

# Finding and Using Data from the Water Quality Portal

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Water Data Integration Branch

National 303(d) and Data  
Workshop

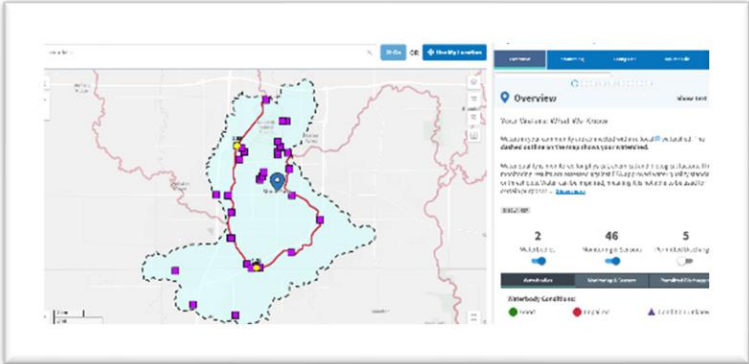
June 23, 2023

# Outline

1. WQX, WQP, and HMW
2. Background Info
3. Quick Tour of the Site
4. Breakdown of the query interface
5. Let's build a query – live practice
6. How do we use this data?
7. Employing the web data services and summary services

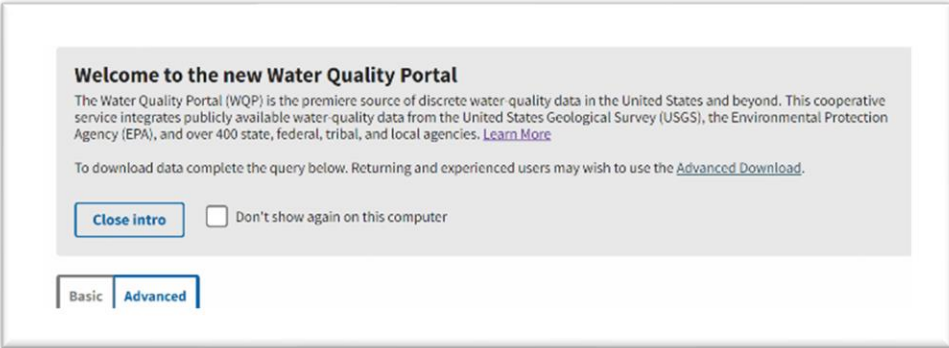
# EPA Connected Water Data Systems

Data Viewer



Data Warehouse

Water Quality Portal



Data Standard

Water Quality eXchange

| Activity Type  | Activity Media Name | Activity Start Date | Activity Start Time | Activity Start Time Zone | Depth/Height Measure | Activity Depth/Height Unit | Sample Collection Method ID | Sampl Meth |
|----------------|---------------------|---------------------|---------------------|--------------------------|----------------------|----------------------------|-----------------------------|------------|
| Sample-Routine | Water               | 3/1/2017            | 14:33               | MST                      |                      |                            | Grab Sample Method          |            |
| Sample-Routine | Water               | 3/1/2017            | 14:33               | MST                      |                      |                            | Grab Sample Method          |            |
| Sample-Routine | Water               | 3/1/2017            | 14:33               | MST                      |                      |                            | Grab Sample Method          |            |
| Sample-Routine | Water               | 3/1/2017            | 14:33               | MST                      |                      |                            | Grab Sample Method          |            |
| Method Msr/Obs | Water               | 3/1/2017            | 14:33               | MST                      |                      |                            | Grab Sample Method          |            |
| Sample-Routine | Water               | 3/1/2017            | 14:33               | MST                      |                      |                            | Grab Sample Method          |            |
| Sample-Routine | Water               | 3/1/2017            | 14:33               | MST                      |                      |                            | Grab Sample Method          |            |
| Method Msr/Obs | Water               | 3/3/2017            | 10:01               | MST                      |                      |                            | Field Sample Method         |            |
| Method Msr/Obs | Water               | 3/3/2017            | 10:01               | MST                      |                      |                            | Field Sample Method         |            |
| Method Msr/Obs | Water               | 3/3/2017            | 10:01               | MST                      |                      |                            | Field Sample Method         |            |

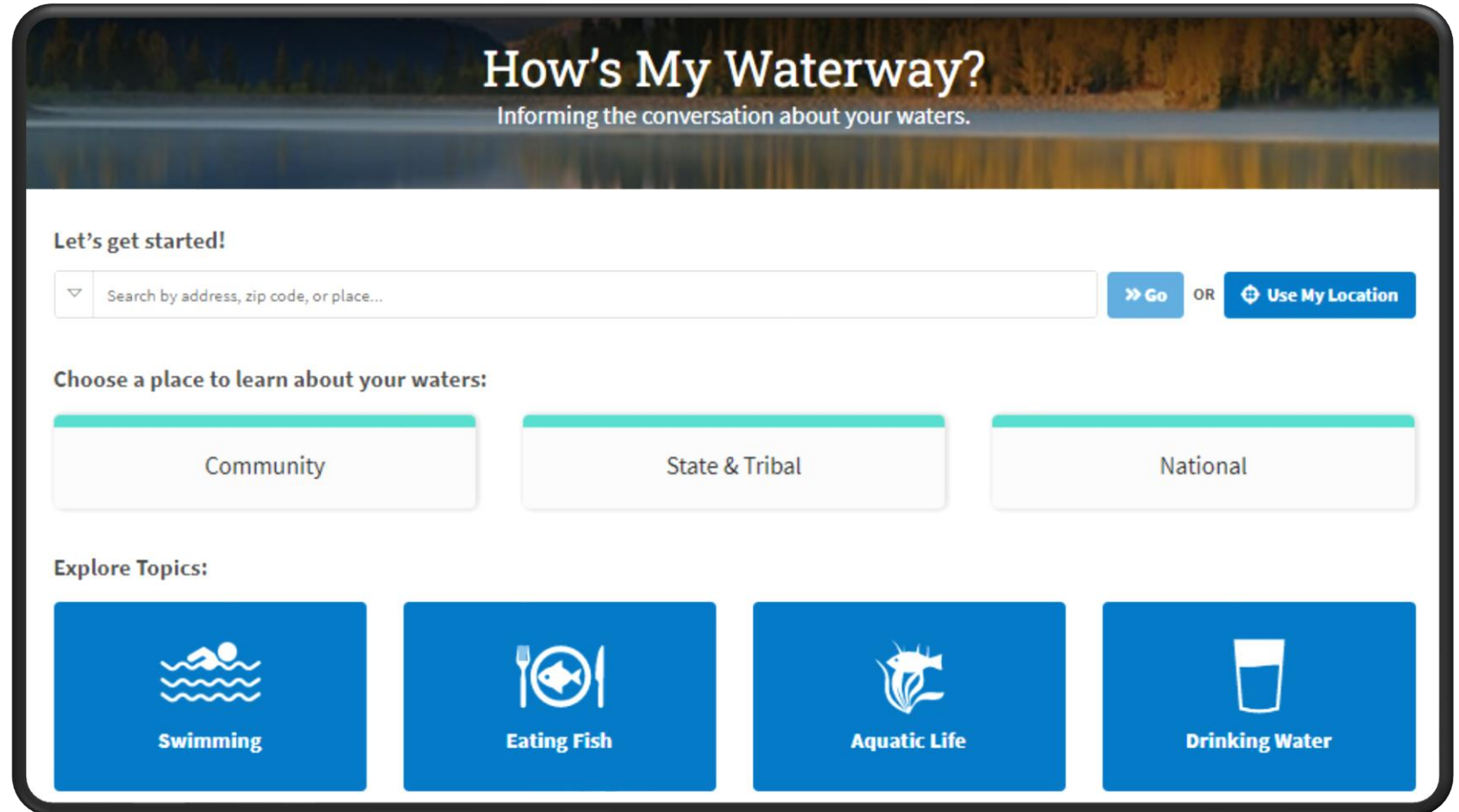
# How's My Waterway

*Powered by open data  
and web services*

*Accesses, interprets,  
and displays data from  
over a dozen sources*

*Including ATTAINS,  
ECHO, and the WQP*

Now includes a full  
interface for Water  
Quality Portal result  
level data



# Water Quality Portal

*Operated under An Interagency Cooperative agreement (USGS & EPA)*

- Serves data from USGS, EPA, USDA, NPS in a standard WQX format
- # WQP: Data from >1,600 organizations
- # WQP: >410m records from >1m sites
- Serves data OF All Water Types
- Includes a Graphical User Interface (GUI) & Web Services
- One of Our Integrated Systems (IOW HUB)
- DATA ServiceS can directly power analytics like those in HMW
- Growing Number of internal/external Tools built on top of this Primary data source

The screenshot shows the National Water Quality Monitoring Council (NWQMC) Water Quality Portal interface. The header includes the NWQMC logo and navigation links for Home, Explore WQP Sites, and Help & About. Below the header, there are tabs for Basic and Advanced, with Advanced selected. The main content area is divided into three sections: Select Location Parameters, Filter Results, and Download the Data. The Download the Data section is expanded, showing options for Data Source, Data Profiles, and File Format. Under Data Source, NWIS (USGS), STEWARDS (ARS), and WQX (EPA) are checked. Under Data Profiles, Sample Results (narrow) is selected. Under File Format, Comma-Separated is selected.

**NATIONAL WATER QUALITY MONITORING COUNCIL**

Home Explore WQP Sites Help & About

Basic Advanced

Select Location Parameters +

Filter Results +

Download the Data -

**Data Source**

- NWIS (USGS)
- STEWARDS (ARS)
- WQX (EPA)

**Data Profiles**

- Organization Data
- Site Data Only
- Project Data
- Project Monitoring Location Weighting Data
- Sample Results (physical/chemical metadata)
- Sample Results (biological metadata)
- Sample Results (narrow)
- Sampling Activity
- Sampling Activity Metrics
- Result Detection Quantitation Limit Data


**File Format**

- Comma-Separated
- Tab-Separated
- MS Excel 2007+

https://www.waterqualitydata.us/

Let's quickly  
explore the  
site

An official website of the United States government [Here's how you know](#) ▾

 NATIONAL WATER  
QUALITY MONITORING  
COUNCIL

Home Explore WQP Sites ▾ Help & About ▾

Basic **Advanced**

Select Location Parameters —

Specify location parameters to describe the spatial extent of the desired dataset. All fields are optional.

|                                     |   |                                       |  |
|-------------------------------------|---|---------------------------------------|--|
| <b>Country</b> ⓘ<br>All Countries ▾ | <b>Point Location</b> ⓘ<br>Within<br><input type="text"/> | <b>Bounding Box</b> ⓘ<br>North:<br>90 | <b>Site Type</b> ⓘ<br>All Site Types ▾             |
| <b>State</b> ⓘ<br>All States ▾      | miles of<br>Latitude<br>0                                 | South:<br>-90                         | <b>Organization ID</b> ⓘ<br>All Organization IDs ▾ |
| <b>County</b> ⓘ<br>All Counties ▾   | Longitude<br>0  | East:<br>180                          | <b>Site ID</b> ⓘ<br>All Site IDs ▾                 |
|                                     | <b>Use my location</b>                                    | West:<br>-180                         | <b>HUC</b> ⓘ<br>All HUCs                           |

# Exploring Locations

An official website of the United States government [Here's how you know](#) ▾

**NATIONAL WATER QUALITY MONITORING COUNCIL**

Home Explore WQP Sites ▾ Help & About ▾

Basic Advanced

Download Water Quality Data

Sites are first organized under the data Provider

1 of 3 Location Parameters

And then further organized under the Organizational owner

**NATIONAL WATER QUALITY MONITORING COUNCIL**

Home Explore WQP Sites ▾ Help & About ▾

WQP Home > Providers > STORET

### Water Quality Portal Data Organizations for STORET

- [Clear Creek Superfund \(Colorado\) - 0800257](#)
- [Clear Creek Superfund - 0800257\\_WQX](#)
- [Ogden Railyard \(US EPA Region 8\) - 0800597](#)
- [Ogden Railyard \(US EPA Region 8\) - 0800597\\_WQX](#)
- [International Smelter \(US EPA Region 8\) - 0800650](#)
- [International Smelter \(US EPA Region 8\) - 0800650\\_WQX](#)
- [Mystery Bridge Road - US Highway 20 - 0800852](#)
- [Mystery Bridge Road - US Highway 20 - 0800852\\_WQX](#)
- [Summitville Superfund site \(US EPA Region 8\) - 0801194](#)
- [Summitville Superfund site \(US EPA Region 8\) - 0801194\\_WQX](#)
- [Red Mountain Pass Zinc \(US EPA Region 8\) - 0801417](#)

# Choose an Organization to see available sites

- [FDEP, Water Quality Standards and Special Projects \(Florida\) - 21FLWQSP\\_WQX](#)
- [GEORGIA DEPARTMENT OF NATURAL RESOURCES - 21GACRD](#)
- [Georgia DNR Environmental Protection Division - 21GAEPD\\_WQX](#)
- [Georgia Department Of Natural Resources - 21GA\\_WQX](#)
- [21GPBCH - Grand Portage Beaches - 21GPBCH](#)
- [Guam Environmental Protection Agency \(BEACH\) - 21GUAM](#)
- [Guam Environmental Protection Agency - 21GUBCH](#)
- [Hawaii Department of Health Clean Water Branch - 21HI](#)
- [Illinois Department of Public Health - 21ILBCH](#)
- [Illinois Department of Public Health - 21ILBCH\\_WQX](#)
- [Indiana Department of Environmental Management \(BEACH\) - 21INBCH](#)
- [Indiana Department of Environmental Management - 21INDEM](#)
- [Indiana Department Of Environmental Management - 21IND\\_WQX](#)
- [Iowa Dept. of Natural Resources - 21IOWA](#)
- [Iowa DNR Surface Water Monitoring Data - 21IOWA\\_WQX](#)
- [Kansas Dept. of Health & Environment - 21KAN001](#)
- [Kansas Department Of Health And Environment - 21KAN001\\_WQX](#)
- [Kentucky Division of Water - 21KY](#)
- [KY WQX - 21KY\\_WQX](#)
- [Louisiana Department of Health - 21LABCH](#)
- [Massachusetts Dept. of Public Health - 21MABCH](#)
- [Maine Department of Environmental Protection - 21MEBCH](#)
- [Michigan Department of Environmental Quality - 21MICH](#)
- [Michigan DEQ - 21MICH\\_WQX](#)
- [Minnesota Dept. of Health \(BEACH\) - 21MNBCH](#)
- [Mississippi Department of Environmental Quality \(BEACH\) - 21MSBCH](#)
- [MS Dept. of Environmental Quality - 21MSWQ](#)
- [MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY - 21MSWQ\\_WQX](#)
- [NCDENR-DWQ - 21NC01WQ](#)
- [North Carolina Department of Environmental Resources NCDENR-DWQ - 21NC02WQ](#)
- [North Carolina Department of Environmental Resources NCDENR-DWQ \(2nd\) - 21NC02WQ](#)
- [North Carolina Department of Environmental Resources NCDENR-DWQ \(2nd\) - 21NC02WQ](#)
- [NC Recreational Water Quality Program - 21NCBCH](#)
- [NC DWQ Monitoring Coalition Program - 21NCCOALITIONS](#)

The screenshot shows the National Water Quality Monitoring Council website. The header includes the organization's logo and name, along with navigation links for Home, Explore WQP Sites, and Help & About. The main content area is titled "Water Quality Portal Data Sites for 21KY\_WQX" and features a map of the region. The map displays various data points represented by colored circles with numbers, indicating the number of sites for each organization. A green arrow points from the list of organizations on the left to the map. Below the map, a text box states: "This organization has 1038 sites. Click on a grouped icon to zoom and expand".

NATIONAL WATER QUALITY MONITORING COUNCIL

Home Explore WQP Sites Help & About

WQP Home > Providers > STORET > 21KY\_WQX


## Water Quality Portal Data Sites for 21KY\_WQX

Leaflet | Tiles © Esri — Esri, DeLorme, NAVTEQ, TomTom, Intermap, IPC, USGS, FAO, NPS, NRCAN, GeoBase, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

This organization has 1038 sites. Click on a grouped icon to zoom and expand



# See detailed summary information for a site



Home Explore WQP Sites Help & About

WQP Home > Providers > STORET > 21KY\_WQX > 21KY\_WQX-DOW03027020

## VALLEY CREEK (21KY\_WQX-DOW03027020) site data in the Water Quality Portal

Data Provider: **STORET** ([Learn more about Water Quality Portal Data Providers](#))

This river/stream site, maintained by the KY WQX (identifier 21KY\_WQX), has the name "VALLEY CREEK" and has the identifier 21KY\_WQX-DOW03027020. This site is in the watershed defined by the 8 digit [Hydrologic Unit Code \(HUC\)](#)05110001.

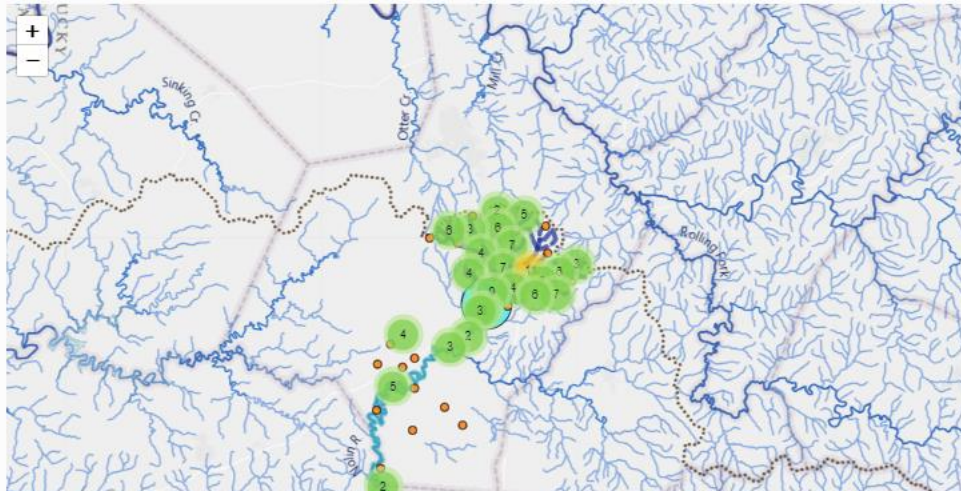
This site is located in Hardin County, Kentucky at 37.6465500000 degrees latitude and -85.9062400000 degrees longitude using the datum NAD83. No horizontal location accuracy metadata is available.

To download the metadata about this site along with water quality data, go to the [Portal Page](#) and enter "21KY\_WQX-DOW03027020" into the "Site ID" box under Site Parameters

### What other monitoring locations are upstream or downstream from this one?

**Upstream and downstream locations**

This map shows all Water Quality Portal stations that are 10 miles upstream (dashed dark blue) and 10 miles downstream (solid light blue) of this monitoring location (indicated by the large blue circle). The upstream and downstream functionality is provided by the [Network Linked Data Index](#).



### When were data collected at this location?

Periods of record for data characteristic groups

For a more detailed breakdown of data, go to the [Monitoring Report at the EPA How's My Waterway Application](#)

| Characteristic Group          | Date Range* |
|-------------------------------|-------------|
| Information                   | 2011 - 2011 |
| Inorganics, Major, Metals     | 2011 - 2011 |
| Inorganics, Major, Non-metals | 2011 - 2011 |
| Inorganics, Minor, Metals     | 2011 - 2011 |
| Inorganics, Minor, Non-metals | 2011 - 2011 |
| Nutrient                      | 2011 - 2011 |
| Organics, Other               | 2011 - 2011 |
| Physical                      | 2011 - 2011 |
| Physical, Habitat             | 2011 - 2011 |
| Sediment                      | 2011 - 2011 |

\*Date ranges may contain gap years

### What other information is available for this location?

**Detailed Metadata**

For the definitions of the metadata elements, please go to the Water Quality Portal [user guide](#)

| Location Metadata            | Value                |
|------------------------------|----------------------|
| OrganizationIdentifier       | 21KY_WQX             |
| OrganizationFormalName       | KY WQX               |
| MonitoringLocationIdentifier | 21KY_WQX-DOW03027020 |
| MonitoringLocationName       | VALLEY CREEK         |
| MonitoringLocationTypeName   | River/Stream         |
| HUCEightDigitCode            | 05110001             |
| LatitudeMeasure              | 37.6465500000        |
| LongitudeMeasure             | -85.9062400000       |



Basic

Advanced

## Download Water Quality Data

### 1 of 3 Location Parameters

Specify location parameters to describe the spatial extent of the desired dataset. Additional options are available. Some fields are optional.

Country ⓘ

All Countries ▾

What is the WQP?

Contributing Organizations

User Guide

Web Services Guide

FAQs

Upload Data

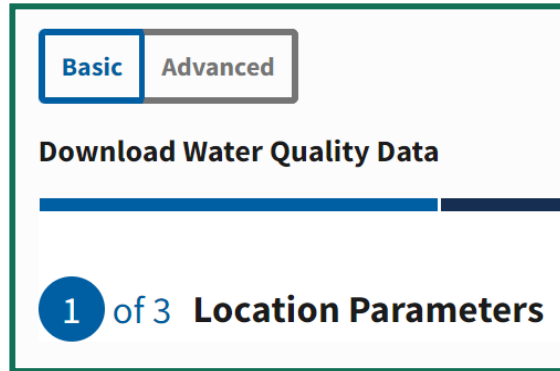
Applications using the WQP

Other Water Quality Portals

Publications

Contact Us

# Water Quality Portal



Start your search here, if searching by a state, county, or point location. Or, click on the Advanced Tab to open up additional search options

The screenshot shows the 'Download Water Quality Data' page on the National Water Quality Monitoring Council website. The page has a dark blue header with the council's logo and navigation links: Home, Explore WQP Sites, and Help & About. Below the header, there are two tabs: 'Basic' (selected) and 'Advanced'. The main heading is 'Download Water Quality Data', followed by a progress indicator '1 of 3 Location Parameters'. A descriptive paragraph states: 'Specify location parameters to describe the spatial extent of the desired dataset. Additional options are available in the [Advanced Download](#). All fields are optional.' The form includes several dropdown menus: 'Country' (All Countries), 'State' (All States), and 'County' (All Counties). There is also a 'Point Location' section with input fields for 'Miles of', 'Lat', and 'Long', and a 'Use my location' button. A 'Site Type' dropdown menu is set to 'All Site Types'. At the bottom of the form are 'Clear search' and 'Next' buttons. The footer contains navigation links: 'What is the WQP?', 'Contributing orgs', 'Apps using the WQP', 'Other Water Quality Portals', and 'Explore WQP sites'. Logos for USGS and EPA are displayed, along with contact information for the Agency Contact Center: 1-800-424-9067 and WQX@epa.gov. Last content change dates are provided for NWIS (USGS), STEWARDS (ARS), and WQX (EPA).

# Building Your Query - Locations

**Select Location Parameters**

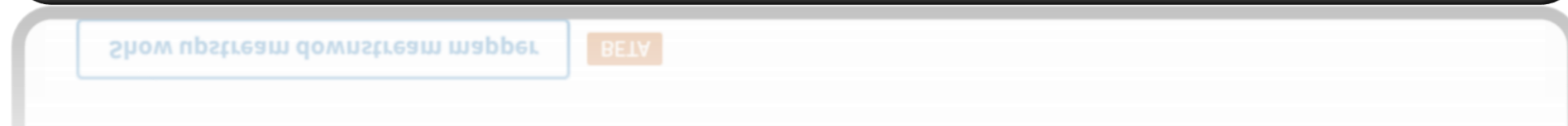
Specify location parameters to describe the spatial extent of the desired dataset. All fields are optional.

**AND**

|  |   |  |   |
|--|---|--|---|
| <p><b>Country</b> ⓘ</p> <p>All Countries</p> | <p><b>Point Location</b> ⓘ</p> <p>Within</p> <p>miles of Latitude</p> <p>Longitude</p> <p><a href="#">Use my location</a></p> | <p><b>Bounding Box</b> ⓘ</p> <p>North: 90</p> <p>South: -90</p> <p>East: 180</p> <p>West: -180</p> | <p><b>Site Type</b> ⓘ</p> <p>All Site Types</p> <p><b>Organization ID</b> ⓘ</p> <p>All Organization IDs</p> <p><b>Site ID</b> ⓘ</p> <p>All Site IDs</p> <p><b>HUC</b> ⓘ</p> <p>All HUCs</p> |
|--|---|--|---|

**OR** **OR** **OR**

[Show upstream downstream mapper](#) **BETA**



# Filtering Your Results

\*optional

Water, sediment,  
tissue, etc.

Chemicals, physical  
measures, obs., etc.

Example of a query to  
retrieve fish  
contaminant data  
(Mercury in  
largemouth bass)

The screenshot shows a 'Filter Results' form with the following fields and annotations:

- Sample Media:** Includes 'Tissue (STORET)' and 'Biological Tissue (NWIS)'. An annotation box labeled 'Water, sediment, tissue, etc.' points to this section.
- Characteristic Group:** Set to 'All Characteristic Groups'. An annotation box labeled 'Chemicals, physical measures, obs., etc.' points to this section.
- Characteristics:** Includes 'Mercury (NWIS, STORET)' and 'Methylmercury(1+) (NWIS, ...)'. An annotation box labeled 'Example of a query to retrieve fish contaminant data (Mercury in largemouth bass)' points to this section.
- Project ID:** Set to 'All Project IDs'.
- Parameter Code (NWIS ONLY):** Set to 'All Parameter Codes'.
- Biological Parameters Assemblage:** Set to 'All Assemblages'. An annotation box labeled 'Assemblages: Fish/Nekton, Macrinvertebrates' points to this section.
- Taxonomic Name:** Set to 'Micropterus salmoides (NW...)'. An annotation box labeled 'Latin names' points to this section.
- Date Range:** Includes a 'from:' field with '01-01-2015' and a 'to:' field with 'mm-dd-yyyy'. This entire section is enclosed in a red box.
- Minimum Sampling Activities Per Site:** Set to '1'.
- Minimum Results Per Site:** Set to '1'.

Below the form, there is a faint reflection of the same interface.

# Download your Data

WQX/WQP support a LOT of metadata.

The screenshot shows a web interface titled "Download the Data" with two main sections: "Data Source" and "Data Profiles".

**Data Source**

- NWIS (USGS)
- STEWARDS (ARS)
- WQX (EPA)

**File Format**

- Comma-Separated
- Tab-Separated
- MS Excel 2007+

**Data Profiles**

- Organization Data
- Site Data Only
- Project Data
- Project Monitoring Location Weighting Data
- Sample Results (physical/chemical metadata)
- Sample Results (biological metadata)
- Sample Results (narrow)
- Sampling Activity
- Sampling Activity Metrics
- Result Detection Quantitation Limit Data
- Biological Habitat Metrics

Callout boxes highlight the "File Format" section and a group of "Data Profiles" (Sample Results) with the text "Results measures and result-level metadata".

# Using Data from Web Services

- Web services are URLs that provide the instructions from your query

Save the URL to your Query

URL of your data download

*Use this web service URL in data applications*

**Query URL**  
Copy and share the URL of this query.

`https://www.waterqualitydata.us/#mimeType=csv&providers=NWIS&providers=STEWARDS&providers=STORET`

**Station**

`https://www.waterqualitydata.us/data/Station/search?  
mimeType=csv&zip=yes&providers=NWIS&providers=STEWARDS&providers=STORET`

**cURL**

`curl -X POST --header 'Content-Type: application/json' --header 'Accept: application/zip' -d '{"providers":  
["NWIS","STEWARDS","STORET"]}' 'https://www.waterqualitydata.us/data/Station/search?mimeType=csv&zip=yes'`

**WFS GetFeature**

`https://www.waterqualitydata.us/ogcservices/wfs/?  
request=GetFeature&service=wfs&version=2.0.0&typeName=wqp_sites&SEARCHPARAMS=providers%3ANWIS%7CSTEWARDS%7C  
STORET&outputFormat=application%2Fjson`

[Clear search](#) [Download](#)

# Let's build a dataset

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[www.waterqualitydata.us/](http://www.waterqualitydata.us/)