSLOOK, USGS rating table l for Lookout Creek near Blue River (14161500); reconstructed rating curve 15
57 GSLOOK, USGS rating table l for Lookout Creek near Blue River (14161500); reconstructed rating curve 16
58 GSLOOK, USGS rating table m for Lookout Creek near Blue River (14161500); reconstructed rating curve 17
59 GSLOOK, USGS rating table m for Lookout Creek near Blue River (14161500); reconstructed rating curve 18
60 GSLOOK, USGS rating table n for Lookout Creek near Blue River (14161500); reconstructed rating curve 19
61 GSLOOK, USGS rating table n for Lookout Creek near Blue River (14161500); reconstructed rating curve 20
62 GSLOOK, USGS rating table o for Lookout Creek near Blue River (14161500); reconstructed rating curve 21
63 GSLOOK, USGS rating table o for Lookout Creek near Blue River (14161500); reconstructed rating curve 22
64 GSLOOK, USGS rating table p for Lookout Creek near Blue River (14161500); reconstructed rating curve 23
65 GSLOOK, USGS rating table q for Lookout Creek near Blue River (14161500); reconstructed rating curve 24
66 GSLOOK, USGS rating table q for Lookout Creek near Blue River (14161500); reconstructed rating curve 25
67 GSWS01, Equation set D, version 1, current version, main flume 1999-Present (replacement for eqn_set_code=' 2')
68 GSWS02, Equation set C, version 1, current version, main flume 1999-Present (replacement for eqn_set_code=' 4')
69 GSWS03, Equation set D, version 1, current version, main flume 1999-Present (replacement for eqn_set_code=' 6')
70 GSWS08, Equation set D, version 1, current version, main flume 1999-Present (replacement for eqn_set_code=' 17')
71 GSWS10, Equation set E, version 1, current version, main flume 1999-Present (replacement for eqn_set_code=' 28')

Enumerated Domain for Attribute: EVENT_CODE
NA No event is reported (not applicable)
INSREM Installation or removal of a v-notch weir, or a change in rating equations applied
MAINTE A maintenance event has occurred (e.g., site visit)
WEATHR  A weather event is affecting the stream discharge measurement

Enumerated Domain for Attribute: ESTCODE
A  Accepted value
M  Missing value
E  Estimated value
P  Provisional data (subject to change)
Q  Questionable value
S  Proportional nutrient sample removed

Enumerated Domain for Attribute: STCODE
HF004  Study code HF004

Enumerated Domain for Attribute: ESTCODE
A  Accepted value
M  Missing value
E  Estimated value
P  Provisional data (subject to change)
Q  Questionable value
S  Proportional nutrient sample removed

Enumerated Domain for Attribute: STCODE
HF004  Study code HF004

Enumerated Domain for Attribute: ESTCODE
A  Accepted value
M  Missing value
E  Estimated value
P  Provisional data (subject to change)
Q  Questionable value
S  Proportional nutrient sample removed

Enumerated Domain for Attribute: STCODE
HF004  Study code HF004

Enumerated Domain for Attribute: ESTCODE
A  Accepted value
M  Missing value
E  Estimated value
P  Provisional data (subject to change)
Q  Questionable value
S  Proportional nutrient sample removed

Enumerated Domain for Attribute: STCODE
HF004  Study code HF004

Enumerated Domain for Attribute: ESTCODE
A  Accepted value
M  Missing value
E  Estimated value
P  Provisional data (subject to change)
Q  Questionable value
S  Proportional nutrient sample removed
Enumerated Domain for Attribute: STCODE
HF004 Study code HF004

Enumerated Domain for Attribute: EQN_SET_CODE
1  GSWS01, Equation set A, version 1, current version, original flume 1952-1956
2  GSWS01, Equation set B, version 1, current version, main flume 1956-Present
3  GSWS01, Equation set C, version 1, current version, v-notch 1999-Present
   summers only
4  GSWS02, Equation set A, version 1, current version, main flume 1952-Present
5  GSWS02, Equation set B, version 1, current version, v-notch 1999-Present
   summers only
6  GSWS03, Equation set A, version 1, current version, main flume 1952-Present
   summers only
7  GSWS03, Equation set B, version 1, current version, main flume post-flood
   1964-1966
8  GSWS03, Equation set C, version 1, current version, v-notch 1999-Present
   summers only
9  GSWS06, Equation set A, version 1, current version, original H-flume
   1963-1997
10 GSWS06, Equation set B, version 1, current version, main flume 1997-Present
11 GSWS07, Equation set A, version 1, current version, original H-flume
   1963-1997
12 GSWS07, Equation set C, version 1, old version, main flume 1973-Present
13 GSWS07, Equation set B, version 1, old version, main flume 1973-1979
14 GSWS08, Equation set A, version 1, old version, main flume 1973-Present
15 GSWS08, Equation set B, version 1, old version, main flume 1973-1979
16 GSWS08, Equation set C, version 1, old version, main flume 1973-1979
17 GSWS08, Equation set D, version 1, current version, main flume 1973-1979
18 GSWS09, Equation set A, version 1, current version, original H-flume
19 GSWS09, Equation set B, version 1, old version, original H-flume
20 GSWS09, Equation set B, version 1, old version, original v-notch 1973-1979
   summers only
21 GSWS09, Equation set B, version 2, current version, original v-notch 1973-1979
   summers only
22 GSWS09, Equation set C, version 1, old version, main flume 1973-Present
23 GSWS09, Equation set C, version 2, current version, main flume 1973-Present
24 GSWS09, Equation set D, version 1, current version, v-notch 1997-Present
   summers only
25 GSWS10, Equation set A, version 1, current version, original H-flume
26 GSWS10, Equation set A, version 1, old version, original H-flume
27 GSWS10, Equation set B, version 1, current version, original v-notch 1973-1979
   summers only
28 GSWS10, Equation set C, version 1, old version, main flume 1973-Present
30 GSWSMA, Equation set A, version 1, old version, main flume 1979-1995
31 GSWSMA, Equation set A, version 2, old version, main flume 1979-1995
GSWSMA, Equation set A, version 3, old version, main flume 1979-1995 prior to fish ladder

GSWSMF, Equation set A, version 1, old version, fish ladder 1995-Present

GSWSMF, Equation set A, version 2, current version, fish ladder 1995-Present

GSWSMA, Equation set A, version 4, current version, main flume 1995-Present represents concurrent fish ladder operation; equations are the same as version 3

GSWSMC, combined Mack Creek main flume + fish ladder (sum of eqn sets 34+35)

GSLOOK, USGS rating tables for Lookout Creek near Blue River (14161500)

GSTIDB, USGS rating tables for Blue River below Tidbits Creek (14161100)

GSLOOK, USGS rating table a for Lookout Creek near Blue River (14161500); reconstructed rating curve 0

GSLOOK, USGS rating table b for Lookout Creek near Blue River (14161500); reconstructed rating curve 1

GSLOOK, USGS rating table c for Lookout Creek near Blue River (14161500); reconstructed rating curve 2

GSLOOK, USGS rating table d for Lookout Creek near Blue River (14161500); reconstructed rating curve 3

GSLOOK, USGS rating table e for Lookout Creek near Blue River (14161500); reconstructed rating curve 4

GSLOOK, USGS rating table f for Lookout Creek near Blue River (14161500); original version; extended forward through WY 1956

GSLOOK, USGS rating table f for Lookout Creek near Blue River (14161500); reconstructed rating curve 5; extended forward through WY 1956

GSLOOK, USFS rating table g for Lookout Creek near Blue River (14161500); original version

GSLOOK, USFS rating table g for Lookout Creek near Blue River (14161500); reconstructed rating curve 6

GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); original version; extended backward to include WY 1963

GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); reconstructed rating curve 7; extended backward to include WY 1963

GSLOOK, USGS rating table 2 for Lookout Creek near Blue River (14161500); reconstructed rating curve 8

GSLOOK, USGS rating table 3 for Lookout Creek near Blue River (14161500); reconstructed rating curve 9

GSLOOK, USGS rating table 4 for Lookout Creek near Blue River (14161500); reconstructed rating curve 10

GSLOOK, USGS rating table 5 for Lookout Creek near Blue River (14161500); reconstructed rating curve 11

GSLOOK, USGS rating table 6 for Lookout Creek near Blue River (14161500); reconstructed rating curve 12

GSLOOK, USGS rating table 7 for Lookout Creek near Blue River (14161500); reconstructed rating curve 13

GSLOOK, USGS rating table 8 for Lookout Creek near Blue River (14161500); reconstructed rating curve 14

GSLOOK, USGS rating table 9 for Lookout Creek near Blue River (14161500); reconstructed rating curve 15

GSLOOK, USGS rating table 10 for Lookout Creek near Blue River (14161500); reconstructed rating curve 16

GSLOOK, USGS rating table 11 for Lookout Creek near Blue River (14161500); reconstructed rating curve 17

GSLOOK, USGS rating table 12 for Lookout Creek near Blue River (14161500); reconstructed rating curve 18

GSLOOK, USGS rating table 13 for Lookout Creek near Blue River (14161500); reconstructed rating curve 19

GSLOOK, USGS rating table 14 for Lookout Creek near Blue River (14161500); reconstructed rating curve 20

GSLOOK, USGS rating table 15 for Lookout Creek near Blue River (14161500); reconstructed rating curve 21

GSLOOK, USGS rating table 16 for Lookout Creek near Blue River (14161500); reconstructed rating curve 22
GSLOOK, USGS rating table 17 for Lookout Creek near Blue River (14161500); reconstructed rating curve 23
GSLOOK, USGS rating table 18 for Lookout Creek near Blue River (14161500); reconstructed rating curve 24
GSWS01, Equation set D, version 1, current version, main flume 1999-Present
(replacement for eqn_set_code=' 2')
GSWS02, Equation set C, version 1, current version, main flume 1999-Present
(replacement for eqn_set_code=' 4')
GSWS03, Equation set D, version 1, current version, main flume 1999-Present
(replacement for eqn_set_code=' 6')
GSWS08, Equation set D, version 1, current version, main flume 1999-Present
(replacement for eqn_set_code=' 17')
GSWS10, Equation set E, version 1, current version, main flume 1999-Present
(replacement for eqn_set_code=' 28')

Enumerated Domain for Attribute: ESTCODE
A Accepted value
M Missing value
E Estimated value
P Provisional data (subject to change)
Q Questionable value
S Proportional nutrient sample removed

Enumerated Domain for Attribute: STCODE
HF004 Study code HF004

Enumerated Domain for Attribute: ESTCODE
A Accepted value
M Missing value
E Estimated value
P Provisional data (subject to change)
Q Questionable value
S Proportional nutrient sample removed

Enumerated Domain for Attribute: EQN_SET_CODE
1 GSWS01, Equation set A, version 1, current version, original flume 1952-1956
2 GSWS01, Equation set B, version 1, current version, main flume 1956-Present
3 GSWS01, Equation set C, version 1, current version, v-notch 1999-Present
4 GSWS02, Equation set A, version 1, current version, main flume 1952-Present
5 GSWS02, Equation set B, version 1, current version, v-notch 1999-Present
6 GSWS03, Equation set A, version 1, current version, main flume 1952-Present
7 GSWS03, Equation set B, version 1, current version, main flume post-flood 1964-1966
8 GSWS03, Equation set C, version 1, current version, v-notch 1999-Present
<table>
<thead>
<tr>
<th>Number</th>
<th>Equation Set</th>
<th>Version</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>GSWS06</td>
<td>A</td>
<td>1963-1997, original H-flume</td>
</tr>
<tr>
<td>10</td>
<td>GSWS06</td>
<td>B</td>
<td>1997-Present, main flume</td>
</tr>
<tr>
<td>11</td>
<td>GSWS06</td>
<td>C</td>
<td>1998-Present, v-notch, summers only</td>
</tr>
<tr>
<td>12</td>
<td>GSWS07</td>
<td>A</td>
<td>1963-1997, original H-flume</td>
</tr>
<tr>
<td>13</td>
<td>GSWS07</td>
<td>B</td>
<td>1997-Present, main flume</td>
</tr>
<tr>
<td>14</td>
<td>GSWS07</td>
<td>C</td>
<td>1998-Present, v-notch, summers only</td>
</tr>
<tr>
<td>15</td>
<td>GSWS08</td>
<td>A</td>
<td>1963-1987, original H-flume</td>
</tr>
<tr>
<td>16</td>
<td>GSWS08</td>
<td>B</td>
<td>1987-Present, main flume</td>
</tr>
<tr>
<td>17</td>
<td>GSWS08</td>
<td>B</td>
<td>1987-Present, v-notch, summers only</td>
</tr>
<tr>
<td>18</td>
<td>GSWS08</td>
<td>C</td>
<td>1997-Present, main flume</td>
</tr>
<tr>
<td>19</td>
<td>GSWS09</td>
<td>A</td>
<td>1968-1973, original H-flume</td>
</tr>
<tr>
<td>20</td>
<td>GSWS09</td>
<td>B</td>
<td>1973-1979, original v-notch, summers only</td>
</tr>
<tr>
<td>21</td>
<td>GSWS09</td>
<td>B</td>
<td>1973-1979, v-notch, summers only</td>
</tr>
<tr>
<td>22</td>
<td>GSWS09</td>
<td>C</td>
<td>1997-Present, main flume</td>
</tr>
<tr>
<td>23</td>
<td>GSWS09</td>
<td>C</td>
<td>1973-1979, main flume</td>
</tr>
<tr>
<td>24</td>
<td>GSWS09</td>
<td>D</td>
<td>1997-Present, v-notch, summers only</td>
</tr>
<tr>
<td>25</td>
<td>GSWS10</td>
<td>A</td>
<td>1968-1973, original H-flume</td>
</tr>
<tr>
<td>26</td>
<td>GSWS10</td>
<td>B</td>
<td>1973-1979, v-notch, summers only</td>
</tr>
<tr>
<td>27</td>
<td>GSWS10</td>
<td>C</td>
<td>1973-1979, main flume</td>
</tr>
<tr>
<td>28</td>
<td>GSWS10</td>
<td>C</td>
<td>1973-1979, main flume</td>
</tr>
<tr>
<td>29</td>
<td>GSWS10</td>
<td>D</td>
<td>1997-Present, v-notch, summers only</td>
</tr>
<tr>
<td>30</td>
<td>GSWSMA</td>
<td>A</td>
<td>1979-1995, older version, main flume</td>
</tr>
<tr>
<td>31</td>
<td>GSWSMA</td>
<td>A</td>
<td>1979-1995, older version, main flume</td>
</tr>
<tr>
<td>32</td>
<td>GSWSMA</td>
<td>B</td>
<td>1995-Present, fish ladder</td>
</tr>
<tr>
<td>33</td>
<td>GSWSMA</td>
<td>C</td>
<td>1995-Present, fish ladder</td>
</tr>
<tr>
<td>34</td>
<td>GSWSMA</td>
<td>D</td>
<td>1995-Present, fish ladder</td>
</tr>
<tr>
<td>35</td>
<td>GSWSMA</td>
<td>E</td>
<td>1995-Present, fish ladder</td>
</tr>
<tr>
<td>36</td>
<td>GSWSMC</td>
<td>A</td>
<td>Combined Mack Creek main flume + fish ladder (sum of eqn sets 34-35)</td>
</tr>
<tr>
<td>37</td>
<td>GSLOOK</td>
<td>A</td>
<td>USGS rating tables for Lookout Creek near Blue River (14161500)</td>
</tr>
<tr>
<td>38</td>
<td>GSTIDB</td>
<td>A</td>
<td>USGS rating tables for Blue River below Tidbits Creek (14161100)</td>
</tr>
<tr>
<td>39</td>
<td>GSLOOK</td>
<td>A</td>
<td>USGS rating table a for Lookout Creek near Blue River (14161500); reconstructed rating curve 0</td>
</tr>
<tr>
<td>40</td>
<td>GSLOOK</td>
<td>A</td>
<td>USGS rating table b for Lookout Creek near Blue River (14161500); reconstructed rating curve 1</td>
</tr>
<tr>
<td>41</td>
<td>GSLOOK</td>
<td>A</td>
<td>USGS rating table c for Lookout Creek near Blue River (14161500); reconstructed rating curve 2</td>
</tr>
</tbody>
</table>
GSLOOK, USGS rating table d for Lookout Creek near Blue River (14161500); reconstructed rating curve 3

GSLOOK, USGS rating table e for Lookout Creek near Blue River (14161500); reconstructed rating curve 4

GSLOOK, USGS rating table f for Lookout Creek near Blue River (14161500); original version; extended forward through WY 1956

GSLOOK, USGS rating table f for Lookout Creek near Blue River (14161500); reconstructed rating curve 5; extended forward through WY 1956

GSLOOK, USGS rating table g for Lookout Creek near Blue River (14161500); original version

GSLOOK, USFS rating table h for Lookout Creek near Blue River (14161500); reconstructed rating curve 6

GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); reconstructed rating curve 7

GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); reconstructed rating curve 8

GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); reconstructed rating curve 9

GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); reconstructed rating curve 10

GSLOOK, USGS rating table 5 for Lookout Creek near Blue River (14161500); reconstructed rating curve 11

GSLOOK, USGS rating table 6 for Lookout Creek near Blue River (14161500); reconstructed rating curve 12

GSLOOK, USGS rating table 7 for Lookout Creek near Blue River (14161500); reconstructed rating curve 13

GSLOOK, USGS rating table 8 for Lookout Creek near Blue River (14161500); reconstructed rating curve 14

GSLOOK, USGS rating table 9 for Lookout Creek near Blue River (14161500); reconstructed rating curve 15

GSLOOK, USGS rating table 10 for Lookout Creek near Blue River (14161500); reconstructed rating curve 16

GSLOOK, USGS rating table 11 for Lookout Creek near Blue River (14161500); reconstructed rating curve 17

GSLOOK, USGS rating table 12 for Lookout Creek near Blue River (14161500); reconstructed rating curve 18

GSLOOK, USGS rating table 13 for Lookout Creek near Blue River (14161500); reconstructed rating curve 19

GSLOOK, USGS rating table 14 for Lookout Creek near Blue River (14161500); reconstructed rating curve 20

GSLOOK, USGS rating table 15 for Lookout Creek near Blue River (14161500); reconstructed rating curve 21

GSLOOK, USGS rating table 16 for Lookout Creek near Blue River (14161500); reconstructed rating curve 22

GSLOOK, USGS rating table 17 for Lookout Creek near Blue River (14161500); reconstructed rating curve 23

GSLOOK, USGS rating table 18 for Lookout Creek near Blue River (14161500); reconstructed rating curve 24

GSWS01, Equation set D, version 1, current version, main flume 1999-Present (replacement for eqn_set_code='2')

GSWS02, Equation set C, version 1, current version, main flume 1999-Present (replacement for eqn_set_code='4')

GSWS03, Equation set D, version 1, current version, main flume 1999-Present (replacement for eqn_set_code='6')

GSWS08, Equation set D, version 1, current version, main flume 1999-Present (replacement for eqn_set_code='17')

GSWS10, Equation set E, version 1, current version, main flume 1999-Present (replacement for eqn_set_code='28')

Enumerated Domain for Attribute: EVENT_CODE

NA No event is reported (not applicable)

INSREM Installation or removal of a v-notch weir, or a change in rating equations applied

MAINTE A maintenance event has occurred (e.g., site visit)
A weather event is affecting the stream discharge measurement.