

Metadata

Dataset Title:

Cary_Hydro_Data.csv

Cary Environmental Monitoring Program Stream Hydrology Data

Abstract

This dataset is a contribution to the Cary Institute of Ecosystem Studies Environmental Monitoring Program. This program is a long-term data collection program designed to understand how the environment changes over time. The program includes monitoring of climate including temperature and precipitation, as well as variables related to air pollution, such as acid deposition and ozone, and water pollution and other streamwater chemistry. Our program also includes solar radiation monitoring, which includes diffuse and global photosynthetically active radiation (PAR), diffuse and global shortwave radiation, net radiation and UV. Long-term monitoring of solar radiation provides us with an understanding of atmospheric energy dynamics, which can affect natural and human systems.

Data provided in this dataset include stream hydrology data.

The Cary Institute of Ecosystem Studies, Environmental Monitoring Program furnishes data under the following conditions: The data have received quality assurance scrutiny by our program, and, although we are confident of the accuracy of these data, Cary Institute will not be held liable for errors in these data. Data are subject to change resulting from updates in data screening or models used. Data citation: The following is a standard citation for referencing data from the Cary Institute of Ecosystem Studies, Environmental Monitoring Program:

Cary Institute of Ecosystem Studies, Environmental Monitoring Program. 2021 (or current year). Cary Institute of Ecosystem Studies, Box AB, Millbrook, NY 12545, www.caryinstitute.org.

Those wishing to publish data from Cary Institute of Ecosystem Studies, Environmental Monitoring Program are encouraged to contact data manager Vicky Kelly, kellyv@caryinstitute.org.

Investigators

First Name	Middle Initial	Last Name	Organization	e-mail address	ORCID ID
Victoria	R	Kelly	Cary Institute of Ecosystem Studies	kellyv@caryinstitute.org	0000-0003-3418-9211

Keywords

Cary Institute, Cary Institute of Ecosystem Studies, data, climate, stream, streamwater, streamflow, hydrology, conductivity, conductance, temperature, discharge, flow

Timeframe

The data in this file start 2 April 1993 and end 31 December 2021. Data collection is ongoing.

Geographic location

Stream gauging and temperature equipment is located on the East Branch of Wappinger Creek in the Fern

Glen on the Cary Institute property. GPS coordinates for the site are N41.78707, W73.73317.

Methods

The stream is a tributary to the main branch of Wappinger Creek, which flows into the Hudson River at Wappingers Falls. Approximately 1.6 km upstream from the gauging station is the Village of Millbrook sewage treatment plant. In addition to the sewage treatment plant, Dietrich Pond and its associated dam can influence the stream at the gauging station. The gauging equipment is situated in a stilling well, which is located on the leeward side of an old bridge abutment. Stream height is monitored using a float and pulley system with a graduated tape (formerly a wire). The pulley is connected to an incremental shaft encoder, which is monitored using a datalogger. Stream temperature and conductivity are monitored using a temperature/conductivity sensor, which sits on the bed of the stream near the stilling well. Instantaneous height, temperature and conductivity measurements are recorded and stored every fifteen minutes. Rating curves for estimating stream discharge were developed in 1987-1988, 1993-1994, 1996, 1997-1998 and 2003-2005 with periodic points checked in intervening and subsequent years.

Stream height was measured between 1986 and 1991 using a Leupold and Stevens, Inc. total flow meter (model 61R) connected to a float and pulley. Stream temperature was measured between 1987 and 1993 using a Weksler Instruments Corporation, Temperature Chart Recorder, 10 inch. Data collected prior to 1993 can be made available on request. In 1993, we began continuous collection of stream height and temperature using a Handar, Inc. 570A Data Acquisition System with an incremental shaft encoder (model 436A) and a water temperature sensor (Handar, Inc., model 433FN 1993-Sept. 2003, Campbell Scientific model CS547A May 2005-present). Stream height is checked with a fixed staff gauge (Sept. 1997-present) and with a graduated tape on the pulley (July 2002-present). The Handar 570A datalogger was replaced with a Campbell Scientific CR510 datalogger in September 2003. We began continuous stream conductivity measurements in May 2005 using a Campbell Scientific CS547A conductivity and temperature probe.

Rating Curve Equations:

$y = \text{discharge (m}^3/\text{s)}$ $x = \text{stage height (cm)}$

1993-1994 $y = 0.0009x^2 + 0.0159x + 0.1192$ $R^2 = 0.9923$, $n=6$

1996 $y = 0.0024x^2 - 0.0168x + 0.1444$ $R^2 = 1$, $n=3$

1997-1998 $y = 0.0009x^2 - 0.0036x + 0.0557$ $R^2 = 0.9934$, $n=6$

2001-2005 $y = 0.0018x^2 - 0.0292x + 0.1178$ $R^2 = 0.9876$, $n=7$

HYDROLOGICAL DATA QUALITY ASSURANCE & QUALITY CONTROL PARAMETERS & METHODS

Stream data are downloaded from the datalogger every week. Height data are checked for accuracy by comparing values with the height registered on the pulley tape and on the fixed staff gauge. Weekly checks are made during winter to determine if the stream is frozen at the stilling well. A code value of 0, 1 or 2 is assigned to each line of data to indicate if the stream was frozen. For each weekly dataset a time series graph is used to identify outlier data points. Any erroneous values that are obviously due to equipment malfunction are replaced with missing value codes. Log files are kept with a description of each site visit, and include calibration information, measurement adjustments, probe cleaning, etc.

At the end of each year a time series graph is produced to look for outlier data points. Questionable data are replaced with missing value codes. In November 2001 adjustments were made to stream height data to account for instrument drift and errors in set points. As a result, some of the stream height values are below zero. Details of these adjustments are available upon request.

Data Table

Column name	Description	Unit or code explanation or date format	Empty value code
DATE	Date in MM/DD/YYYY format where MM is month number, DD is date number and YYYY is year		
HOUR_MIN	Hour HH:MM format in Eastern Standard Time. Note that data are from the preceding 15-minute interval. For example, data for hour 00:15 are from midnight to 12:15 am Eastern Standard Time.	HH:MM (EST)	
STRM_TMP	Stream temperature (degrees Celsius)	Degrees C	NA
STRM_HT	Height of stream	Cm	NA
STRM_COND	conductivity corrected for temp to 25 C	mScm ⁻¹	NA
Q	stream discharge	m ³ /s	NA
QUEST_HT	Code for if stream frozen, 0 = stream not frozen, 1 = stream frozen, 2 = stream may have been frozen, have no notes.		NA

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