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RECLAMATION

Automated Retrieval Documentation for Missouri Basin HydroMet



Bighorn Reservoir, Montana

Missouri Basin Regional Office

Mission Statements

The Department of the Interior (DOI) conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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REST URL Data Retrieval from the Hydromet Website

The following document contains instructions for obtaining data from the Hydromet website via editable URLs. These URLs can be manually edited or parsed for data.

Dayfile Data Request Format

Dayfile data is near real time or instantaneous data. The time interval that data is collected varies depending on the site, but it is typically in 15, 30, or 60 minute intervals. There are two main formats in which Dayfile data can be obtained from URLs: Table and CSV formats.

Table Format

This is a sample URL to collect near real time data for stations and parameters:

<http://www.usbr.gov/gp-bin/webdaycsv.pl?parameter=PUER%20FB&syer=2018&smnth=1&sdymth=1&eyer=2018&emnth=1&edy=24&format=2>

Up to 14 station and parameter combinations can be requested at a time. A space, or "%20", separates a station from a parameter and multiple stations/parameter combinations are separated with a comma. Examples of requesting multiple stations and parameters can be found in the following sections. If other stations, parameters, or time periods are needed, the URL script can be edited based on the following:

- **parameter=PUER:** PUER is the station name selected in the example. A list of stations by state can be found here:
https://www.usbr.gov/gp/hydromet/station_list_by_state.html
- **FB:** FB is the name of the parameter selected in the example. Use this URL, https://www.usbr.gov/gp/hydromet/station_list_by_state.html, to find a list of parameters at each station by state.
- **syer:** Start Year
- **smnth:** Start Month
- **sdymth:** Start Day
- **eyer:** End Year
- **emnth:** End Month
- **edy:** End Day

The data can also be requested in a variety of formats by editing the “format=2” in the sample URL. The numbers correspond to the following formats:

1- Tab delimited

```
BEGIN DATA
DATE          TIME          PUER    FB
01/01/2018 00:00          4881.13
01/01/2018 00:15          4881.13
01/01/2018 00:30          4881.13
01/01/2018 00:45          4881.14
01/01/2018 01:00          4881.14
01/01/2018 01:15          4881.14
01/01/2018 01:30          4881.14
01/01/2018 01:45          4881.14
01/01/2018 02:00          4881.14
01/01/2018 02:15          4881.14
01/01/2018 02:30          4881.15
```

2- Comma delimited

```
BEGIN DATA
DATE          TIME , PUER    FB
01/01/2018 00:00, 4881.13
01/01/2018 00:15, 4881.13
01/01/2018 00:30, 4881.13
01/01/2018 00:45, 4881.14
01/01/2018 01:00, 4881.14
01/01/2018 01:15, 4881.14
01/01/2018 01:30, 4881.14
01/01/2018 01:45, 4881.14
01/01/2018 02:00, 4881.14
01/01/2018 02:15, 4881.14
01/01/2018 02:30, 4881.15
01/01/2018 02:45, 4881.15
01/01/2018 03:00, 4881.15
01/01/2018 03:15, 4881.15
01/01/2018 03:30, 4881.15
01/01/2018 03:45, 4881.15
```

3- HTML table with quality flags

DATE TIME	PUER FB
01/01/2018 00:00	4881.13
01/01/2018 00:15	4881.13
01/01/2018 00:30	4881.13
01/01/2018 00:45	4881.14
01/01/2018 01:00	4881.14
01/01/2018 01:15	4881.14
01/01/2018 01:30	4881.14
01/01/2018 01:45	4881.14
01/01/2018 02:00	4881.14

4- Reserved

```
#DATETIME,PUER_FB 2018-01-01 00:00,4881.13 2018-01-01 00:15,4881.13 :
```

5- HTML table, no headers, quality data in same cell as data value

01/01/2018 00:00	4881.13
01/01/2018 00:15	4881.13
01/01/2018 00:30	4881.13
01/01/2018 00:45	4881.14
01/01/2018 01:00	4881.14
01/01/2018 01:15	4881.14
01/01/2018 01:30	4881.14

6- HTML table, no headers, no date

0.31
0.28
0.30
0.41
0.25
0.34
0.42

7- HTML table, no headers, no quality flags

01/01/2018 00:00	4881.13
01/01/2018 00:15	4881.13
01/01/2018 00:30	4881.13
01/01/2018 00:45	4881.14
01/01/2018 01:00	4881.14
01/01/2018 01:15	4881.14
01/01/2018 01:30	4881.14
01/01/2018 01:45	4881.14
01/01/2018 02:00	4881.14
01/01/2018 02:15	4881.14

8- Comma separated values where values of 998877 and near 0 is blank and no flags

```
BEGIN DATA
DATE      TIME ,  PUER    FB
01/01/2018 00:00,  4881.13
01/01/2018 00:15,  4881.13
01/01/2018 00:30,  4881.13
01/01/2018 00:45,  4881.14
01/01/2018 01:00,  4881.14
01/01/2018 01:15,  4881.14
01/01/2018 01:30,  4881.14
01/01/2018 01:45,  4881.14
01/01/2018 02:00,  4881.14
01/01/2018 02:15,  4881.14
```

9- HTML table with headers and dates, but no quality flags

DATE TIME	PUER FB
01/01/2018 00:00	4881.13
01/01/2018 00:15	4881.13
01/01/2018 00:30	4881.13
01/01/2018 00:45	4881.14
01/01/2018 01:00	4881.14
01/01/2018 01:15	4881.14
01/01/2018 01:30	4881.14

10- JSON Data

```
{"SITE":{"CODE":"PUER","DATA":[{"DATE":"2018/01/01 00:00","FB":4881.13}, {"DATE":"2018/01/01 00:15","FB":4881.13} ],
```

Example URL for Multiple Parameters at the Same Station:

<https://www.usbr.gov/gp-bin/webdaycsv.pl?parameter=PUER%20FB,PUER%20AF&syer=2018&smnth=1&sdym=1&eyer=2018&emnth=1&edy=24&format=2>

Example URL for Multiple Stations:

<https://www.usbr.gov/gp-bin/webdaycsv.pl?parameter=PUER%20FB,PUER%20AF,PUERWXCO%20BH&syer=2018&smnth=1&sdym=1&eyer=2018&emnth=1&edy=24&format=2>

Comma Separated Value (CSV) Format

<https://www.usbr.gov/gp-bin/daycsv.pl?BBR,AF,2016MAY052345,DAT,-1>

The editable portion of this URL is in the following format: ?SITE,PAR,DATE,PROCESS,NDAYS

- **SITE** is based on station codes found in this link: https://www.usbr.gov/gp/hydromet/station_list_by_state.html
- **PAR** can be inputted with two objects:

- Parameter codes, such as AF in the example can be inputted. Parameter codes can be found in this link:
https://www.usbr.gov/gp/hydromet/station_list_by_state.html
- Alternatively, + can be entered in place of a parameter code to obtain a list of all parameter codes associated with the site. If this method is used leave remaining arguments blank.
- **DATE** is in the format YYYYMMDDHHMM
- **PROCESS:** The process completed by the URL can be DAT (output data values), MIN (output minimum value), MAX (output maximum value), AVG (output average value), or SUM (output sum of all values).
- **NDAYS** is the number of 15-minute intervals of data to be returned (DAT) or to be calculated through one of the other processes. NDAYS also adheres to the following commands:
 - 0 = outputs the full day in which the date falls
 - -1 = outputs the first non-missing data value found within 96 intervals (1 day)
 - For DAT, the range of acceptable values includes 1 through 385
 - For other calculations, the range of acceptable values includes 1 through 3000

Archive Data Request Format

Archive data consists of daily data values for stations and parameters. Daily data for the previous day is available after 5:25 a.m. on the current day.

Table Format

The table format URL for archive/daily data is almost the same as the dayfile data URL. The only difference is “webdaycsv” is changed to “webarccsv”. The output data is a daily value as opposed to a near real time value. Here is a sample URL for obtaining daily data for stations:

<http://www.usbr.gov/gp-bin/webarccsv.pl?parameter=BOZM%20MM&syer=2017&smnth=6&sdv=1&eyer=2017&emnth=6&edy=30&format=2>

Up to 14 station and parameter combinations can be requested at one time. A "%20" separates a station from a parameter and multiple stations/parameter combinations are separated with a comma. More information on the different format options and examples of multiple parameter URLs can be found in the Table Format Dayfile Data Request section. If you need other stations, parameters, or time periods, you can edit the URL script based on the following:

- **parameter = BOZM:** BOZM is the station name selected in the example. A list of stations by state can be found here:
https://www.usbr.gov/gp/hydromet/station_list_by_state.html
- **ET:** MM is the name of the parameter selected in the example. Use this URL, https://www.usbr.gov/gp/hydromet/station_list_by_state.html, to find a list of parameters at each station by state.
- **syer:** Start Year

- **smnth**: Start Month
- **sd**y: Start Day
- **eyer**: End Year
- **emnt**: End Month
- **edy**: End Day

Format:

- 1- **Tab delimited**
- 2- **Comma delimited**
- 3- **HTML table**
- 4- **Reserved**
- 5- **HTML table, no headers**
- 6- **HTML table, no headers, no date**
- 7- **Space delimited data**
- 8- **Same as 2**
- 9- **Same as 7**
- 10- **JSON Format Data**

Comma Separated Values (CSV) Format

The CSV format for archive/daily data is almost entirely the same as the CSV format for the near real time data. The “arccsv” text and the NDAY arguments are the only significant changes in the inputs.

<https://www.usbr.gov/gp-bin/arccsv.pl?BOZM,ET,2017JUN01,DAT,30>

The editable portion of this URL is in the following format:

?SITE,PAR,DATE,PROCESS,NDAYS

- **SITE** is based on station codes found in this link:
https://www.usbr.gov/gp/hydromet/station_list_by_state.html
- **PAR** can be inputted with two objects:
 - Parameter codes, such as AF in the example can be inputted. Parameter codes can be found in this link:
https://www.usbr.gov/gp/hydromet/station_list_by_state.html
 - Alternatively, + can be entered in place of a parameter code to obtain a list of all parameter codes associated with the site. If using this method leave remaining arguments blank.
- **DATE** is in the format YYYYMMDDHHMM
- **PROCESS**: The process completed by the URL can be DAT (output data values), MIN (output minimum value), MAX (output maximum value), AVG (output average value), or SUM (output sum of all values).
- **NDAYS** is the number of days of data to be returned (DAT) or to be calculated through one of the other processes. NDAY also adheres to the following commands:
 - 0 = outputs the full water year in which the date falls
 - -1 = outputs the first non-missing data value found within 60 days
 - For DAT, the range of acceptable values includes 1 through 366

- For other calculations, the range of acceptable values includes 1 through 3000

JSON Format

This URL can be used to download the data in JSON:

<https://www.usbr.gov/gp-bin/arcread.pl?st=BOZM&by=2017&bm=6&bd=1&ey=2017&em=6&ed=30&pa=ET&json=1>

The URL can be edited with the following inputs:

- **st:** station
- **by:** start year
- **bm:** start month
- **bd:** start day
- **ey:** end year
- **em:** end month
- **ed:** end day
- **pa:** parameter

json=1 for json format.

To obtain multiple parameters for a single station, add additional parameters in this format “&pa=MM” after the original parameter. An example is provided here:

<https://www.usbr.gov/gp-bin/arcread.pl?st=BOZM&by=2017&bm=6&bd=1&ey=2017&em=6&ed=30&pa=TA&pa=PP&pa=MM&json=1>

Data Inventory

Data inventory for a site includes the years in which a parameter associated with the site had data collected. Here is a URL to provide a data inventory for a site:

<http://www.usbr.gov/gp-bin/inventory.pl?site=gibr>

Change the “site=gibr” to “site=site of interest”.

Rating Table Data

The following API has rating table metadata such as a list of all parameter rating tables, when they were created, and when the tables were last edited:

<https://www.usbr.gov/gp/hydromet/ratingtables.csv>

There are two APIs that pull in rating tables from Hydromet.

One rating table API has only a selection of rating tables, but dumps all the tables into one file:

<https://www.usbr.gov/gp/hydromet/rtf.html>

The other rating table API allows a user to select any rating table in Hydromet:

<https://www.usbr.gov/gp-bin/expandrtf.pl?site=NPOW&pcode=Q&FORM=CSV&INCR=.1>

The URL can be edited with the following inputs:

- site= The site code that the user is interested in
- pcode= The parameter code that the user is interested in
- FORM= Format the user wants, the formats are described below.
- INCR= Increment of the X variable in the rating table in feet. Some tables are imported from USGS at 1/10th of a foot rather than the normal 1/100th of a foot.

The available formats are:

- CRO
- HTMLT Default Format
- Text
- COL
- CSV

Miscellaneous Other Data

Here is a list of XML files that are generated on an hourly or daily basis to provide data to outside users that can be parsed for certain data.

Provides location and hourly reservoir elevation and content.

<https://www.usbr.gov/gp/hydromet/res.xml>

Provides daily boat ramp data.

<https://www.usbr.gov/gp/hydromet/boatlim.xml>

Provides daily reservoir statistic.

<https://www.usbr.gov/gp/hydromet/curres.xml>

Provides daily location information for all sites. (Type, State, Elevation, Latitude and Longitude)

<https://www.usbr.gov/gp/hydromet/location.htm>

<https://www.usbr.gov/gp/hydromet/location.csv>