Database Code: HF004

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. Raw instantaneous streamflow data in cubic feet per second (cfs) and mean flow at fine temporal intervals are available. Rating curves for fixed trapezoidal flumes are maintained for all small watersheds except Lookout Creek and allow calculation of mean and total flow. The USGS-maintained Lookout Creek relies on annual rating table development to reflect changes in the open channel for instantaneous flow calculation. Entity 1 includes a reconstructed history of USGS Lookout Creek hourly data beginning in 1950 and more recently 30 and 15 minute interval data. Calculated mean cfs and total flow for each watershed are available at daily (Entity 2), monthly (Entity 3), annual (Entity 4), and stream sampling (Entity 6) time intervals. An interactive program, FLOW (Entity 5), allows the user to download instantaneous, mean and total flow at requested time periods (e.g., 5 minute, 15 minute, hourly) for all watersheds except for Lookout Creek.

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)

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1. Corrected instantaneous stage height with flow calculations

Only Lookout Creek streamflow data is available through this entity from the Andrews Forest data catalog. Entity 5 (the interactive FLOW program) is available from our catalog to download high temporal resolution streamflow data for all other Andrews small watersheds. The full dataset (all watersheds) is available in this entity through the Environmental Data Initiative (EDI) portal. Please use the DOI in the citation to access the current dataset in EDI. 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:

STCODE	N	N	char(5)	enum			
FORMAT	N	N	numeric(2,0)	range	1.0000	1.0000	number
SITECODE	Y	N	char(6)	place			
WATERYEAR	N	N	numeric(4,0)	range	1950.0000	2019.0000	number
DATE_TIME	Y	N	datetime	range	10/1/1949 12:00:00 AM	10/1/2019 2:30:00 PM	YYYY-MM-DD hh:mm:ss
EQN_SET_CODE	N	N	char(3)	enum	1.0000	37.0000	

STAGE	N	Y	numeric(6,3)	range	0.0000	10.0300	ft
INST_Q	N	Y	numeric(8,3)	range	0.0000	8000.0000	cfs
INST_Q_AREA	N	Y	numeric(7,3)	range	0.0000	332.0000	cfsm
INTERVAL	N	Y	numeric(4,0)	range	0.0000	1440.0000	min
MEAN_Q	N	Y	numeric(8,3)	range	0.0000	6605.0000	cfs
MEAN_Q_AREA	N	Y	numeric(7,3)	range	0.0000	275.0000	cfsm
TOTAL_Q_INT	N	Y	numeric(8,6)	range	0.0000	2.1000	in
ESTCODE	N	N	char(1)	enum			
EVENT_CODE	N	N	char(6)	enum			

2. Daily streamflow summaries

Daily data can also be interactively viewed, downloaded, and graphically displayed using ClimDB/HydroDB.

Attribute List:

STCODE	N	N	char(5)	enum			
FORMAT	N	N	numeric(2,0)	range	2.0000	2.0000	number
SITECODE	Y	N	char(6)	place			
WATERYEAR	N	N	numeric(4,0)	range	1950.0000	2019.0000	number
DATE	Y	N	datetime	range	10/1/1949 12:00:00 AM	9/30/2019 12:00:00 AM	YYYY-MM-DD
MEAN_Q	N	Y	numeric(8,3)	range	0.0000	4890.0000	cfs
MAX_Q	N	Y	numeric(8,3)	range	0.0000	8000.0000	cfs
MIN_Q	N	Y	numeric(8,3)	range	0.0000	2415.0000	cfs
MEAN_Q_AREA	N	Y	numeric(7,3)	range	0.0000	202.9200	cfsm
TOTAL_Q_AREA	N	Y	numeric(7,3)	range	0.0000	7.5430	in
ESTCODE	N	N	char(1)	enum			

3. Monthly streamflow summaries

Monthly data can also be interactively viewed, downloaded, and graphically displayed using ClimDB/HydroDB.

Attribute List:

STCODE	N	N	char(5)	enum			
FORMAT	N	N	numeric(2,0)	range	3.0000	3.0000	number
SITECODE	Y	N	char(6)	place			
WATERYEAR	N	N	numeric(4,0)	range	1950.0000	2019.0000	number
YEAR	Y	N	numeric(4,0)	range	1949.0000	2019.0000	number
MONTH	Y	N	numeric(2,0)	range	1.0000	12.0000	number
MEAN_Q	N	Y	numeric(8,3)	range	0.0000	794.1290	cfs
MAX_Q	N	Y	numeric(8,3)	range	0.0000	8000.0000	cfs

MIN_Q	N	Y	numeric(8,3)	range	0.0000	195.0000	cfs
MEAN_Q_AREA	N	Y	numeric(7,3)	range	0.0000	32.9510	cfsm
TOTAL_Q_AREA	N	Y	numeric(7,3)	range	0.0000	37.9800	in
ESTCODE	N	N	char(1)	enum			
ESTDAYS	N	N	numeric(3,0)	range	0.0000	31.0000	days
TOTAL_DAYS	N	N	numeric(3,0)	range	0.0000	31.0000	days

4. Annual streamflow summaries by wateryear (October 1 - September 30)

Annual data can also be interactively viewed, downloaded, and graphically displayed using ClimDB/HydroDB.

Attribute List:

STCODE	N	N	char(5)	enum			
FORMAT	N	N	numeric(2,0)	range	4.0000	4.0000	number
SITECODE	Y	N	char(6)	place			
WATERYEAR	Y	N	numeric(4,0)	range	1950.0000	2019.0000	number
MEAN_Q	N	Y	numeric(8,3)	range	0.0340	207.1000	cfs
MAX_Q	N	Y	numeric(8,3)	range	0.4130	8000.0000	cfs
MIN_Q	N	Y	numeric(8,3)	range	0.0000	15.0000	cfs
MEAN_Q_AREA	N	Y	numeric(7,3)	range	0.0180	8.9380	cfsm
TOTAL_Q_AREA	N	Y	numeric(7,3)	range	0.2490	116.6000	in
ESTCODE	N	N	char(1)	enum			
ESTDAYS	N	N	numeric(3,0)	range	0.0000	150.0000	days
TOTAL_DAYS	N	N	numeric(3,0)	range	0.0000	366.0000	days

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. The full dataset (all watersheds) is available in this entity through the Environmental Data Initiative (EDI) portal. Please use the DOI in the citation to access the current dataset in EDI.

Attribute List:

STCODE	N	N	char(5)	enum			
FORMAT	N	N	numeric(2,0)	range	5.0000	5.0000	number
SITECODE	Y	N	char(6)	place			
DATE_TIME	Y	N	datetime	range	10/1/1952 12:00:00 AM	10/1/2018 12:00:00 AM	YYYY-MM-DD hh:mm:ss
EQN_SET_CODE	N	N	char(3)	enum			
STAGE	N	Y	numeric(6,3)	range	0.0000	2.5000	ft
INST_Q	N	Y	numeric(8,3)	range	0.0000	8000.0000	cfs
MEAN_Q	N	Y	numeric(8,3)	range	0.0000	500.0000	cfs
MEAN_Q_AREA	N	Y	numeric(7,3)	range	0.0000	400.0000	cfsm

TOTAL_Q_INT	N	Y	numeric(8,6)	range	0.0000	2.0000	in
TOTAL_Q	N	Y	numeric(10,1)	range	0.0000	30000000.0000	ft3
ESTCODE	N	N	char(1)	enum			

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	YYYY-MM-DD hh:mm:ss
END_DATETIME	N	N	datetime	range	10/9/1968 12:00:00 PM	10/1/2019 5:15:00 PM	YYYY-MM-DD hh:mm:ss
TOTAL_Q_SMPL	N	Y	numeric(7,3)	range	0.0000	68.8390	in
ESTCODE	N	N	char(1)	enum			

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	YYYY-MM-DD hh:mm:ss
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_DATETIME

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

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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
12	GSWS07, Equation set A, version 1, current version, original H-flume 1963-1997
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 1 for Lookout Creek near Blue River (14161500); original version; extended backward to include WY 1963
49	GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); reconstructed rating curve 7; extended backward to include WY 1963
50	GSLOOK, USGS rating table 2 for Lookout Creek near Blue River (14161500); reconstructed rating curve 8
51	GSLOOK, USGS rating table 3 for Lookout Creek near Blue River (14161500); reconstructed rating curve 9
52	GSLOOK, USGS rating table 4 for Lookout Creek near Blue River (14161500); reconstructed rating curve 10
53	GSLOOK, USGS rating table 5 for Lookout Creek near Blue River (14161500); reconstructed rating curve 11
54	GSLOOK, USGS rating table 6 for Lookout Creek near Blue River (14161500); reconstructed rating curve 12
55	GSLOOK, USGS rating table 7 for Lookout Creek near Blue River (14161500); reconstructed rating curve 13
56	GSLOOK, USGS rating table 8 for Lookout Creek near Blue River (14161500); reconstructed rating curve 14
57	GSLOOK, USGS rating table 9 for Lookout Creek near Blue River (14161500); reconstructed rating curve 15
58	GSLOOK, USGS rating table 10 for Lookout Creek near Blue River (14161500); reconstructed rating curve 16
59	GSLOOK, USGS rating table 11 for Lookout Creek near Blue River (14161500); reconstructed rating curve 17
60	GSLOOK, USGS rating table 12 for Lookout Creek near Blue River (14161500); reconstructed rating curve 18
61	GSLOOK, USGS rating table 13 for Lookout Creek near Blue River (14161500); reconstructed rating curve 19
62	GSLOOK, USGS rating table 14 for Lookout Creek near Blue River (14161500); reconstructed rating curve 20
63	GSLOOK, USGS rating table 15 for Lookout Creek near Blue River (14161500); reconstructed rating curve 21
64	GSLOOK, USGS rating table 16 for Lookout Creek near Blue River (14161500); reconstructed rating curve 22
65	GSLOOK, USGS rating table 17 for Lookout Creek near Blue River (14161500); reconstructed rating curve 23
66	GSLOOK, USGS rating table 18 for Lookout Creek near Blue River (14161500); reconstructed rating curve 24
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

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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
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
12	GSWS07, Equation set A, version 1, current version, original H-flume 1963-1997
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)
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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 1 for Lookout Creek near Blue River (14161500); original version; extended backward to include WY 1963
49	GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); reconstructed rating curve 7; extended backward to include WY 1963
50	GSLOOK, USGS rating table 2 for Lookout Creek near Blue River (14161500); reconstructed rating curve 8
51	GSLOOK, USGS rating table 3 for Lookout Creek near Blue River (14161500); reconstructed rating curve 9
52	GSLOOK, USGS rating table 4 for Lookout Creek near Blue River (14161500); reconstructed rating curve 10
53	GSLOOK, USGS rating table 5 for Lookout Creek near Blue River (14161500); reconstructed rating curve 11
54	GSLOOK, USGS rating table 6 for Lookout Creek near Blue River (14161500); reconstructed rating curve 12
55	GSLOOK, USGS rating table 7 for Lookout Creek near Blue River (14161500); reconstructed rating curve 13
56	GSLOOK, USGS rating table 8 for Lookout Creek near Blue River (14161500); reconstructed rating curve 14
57	GSLOOK, USGS rating table 9 for Lookout Creek near Blue River (14161500); reconstructed rating curve 15
58	GSLOOK, USGS rating table 10 for Lookout Creek near Blue River (14161500); reconstructed rating curve 16
59	GSLOOK, USGS rating table 11 for Lookout Creek near Blue River (14161500); reconstructed rating curve 17
60	GSLOOK, USGS rating table 12 for Lookout Creek near Blue River (14161500); reconstructed rating curve 18
61	GSLOOK, USGS rating table 13 for Lookout Creek near Blue River (14161500); reconstructed rating curve 19
62	GSLOOK, USGS rating table 14 for Lookout Creek near Blue River (14161500); reconstructed rating curve 20
63	GSLOOK, USGS rating table 15 for Lookout Creek near Blue River (14161500); reconstructed rating curve 21

64	GSLOOK, USGS rating table 16 for Lookout Creek near Blue River (14161500); reconstructed rating curve 22
65	GSLOOK, USGS rating table 17 for Lookout Creek near Blue River (14161500); reconstructed rating curve 23
66	GSLOOK, USGS rating table 18 for Lookout Creek near Blue River (14161500); reconstructed rating curve 24
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: 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
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
12	GSWS07, Equation set A, version 1, current version, original H-flume 1963-1997
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 1 for Lookout Creek near Blue River (14161500); original version; extended backward to include WY 1963
49	GSLOOK, USGS rating table 1 for Lookout Creek near Blue River (14161500); reconstructed rating curve 7; extended backward to include WY 1963
50	GSLOOK, USGS rating table 2 for Lookout Creek near Blue River (14161500); reconstructed rating curve 8
51	GSLOOK, USGS rating table 3 for Lookout Creek near Blue River (14161500); reconstructed rating curve 9
52	GSLOOK, USGS rating table 4 for Lookout Creek near Blue River (14161500); reconstructed rating curve 10
53	GSLOOK, USGS rating table 5 for Lookout Creek near Blue River (14161500); reconstructed rating curve 11
54	GSLOOK, USGS rating table 6 for Lookout Creek near Blue River (14161500); reconstructed rating curve 12
55	GSLOOK, USGS rating table 7 for Lookout Creek near Blue River (14161500); reconstructed rating curve 13
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58	GSLOOK, USGS rating table 10 for Lookout Creek near Blue River (14161500); reconstructed rating curve 16
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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