

**USER'S MANUAL**  
for  
**VIEWING AND DOWNLOADING**  
**1971-2000 AVERAGES**



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## 1. INTRODUCTION

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Beginning on October 1, 2001, the, NRCS Data Collection Offices will be required to provide new 30-year averages, for the 1971-2000 period, for data used in water supply related activities. These averages will be made available to the public and other federal agencies concerned with managing the water resources of the Western United States. The software described in this document was written to satisfy these requirements. The following types of data are included in the requirements to provide new 30-year averages:

1. Monthly Snow Course snow water equivalent data
2. Monthly SNOTEL snow water equivalent data
3. Daily SNOTEL snow water equivalent data
4. Daily SNOTEL precipitation data
5. Monthly stream flow data
6. End-of-month reservoir storage data

The following sets of averages can be viewed and downloaded by this software:

1. Daily averages from daily precipitation or snow water equivalent data sets
2. Monthly averages from daily precipitation data sets
3. Annual averages from daily precipitation data sets
4. Monthly averages from monthly reservoir, stream, or snow water equivalent data sets

The purpose for developing this software is to satisfy the requirement to provide sets of 30-year averages for years 1971-2000.

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## **2. HARDWARE AND SOFTWARE REQUIREMENTS**

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The software that views and downloads the sets of averages is intended to be used over the World Wide Web. In order to use this software, the user's computer must have a WWW browser that is capable of handling Java applets written in Java Version 1.3, and must have at least 128 Mb of memory. Theoretically, those are the only requirements for the user's computer. In practice, the configurations that have been tested and proven to work during testing at the NWCC use IBM-compatible Pentium-II and Pentium-III PCs, with 128 Mb of memory, processor speeds of 200 MHz or greater, running Windows 95 and Windows NT 4.0, with either Netscape 4.5 (or newer) or Internet Explorer 5.0 (or newer). In addition, the Java 1.3 plugin for the user's WWW browser must be installed on the user's computer. (Note that if the Java 1.3 plugin is not installed, then the first time that a user tries to run the Averages software, the software will lead the user through the process of downloading and installing the plugin.) Also, web browsers use "certificates" to allow web pages to write to a computer's hard disk. The NWCC has created a certificate to allow the averages viewer to write a set of averages to the user's hard disk. Follow the instructions on the initial screen to download and install the NWCC certificate.

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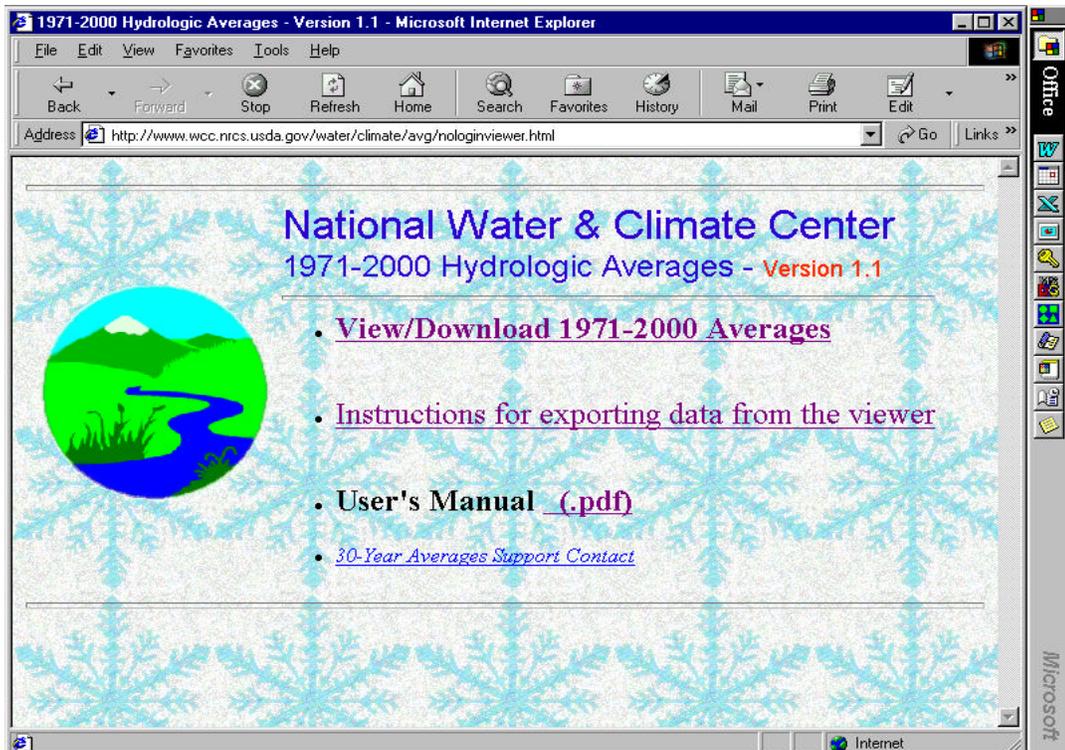
### 3. STARTING AND STOPPING THE VIEWING SOFTWARE

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To start the software that will create, view, and edit the sets of averages, start a WWW browser, and go to the following URL:

<http://www.wcc.nrcs.usda.gov/water/climate/avg/nologinviewer.html>

The averages software will display the web page shown in Figure 3.1. Start the viewing and downloading software by clicking on the link titled “View Averages”.



**Figure 3.1. Initial Screen**

Once the user has chosen to view or download a set of averages, the viewer software module will display the screen shown in Figure 3.2. This screen may take a minute or two to load. Please be patient. This screen is the first step in the process of viewing a set of averages for a data set that the user selects.

The screenshot shows a web browser window with the title "VIEW 30-YEAR AVERAGES: 1971-2000 - Microsoft Internet Explorer". The main content area is titled "Select Data Set". It contains the following elements:

- Data Type:** A dropdown menu with "SWE" selected.
- Data Frequency:** A dropdown menu with "Monthly" selected.
- State:** An empty text input field.
- HUC:** An empty text input field with a "Reset" button to its right.
- Station:** An empty text input field with a "Create Station List" button to its right.
- Station List:** A large empty rectangular box.
- Buttons:** "Select All" and "Continue" buttons are located at the bottom right of the page.

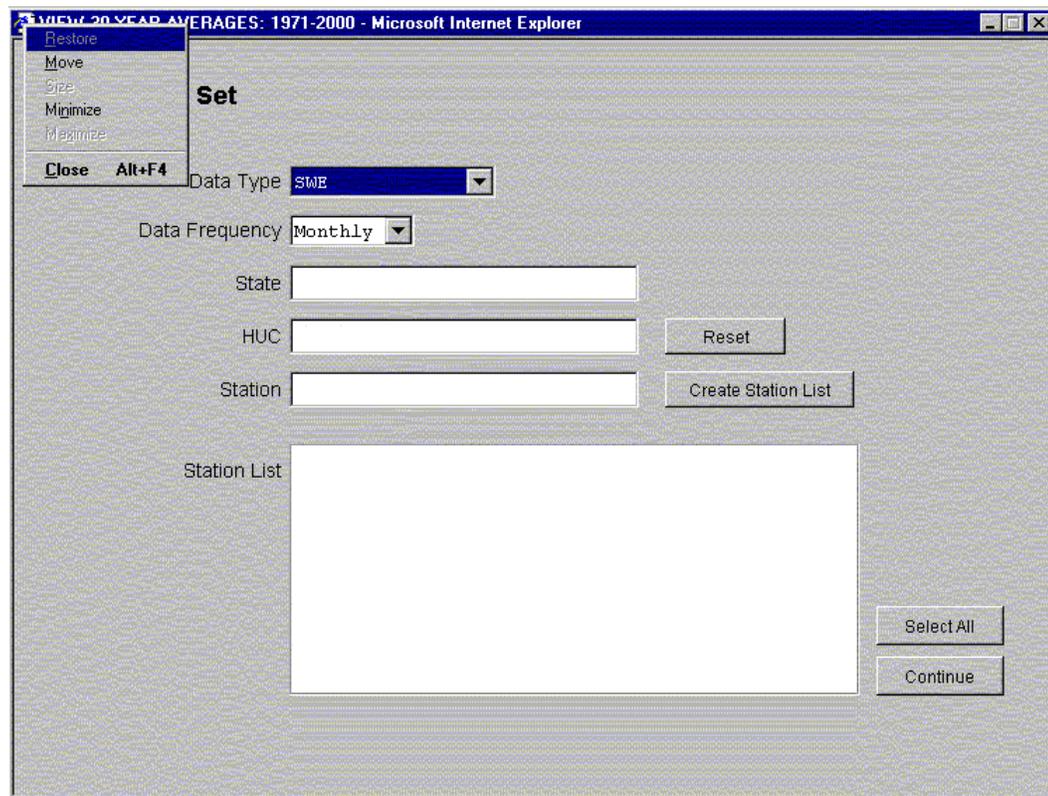
**Figure 3.2. Select Data Set Screen**

The general process of viewing or downloading a set of averages (and the Sections of this manual that each part of the process is discussed in) is:

1. Selecting stations for viewing and downloading averages (Section 4).
2. Viewing and exporting the selected station averages (Section 5).

At any point, the user can exit the averages viewing process by doing one of three things: (listed in order of preferred use)

1. In the upper left corner of the Averages screen, there is a pull-down menu. Click on the small icon, and a menu will be displayed, as shown in Figure 3.3. Click on the word “Close”, and the viewer program will stop.
2. In the upper right corner of the browser window that is being used to display the viewer screens, there is a button with an “X”, that is used to close the window. Click on the “X”, and the program will stop.
3. Exit the browser.



**Figure 3.3. Exiting the Averages Viewer**

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## **4. SELECTING STATIONS TO VIEW AND DOWNLOAD**

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The Select Data Set screen is used to select the station(s) and 30-year average data set that will be viewed and downloaded. As was shown in Figure 3.2, the Select Data Set screen allows the user to select a data set based on 5 different parameters:

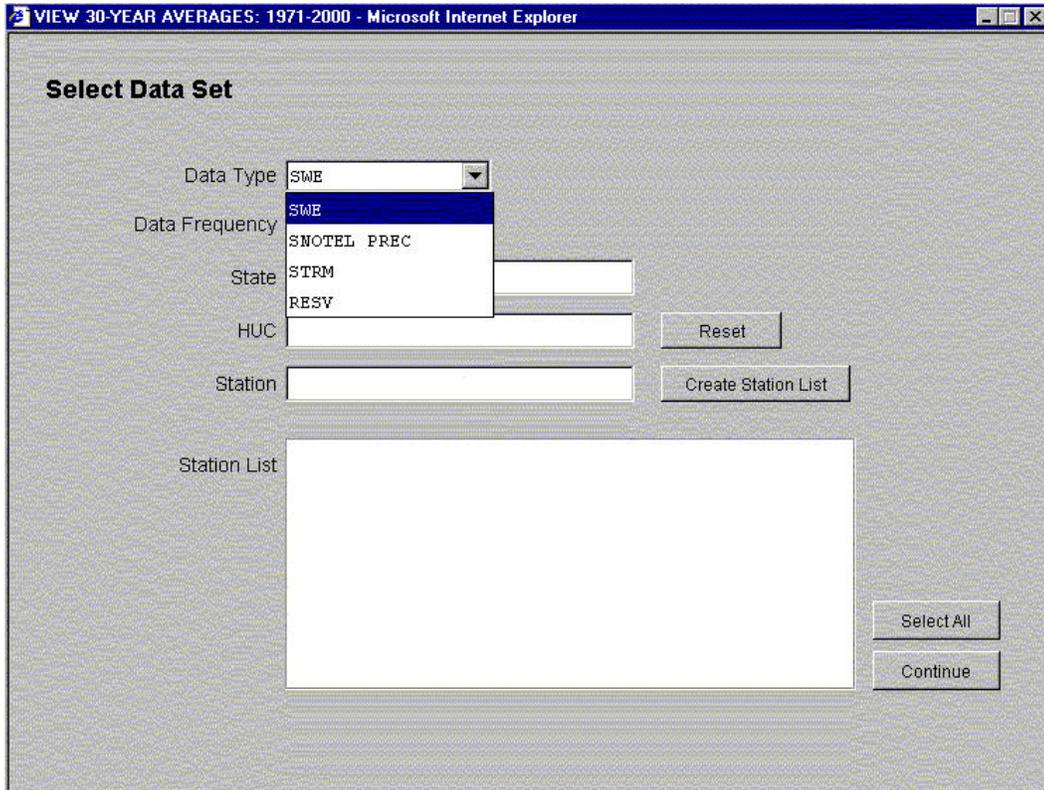
1. Data Type
2. Data Frequency
3. State(s) where stations are located
4. Hydrologic Unit Code(s) (HUC(s)) where stations are located
5. Station Name or ID

### **4.1. Selecting a Data Type**

The viewing software module is set up to allow averages to be viewed or downloaded for any of the following data types:

1. SNOTEL and snow course snow water equivalent – daily and monthly
2. SNOTEL cumulative precipitation – daily, monthly, and annual
3. Stream flow (calculated 30-year averages)
4. Stream flow (calculated 30-year medians)
5. End-of-month reservoir storage

As Figure 4.1 shows, the data type is chosen by choosing the desired elements from pull-down lists on the data selection screen.

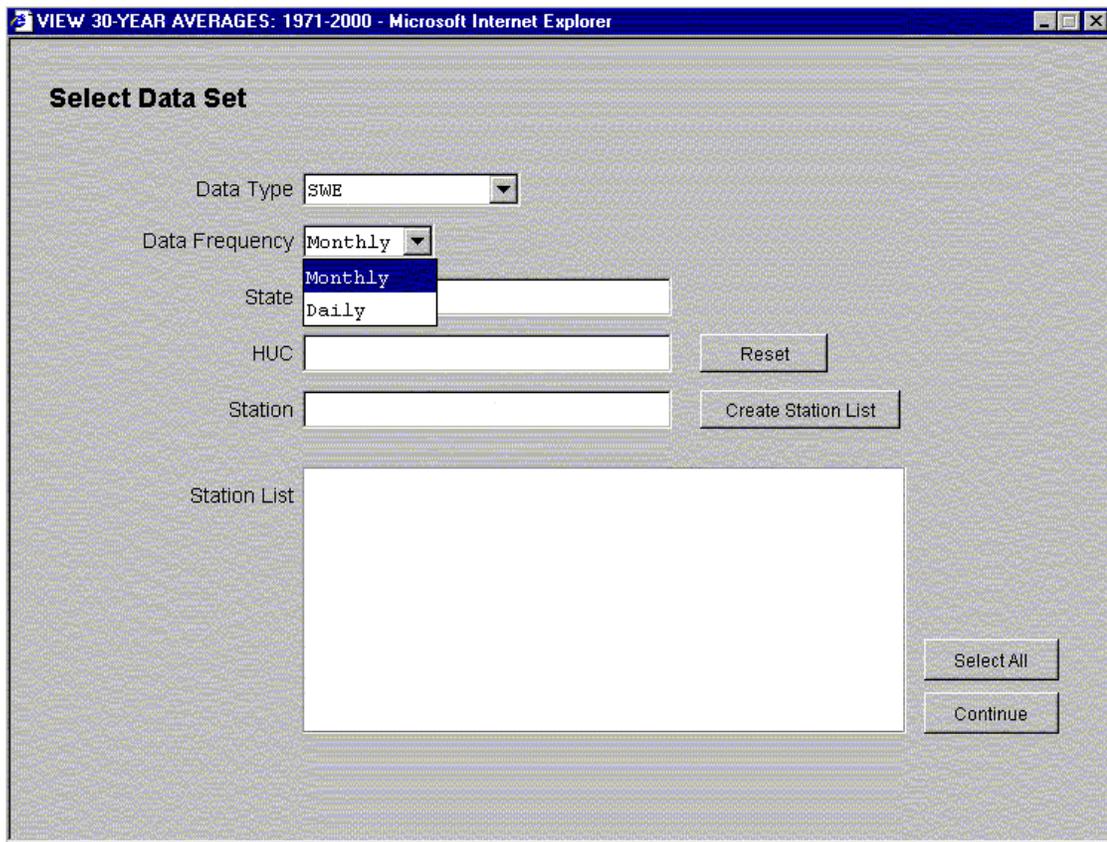


**Figure 4.1. Selecting a Data Type**

## **4.2. Selecting a Data Frequency**

The viewing software is set up to view and download averages based on average data that have daily or monthly frequencies. Since, in normal operations, the term “monthly data” is generally applied to both monthly data and bi-monthly data, that same convention is used in the viewing software. As Figure 4.2 shows, only the choices of “Daily” and “Monthly” appear on the Select Data Set screen. When a frequency of “Monthly” is chosen, the viewing software will automatically check to see whether the chosen station has monthly data and/or bi-monthly data, and will show both.

The “daily” frequency element may only be chosen with elements of SNOTEL “Swe” or “Prec”. The “daily” frequency is not available for elements “Strm” or “Resv”.



**Figure 4.2. Selecting a Data Frequency**

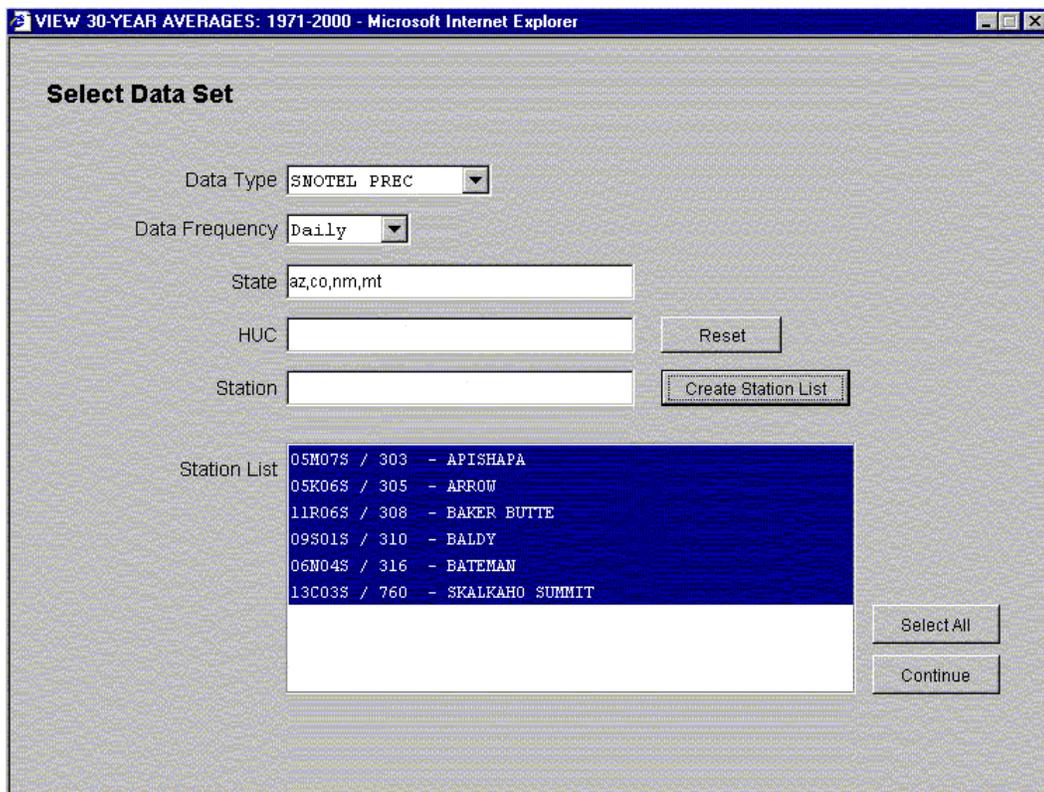
### **4.3. Selecting a Station**

The viewing software will allow the user to select stations, using queries from three labeled boxes: (1) State, (2) HUC, and (3) Station, as shown in Figure 3.3. One, two or all of these boxes may be used in the selection process. If a mistake is made during the selection process, the user can press the “Reset” button to clear out the selection boxes.

#### **4.3.1. Selecting by State**

After the data type and frequency have been selected, a state or states can be selected by the user, as shown in figure 4.3. All average data sets of the selected data type and frequency within the selected state will be extracted for viewing. If multiple

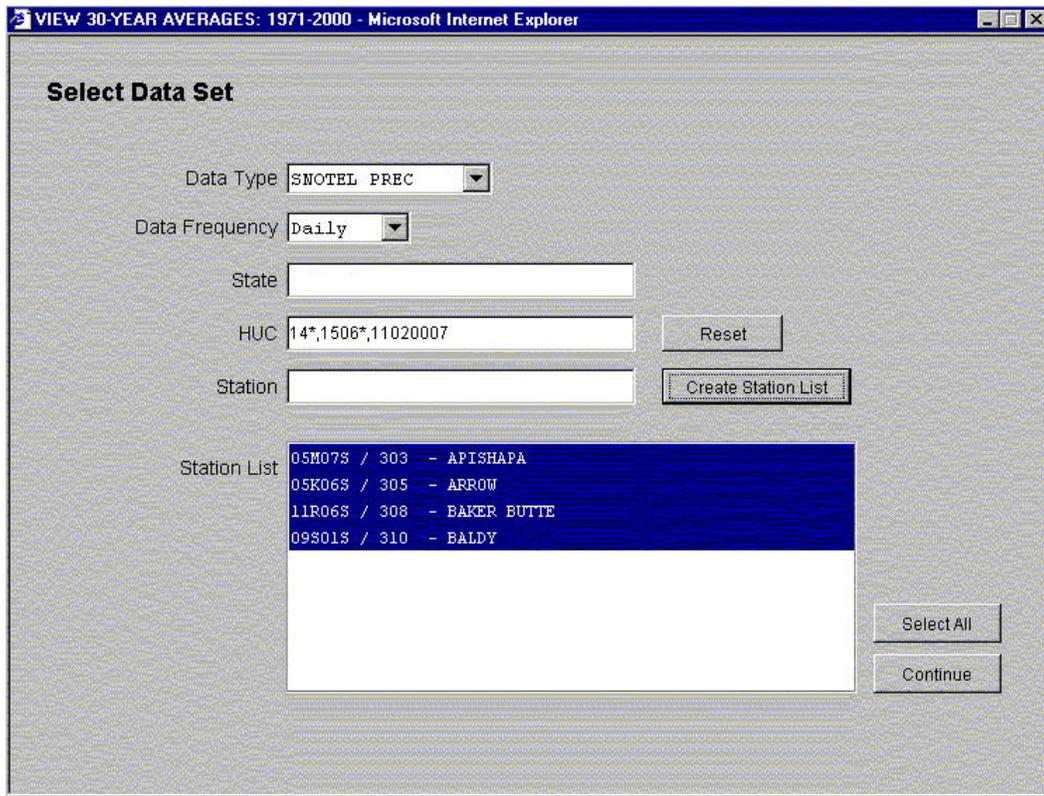
state codes are entered, as shown in Figure 4.3, all sites within the multiple state query will be extracted for viewing.



**Figure 4.3. Selecting by State**

### 4.3.2. Selecting by Hydrologic Unit Code (HUC)

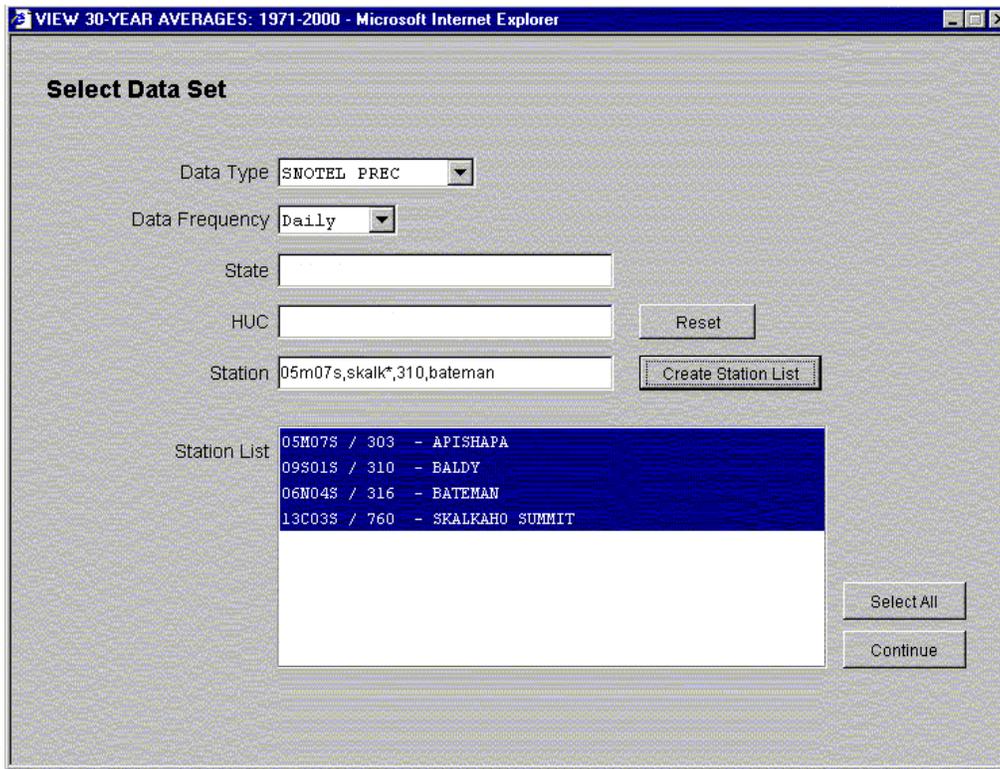
After the data type and frequency have been selected, HUC's can be selected by the user, as shown in figure 4.4. All average data sets of the selected data type and frequency within the selected HUC's will be extracted for viewing. If multiple hydrologic unit codes are entered, as shown in Figure 4.4, all sites within the multiple HUC query will be extracted for viewing. The HUC queries can either be the entire code or a partial code, using the "\*" wild card. If any part of the HUC is used in the query, as shown in Figure 4.4, then all stations within the larger hydrologic unit will be extracted. For example, if code 14\* is used in the query, all average data sets in the Upper Colorado Basin, for the selected data type and frequency, will be extracted for viewing.



**Figure 4.4. Selecting by Hydrologic Unit Code (HUC)**

### 4.3.3. Selecting by Station

After the data type and frequency have been selected, stations can be selected by the user, as shown in figure 4.5. All stations selected will be extracted for viewing. The station queries can be entered, using the entire station name (or ID) or a partial name (or ID), using the “\*” wild card. Either the “old SCS” snow grid (05m07s) ID or the “new” SNOTEL (310) ID can be used to select sites. In addition, the “secret” SNOTEL and DMP dco codes can be used to extract all sites within a DCO jurisdiction.



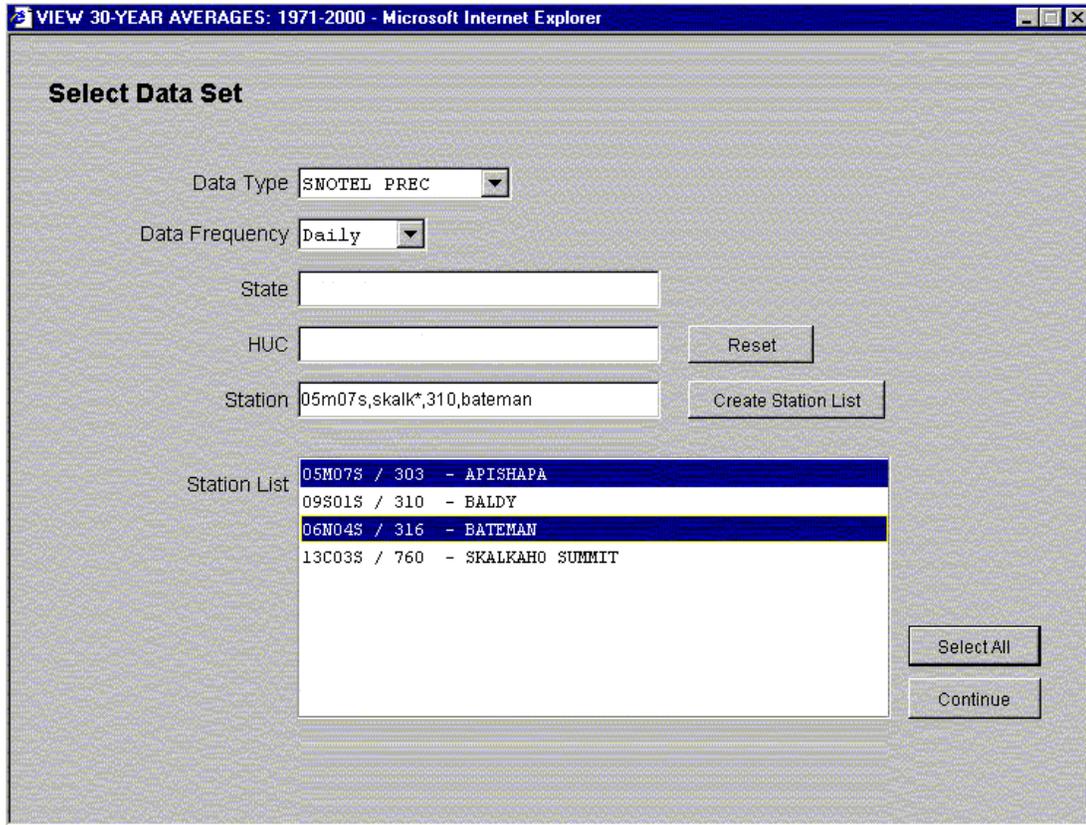
**Figure 4.5. Selecting by Station**

#### **4.4. Create Station List**

Once the desired stations have been selected, the user clicks on the “Create Station List” button to list all available stations from the query in the “Station List” box. Examples of this can be seen in Figures 4.3, 4.4, and 4.5.

#### **4.5. Selecting Station for Exporting Averages**

After the station list has been created, an individual station or multiple stations can be selected for viewing averages, by clicking on the station(s), using the left mouse button, as shown in Figure 4.6. For selecting multiple stations, hold the Ctrl key down, while clicking the left mouse button. If averages for all selected stations will be viewed or downloaded, the “Select All” button can be pressed.



**Figure 4.6. Selecting Station for Exporting Averages**

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## **5. VIEWING AND EXPORTING THE SELECTED AVERAGES**

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After the user has selected the stations for viewing, the user can choose to continue to the next step in the viewing and downloading process by clicking on the “Continue” button at the bottom of the screen.

### **5.1. Viewing Averages**

When the “Continue” button on the data selection screen is pressed, the “View Averages” screen is activated, as shown in Figure 5.1. This is an example of a SNOTEL daily average snow water equivalent table. The average data were produced with the average developer software module. Figures 5.2, 5.3, 5.4 and 5.5 are examples of a monthly snow course average table, SNOTEL daily average

precipitation table, monthly and seasonal streamflow average table, and monthly reservoir average table, respectively.

**View Averages**

**Station:** 05K14S / 335 - BERTHOUD SUMMIT **Latitude:** 39.80  
**Data Type:** SWE **Units:** inches **Elevation:** 11300 **Longitude:** 105.78

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1.0	0.0	1.1	4.2	7.5	11.1	14.3	18.4	21.6	12.7	0.5	0.0	0.0
2.0	0.0	1.1	4.3	7.7	11.2	14.5	18.5	21.7	12.1	0.4	0.0	0.0
3.0	0.0	1.2	4.4	7.8	11.3	14.6	18.6	21.7	11.5	0.3	0.0	0.0
4.0	0.0	1.3	4.5	7.9	11.4	14.7	18.8	21.7	10.8	0.2	0.0	0.0
5.0	0.0	1.4	4.6	8.0	11.6	14.8	18.9	21.6	10.2	0.1	0.0	0.0
6.0	0.1	1.5	4.7	8.1	11.7	15.0	19.0	21.5	9.5	0.1	0.0	0.0
7.0	0.1	1.6	4.8	8.2	11.8	15.1	19.2	21.3	8.8	0.0	0.0	0.0
8.0	0.1	1.7	4.9	8.3	11.9	15.2	19.3	21.2	8.1	0.0	0.0	0.0
9.0	0.1	1.8	5.0	8.5	12.0	15.3	19.4	21.0	7.4	0.0	0.0	0.0
10.0	0.1	1.9	5.1	8.6	12.1	15.5	19.6	20.7	6.8	0.0	0.0	0.0
11.0	0.1	2.0	5.3	8.7	12.2	15.6	19.7	20.5	6.2	0.0	0.0	0.0
12.0	0.2	2.1	5.4	8.8	12.3	15.7	19.8	20.2	5.6	0.0	0.0	0.0
13.0	0.2	2.2	5.5	8.9	12.4	15.8	19.9	19.9	5.0	0.0	0.0	0.0

Start Over

Figure 5.1. SNOTEL Daily Average Snow Water Equivalent Table

**View Averages**

**Station:** 05K14 - BERTHOUD SUMMIT **Latitude:** 39.80  
**Data Type:** SWE **Units:** inches **Elevation:** 11300 **Longitude:** 105.78

	1st	Flags	15th	Flags
Oct				
Nov				
Dec				
Jan	8.2	UC		
Feb	12.3	CC		
Mar	15.8	CC		
Apr	19.3	CC		
May	22.2	CC	21.8	CC
Jun	15.0	CC		
Jul				
Aug				
Sep				

Start Over

Figure 5.2. Monthly Snow Course Average Table

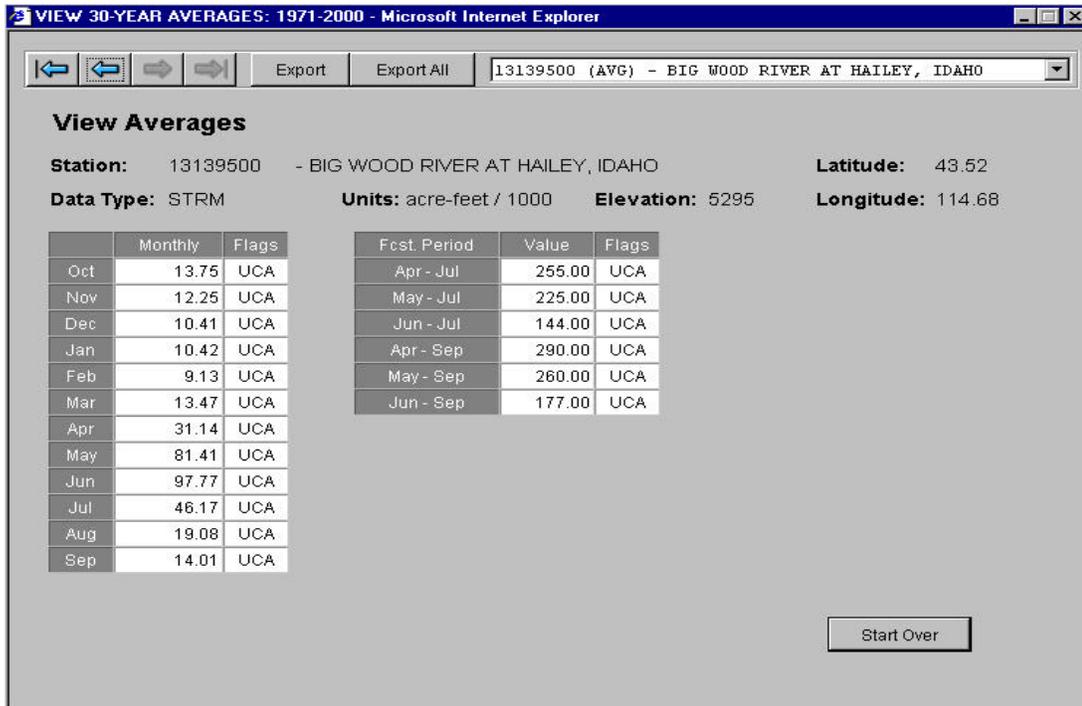


Figure 5.3. SNOTEL Daily Average Precipitation Table

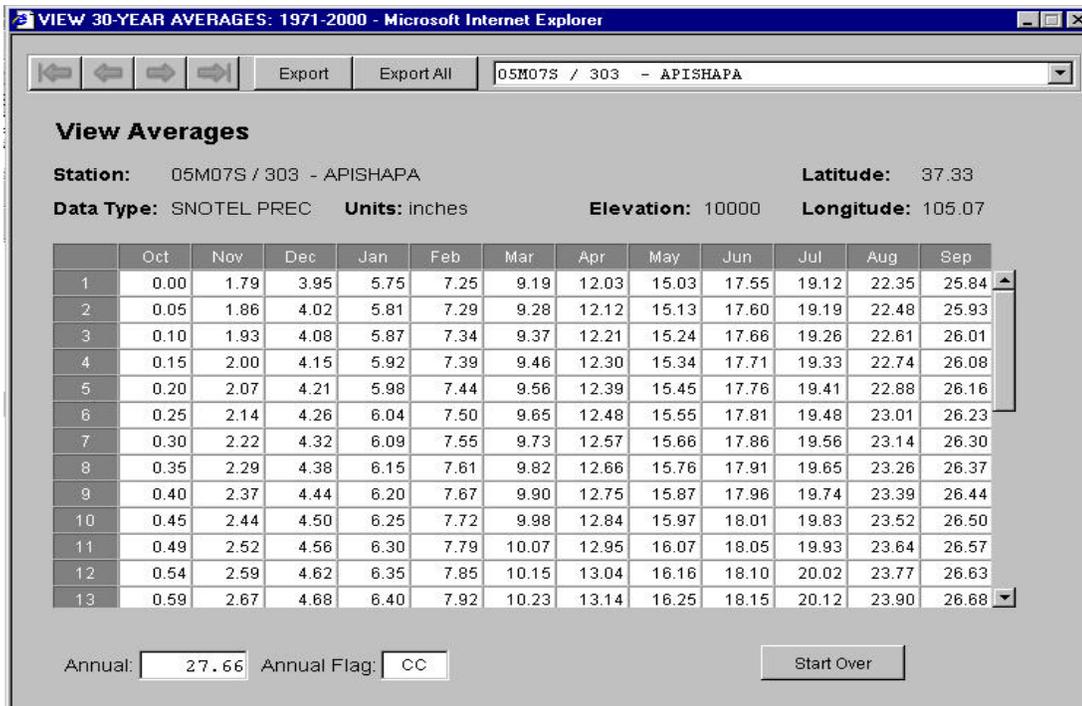
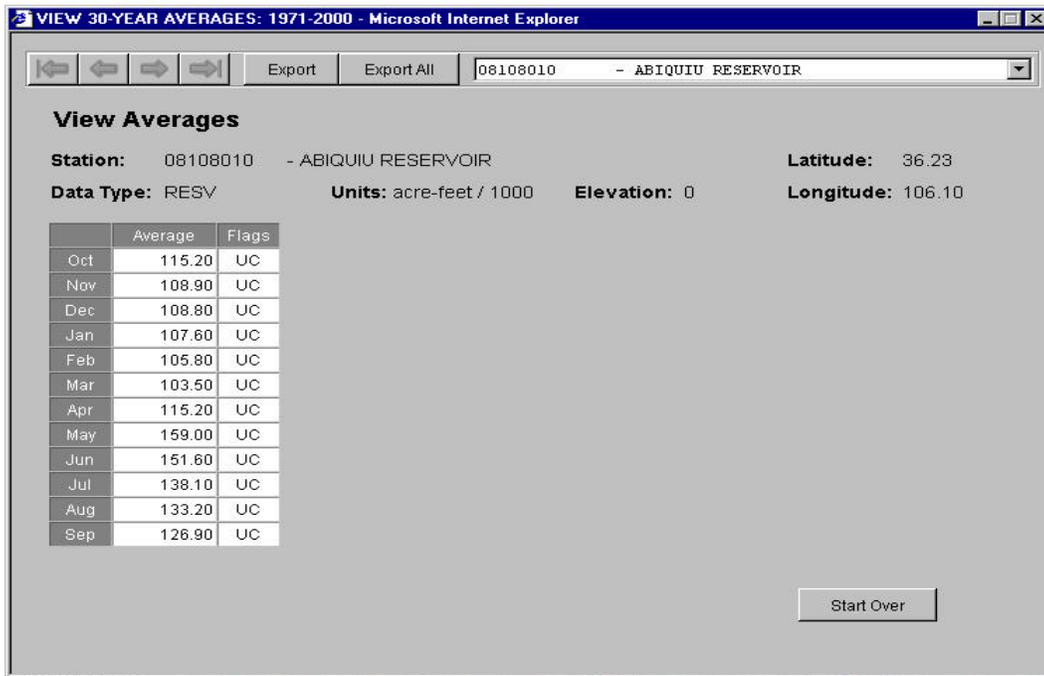


Figure 5.4. Monthly and Seasonal Streamflow Average Table



**Figure 5.5. Monthly Reservoir Average Table**

## 5.2. Exporting Averages

Prior to exporting averages to your local computer, the user should read the “Instructions for exporting data from the viewer”, available from the link on the initial screen (Figure 3.1). These instructions reveal to the user how to download and install the NWCC certificate, needed to save the selected average file to the local hard drive.

There are several different data formats available for exporting/downloading, based on the data type and frequency selected. The following data types and frequencies are available for single and multiple station selection:

1. Monthly snow water equivalent
2. SNOTEL daily snow water equivalent
3. SNOTEL daily precipitation
4. Monthly and seasonal streamflow
5. End-of –month reservoir storage

The first three lines of each export file, regardless of data type, data frequency, or whether the file contains single or multiple stations, are the same (see Figure 5.6). The first line is a header line that contains the entries “Element”, “Duration”, and “Year Range”. The second line contains the element and duration codes, and the static “WY1971-WY2000” year range. The third line is blank. All entries, codes, and data values in the export files are tab-separated. These tab-separated files are easily loaded into a spreadsheet for viewing or graphing the averages. When any of the export files are opened in a spreadsheet, the first two columns should be set to “text” data format. The “general” data format may convert the station ID’s to scientific notation. It should also be pointed out that multiple daily swe and multiple daily precipitation export files will be truncated if they are exported into a spreadsheet program that only allows 256 entries.

### 5.2.1. Monthly Snow Water Equivalent – Single Station

The format for a single, monthly snow water equivalent station is shown in Figure 5.6.

Element	Duration	Year Range			
WTEQ	M	WY1971-WY2000			
Name	ID	Lat	Lon	Elev	Set Flag
BERTHOUD SUMMIT	05K14	39.8	105.78	11300	CC
Oct 01					
Oct 15					
Nov 01					
Nov 15					
Dec 01					
Dec 15					
Jan 01	8.2	UC			
Jan 15					
Feb 01	12.5	CC			
Feb 15					
Mar 01	15.4	CC			
Mar 15					
Apr 01	19.6	CC			
Apr 15					
May 01	23.3	CC			
May 15	22.4	CC			
Jun 01	16.5	CC			
Jun 15					
Jul 01					
Jul 15					
Aug 01					
Aug 15					
Sep 01					
Sep 15					

**Figure 5.6. Monthly Snow Water Equivalent - Single Station**

The fourth line of the single station, monthly swe file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, and “Set Flag”. The fifth line of the export file contains six pieces of data that correspond to the fourth line header: (1) long English name of the selected station, (2) the “old” SCS snow grid ID, (3) latitude, (4) longitude, (5) elevation, and (6) set flag. The set flag is of no significance for monthly frequencies.

As shown in Figure 5.6, there are 24 lines remaining in the single station, monthly swe file. Each line has a date, an average associated with the date, and the individual month quality flag. Each monthly flag is a two-character field that describes the quality and method of calculation of the monthly average. The first character is an indicator of the quality of the data averages. A “U” means that there were at least 25 years of data available for the average analysis. These averages are labeled “unconditional”. A “C” means that there were at least 5 years, but less than 25 years of data available for the average analysis. These averages were established by using a relationship with a nearby station with 25 or more years of record. These averages are labeled “conditional”. An “R” means that there were less than 5 years of record and the software could not calculate an average for a particular month. The user has the ability to edit in a value for a monthly swe if an average can be estimated, using another type of analysis. These averages are labeled “rough”, for a rough approximation. The second character indicates whether the average was calculated (“C”), using the observed data, or inserted (“I”) by the averages software during the creation of average daily swe, or edited (“E”) by the user.

Generally, snow course sites will only have average values from January 1 through June 1, depending on the historically scheduled sampling interval. SNOTEL sites will contain all 24 monthly and mid-monthly average values, because the missing averages will have been inserted into the record during the analysis of the daily averages for the site.

### **5.2.2. Monthly Snow Water Equivalent – Multiple Stations**

The format for multiple, monthly snow water equivalent stations is shown in Figure 5.7.

The fourth line of the multiple station, monthly swe file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, 24 date headings for the first-of-the-month or mid-month averages, and 24 date heading for the first-of-the-month or mid-month quality flags, and a set quality flag. The fifth and subsequent lines of the export file contains the (1) long English name of each selected station, (2) the “old” SCS snow grid ID, (3) latitude, (4) longitude, (5) elevation, (6) 24 monthly average values, (7) 24 monthly flags, and (8) the set flag. For a description of the flags, see Section 5.2.1.

Element	Duration	Year Range							
WTEQ	M	WY1971-WY2000							
Name	ID	Lat	Lon	Elev	1-Oct	15-Oct	1-Nov	15-Nov	
ANTERO RESERVOIR	05L06	39	105.88	9000					
APISHAPA	05M07S	37.33	105.07	10000	0	0.1	0.3	0.7	
ARROW	05K06S	39.92	105.75	9680	0	0.1	0.7	1.7	
BAKER BUTTE	11R06S	34.45	111.4	7300	0	0.1	0.1	0.3	
BALDY	09S01S	33.98	109.52	9125	0	0	0.1	0.4	
BATEMAN	06N04S	36.52	106.32	9300	0	0	0.3	1.3	
BATTLE MOUNTAIN	07H04S	41.05	107.27	7440	0	0	0.4	1.1	
BEAR LAKE	05J39S	40.32	105.65	9500	0	0	0.7	1.8	
BEARTOWN	07M32S	37.72	107.52	11600	0.1	0.8	2.5	4.9	
BERTHOUD SUMMIT	05K14	39.8	105.78	11300					
BERTHOUD SUMMIT	05K14S	39.8	105.78	11300	0.1	0.3	1.1	2.6	
BIG GOOSE	07E32	44.6	107.22	7760					
BIG GOOSE	07E32S	44.57	107.2	7990	0	0	0.4	0.8	
TOLBY	05N19	36.47	105.18	10180					
TOLBY	05N19S	36.47	105.18	10180					
TRAPPER LAKE	07K13S	40	107.23	9700					
UPPER SAN JUAN	06M03S	37.48	106.83	10130	0	0.3	1.9	4.2	

**Figure 5.7. Monthly Snow Water Equivalent - Multiple Stations**

Generally, snow course sites will only have average values from January 1 through June 1, depending on the historically scheduled sampling interval. SNOTEL sites will contain all 24 monthly and mid-monthly average values, because the missing averages will have been inserted into the record during the analysis of the daily averages for the site.

### 5.2.3. Daily Snow Water Equivalent – Single Station

The format for a single, daily snow water equivalent station is shown in Figure 5.8.

Element	Duration	Year Range			
WTEQ	D	WY1971-WY2000			
Name	ID	Lat	Lon	Elev	Set Flag
BATTLE MOUNTAIN	317	41.05	107.27	7440	CC
Oct 01	0.0				
Oct 02	0.0				
Oct 03	0.0				
Oct 04	0.0				
Oct 05	0.0				
Oct 06	0.0				
Oct 07	0.0				
Oct 08	0.0				
Oct 09	0.0				
Oct 10	0.0				
Oct 11	0.0				
Oct 12	0.0				
Oct 13	0.0				
Oct 14	0.0				
Oct 15	0.0				
Oct 16	0.0				
Oct 17	0.0				
Oct 18	0.0				
Oct 19	0.1				
Oct 20	0.1				
Oct 21	0.1				
Oct 22	0.1				
Oct 23	0.2				
Oct 24	0.2				
Oct 25	0.2				
Oct 26	0.2				
Oct 27	0.3				
Oct 28	0.3				

**Figure 5.8. Daily Snow Water Equivalent - Single Station**

The fourth line of the single station, daily swe file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, and “Set Flag”. The fifth line of the export file contains six pieces of data that correspond to the fourth line header: (1) long English name of the selected station, (2) the SNOTEL system ID, (3) latitude, (4) longitude,

(5) elevation, and (6) set flag. The set flag is a two-character field that describes the quality and method of calculation of the entire set of data. The first character is an indicator of the quality of the data averages. A “U” means that there were at least 25 years of data available for the average analysis. These averages are labeled “unconditional”. A “C” means that there were at least 5 years, but less than 25 years of data available for the average analysis. These averages were established by using a relationship with a co-located snow course with 25 or more years of record. These averages are labeled “conditional”. An “R” means that there were less than 5 years of data available for the average analysis. If a user has sufficient skill and a thorough knowledge of the area, rough daily hydrographs can be developed for “new” automated sites that have been installed subsequent to 1995. These averages are labeled “rough”, for a rough approximation. For daily SNOTEL swe averages, the second character will always be a “C”, which indicates that the program calculated the averages.

As shown in Figure 5.8, there are 366 lines remaining in the single station, daily swe file. Each line has a date and an average associated with the date.

#### **5.2.4. Daily Snow Water Equivalent – Multiple Stations**

The format for multiple, daily snow water equivalent stations is shown in Figure 5.9.

From the fourth line, to the end of the multiple station file, each line contains the (1) long English name of the selected stations, (2) the SNOTEL system ID, (3) latitude, (4) longitude, (5) elevation, (6) 366 daily averages, starting on October 1, and (7) set flag. The set flag is a two-character field that describes the quality and method of calculation of the entire set of data. The first character is an indicator of the quality of the data averages. A “U” means that there were at least 25 years of data available for the average analysis. These averages are labeled “unconditional”. A “C” means that there were at least 5 years, but less than 25 years of data available for the average analysis. These averages were established by using a relationship with a co-located snow course with 25 or more years of record. These averages are labeled “conditional”. An “R” means that there were less than 5 years of data available for the

average analysis. If a user has sufficient skill and a thorough knowledge of the area, rough daily hydrographs can be developed for “new” automated sites that have been installed subsequent to 1995. These averages are labeled “rough”, for a rough approximation. For daily SNOTEL swe averages, the second character will always be a “C”, which indicates that the program calculated the averages.

Element	Duration	Year Range						
WTEQ	D	WY1971-WY2000						
APISHAPA	303	37.33	105.07	10000	0	0	0	0
ARROW	305	39.92	105.75	9680	0	0	0	0
BAKER BUTTE	308	34.45	111.4	7300	0	0	0	0
BALDY	310	33.98	109.52	9125	0	0	0	0
BATEMAN	316	36.52	106.32	9300	0	0	0	0
BATTLE MOUNTAIN	317	41.05	107.27	7440	0	0	0	0
BEAR LAKE	322	40.32	105.65	9500	0	0	0	0
BEARTOWN	327	37.72	107.52	11600	0.1	0.2	0.2	0.3
BERTHOUD SUMMIT	335	39.8	105.78	11300	0.1	0.1	0.1	0.1
BIG GOOSE	931	44.57	107.2	7990	0	0	0	0
UPPER SAN JUAN	840	37.48	106.83	10130	0	0	0	0

**Figure 5.9. Daily Snow Water Equivalent - Multiple Stations**

### 5.2.5. Daily SNOTEL Precipitation – Single Station

The format for a single, daily SNOTEL precipitation station is shown in Figure 5.10.

The fourth line of the single station, daily swe file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, and “Set Flag”. The fifth line of the export file contains six pieces of data that correspond to the fourth line header: (1) long English name of the selected station, (2) the SNOTEL system ID, (3) latitude, (4) longitude, (5) elevation, and (6) set flag. The set flag is a two-character field that describes the quality and method of calculation of the entire set of data. The first character is an indicator of the quality of the data averages. A “U” means that there were at least 25 years of data available for the average analysis. These averages are labeled “unconditional”. A “C” means that there were at least 5 years, but less than 25 years of data available for the average analysis. These averages were established by using a

Element	Duration	Year Range			
PREC	D	WY1971-WY2000			
Name	ID	Lat	Lon	Elev	Set Flag
BATEMAN	316	36.52	106.32	9300	CC
Oct 01	0.00				
Oct 02	0.06				
Oct 03	0.12				
Oct 04	0.18				
Oct 05	0.25				
Oct 06	0.31				
Oct 07	0.37				
Oct 08	0.43				
Oct 09	0.49				
Oct 10	0.55				
Oct 11	0.61				
Oct 12	0.68				
Oct 13	0.74				
Oct 14	0.81				
Oct 15	0.88				
Oct 16	0.95				
Oct 17	1.01				
Oct 18	1.08				
Oct 19	1.15				
Oct 20	1.22				
Oct 21	1.29				
Oct 22	1.36				
Oct 23	1.43				
Oct 24	1.49				
Oct 25	1.56				
Oct 26	1.63				
Oct 27	1.71				

**Figure 5.10. Daily SNOTEL Precipitation - Single Station**

relationship with a nearby precipitation station with 25 or more years of record. These averages are labeled “conditional”. An “R” means that there were less than 5 years of data available for the average analysis. If a user has sufficient skill and a thorough knowledge of the area, rough daily precipitation averages can be developed for “new” automated sites that have been installed subsequent to 1995. These averages are labeled “rough”, for a rough approximation. For daily SNOTEL precipitation averages, the second character will always be a “C”, which indicates that the program calculated the averages.

As shown in Figure 5.10, there are 366 lines remaining in the single station, daily precipitation file. Each line has a date and an average associated with the date.

### 5.2.6. Daily SNOTEL Precipitation – Multiple Stations

The format for multiple, daily snow water equivalent stations is shown in Figure 5.11.

Element	Duration	Year Range						
PREC	D	WY1971-WY2000						
APISHAPA	303	37.33	105.07	10000	0	0.05	0.11	0.15
ARROW	305	39.92	105.75	9680	0	0.05	0.09	0.14
BAKER BUTTE	308	34.45	111.4	7300	0	0.07	0.14	0.21
BALDY	310	33.98	109.52	9125	0	0.07	0.14	0.21
BATEMAN	316	36.52	106.32	9300	0	0.06	0.12	0.18
SKALKAHO SUMMIT	760	46.25	113.77	7250	0	0.06	0.12	0.18

**Figure 5.11. Daily SNOTEL Precipitation - Multiple Stations**

From the fourth line, to the end of the multiple station file, each line contains the (1) long English name of the selected stations, (2) the SNOTEL system ID, (3) latitude, (4) longitude, (5) elevation, (6) 366 daily averages, starting on October 1, and (7) set flag. The set flag is a two-character field that describes the quality and method of calculation of the entire set of data. The first character is an indicator of the quality of the data averages. A “U” means that there were at least 25 years of data available for the average analysis. These averages are labeled “unconditional”. A “C” means that there were at least 5 years, but less than 25 years of data available for the

average analysis. These averages were established by using a relationship with a nearby precipitation station with 25 or more years of record. These averages are labeled “conditional”. An “R” means that there were less than 5 years of data available for the average analysis. If a user has sufficient skill and a thorough knowledge of the area, rough daily precipitation averages can be developed for “new” automated sites that have been installed subsequent to 1995. These averages are labeled “rough”, for a rough approximation. For daily SNOTEL swe averages, the second character will always be a “C”, which indicates that the program calculated the averages.

### **5.2.7. Monthly Streamflow – Single Station**

There are two retrieval options for streamflow averages. The user can download monthly averages or seasonal averages. The seasonal averages are used in the forecast coordination process and are rounded by convention.

The fourth line of the single station, streamflow file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, and “Set Flag” for monthly averages, or “# of Fcst Periods” for seasonal averages. The fifth line of the export file contains six pieces of data that correspond to the fourth line header: (1) long English name of the selected station, (2) the streamflow ID, (3) latitude, (4) longitude, (5) elevation, and (6) set flag or # of fcst periods. The set flag is of no significance for monthly frequencies.

As shown in Figure 5.12, there are 12 lines remaining in the monthly selection file. Each line has a date, an average associated with the date, and the individual month quality flag. In the seasonal selection file, the number of remaining lines in the file is dependent on the value in the “# of Fcst Periods” column. Each line in this file has a beginning date for the forecast period, an end date for the forecast period, an average associated with the forecast period, and the seasonal quality flag. Each quality flag is a three-character field that describes the quality, method of calculation of the average, and whether it is an average calculation or a median. The first character is an indicator of the quality of the data averages. A “U” means that there were at least 25 years of data available for the average analysis. These averages are

labeled “unconditional”. A “C” means that there were at least 5 years, but less than 25 years of data available for the average analysis. These averages are labeled “conditional”. An “R” means that there were less than 5 years of record and the software could not calculate an average for a particular month. The user has the ability to edit in a value for an end-of-month storage average, if an average can be estimated, using another type of analysis. These averages are labeled “rough”, for a rough approximation. The second character indicates whether the average was calculated (“C”), using the observed data, or edited (“E”) by the user. The third character indicates whether the value is an average (“A”) or a median (“M”).

Element	Duration	Year Range			
SRVO	M	WY1971-WY2000			
Name	ID	Lat	Lon	Elev	Set Flag
FISHER R	12302055	48.35	115.85	2134	
Oct	8.22	UCA			
Nov	14.14	UCA			
Dec	15.93	UCA			
Jan	16.41	UCA			
Feb	20.53	UCA			
Mar	38.93	UCA			
Apr	73.23	UCA			
May	86.37	UCA			
Jun	49.76	UCA			
Jul	18.42	UCA			
Aug	8.77	UCA			
Sep	7.10	UCA			

Element	Duration	Year Range			
SRVO	M	WY1971-WY2000			
Name	ID	Lat	Lon	Elev	# of Fcst Periods
FISHER R NR LIBBY	12302055	48.35	115.85	2134	6
Apr	Jul	230	UCA		
May	Jul	155	UCA		
Jun	Jul	68	UCA		
Apr	Sep	245	UCA		
May	Sep	170	UCA		
Jun	Sep	84	UCA		

**Figure 5.12. Monthly and Seasonal Streamflow – Single Station**

### 5.2.8. Monthly Streamflow – Multiple Stations

As noted above, there are two retrieval options for streamflow averages; monthly or seasonal values. The seasonal averages are used in the forecast coordination process and are rounded by convention.

For monthly averages, the fourth line of the multiple station, streamflow file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, 12 date headings for the streamflow averages, and 12 date headings for the monthly quality flags, and a set quality flag. The set flag is of no significance for monthly frequencies. The fifth and subsequent lines of the export file contains the (1) long English name of each selected station, (2) streamflow ID, (3) latitude, (4) longitude, (5) elevation, (6) 12 end-of-month average values, (7) 12 monthly flags, and (8) the set flag. For a description of the flags, see Section 5.2.7.

For seasonal averages, the fourth line of the multiple station, streamflow file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, “# of Fcst Periods”, “Fcst Begin Month” for each forecast period, “Fcst End Month” for each forecast period, average “Value” for each forecast period, and a quality “Flag” for each forecast period. The fifth and subsequent lines of the export file contains the (1) long English name of each selected station, (2) streamflow ID, (3) latitude, (4) longitude, (5) elevation, (6) number of forecast periods, (7) forecast period begin month, end month, average/median value, and quality flag for the listed number of forecast periods. For a description of the flags, see Section 5.2.7. The format options are shown in Fig. 5.13.

Element	Duration	Year Range								
SRVO	M	WY1971-WY2000								
Name	ID	Lat	Lon	Elev	Oct	Nov	Dec	Jan	Feb	Mar
FISHER R	12302055	48.35	115.85	2134	8.22	14.14	15.93	16.41	20.53	38.93
WIND R A	06228000	43.02	108.14	4902	40.56	30.03	21.84	19.94	18.51	25.49
YAAK R N	12304500	48.57	115.92	1839	10.96	20.11	21.19	19.26	21.18	41.65

Element	Duration	Year Range											
SRVO	M	WY1971-WY2000											
Name	ID	Lat	Lon	Elev	# of Fcst P	Fcst Begin	Fcst End	Value	Flag	Fcst Begin	Fcst End	Value	
FISHER R	12302055	48.35	115.85	2134	6	Apr	Jul	230	UCA	May	Jul	155	
WIND R A	06228000	43.02	108.14	4902	6	Apr	Jul	545	UCA	May	Jul	510	
YAAK R N	12304500	48.57	115.92	1839	6	Apr	Jul	440	UCA	May	Jul	325	

**Figure 5.13. Monthly and Seasonal Streamflow – Multiple Stations**

### 5.2.9. End-of-Month Reservoir Storage – Single Station

The format for a single reservoir station is shown in Figure 5.14.

Element	Duration	Year Range			
RESC	M	WY1971-WY2000			
Name	ID	Lat	Lon	Elev	Set Flag
ABIQUIU RESERVOIR	08108010	36.23	106.1		0 UC
Oct 31	115.2	UC			
Nov 30	108.9	UC			
Dec 31	108.8	UC			
Jan 31	107.6	UC			
Feb 29	105.8	UC			
Mar 31	103.4	UC			
Apr 30	115.2	UC			
May 31	159.0	UC			
Jun 30	151.6	UC			
Jul 31	138.1	UC			
Aug 31	133.2	UC			
Sep 30	126.9	UC			

**Figure 5.14. End-of-Month Reservoir Storage – Single Station**

The fourth line of the single station, end-of-month reservoir storage file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, and “Set Flag”. The fifth line of the export file contains six pieces of data that correspond to the fourth line header: (1) long English name of the selected station, (2) the reservoir ID, (3) latitude, (4) longitude, (5) elevation, and (6) set flag. The set flag is of no significance for monthly frequencies.

As shown in Figure 5.14, there are 12 lines remaining in the single station, reservoir file. Each line has a date, an average associated with the date, and the individual month quality flag. Each monthly flag is a two-character field that describes the quality and method of calculation of the end-of-month average. The first character is an indicator of the quality of the data averages. A “U” means that there were at least 25 years of data available for the average analysis. These averages are labeled “unconditional”. A “C” means that there were at least 5 years, but less than 25

years of data available for the average analysis. These averages are labeled “conditional”. An “R” means that there were less than 5 years of record and the software could not calculate an average for a particular month. The user has the ability to edit in a value for an end-of-month storage average, if an average can be estimated, using another type of analysis. These averages are labeled “rough”, for a rough approximation. The second character indicates whether the average was calculated (“C”), using the observed data, or edited (“E”) by the user.

### 5.2.10. End-of-Month Reservoir Storage – Multiple Stations

The format for multiple reservoir stations is shown in Figure 5.15.

Element	Duration	Year Range					
RESC	M	WY1971-WY2000					
Name	ID	Lat	Lon	Elev	31-Oct	30-Nov	31-Dec
ABIQUIU RESERVOIR	08108010	36.23	106.1	0	115.2	108.9	108.8
ADOBE CREEK RESERVOIR	07007010	38.23	103.52	0	11.4	13.3	19.2

**Figure 5.15. End-of-Month Reservoir Storage – Multiple Stations**

The fourth line of the multiple station, end-of-month reservoir storage file contains the entries “Name”, “ID”, “Lat”, “Lon”, “Elev”, 12 date headings for the end-of-month averages, and 12 date headings for the end-of-month quality flags, and a set quality flag. The set flag is of no significance for monthly frequencies. The fifth and subsequent lines of the export file contains the (1) long English name of each selected station, (2) reservoir ID, (3) latitude, (4) longitude, (5) elevation, (6) 12 end-of-month average values, (7) 12 monthly flags, and (8) the set flag. For a description of the flags, see Section 5.2.1.