# Daily streamflow data for watersheds at Coweeta Hydrologic Lab, North Carolina

## Metadata:

* [Identification\_Information](https://www.fs.usda.gov/rds/archive/products/RDS-2016-0025/_metadata_RDS-2016-0025.html#Identification_Information)
* [Data\_Quality\_Information](https://www.fs.usda.gov/rds/archive/products/RDS-2016-0025/_metadata_RDS-2016-0025.html#Data_Quality_Information)
* [Entity\_and\_Attribute\_Information](https://www.fs.usda.gov/rds/archive/products/RDS-2016-0025/_metadata_RDS-2016-0025.html#Entity_and_Attribute_Information)
* [Distribution\_Information](https://www.fs.usda.gov/rds/archive/products/RDS-2016-0025/_metadata_RDS-2016-0025.html#ID0EQF)
* [Metadata\_Reference\_Information](https://www.fs.usda.gov/rds/archive/products/RDS-2016-0025/_metadata_RDS-2016-0025.html#Metadata_Reference_Information)

*Identification\_Information:*

*Citation:*

*Citation\_Information:*

*Originator:* Miniat, Chelcy Ford

*Originator:* Laseter, Stephanie H.

*Originator:* Swank, Wayne T.

*Originator:* Vose, James M.

*Publication\_Date:* 2016

*Title:*

Daily streamflow data for watersheds at Coweeta Hydrologic Lab, North Carolina

*Geospatial\_Data\_Presentation\_Form:* tabular digital data

*Publication\_Information:*

*Publication\_Place:* Fort Collins, CO

*Publisher:* Forest Service Research Data Archive

*Other\_Citation\_Details:*

Updated 10 February 2020

*Online\_Linkage:* <https://doi.org/10.2737/RDS-2016-0025>

*Description:*

*Abstract:*

These data include daily streamflow data for four watersheds at Coweeta Hydrologic Laboratory in Macon County, North Carolina, USA. The station is operated by the Southern Research Station, USDA Forest Service. Data include streamflow for the following stream gages and water years: WS07 (1965-2019), WS14 (1937-2019), WS18 (1937-2019), and WS27 (1947-2019).

*Purpose:*

The Coweeta Hydrologic Laboratory was established in 1934 and is world-renowned for its research in forest hydrology. Coweeta was established to determine the fundamental effects of forest management on soil and water resources and to serve as a testing ground for theories in forest hydrology. To facilitate this, a network of high- and low- elevation experimental watersheds were established across the site. Streamflow from watersheds is gaged with 90-degree or 120-degree V-notch weirs every five minutes. Approximately half of the watersheds serve as “references” with no purposeful disturbance, while the other watersheds serve as “experimental” and have undergone land management treatments.

*Supplemental\_Information:*

Original metadata date was 08/26/2016. Minor metadata updates on 12/16/2016. On 02/27/2017 data for 2016 was added to the download. On 02/08/2018 data for 2017 was added to the download, and on 02/13/2019 the 2018 data were added. Additional minor metadata updates were made on 09/06/2019. On 02/10/2020 data for 2019 were added.  
  
For more information about Coweeta: <https://www.srs.fs.usda.gov/coweeta/research/lter/>.

*Time\_Period\_of\_Content:*

*Time\_Period\_Information:*

*Range\_of\_Dates/Times:*

*Beginning\_Date:* 19361101

*Ending\_Date:* 20191031

*Currentness\_Reference:*

Ground condition

*Status:*

*Progress:* Planned

*Maintenance\_and\_Update\_Frequency:* As needed

*Spatial\_Domain:*

*Description\_of\_Geographic\_Extent:*

Coweeta Hydrologic Lab in the Coweeta Basin consists of 1626 hectares in Macon County, North Carolina, USA. Below are geographic details for each watershed.  
  
WATERSHED 7:  
Clear-cut watershed. Elevation at the weir is 722 meters (m). Maximum elevation of watershed is 1077 m.  
Watershed area is 59 hectares (ha).  
Aspect is south-facing.  
  
WATERSHED 14:  
Reference watershed. Elevation at the weir is 707 m. Maximum elevation of watershed is 992 m.  
Watershed area is 61.1 ha.  
Aspect is northwest.  
  
WATERSHED 18:  
Reference watershed. Elevation at the weir is 726 m. Maximum elevation of watershed is 993 m.  
Watershed area is 12.5 ha.  
Aspect is northwest.  
  
WATERSHED 27:  
Reference watershed. Elevation at the weir is 1061 m. Maximum elevation of watershed is 1454 m.  
Watershed area is 39 ha.  
Aspect is northeast.

*Bounding\_Coordinates:*

*West\_Bounding\_Coordinate:* -83.47845

*East\_Bounding\_Coordinate:* -83.42166

*North\_Bounding\_Coordinate:* 35.07382

*South\_Bounding\_Coordinate:* 35.02734

*Bounding\_Altitudes:*

*Altitude\_Minimum:* 685

*Altitude\_Maximum:* 1389

*Altitude\_Distance\_Units:* meters

*Keywords:*

*Theme:*

*Theme\_Keyword\_Thesaurus:* ISO 19115 Topic Category

*Theme\_Keyword:* climatologyMeteorologyAtmosphere

*Theme\_Keyword:* environment

*Theme:*

*Theme\_Keyword\_Thesaurus:* National Research & Development Taxonomy

*Theme\_Keyword:* Climate change

*Theme\_Keyword:* Climate change effects

*Theme\_Keyword:* Ecology, Ecosystems, & Environment

*Theme\_Keyword:* Hydrology, watersheds, sedimentation

*Theme\_Keyword:* Forest & Plant Health

*Theme\_Keyword:* Climate effects

*Theme:*

*Theme\_Keyword\_Thesaurus:* None

*Theme\_Keyword:* streamflow

*Theme\_Keyword:* hydrology

*Place:*

*Place\_Keyword\_Thesaurus:* None

*Place\_Keyword:* Coweeta Hydrologic Laboratory

*Place\_Keyword:* Coweeta Lab

*Place\_Keyword:* North Carolina

*Place\_Keyword:* Macon County

*Place\_Keyword:* southern Appalachians

*Place\_Keyword:* Coweeta Basin

*Access\_Constraints:* None

*Use\_Constraints:*

These data were collected using funding from the U.S. Government and can be used without additional permissions or fees. If you use these data in a publication, presentation, or other research product please use the following citation:  
  
Miniat, Chelcy Ford; Laseter, Stephanie H.; Swank, Wayne T.; Vose, James M. 2016. Daily streamflow data for watersheds at Coweeta Hydrologic Lab, North Carolina. Fort Collins, CO: Forest Service Research Data Archive. Updated 10 February 2020. <https://doi.org/10.2737/RDS-2016-0025>\* We also encourage data users to contact the Coweeta Project Leader (via the Metadata Contact below) for a review of manuscripts that use any of these Coweeta data.

*Browse\_Graphic:*

*Browse\_Graphic\_File\_Name:* \Supplements\CoweetaBasinMap.pdf

*Browse\_Graphic\_File\_Description:*

Adobe Acrobat PDF file containing a contour map of the Coweeta Hydrologic Laboratory showing the location of the climate stations, rain gages, and weirs.

*Browse\_Graphic\_File\_Type:* PDF

*Data\_Set\_Credit:*

Funding for these data were provided by the USDA Forest Service, Southern Research Station (SRS).  
  
We acknowledge the support of many individuals, past and present, including Charlie L. Shope, Charles Swafford, Neville Buchanan, Bryant Cunningham, Bruce McCoy, Chuck Marshall, Mark Crawford, and Julia Moore.

*Cross\_Reference:*

*Citation\_Information:*

*Originator:* Douglass, J. E.

*Originator:* Hoover, M. D.

*Publication\_Date:* 1988

*Title:*

Chapter 2. History of Coweeta

*Geospatial\_Data\_Presentation\_Form:* book chapter

*Series\_Information:*

*Series\_Name:* Ecological Studies

*Issue\_Identification:* 66

*Publication\_Information:*

*Publication\_Place:* New York

*Publisher:* Springer-Verlag

*Other\_Citation\_Details:*

pages 17-31; In: Forest Hydrology and Ecology at Coweeta (W. T. Swank & D. A. Crossley Jr., eds)

*Online\_Linkage:* <https://coweeta.uga.edu/publications/425_2.pdf>

*Cross\_Reference:*

*Citation\_Information:*

*Originator:* Ford, Chelcy R.

*Originator:* Laseter, Stephanie H.

*Originator:* Swank, Wayne T.

*Originator:* Vose, James M.

*Publication\_Date:* 2011

*Title:*

Can forest management be used to sustain water-based ecosystem services in the face of climate change?

*Geospatial\_Data\_Presentation\_Form:* journal article

*Series\_Information:*

*Series\_Name:* Ecological Applications

*Issue\_Identification:* 21:2049-2067

*Online\_Linkage:* <https://www.fs.usda.gov/treesearch/pubs/38726>

*Online\_Linkage:* <https://doi.org/10.1890/10-2246.1>

*Cross\_Reference:*

*Citation\_Information:*

*Originator:* Golladay, S. W.

*Originator:* Webster, J. R.

*Publication\_Date:* 1988

*Title:*

Effects of clear-cut logging on wood breakdown in Appalachian Mountain streams

*Geospatial\_Data\_Presentation\_Form:* journal article

*Series\_Information:*

*Series\_Name:* The American Midland Naturalist

*Issue\_Identification:* 119(1):143-155

*Online\_Linkage:* <https://doi.org/10.2307/2426063>

*Cross\_Reference:*

*Citation\_Information:*

*Originator:* Laseter, Stephanie H.

*Originator:* Ford, Chelcy R.

*Originator:* Vose, James M.

*Originator:* Swift, Lloyd W. Jr.

*Publication\_Date:* 2012

*Title:*

Long-term temperature and precipitation trends at the Coweeta Hydrologic Laboratory, Otto, North Carolina, USA

*Geospatial\_Data\_Presentation\_Form:* journal article

*Series\_Information:*

*Series\_Name:* Hydrology Research

*Issue\_Identification:* 43(6):890-901

*Online\_Linkage:* <https://www.fs.usda.gov/treesearch/pubs/42197>

*Online\_Linkage:* <https://doi.org/10.2166/nh.2012.067>

*Cross\_Reference:*

*Citation\_Information:*

*Originator:* Swank, Wayne T.

*Originator:* Webster, Jackson R.

*Publication\_Date:* 2014

*Title:*

Preface: long-term response of a forest watershed ecosystem, clearcutting in the Southern Appalachians

*Geospatial\_Data\_Presentation\_Form:* book

*Publication\_Information:*

*Publication\_Place:* New York, NY

*Publisher:* Oxford University Press

*Other\_Citation\_Details:*

In: Swank, Wayne T.; Webster, Jackson R., eds. Long-term response of a forest watershed ecosystem: Clearcutting in the southern Appalachians

*Online\_Linkage:* <https://www.fs.usda.gov/treesearch/pubs/46145>

*Cross\_Reference:*

*Citation\_Information:*

*Originator:* Swift, Lloyd W. Jr.

*Originator:* Cunningham, G. B.

*Originator:* Douglass, J. E.

*Publication\_Date:* 1988

*Title:*

Chapter 3. Climatology and hydrology

*Geospatial\_Data\_Presentation\_Form:* book chapter

*Series\_Information:*

*Series\_Name:* Ecological Studies

*Issue\_Identification:* 66

*Publication\_Information:*

*Publication\_Place:* New York

*Publisher:* Springer-Verlag

*Other\_Citation\_Details:*

In: Forest Hydrology and Ecology at Coweeta (W. T. Swank & D. A. Crossley Jr., eds)

*Online\_Linkage:* <https://coweeta.uga.edu/publications/425_3.pdf>

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*Data\_Quality\_Information:*

*Attribute\_Accuracy:*

*Attribute\_Accuracy\_Report:*

H330 Shaft Encoder  
Accuracy: 0.01 feet

*Logical\_Consistency\_Report:*

See Hibbert and Cunningham (1966) for details.  
  
Hibbert, A. R.; Cunningham, G. B. 1966. Streamflow data processing opportunities and application. In: Proceedings of a ‘National Science Foundation’ Advanced Science Seminar: International Symposium of Forest Hydrology, August 29-September 10. New York, NY. Pergamon Press. <https://coweeta.uga.edu/publications/841.pdf>

*Completeness\_Report:*

Missing data are recorded as zeros. Typically short gaps are hardware malfunction and long gaps are periods when the weir was down for repairs.  
  
All September 2003 data were lost, so no measurements are available for any of the weirs.  
  
For WS14 data were not recorded from May 1, 1975 through June 15, 1977.

*Lineage:*

*Methodology:*

*Methodology\_Type:* Field

*Methodology\_Description:*

Stream height (which is later converted to streamflow) is recorded at four different watersheds in the Coweeta Basin with a WaterLog H330 Shaft Encoder and H500XL data logger. The height of the water in the notch of the weir blade is recorded on a 5 minute time step. Data are measured for each water year, which is defined as November 1 of a given year through October 31 of the following year.  
  
Below is information specific to each gage or watershed.  
  
WATERSHED 7: This treatment watershed has a 90 degree v-notch weir, which is measuring flow on Big Hurricane Creek. Maximum discharge in this creek is 199.29 cubic feet per second per square mile (csm) on 5/28/1976. The lower portion of the watershed was grazed by an average of six cattle during a 5-month period each year from 1941 to 1952. It was commercially clear-cut and cable logged in 1977.  
  
WATERSHED 14: This reference watershed has a 120 degree v-notch weir, which is measuring flow on Hugh White Branch. It is an unmanaged watershed with mixed hardwood stands remaining undisturbed since 1927.  
  
WATERSHED 18: This reference watershed has a 120 degree v-notch weir, which is measuring flow on Grady Branch. It is an unmanaged watershed with mixed hardwood stands remaining undisturbed since 1927.  
  
WATERSHED 27: This reference watershed has a 120 degree v-notch weir, which is measuring flow on Hard Luck Creek. It is an unmanaged watershed with mixed hardwood stands. It was partially defoliated by fall cankerworm infestation from 1972 to 1979.

*Process\_Step:*

*Process\_Description:*

Data are downloaded monthly and converted to streamflow using an equation specific to the geometry of each weir and then summarized for daily totals. See Hibbert and Cunningham (1966) for more information.  
  
Hibbert, A. R.; Cunningham, G. B. 1966. Streamflow data processing opportunities and application. In: Proceedings of a ‘National Science Foundation’ Advanced Science Seminar: International Symposium of Forest Hydrology, August 29-September 10. New York, NY. Pergamon Press. <https://coweeta.uga.edu/publications/841.pdf>

*Process\_Date:* Unknown

*Process\_Step:*

*Process\_Description:*

In 2011, there were a few days where the datalogger for WS14 malfunctioned. As a result, data from adjacent weir WS6 were used to estimate flow for WS14, using regression. These data are marked with an 'E' to imply the data are estimates.

*Process\_Date:* 2011

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*Entity\_and\_Attribute\_Information:*

*Overview\_Description:*

*Entity\_and\_Attribute\_Overview:*

Below you will find the data available in this data publication and a short description of its contents.  
  
\Data\ws07\_daily\_flow\_1965\_2019.csv  
\Data\ws14\_daily\_flow\_1937\_2019.csv  
\Data\ws18\_daily\_flow\_1937\_2019.csv  
\Data\ws27\_daily\_flow\_1947\_2019.csv  
  
These files are comma-delimited ASCII text files containing daily streamflow data from watersheds in the Coweeta Basin. Variables include:  
  
WYR = Water Year (November 1 of previous year through October 31).  
  
MO = Month of recorded measurement (1-12).  
  
DAY = Day of month of measurement (1-31).  
  
CSM = Watershed total daily streamflow in cubic feet/second/square mile (csm).  
  
ESTIMATE = 'E' if data were estimated (this variable is not available for all files).

*Entity\_and\_Attribute\_Detail\_Citation:*

Laseter et al. (2012), Swift et al. (1988), Hibbert and Cunningham (1966), and Swank et al. (2014) - citations available above.

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*Distribution\_Information:*

*Distributor:*

*Contact\_Information:*

*Contact\_Organization\_Primary:*

*Contact\_Organization:* USDA Forest Service, Research and Development

*Contact\_Position:* Research Data Archivist

*Contact\_Address:*

*Address\_Type:* mailing and physical

*Address:* 240 West Prospect Road

*City:* Fort Collins

*State\_or\_Province:* CO

*Postal\_Code:* 80526

*Country:* USA

*Contact\_Voice\_Telephone:* see Contact Instructions

*Contact Instructions:* This contact information was current as of February 2020. For current information see Contact Us page on: <https://doi.org/10.2737/RDS>.

*Resource\_Description:* RDS-2016-0025

*Distribution\_Liability:*

Metadata documents have been reviewed for accuracy and completeness. Unless otherwise stated, all data and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. However, neither the author, the Archive, nor any part of the federal government can assure the reliability or suitability of these data for a particular purpose. The act of distribution shall not constitute any such warranty, and no responsibility is assumed for a user's application of these data or related materials.  
  
The metadata, data, or related materials may be updated without notification. If a user believes errors are present in the metadata, data or related materials, please use the information in (1) Identification Information: Point of Contact, (2) Metadata Reference: Metadata Contact, or (3) Distribution Information: Distributor to notify the author or the Archive of the issues.

*Standard\_Order\_Process:*

*Digital\_Form:*

*Digital\_Transfer\_Information:*

*Format\_Name:* ASCII

*Format\_Version\_Number:* see Format Specification

*Format\_Specification:*

Comma-delimited ASCII text file (CSV)

*File\_Decompression\_Technique:* Files zipped with 7-Zip 19.00

*Digital\_Transfer\_Option:*

*Online\_Option:*

*Computer\_Contact\_Information:*

*Network\_Address:*

*Network\_Resource\_Name:* <https://doi.org/10.2737/RDS-2016-0025>

*Fees:* None

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*Metadata\_Reference\_Information:*

*Metadata\_Date:* 20200210

*Metadata\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Chelcy Miniat

*Contact\_Organization:* USDA Forest Service, Southern Research Station

*Contact\_Address:*

*Address\_Type:* mailing and physical

*Address:* 3160 Coweeta Lab Road

*City:* Otto

*State\_or\_Province:* NC

*Postal\_Code:* 28763

*Contact\_Voice\_Telephone:* 828-524-2128 \*118

*Contact\_Electronic\_Mail\_Address:* [chelcy.f.miniat@usda.gov](mailto:chelcy.f.miniat@usda.gov)

*Metadata\_Standard\_Name:* FGDC Biological Data Profile of the Content Standard for Digital Geospatial Metadata

*Metadata\_Standard\_Version:* FGDC-STD-001.1-1999

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