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Reclamation Water Information System (RWIS)

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Reclamation Water Information System

The Reclamation Water Information System (RWIS) is a pilot version of a Reclamation-wide system for viewing, accessing, and downloading Reclamation's data via a centralized data portal. The RWIS pilot serves representative time-series water data from each Reclamation region. With the RWIS pilot you can:

FACT SHEETS
What could I do with RWIS?

RWIS Overview

Reclamation's Water Information System (RWIS) is at <https://water.usbr.gov/>. This pilot website serves time-series data about its canals and reservoirs. This tool is an initial release, and we welcome your comments (mail to rwis@usbr.gov). Further development and transition from the pilot to a full-featured system is anticipated to continue in 2017-2018. In this pilot, only sites with data in RWIS appear and data before 2010 is not available.

The map lets you get information by location, a query tool lets you select precisely the sites and parameters that you are interested in, and a web service/API can automatically transfer data to your own tools, apps, and models. To get data, you must first select sites by using either the map or the query tool and then select parameters data format by using the query tool. Click "submit" on the query page to provide results. This results page will provide a static URL that you can bookmark or use in other programs so that you only have to perform this query once. Note, to change any parameters and sites in the query, perform a new query and use the new query's static URL.

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Data Sites and Types

RWIS serves Reclamation data from various types of sites as shown in the legend from the map (Figure 1):

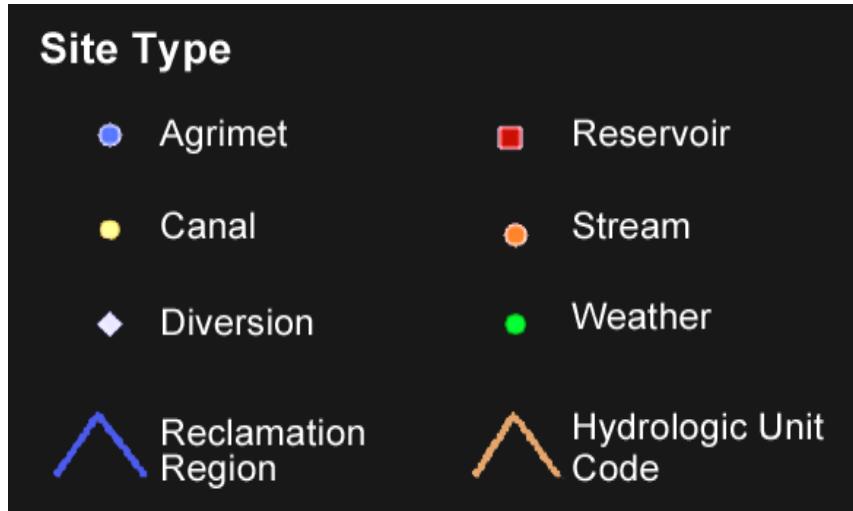


Figure 1. List of data types from the RWIS map.

- **Agrimet** provides weather data, such as wind direction and speed, air temperature, or precipitation. See the Agrimet Network Map at <https://www.usbr.gov/pn/agrimet/agrimetmap/agrimap.html> for more information on these sites.
- **Canal data** is from canals and covers canal stage and flow. Other parameters may include precipitation, stream gage height, streamflow, water temperature, or air temperature, depending on the instrumentation and data collection at the site.
- **Diversion data** is from diversion points measures the amount of water diverted from river or canal (stage and flow). Other parameters may include streamflow, wind speed, precipitation, wind direction, and reservoir diversion, depending on the instrumentation and data collection at the site.
- **Reservoir data** is from reservoir operations and measurements and usually includes reservoir releases, storage, elevation, and inflow. Other parameters may include reservoir evaporation, releases (total or powerplant), inflow, or diversion, or streamflow, canal flow, canal stage, precipitation, stream gage height, snow water equivalent, water temperature, air temperature, or wind direction or speed, depending on the instrumentation and data collection at the site.
- **Weather data** is from Reclamation's weather monitoring stations and may include wind direction and speed, air temperature, or precipitation, depending on the instrumentation and data collection at the site.

Map Tool: Find Your Sites

Navigate Through the Map

Find a site by using the map, which provides locations and types of data sites (shown by color and shape as listed in Figure 1 in the data types). Reclamation's regional boundaries are shown in the map as blue lines and major Hydrologic Unit codes (HUC) are tan lines. Zoom in or out by clicking on the map and using arrow keys or your mouse. Click and drag the map to pan around the map. Hover over a dot to show the site name. Click on a dot to see the site information.

Toggle switches are on the upper left corner of the map (Figure 2) to:

- Zoom in or out (the plus and minus)

Turn topography on or off (the square inset map).

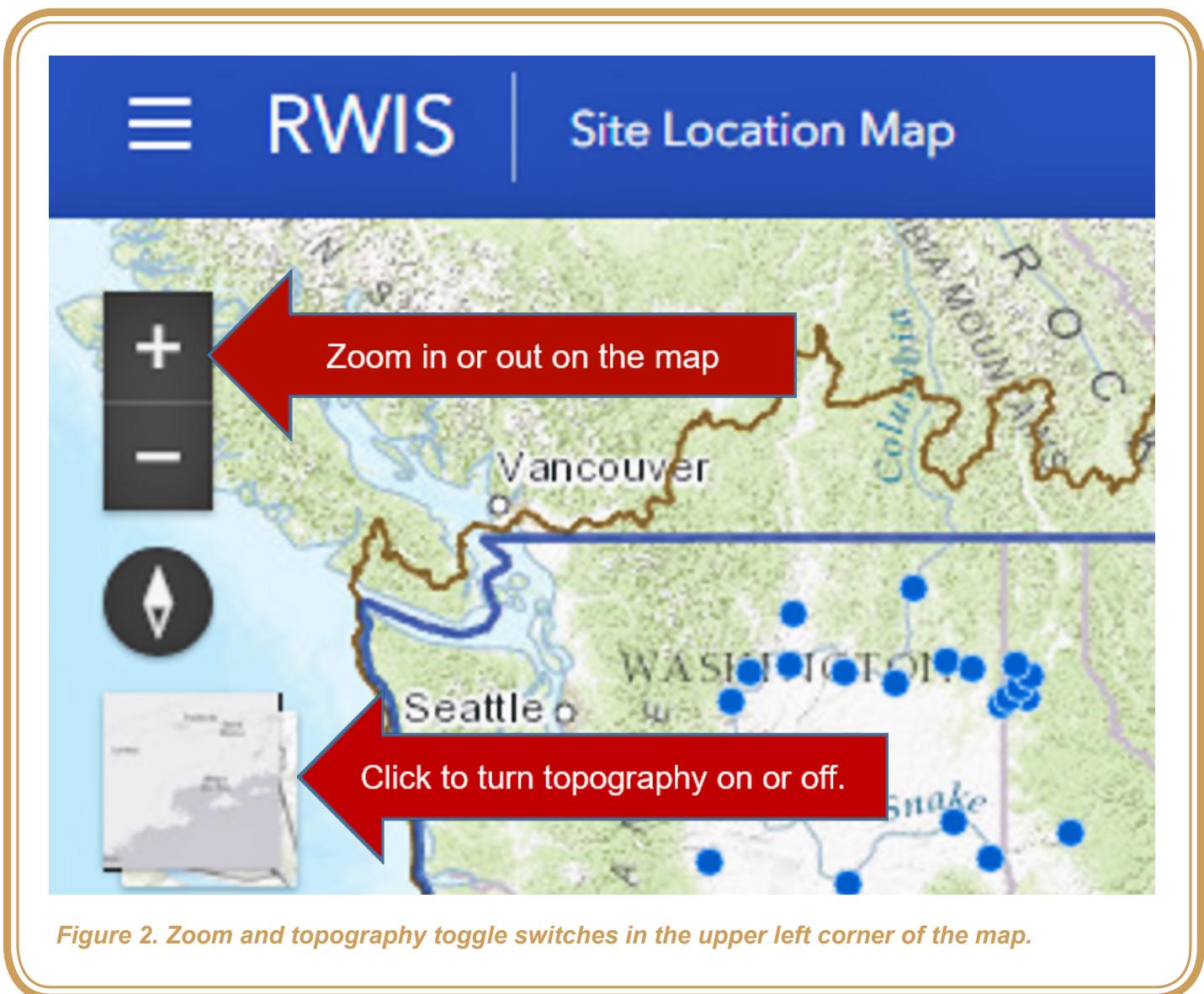


Figure 2. Zoom and topography toggle switches in the upper left corner of the map.

Find a Single Site

To get a single site (such as a single reservoir), zoom in and click on the site on the map. This will bring up a description of the site (site id, type, state, latitude, longitude, Reclamation region) (Figure 3).

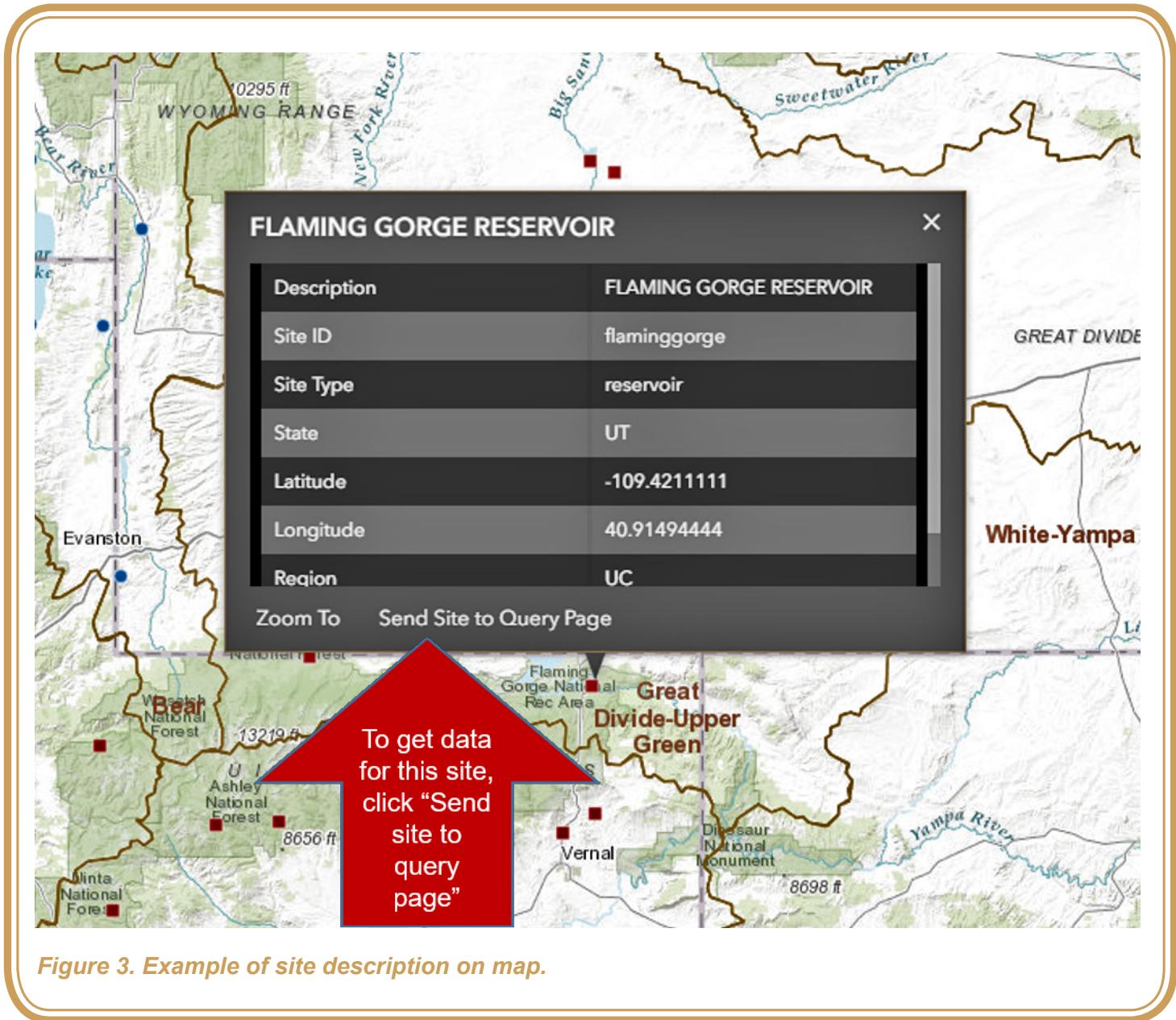


Figure 3. Example of site description on map.

Click on “Send site to query page.” The query page will come up with this site selected. See Query Tool” Get Your Data in the next section for the next steps to get data.

Get Multiple Sites

To select multiple sites for a query (such as several reservoirs in an area to compare reservoir levels), click on the “Build Site List to Send to Query Page” radio button in the menu on the map page (Figure 4).

To get multiple sites, click on the radio button:
Build Site List to Send to Query Page.

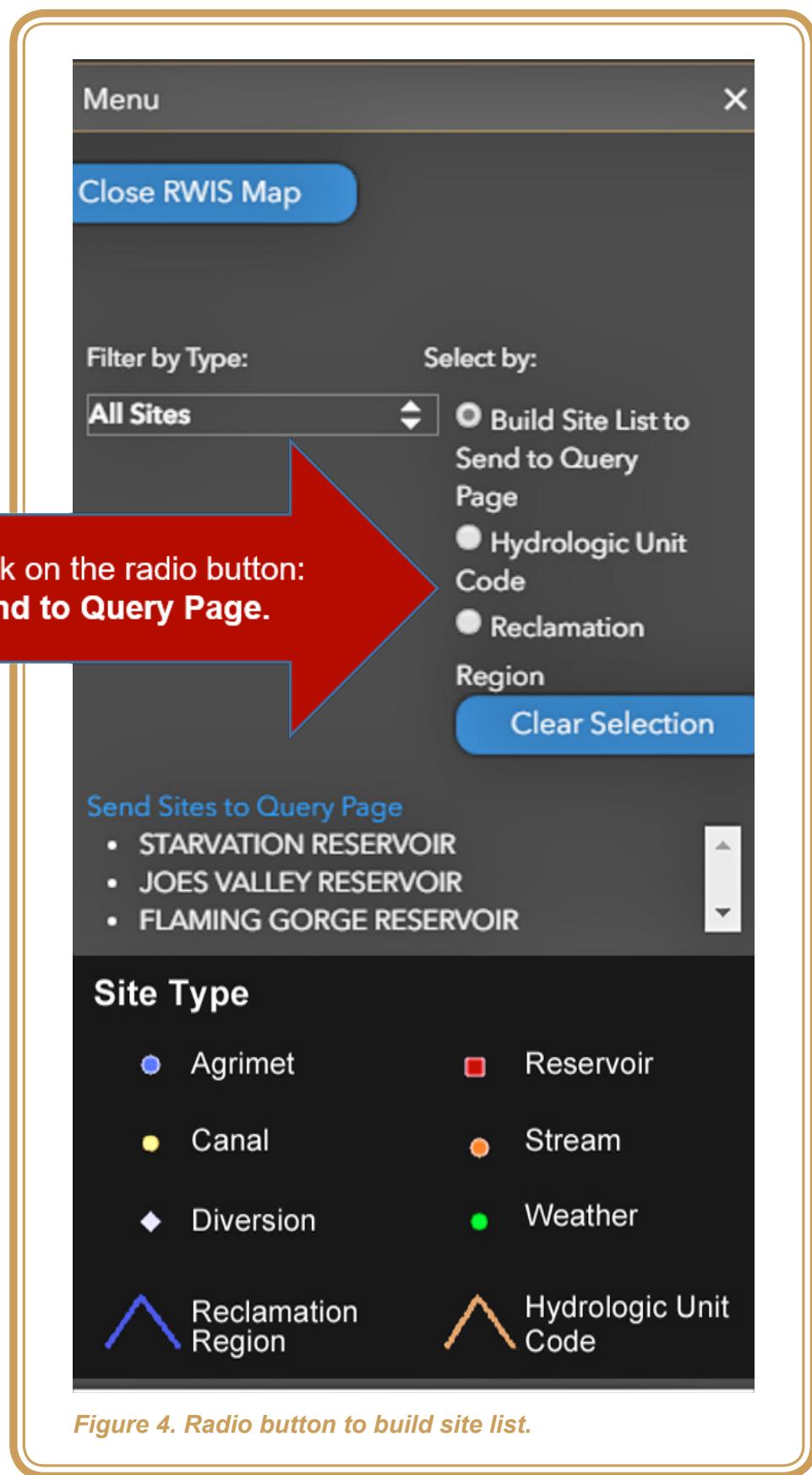
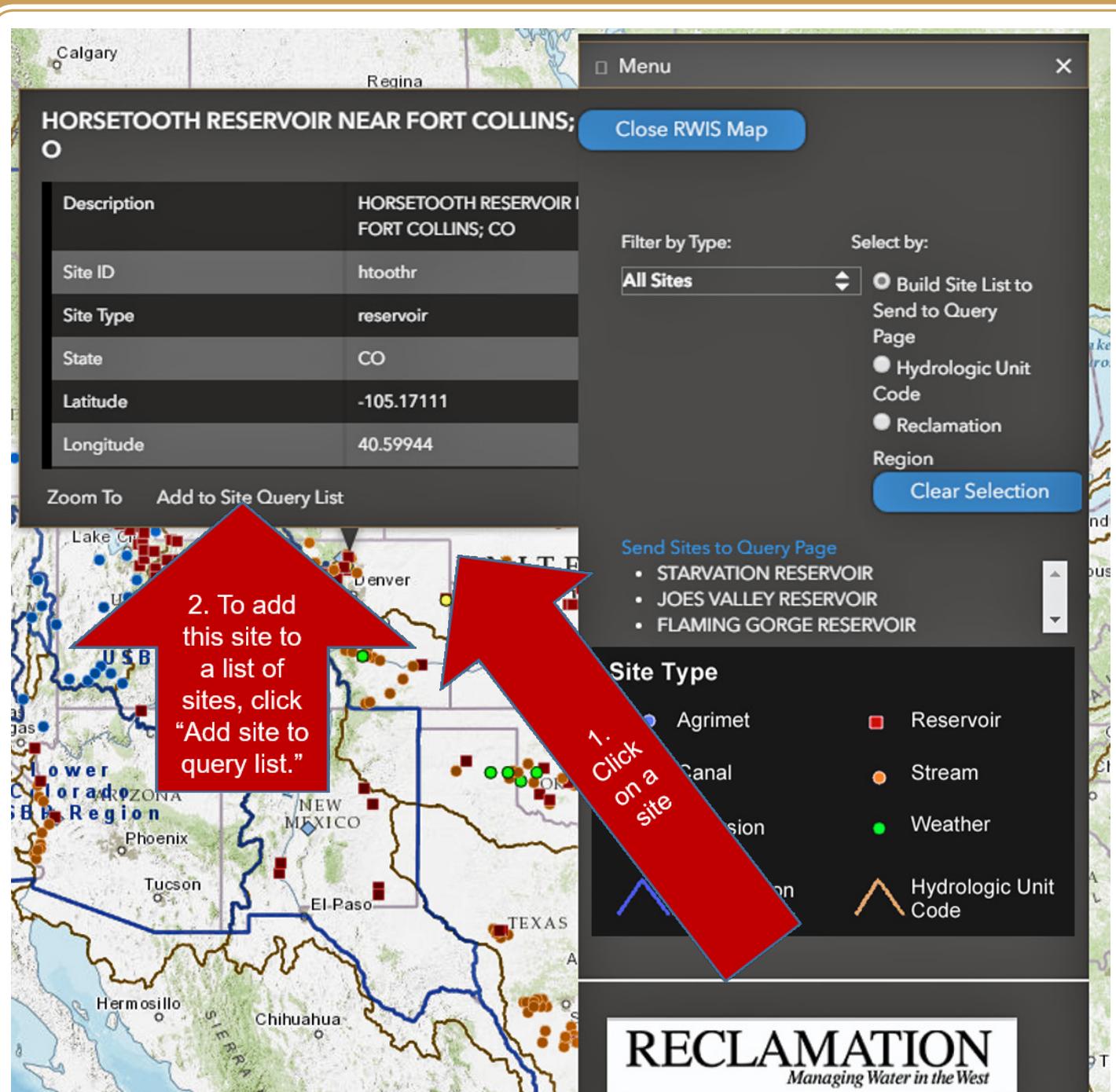


Figure 4. Radio button to build site list.

Click on the sites you want in the map. Click on **Add Site to Query List** (shown in Figure 5) to add that site for your query. Your sites will appear in the **Send sites to Query Page**. To clear your selection, click “Clear selection.” This will remove all the sites listed under “Send Sites to Query Page. The list will build automatically under the “Send Sites to Query Page” link under the menu. When you have all of your sites listed, click **Send Sites to Query Page**, and you will see the query page with your sites pre-selected.



Find Sites by Data Types

The map initially appears with all the data sites, with types noted by color and shape. Filter sites on the map by type by clicking on the menu and then selecting a type as shown in Figure 6.

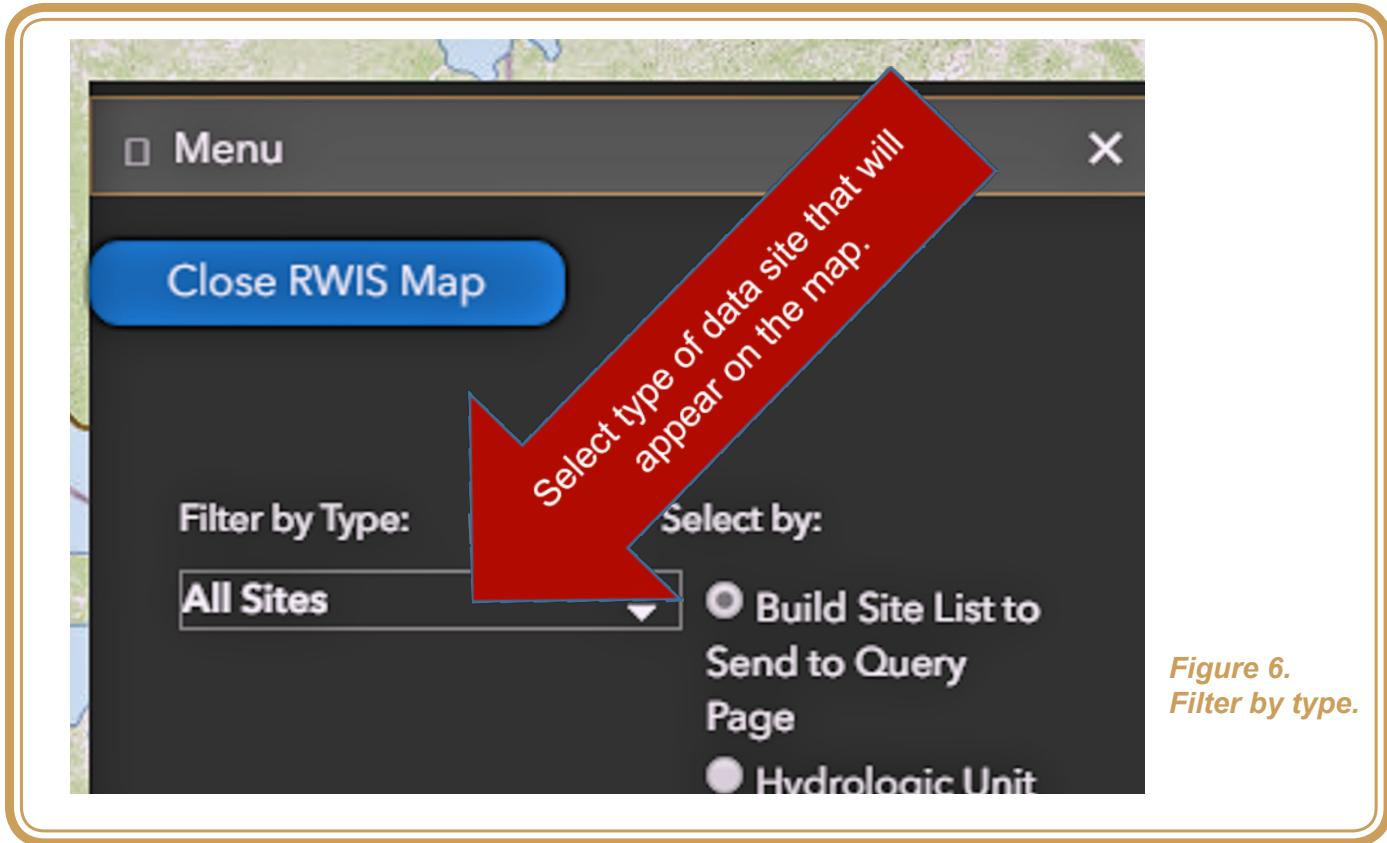


Figure 6.
Filter by type.

If you select Reservoir sites, for example, only reservoir sites with information in RWIS will appear on the map. (Note that, not all of Reclamation's data sites are available in this pilot version.)

Find Sites Within a Single Hydrologic Unit Code or Reclamation Region

Select a single Hydrologic Unit Code or Reclamation region to show all sites within those areas. These are the major geographic regions that the U.S. Geological Survey (USGS) describes in their hydrologic unit maps. From left (west) to right (east), up (north) to down (south) are:

- Region 17 Pacific Northwest
- Region 18 California
- Region 16 Great Basin
- Region 15 Lower Colorado
- Region 14 Upper Colorado
- Region 13 Rio Grande
- Region 10 Missouri
- Region 11 Arkansas-White-Red
- Region 12 Texas-Gulf

All sites within one of the five Reclamation Regions:

- Pacific Northwest Region
- Mid-Pacific Region
- Upper Colorado Region
- Lower Colorado Region
- Great Plains Region

See <https://water.usgs.gov/GIS/huc.html> for more information on HUC units.

Find Sites Both by Data Type and Location

If you want all sites of a particular data type in a HUC unit or Reclamation region, first select the HUC or Reclamation Region, and then filter by type (Figure 7). Then click on the HUC unit or Reclamation region on the map. If you want all these sites, just click “Send Sites to Query Page” in the menu.



Figure 7. Select a HUC unit.

The example in Figure 8 shows all of the reservoir sites within the Upper Colorado Region.



Figure 8. Select all reservoirs within the Upper Colorado Region.

Query Tool: Get Your Data

Coming to the Query Tool from the Map

When you have selected sites on the map and clicked “Send Sites to Query Page,” the query page will come up with your sites preselected.

Select Your Site with the Query Tool

RWIS provides Reclamation data in tables and machine readable formats. You can use the map to find sites for your queries or you can select sites from the query tool. User hint—if you want a particular site, make sure that filters are not selected.

Type in the Site Name

If you know the name of your site, you can type it into the box as shown in Figure 9.

Filter Sites by Location and Data Type

If you need to find your site, or if you want a list of sites, you can filter the available sites. Sites are categorized in two ways: by location (region and state) and the site type of data measured at the site.

- Type—select the data type (e.g., weather, flow)
- Region—select Reclamation Region
- State—select state

To find your sites, click on the filter as shown in Figure 10:

If you want all of the sites within a data type, region, or state, select that type. Then that Region, state, or type will appear as the first line under selectable sites. Click on that line, and all of those sites will be selected. To delete a site from your selected sites, click on it in the Selected Sites box. If you select multiple sites, you get every parameter for any data available at any of those sites. And if a particular site does not have data for that parameter, results will return with “no data available.”

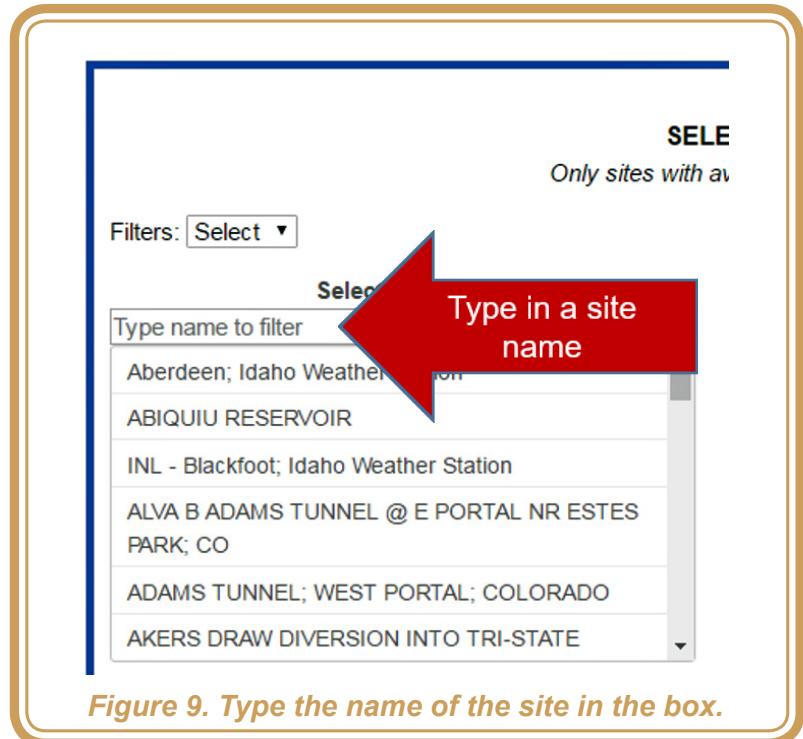


Figure 9. Type the name of the site in the box.

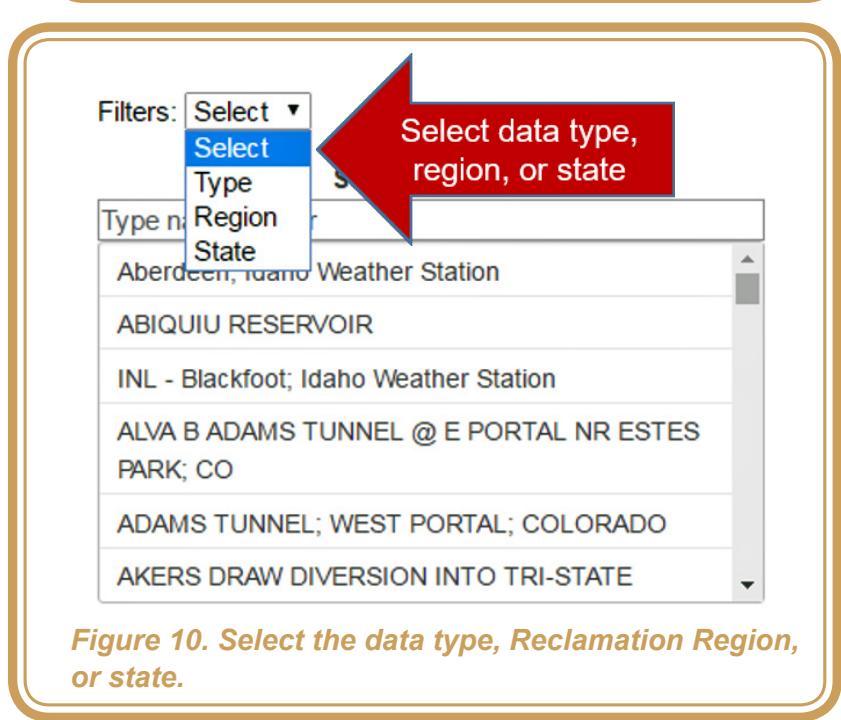


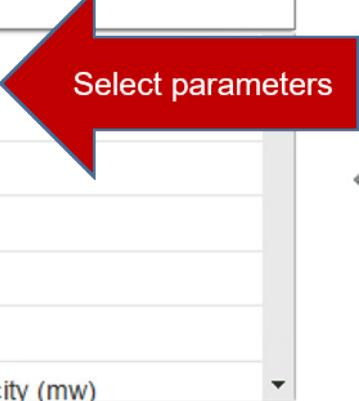
Figure 10. Select the data type, Reclamation Region, or state.

Select Your Parameters

The parameter box in the query page after the site selection will show the available parameters for all sites selected, as shown in Figure 11 .Select parameters by clicking on the ones you want in the filter box. You can select single or multiple parameters.

SELECT PARAMETERS:
Parameters will be filtered as sites are selected.

Selectable parameters
Type name to filter
Air Temperature (DegF)
Canal Diversion (cfs)
Canal Flow (cfs)
Canal Stage (feet)
Electrical Conductivity (uS/cm)
Full Natural Flow (cfs)
Powerplant Generation - Capacity (mw)



Select parameters

Figure 11. Select parameters.

Select Desired Dates

As shown in Figure 12, you can choose dates by current month, current year, all available data, or by selecting a specific date range. As data are only available from 2010, if you select a date earlier than that, the results will only show from 2010 on.

Selecting **All Available Data** will provide all data available in RWIS for this site. Note that there may be additional data, and you can contact Reclamation's Offices to search for other data sets.

See <http://www.usbr.gov/main/offices.html>.

SELECT YOUR DESIRED DATE RANGE (YYYY-MM-DD) OR PERIOD:

Current Month Current Year All Available Data
 Date Range: From To

Figure 12.
Select desired dates.

Clicking in the Date Range box will bring up a calendar.

Select Desired Output

As shown in Figure 13, there are several formats to present results.

SELECT YOUR DESIRED OUTPUT FORMAT:

Interactive Plot
 HTML Table
 JSON
 CSV
 WML2

Submit

Figure 13.
Select desired
format for your
results.

- **Interactive plot.** This line graph shows the time-series data (see examples in next section).
- **HTML.** Hypertext Markup Language (HTML) provides a table that can be used on a web site, copied into Excel, printed as a table, etc. (see examples in next section).
- **JSON.** JavaScript Object Notation (JSON) is easy for humans to read and write and for machines to parse and generate. JSON is a lightweight data-interchange format. It is easy for humans to read and write as well as for machines to parse and generate. It is based on a subset of the JavaScript Programming Language, Standard ECMA-262 3rd Edition - December 1999. JSON is a text format that is completely language independent but uses conventions that are familiar to programmers of the C-family of languages, including C, C++, C#, Java, JavaScript, Perl, Python, and many others.
 (Source: Project Open Data, Glossary)
- **CSV.** Comma separated values (CSV) allows data to be saved in a table structured format. A comma separated values (CSV) file is a computer data file used for implementing the Comma Separated List. The CSV file is used for the digital storage of data structured in a table of lists form. Each line in the CSV file corresponds to a row in the table. Within a line, fields are separated by commas, and each field belongs to one table column. CSV files are often used for moving tabular data between two different computer programs (like moving between a database program and a spreadsheet program).
 (Source: Project Open Data, Glossary)
- **WML2.** WaterML2 is a new data exchange standard in Hydrology which can basically be used to exchange many kinds of hydro-meteorological observations and measurements. An update to WaterML and the Open Government Consortium's standard information model for the representation of water observations data, with the intent of allowing the exchange of such data sets across information systems. By using existing OGC standards, it aims at being an interoperable exchange format that may be re-used to address a range of exchange requirements. (Source: Open Geospatial Consortium, OGC WaterML). For more information, see the WaterML2 site at <http://www.waterml2.org>.

Click Submit

Depending on the amount of data, this may take a few seconds to load.

Use Results

The results have a static URL that you can bookmark or add to a computer code. This will automatically provide new data for this same query, as shown in Figure 14. Click View to view the CSV file, and click download to download the dataset to your computer.

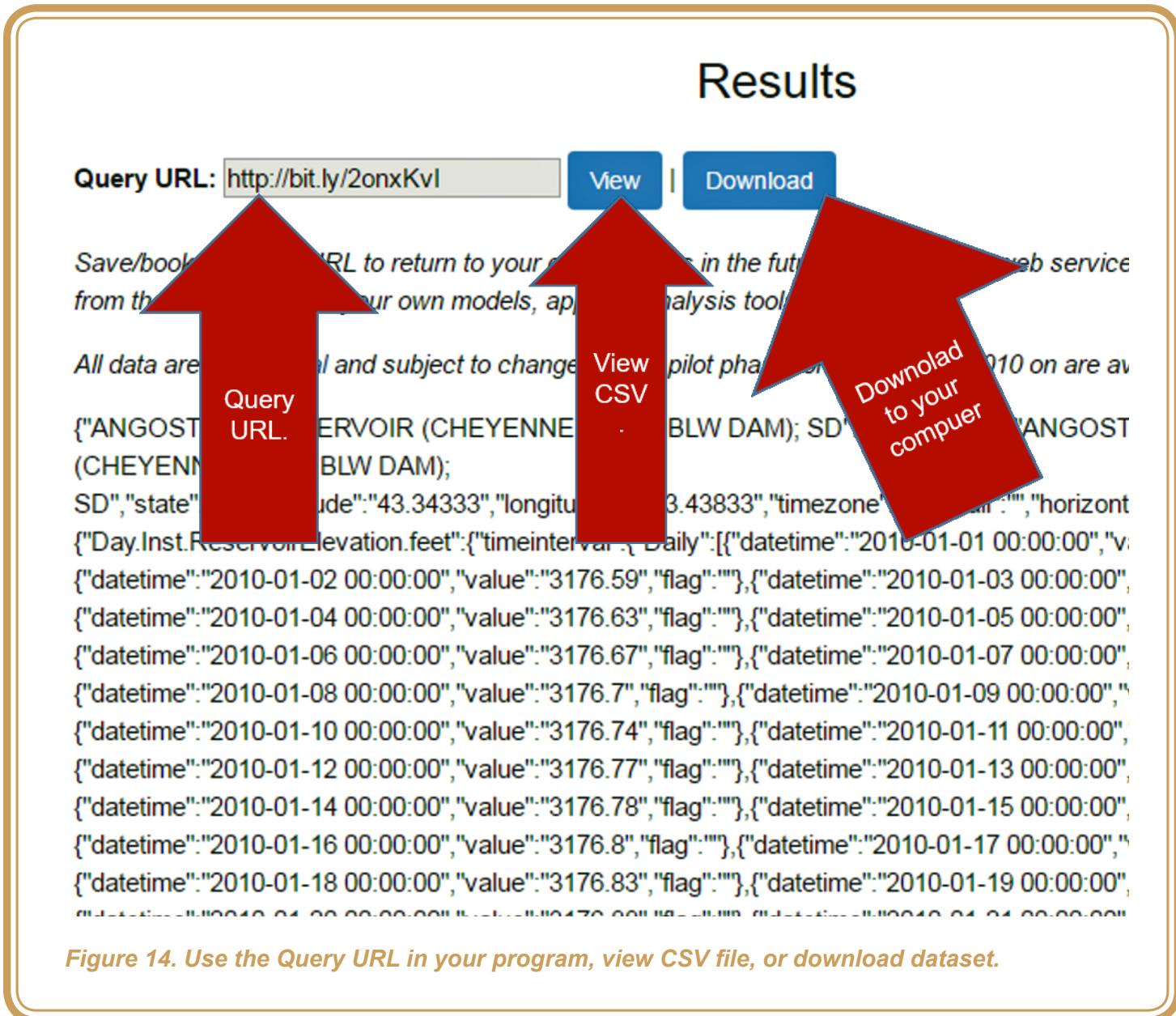


Figure 14. Use the Query URL in your program, view CSV file, or download dataset.

Examples of Results

Scroll down the page for the results.

HTML

You can view source and copy the HTML plot information or use the table (Figure 15). You can also use the Query URL within your own HTML code to provide this query on your website.

Aberdeen; Idaho Weather Station

Wind Speed

Date	Value
2016-08-02 00:00:00	4.37
2016-08-03 00:00:00	10.32
2016-08-04 00:00:00	4.09
2016-08-05 00:00:00	4.09
2016-08-06 00:00:00	4.96
2016-08-07 00:00:00	6.42
2016-08-08 00:00:00	3.83
2016-08-09 00:00:00	9.33
2016-08-10 00:00:00	6.61
2016-08-11 00:00:00	7.21
2016-08-12 00:00:00	4.86
2016-08-13 00:00:00	4.14
2016-08-14 00:00:00	4.91
2016-08-15 00:00:00	4.47
2016-08-16 00:00:00	3.51

Figure 15. Example of HTML results.

Interactive Plots

Interactive plots first show as an overall plot for the entire range of dates selected (Figure 16). Single sites (Figure 16) or a few sites (Figure 17) have relatively simple interactive graphs , but the more sites you select for your query, the more lines will show up on your interactive graphs.

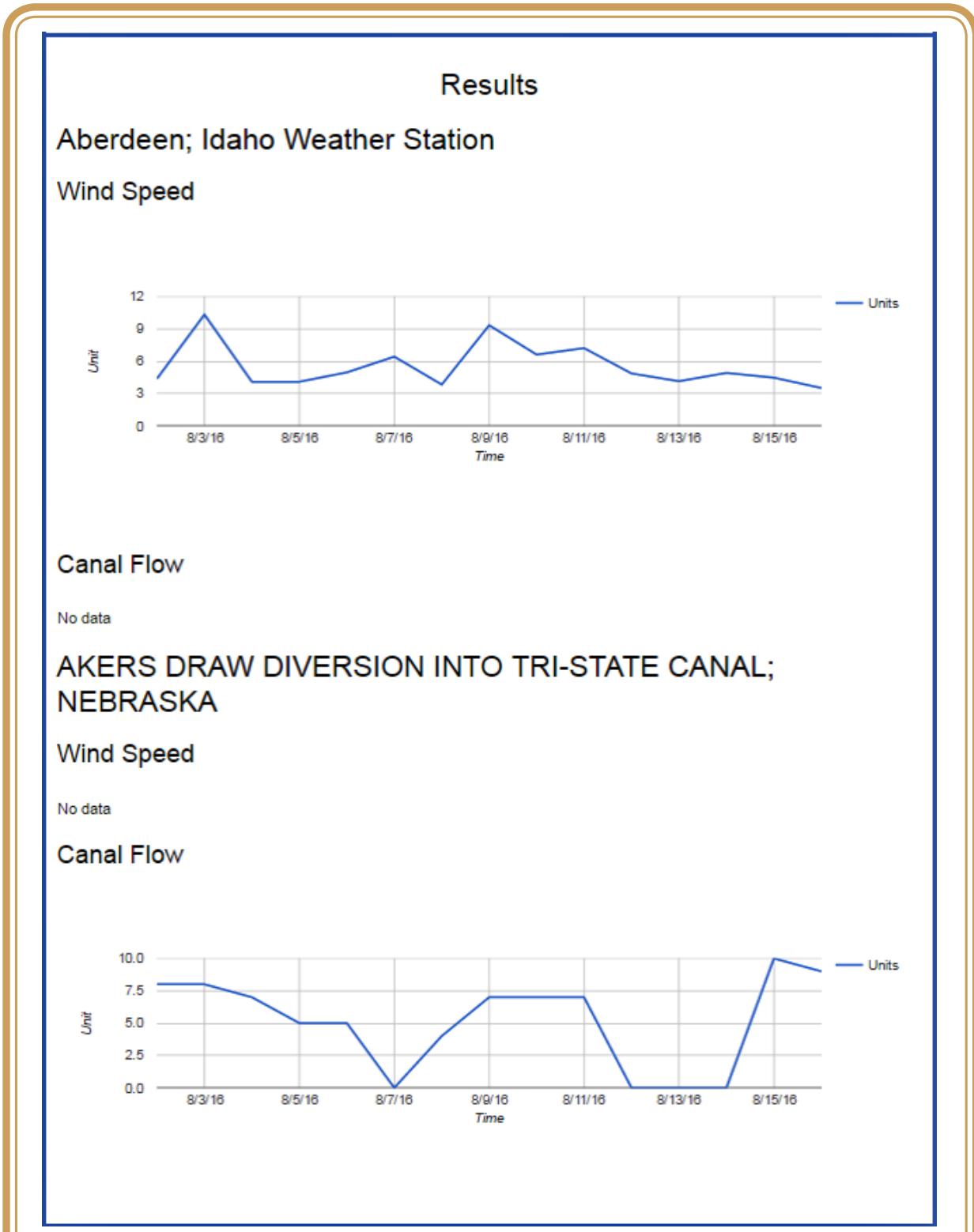


Figure 16. Example of interactive plots for a single site.

SITE DETAILS

ALCOVA RESERVOIR; WYOMING
GIBSON RESERVOIR; MONTANA
GREEN MOUNTAIN RESERVOIR; SUMMIT COUNTY; CO

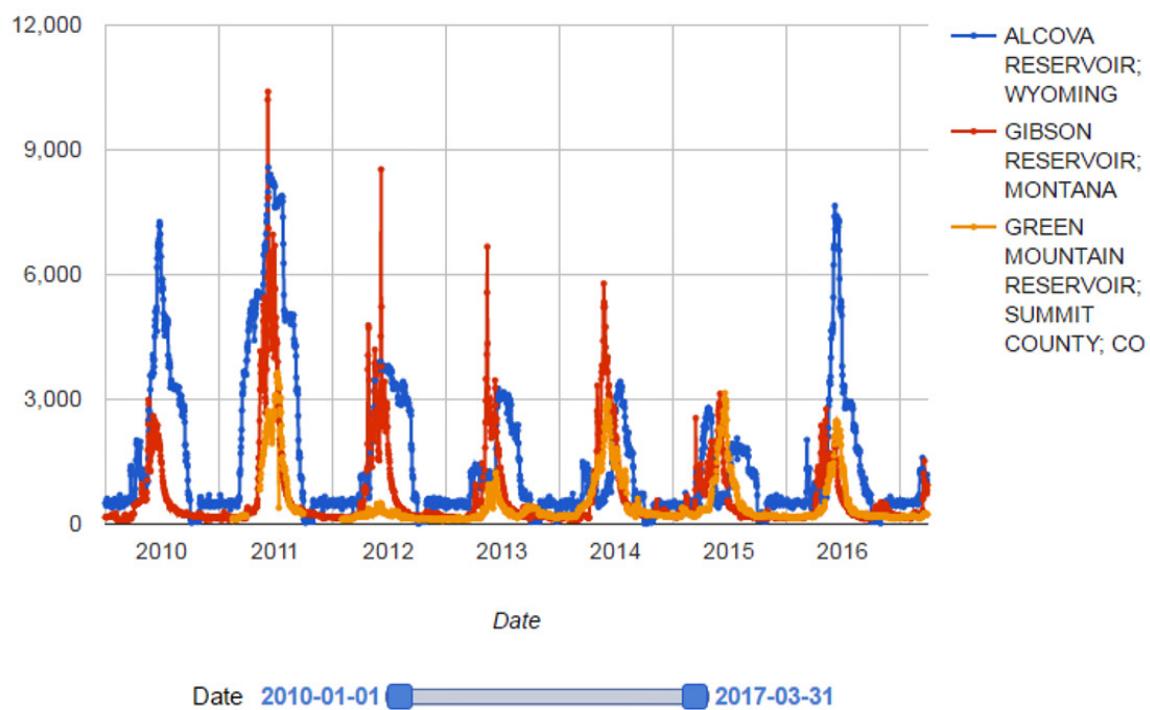
Reservoir Inflow (cubic feet per second)[Download Image](#)

Figure 17. Example of interactive plots for a single multiple sites.

Scroll over a spot to get values for a precise time. You can move the date bar at the bottom of the screen to change the date range.

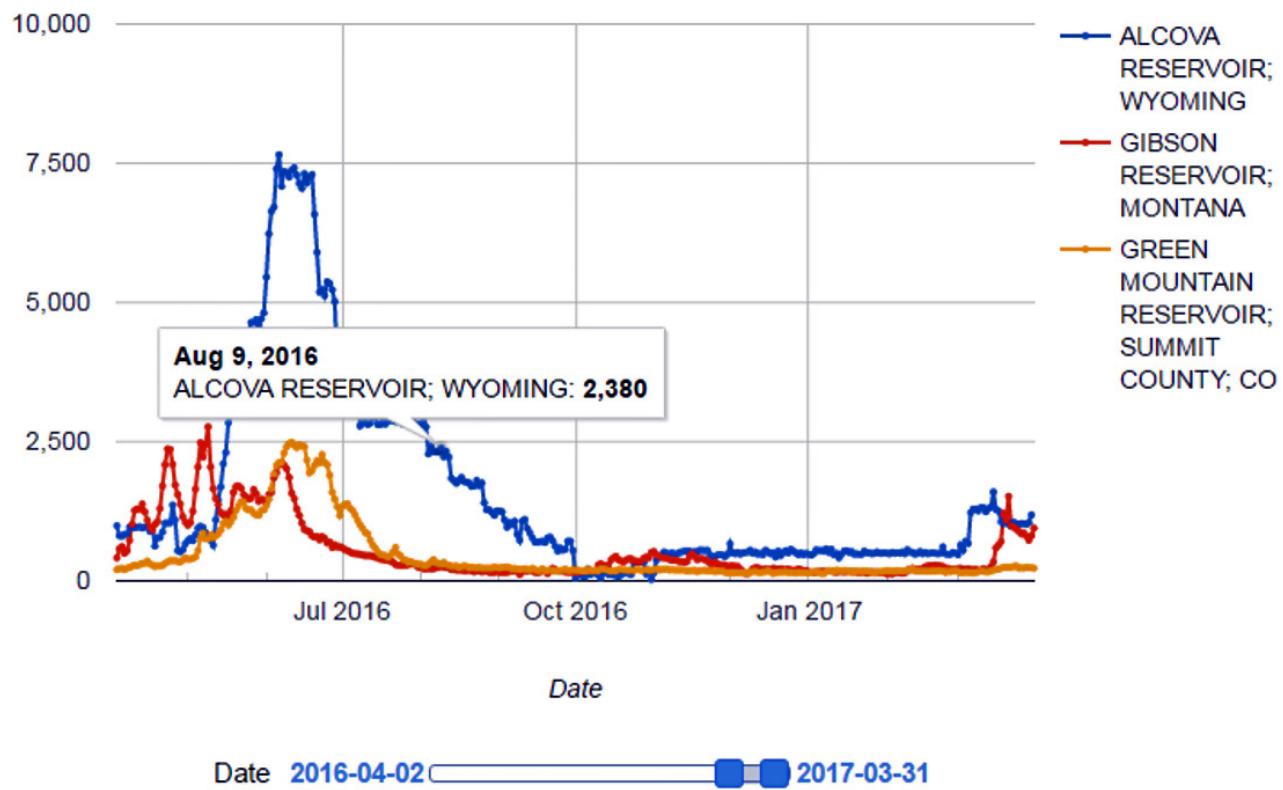


Figure 18. Example of close up on interactive line for data points.

Scrolling over specific data points will provide information. Clicking will revert to the interactive plot line.