

Water Quality Portal

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Purpose

Help you understand how the Water Quality Portal can help you manage your water quality and quantity resource issues

Define common terms

Explain the benefits of the Water Quality Portal

Provide a history of the Portal development drivers

Demonstrate the Water Quality Portal and other tools

Discuss important role of water quality data in water resource management

Discuss some future steps in water data sharing and data integration

Potential Use Case Examples for Wastewater Partners

1. Establish water baselines and calculate permit levels
2. Display status of stream/river temperature being warmer/cooler
3. Demonstrate if a phosphorus TMDL program is working
4. Demonstrate that the facility is not increasing water body pollution levels
5. Manage risk from upstream water pollution levels
6. Identify other watershed partners

Data are valuable, plan for re-use

Electronic data are more valuable than data in file cabinets

The more data are re-used, the more valuable they become

- Collect once – use multiple times

Shared data are of even higher value

- Provide for better planning decisions
- Incentivize collaborative efforts
- Make the most use of the data collection resources being invested

Enable for easier use in models and analytical tools

Terms and definitions

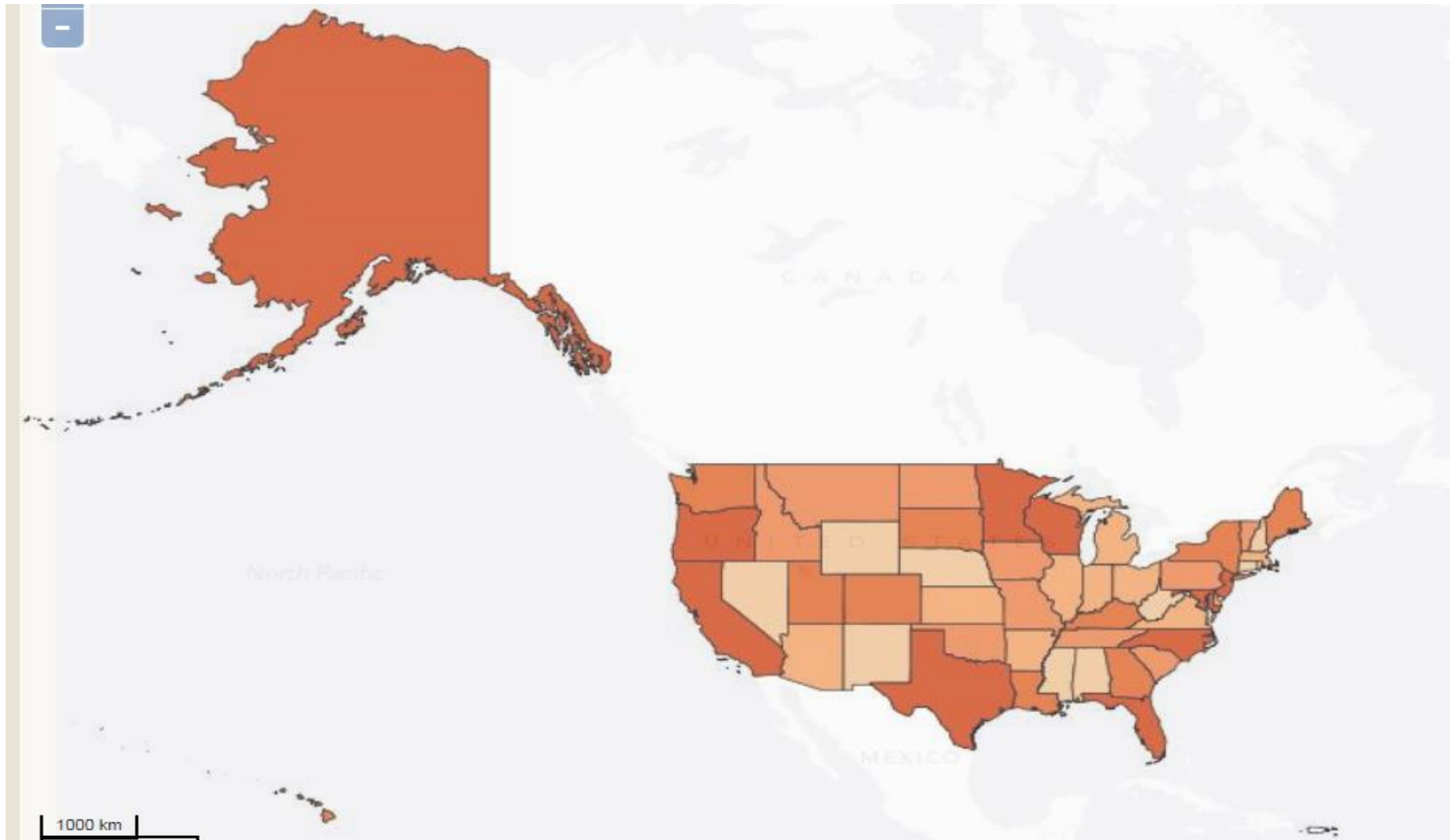
Web Service: A web service allows for information to be exchanged computer-to-computer over the internet

Portal: A one-stop shop that pulls together information from various sources and provides it to the user in a seamless fashion

Catalog: Like a library card-catalog, these provide summary level information on what data are available at the various sources

Exchange Schema: An agreed-upon data sharing format via which data owners publish data

What is the Water Quality Portal?



Access to over 230 million discrete water data records

Benefits of the Portal

Reduces your effort to use other data sources

- Collecting data from multiple sources
- Combining into common format
- Delivering in a single file

Leverages and protects investments in monitoring data

- Common data elements emerging from monitoring community
- Marketplace of what, when and where for monitoring

Supports water quality based decision making

- Comparing to water quality standards
- Identifying hotspots
- Developing protection and restoration plans
- Modeling expected changes

Benefits of the Portal continued

Based on the EPA Water Quality eXchange (WQX) format to enable data sharing in one format

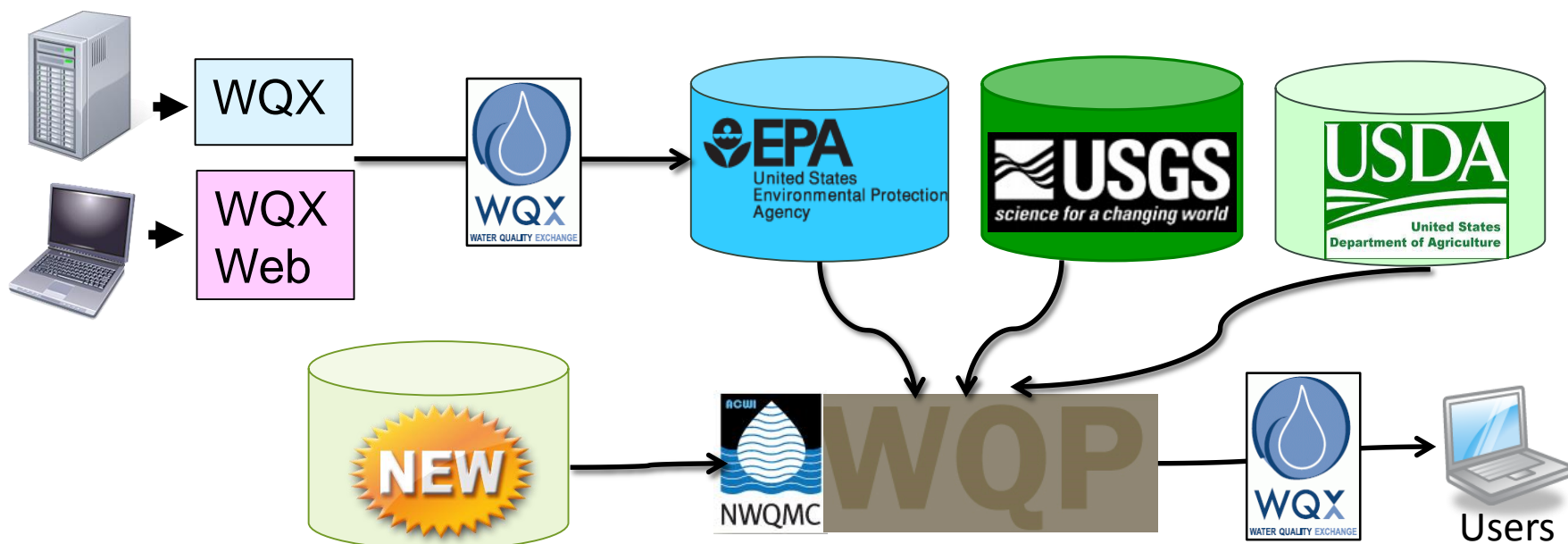
Provides access to data from 400 federal, states, and tribal agencies and watershed organizations already using the WQX file formats – **participation is through WQX or WQX Web**

Leverages web services to make data available through an automated call

Increases ability of others to incorporate data into other applications for analysis

Portal Interagency Cooperation

With the National Water Quality Monitoring Council ([NWQMC](#)), the Water Quality Portal ([WQP](#)) integrates publicly available water-quality data, through use of the Water Quality eXchange ([WQX](#)), from the USGS [NWIS](#), EPA [STORET](#), and USDA ARS [STEWARDS](#).



Access to Multiple Data Types

Portal Data Records (240m total)

- USGS NWIS – 90m records
- USDA STEWARDS – 1m records
- USEPA STORET – 150m records

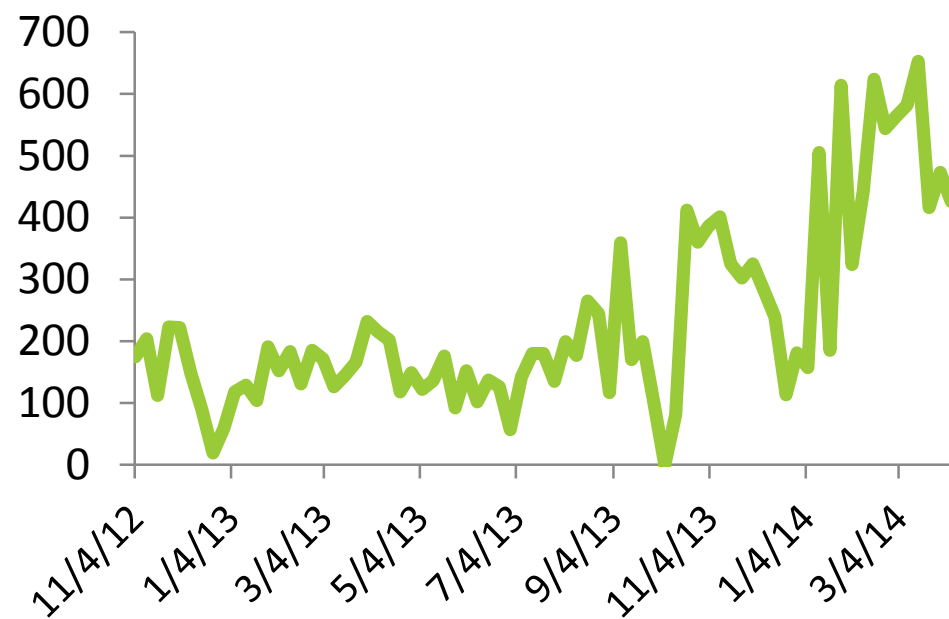
Portal Data Contributors

- Federal – EPA, USGS, USACOE, NPS, USBR
- States and territories – 46 with 10 more in progress
- Tribes – 120 agencies
- Other organizations – county, watershed groups, academic

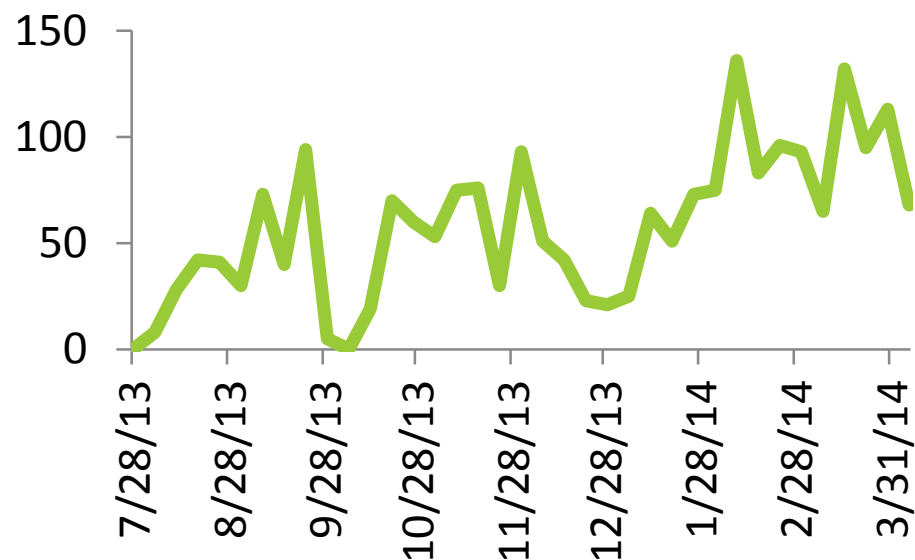
Portal Data types

- Physical/Chemical - Current
- Biological (Fall 2014)
- Habitat, Metrics, Indexes (Fall 2015)

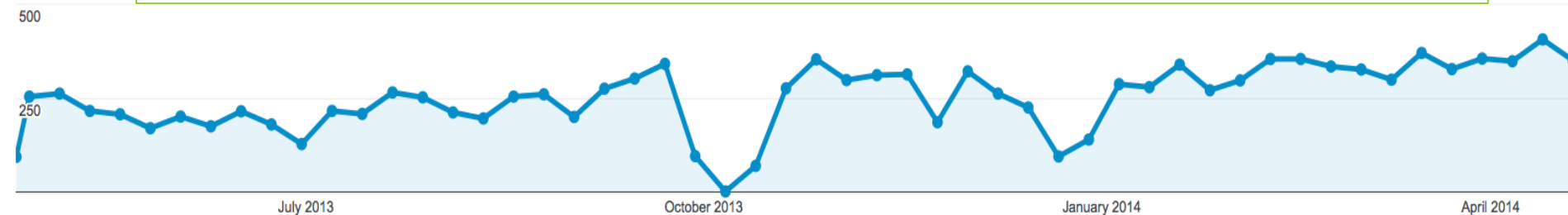
Weekly Portal Downloads



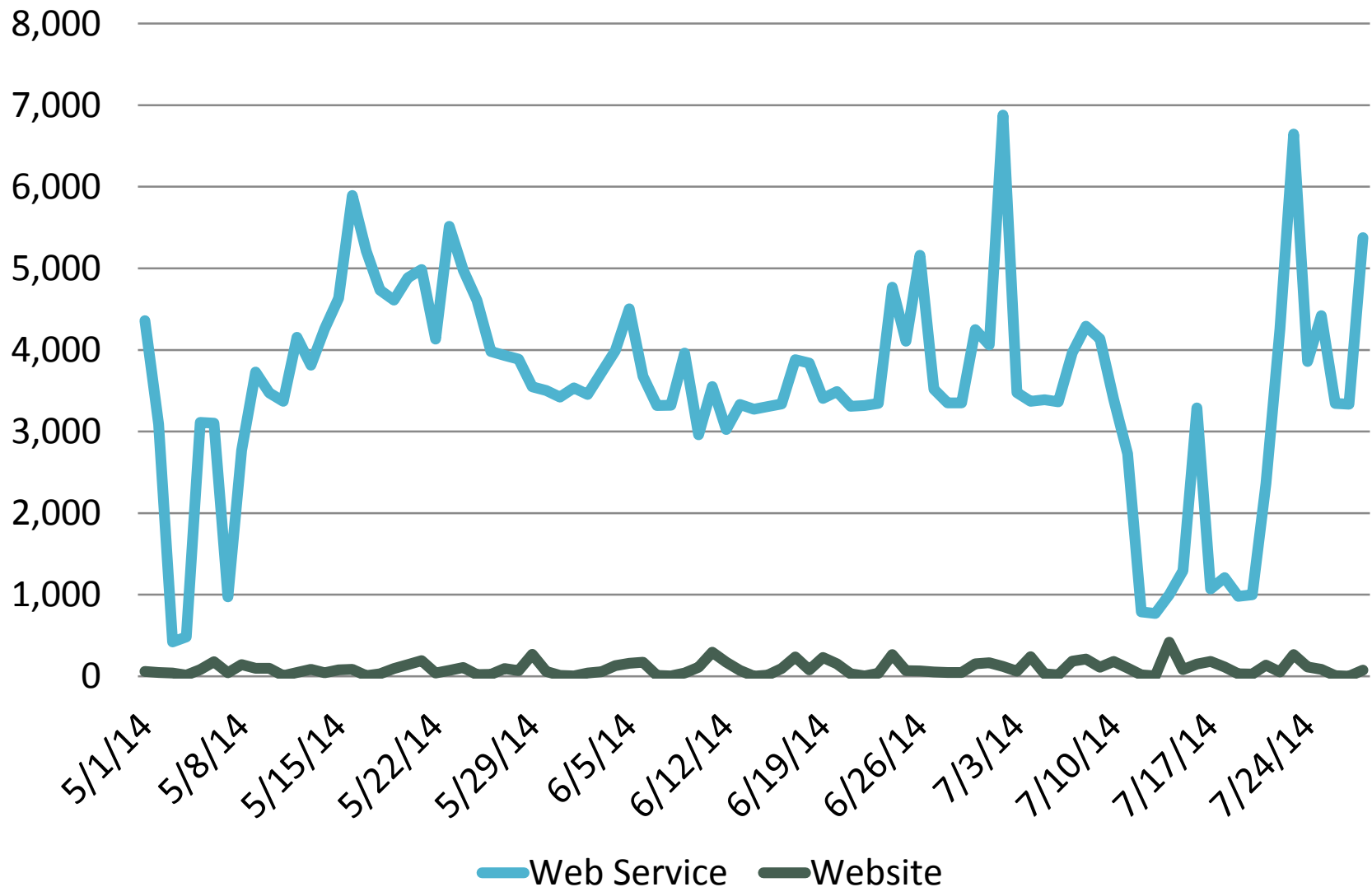
Total Weekly Map Create Events



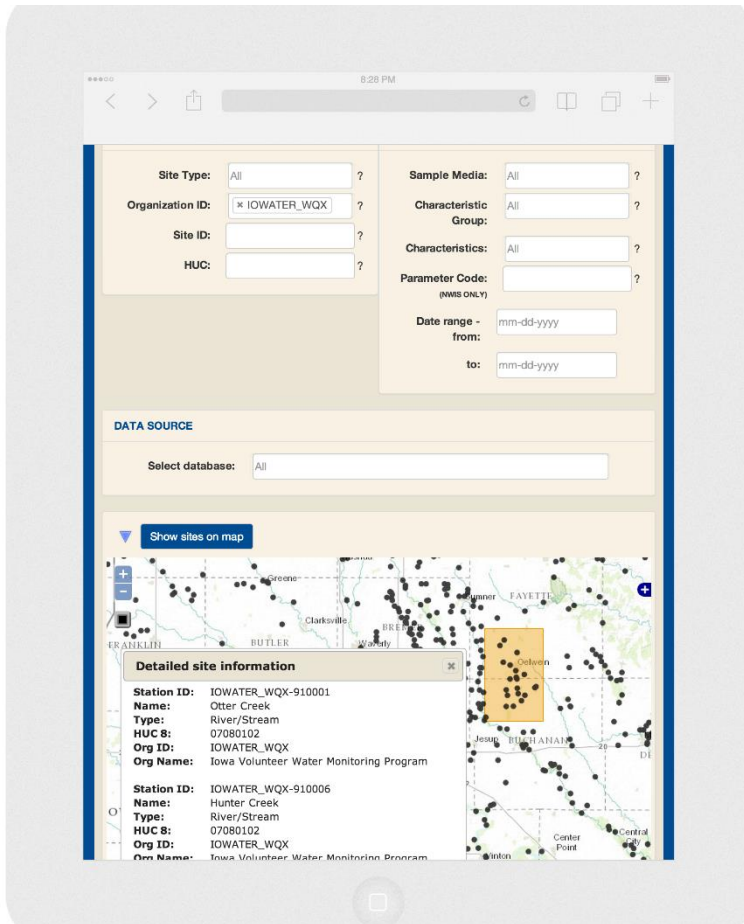
Number of Visits to Water Quality Portal per week April 2013-April 2014



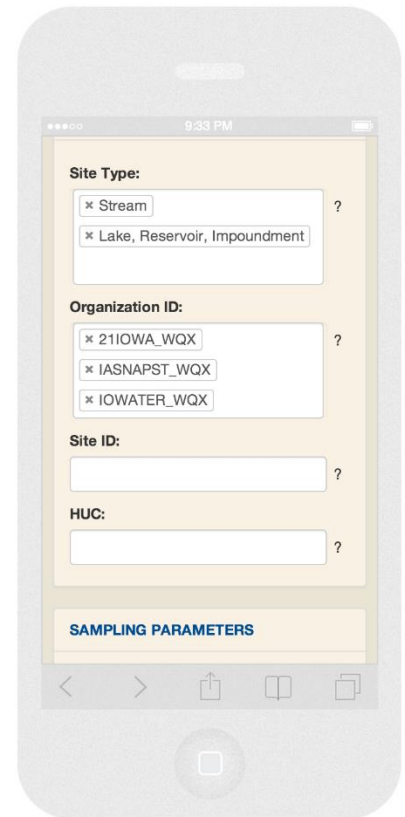
Number of Downloads per Day



Built using Responsive Design



Water Quality
Portal works on
any device with a
modern web
browser



Water Data Sharing History – Part 1

EPA's STORET database and USGS's NWIS database provide a case study in how data sharing has evolved

1960's the data were maintained in the **same system** (WATSTORE)

1972 NWIS and STORET were developed, had similar structure, design, and nomenclature. NWIS data were **copied** to STORET on a routine basis

1999 EPA 'Modernized' STORET to move it away from a mainframe system to a **distributed system**.

NWIS/STORET no longer compatible

Water Data Sharing History – Part 2

2003 EPA/USGS signed an **agreement** to work together on making data more seamless

2004 brought the data together on **map** but still difficult to use the data together

Oregon develops Pacific Northwest Water Quality Exchange demonstrating a **services** approach for sharing data

2005 NWQMC publishes **data standards** for monitoring data, which then becomes a national standard called Environmental Sampling Analysis and Results (ESAR) standard

Water Data Sharing History – Part 3

2005 EPA initiates a **pilot** to test exchanging water quality data via services using ESAR standard

2006 EPA/USGS begin discussions on **common services**

2007 EPA releases the Water Quality Exchange (WQX) which changes the STORET model to a **federated-warehouse** model based on services

2008 EPA/USGS release common services based on the WQX Schema and **common nomenclature**

2012 EPA/USGS **launch** the Water Quality Portal

2014 EPA/USGS add USDA ARS STEWARDS as **new federal data partner**

Water Quality Portal Demo

Portal data holdings

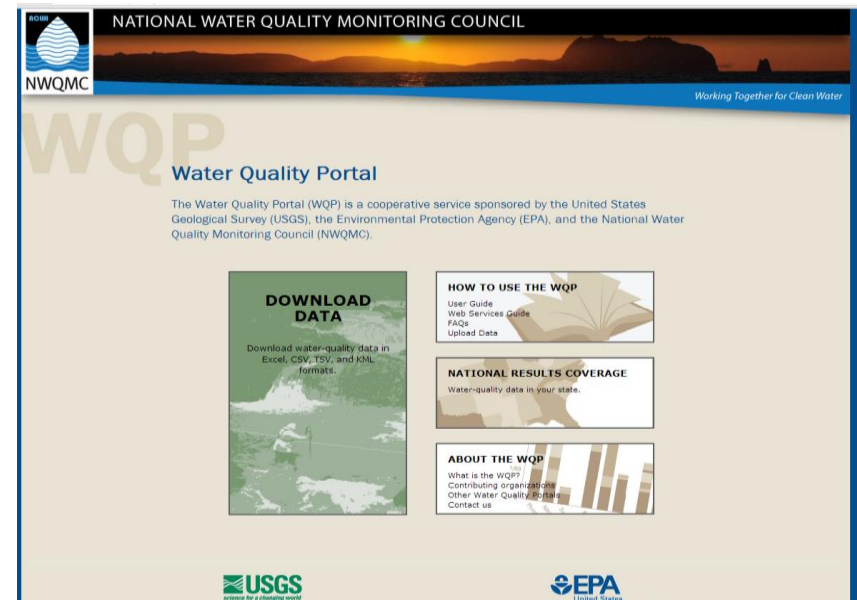
- <http://waterqualitydata.us>
- Characteristics and query capabilities
- Display stations on a map

Web services: Water Courier

- <http://www.wqcourier.com/>

Web services: EnDDat Tool

- <http://cida.usgs.gov/enddat/>



Using R for data exploration

DataRetrieval

- Officially supported R client for WQP and NWIS data. On CRAN and Github

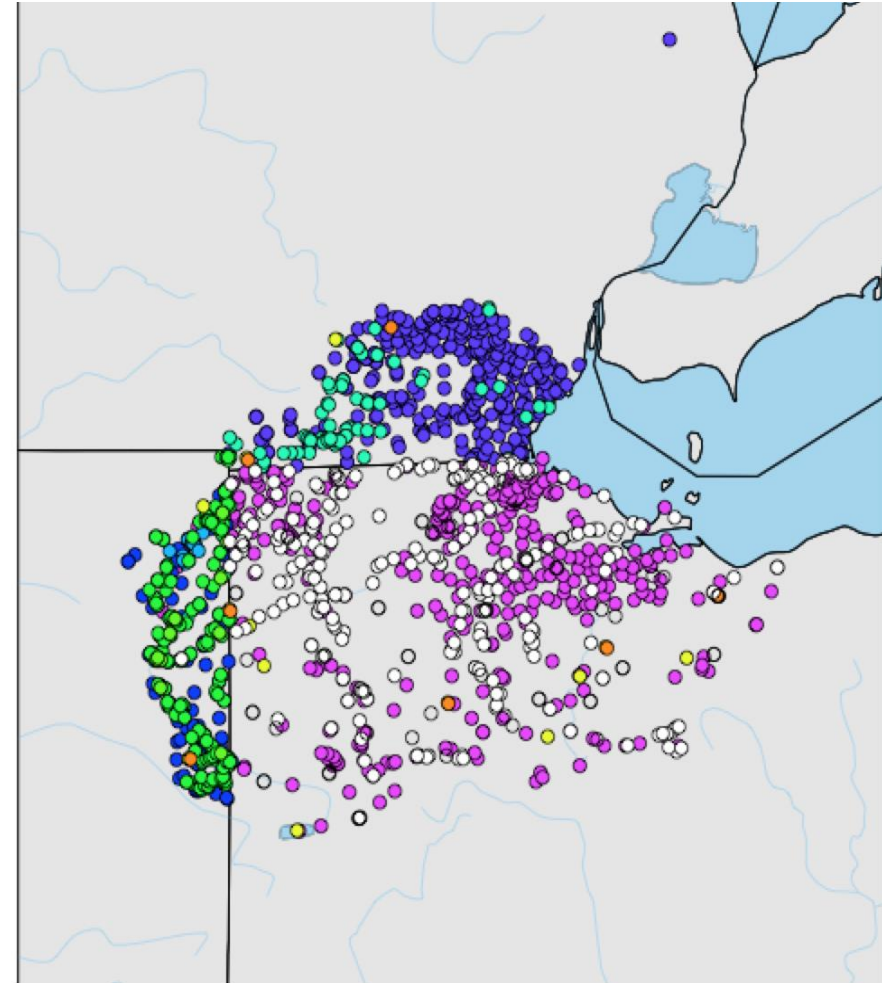
WQP_Data_Exploration

- Suite of R-based data exploration examples for the WQP, available to all on Github
- https://github.com/USGS-CIDA/WQP_Data_Exploration

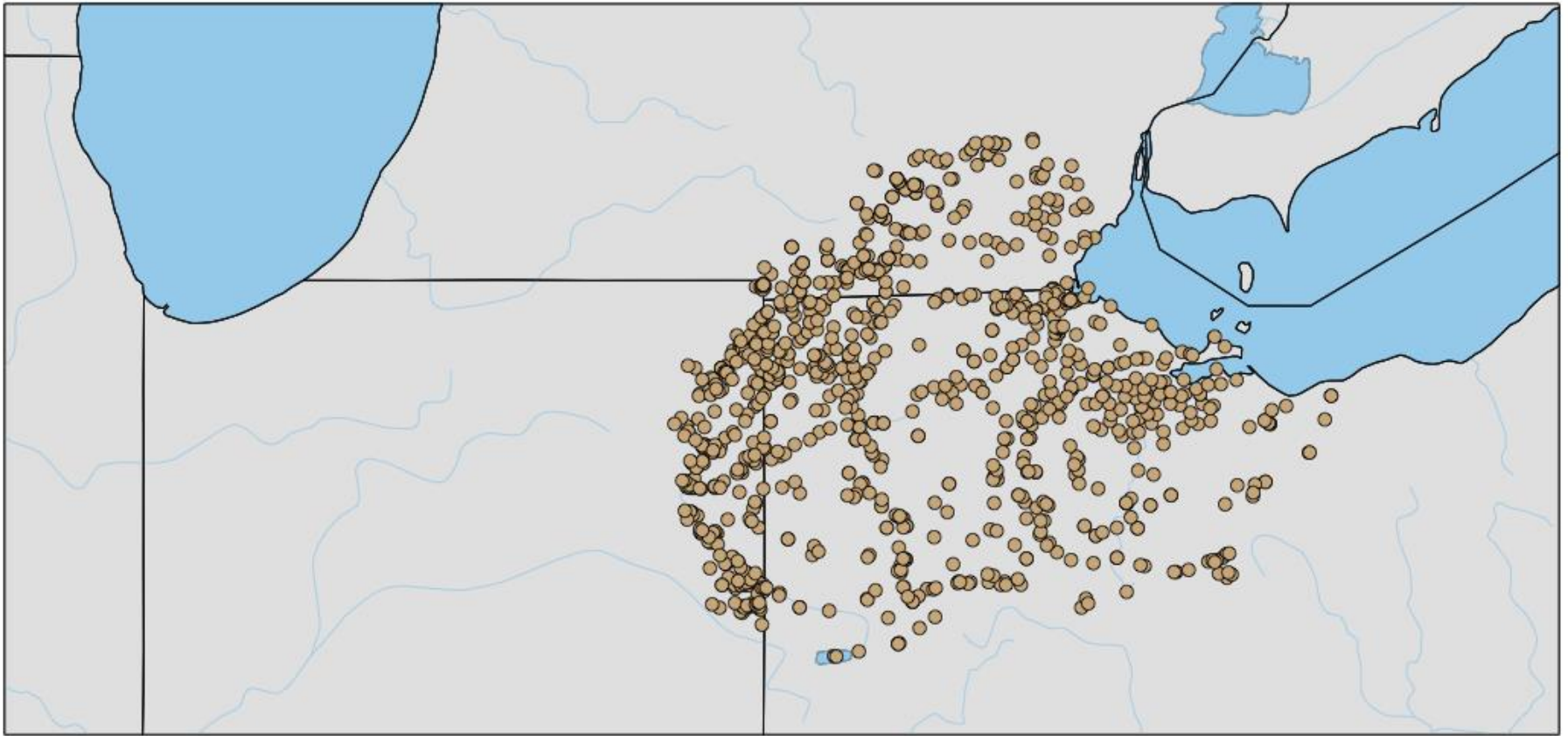
Show R example for WI_Chloride.

What agencies have sampled for nutrients in the western Lake Erie basin?

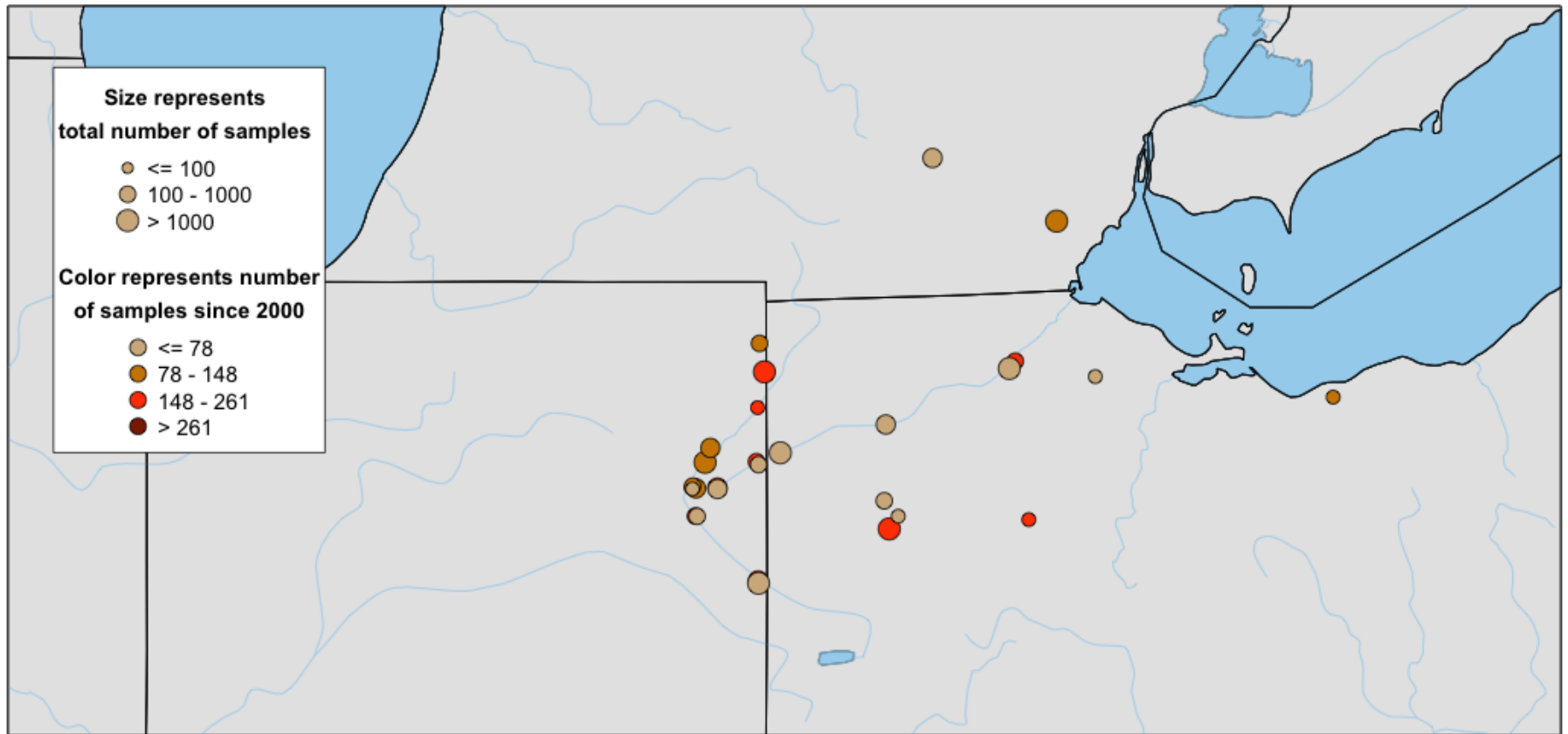
	OrganizationFormalName	count
1	USGS Ohio Water Science Center	427
2	USGS Michigan Water Science Center	351
3	Division of Surface water (Ohio)	221
4	Indiana STORET	201
5	USGS Indiana Water Science Center	107
6	Michigan Department of Environmental Quality	74
7	Division of Drinking and Ground Water (Ohio)	63
8	EPA National Aquatic Resources Survey	16
9	USDA Agricultural Research Service	16
10	IDEM	12
11	EPA National Aquatic Resource Survey Data	7



How many sites in the Western Lake Erie basin have been sampled for phosphorus?



What sites have more than 50 phosphorus samples, with at least 10 of those samples after 2000?



Revisit - Potential Use Case Examples for Wastewater Partners

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Water Quality Data is Essential to Water Resources Management

Water Quality Portal is a **Water Quality** data sharing network

Water quality and quantity are related

- Waters need an appropriate **quality** to meet the given beneficial use that the water will be used for
- The **quantity** of water in a stream (including impacts from diversions, discharges, and runoff) can have a direct impact on water **quality** and designated uses for that water as defined in a state's water quality standards

The Portal provides water quality data in an easily accessible format. It creates the opportunity to start weaving together water quality and quantity data

In addition, EPA is exploring options with other federal agencies to establish a common approach for sharing sensor data (both quantity and quality)

Portal Next Steps

Development

- Standardize analytical method metadata with USGS National Environmental Methods Inventory
- Identify additional data sources - biological and habitat data
- Improve mapping interface and NHD based searches
- Improve data QA/QC
- Discuss continuous data solution
- **Provide tools that leverage Portal web services**

Outreach

- NWQMC meeting in Cincinnati, OH (2014)
- Highlight new community tools
- Promote data sharing

Integrated Watershed Approach - Water Quality Framework

The Water Quality Framework is a new way of thinking about how EPA's data and information systems can be better integrated to more effectively support water quality managers.

Goal: to streamline water quality assessment and reporting while providing a more complete picture of the nation's water quality



Framework: Enabling Federal Data Sharing Network for Sensors

EPA is seeking to partner with other federal agencies, states, and tribes to enable a federal data sharing network

EPA's specific focus will be on water quality sensors, but the solution should work for other sensors (i.e. snowpack, reservoir height, stream gaging, etc.)

USGS has already made significant progress in this direction with their sensors, and we'd seek to follow a similar strategy

We seek to use an open-source data model for sharing sensor data

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