Visualizing National Water Quality Data

The Water Quality Portal (WQP) is a large national dataset of water quality measurements aggregated by the USGS and EPA.

The WQP offers a central source for a large number of water quality measurements. However, there lacks a way to quickly explore when and where measurements exist and what that data looks like.

pondr is a comprehensive tool for investigating data coverage, values, and trends from the Water Quality Portal.

Pondr’s interactive functionalities are built with RShiny, a powerful web framework for presenting R-based data analyses.

From Raw Datasets to Responsive Plots

- **Water Quality Portal**
- **National Hydrography Dataset**
- **Watershed Boundary Dataset**

Data harmonization

Joining of spatial site location data, quantitative measurement data, and satellite overpass data

Joining of flowline attributes based on site location

Watershed boundary polygon simplification

Calculation of measurement counts for each watershed

Data storage in queryable SQLite file format

Querying, loading, and filtering relevant data based on selection

Rendering plot output
Chloropleth map shows measurement densities for national watersheds, with darker colors representing well covered regions.

Users can select hydrologic unit code (HUC) levels and water quality parameters to reflect varying research goals and interests.

A coverage plot for selected regions offers an at-a-glance overview of spatiotemporal measurement coverage.
An interactive measurement site map offers further insight into spatial density across distinct water bodies within a watershed.

Filters allow users to quickly narrow down their search based on parameters such as water body type and satellite overpass availability.

Settings for several visualization options provide more or less granular views of data depending on scope of the search.

Users can quickly extract filtered data to a CSV file with WQP SiteIDs and Landsat scene IDs for further research.

Time series presents measurement values over time for selected points.