

Water Quality Data in Practice: The U.S. Experience and the Water Quality Exchange

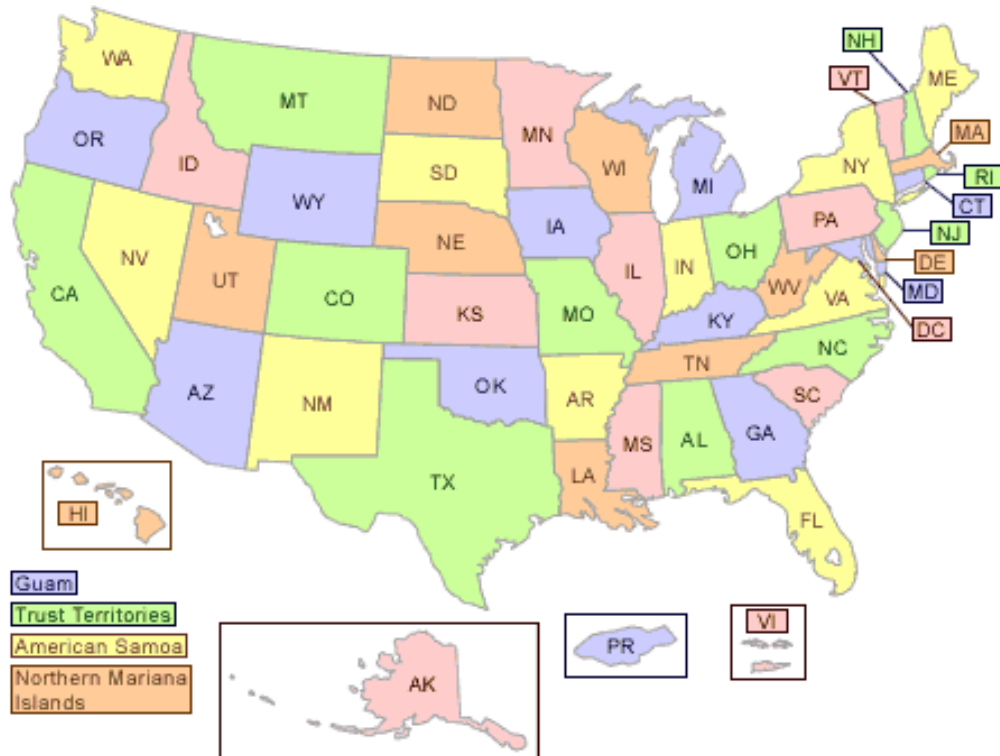
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Outline

- Background on Water Quality Monitoring and Policy in the U.S.
- History of Water Quality Data Sharing in the U.S.
- What is the Water Quality Exchange
- Role of the Water Quality Portal
- Role of Application Program Interfaces
- What about Sensor Data?
- Pulling Data Together (How's My Waterway)

Background on Water Quality Monitoring



- Federal/State/Tribal Relationship and water quality monitoring
- States and Tribes perform collect water quality samples and perform assessments with Federal oversight
- EPA promotes consistency in data collection and sharing, but with few regulatory 'requirements'

History

- Water Data Sharing goes back to the 1970s with a mainframe system called Legacy STORET. Lasted until 1998.
- From 1998-2007, EPA provided a distributed database (STORET) for partners to use to manage their data; partners could then send a 'copy' of their database to EPA
- Numerous issues:
 - Partners didn't buy-in to using the EPA database
 - "Keeping up with technology" was exceptionally difficult
 - Trying to build one system that met everybody's needs resulted in an overly complex system
- 2005 we began the development of the Water Quality Exchange

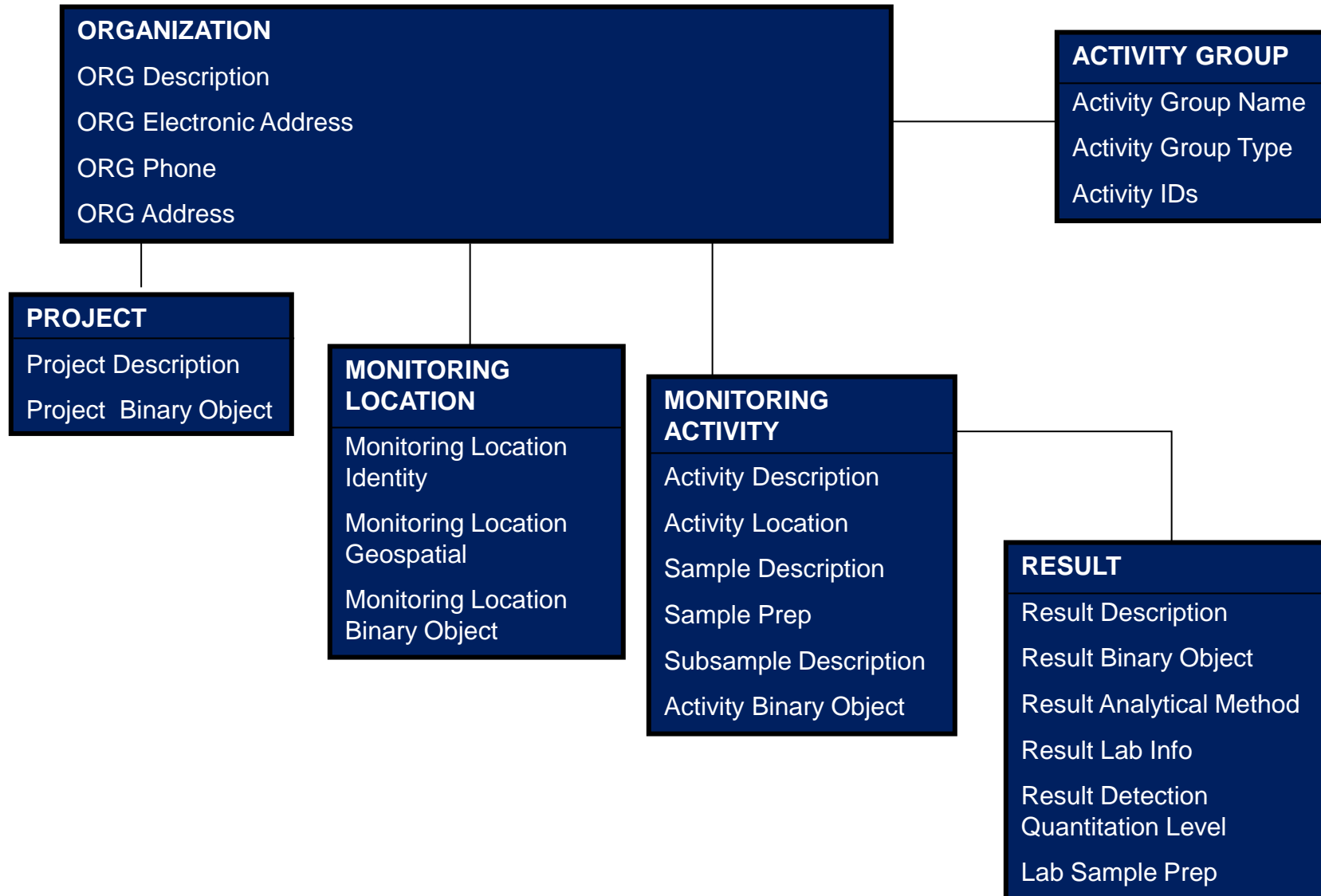
What is WQX?

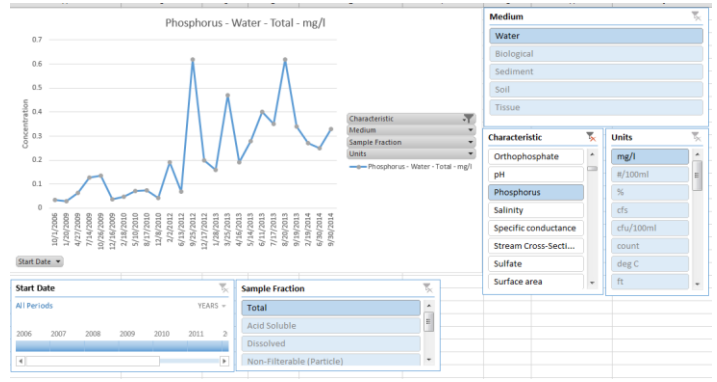
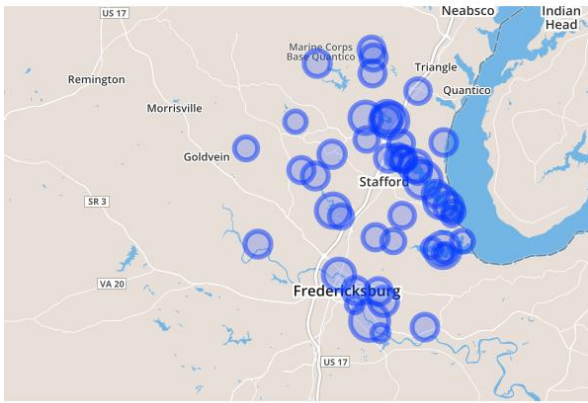
- WQX is a 'standards' based approach for sharing water quality monitoring data
- WQX defines a common data model for communicating water quality data (sample data)
- Designed to be automated
- The structure of partner data systems don't matter, so long as they can map to WQX
- WQX also provides a standard format for publishing data

WQX Tells a story about water quality monitoring

- WQX captures the following information:
 - Who: Who's conducting the sample
 - What: What did they sample
 - When: What time of year or day was the sample taken
 - Where: Where was the sample taken
 - Why: What was the purpose of the monitoring
 - How: How was the sample collected, how was the sample analyzed

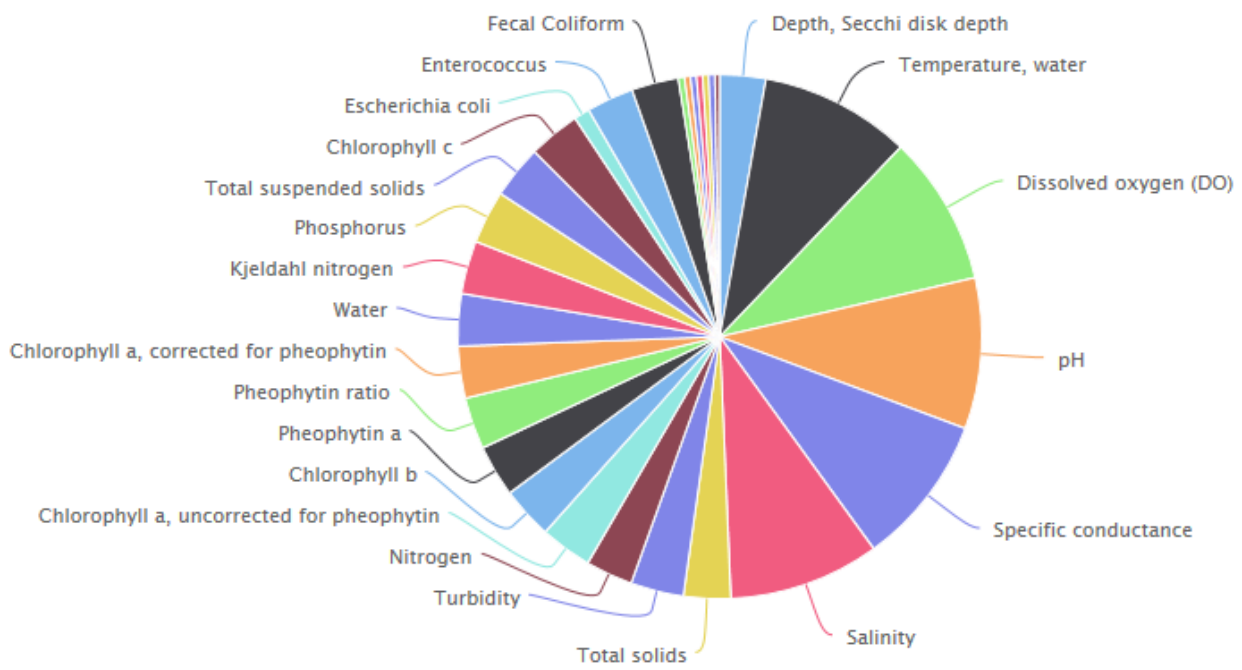
WQX Data Model





WATER QUALITY PORTAL

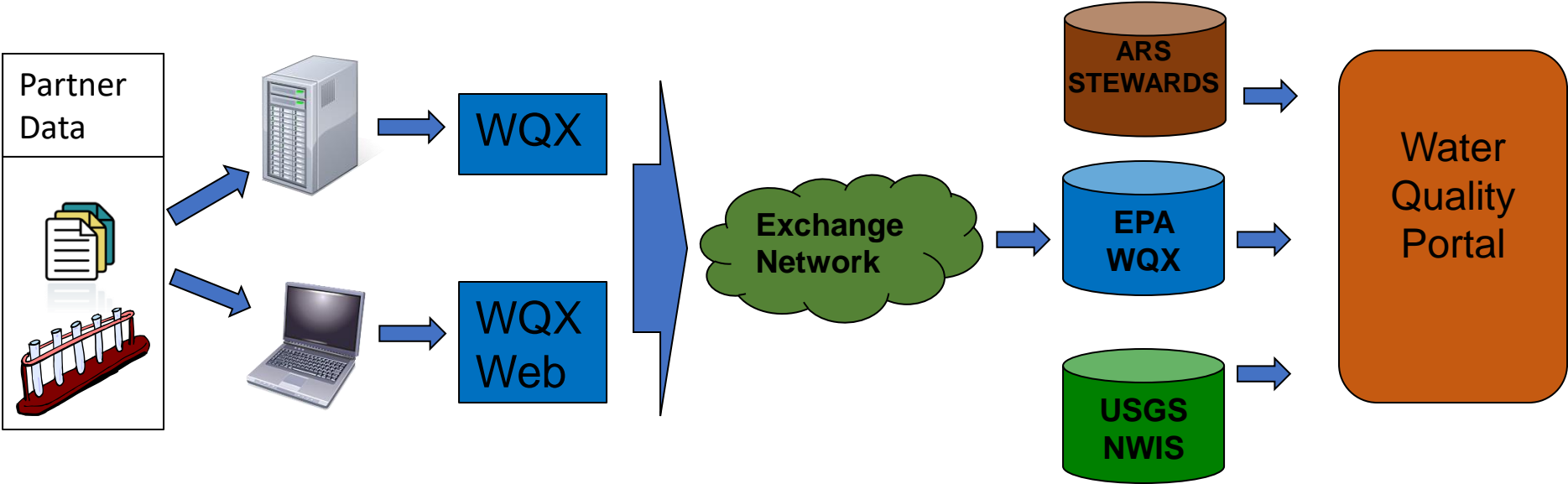
INTEROPERABLE SAMPLING DATA



What is the Water Quality Portal?

- One-stop shop for water quality monitoring data (both data shared with EPA through WQX (over 400 partners) and USGS data)
- Contains over 425 million water quality results collected at over 1,000,000 monitoring locations
- Data use common terminology across USGS and EPA data
- Is built upon an API (Application Program Interface) approach allowing integration with other applications
- Simple user interface available at <https://waterqualitydata.us>
- Provides data back in multiple formats (Excel, tab separated, comma separated, KML, and WQX format)

WQX and Water Quality Portal in Context

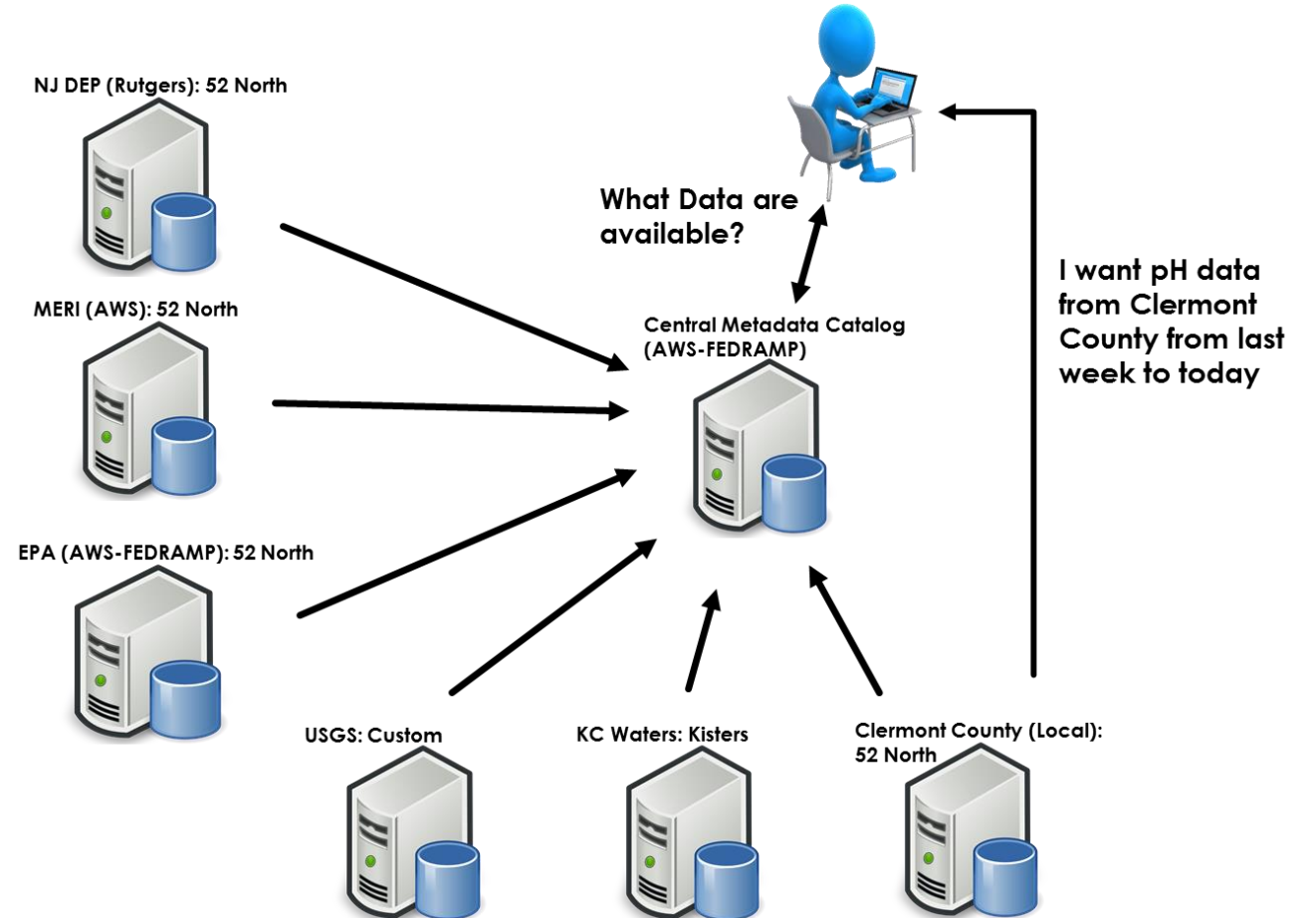


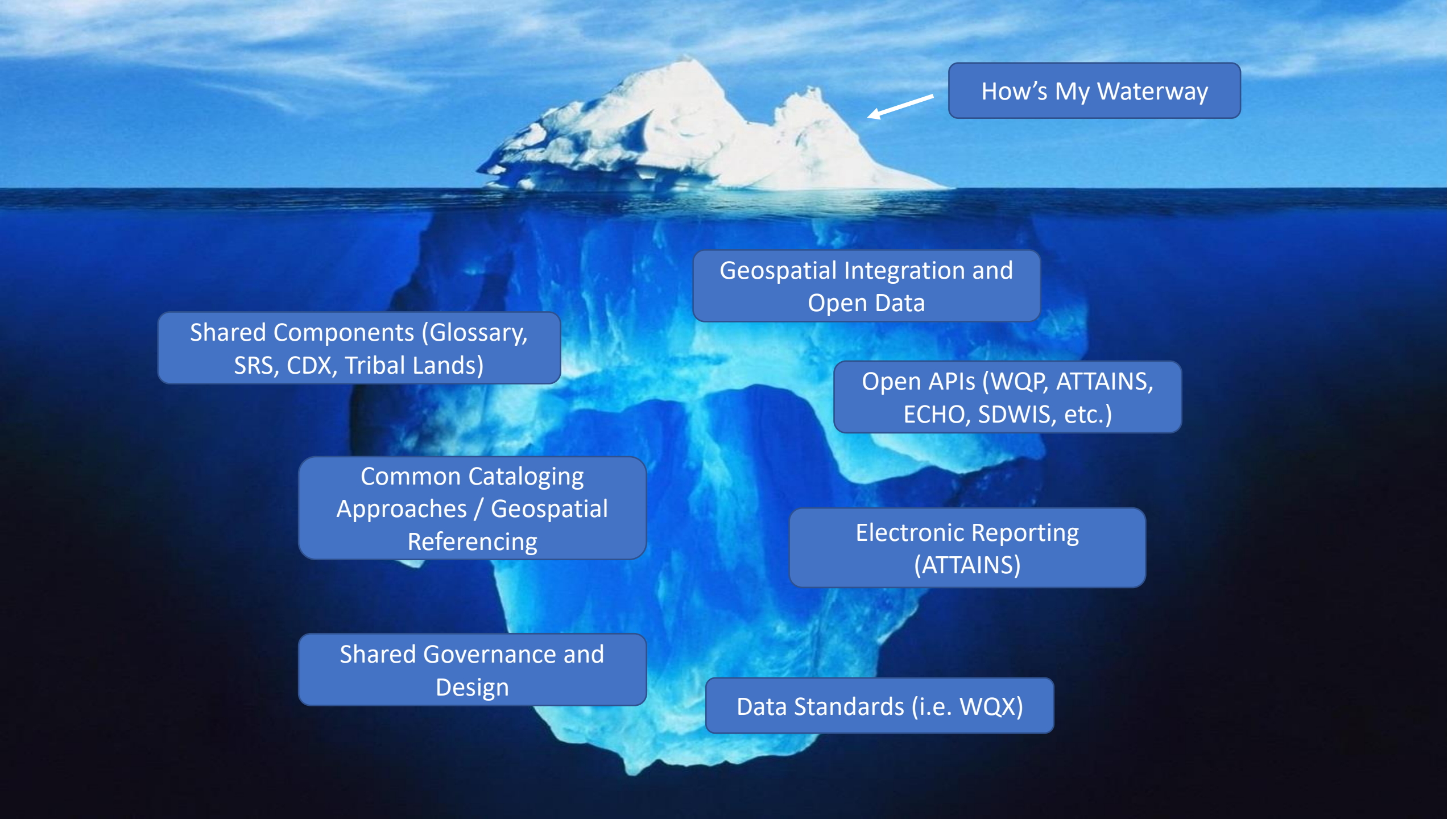


What about Sensor Data?

How do you solve the problem of multiple data providers with large amounts of data that have the potential to change every 3-15 minutes?

- Used a central catalog/index that references every data owner's assets with the corresponding metadata for each sensor
- Allowed for quick searching and discovery of available data
- This approach is similar to how Google allows you to search the internet
- Actual data comes from the partners systems in real-time





How's My Waterway

Geospatial Integration and Open Data

Shared Components (Glossary, SRS, CDX, Tribal Lands)

Open APIs (WQP, ATTAINS, ECHO, SDWIS, etc.)

Common Cataloging Approaches / Geospatial Referencing

Electronic Reporting (ATTAINS)

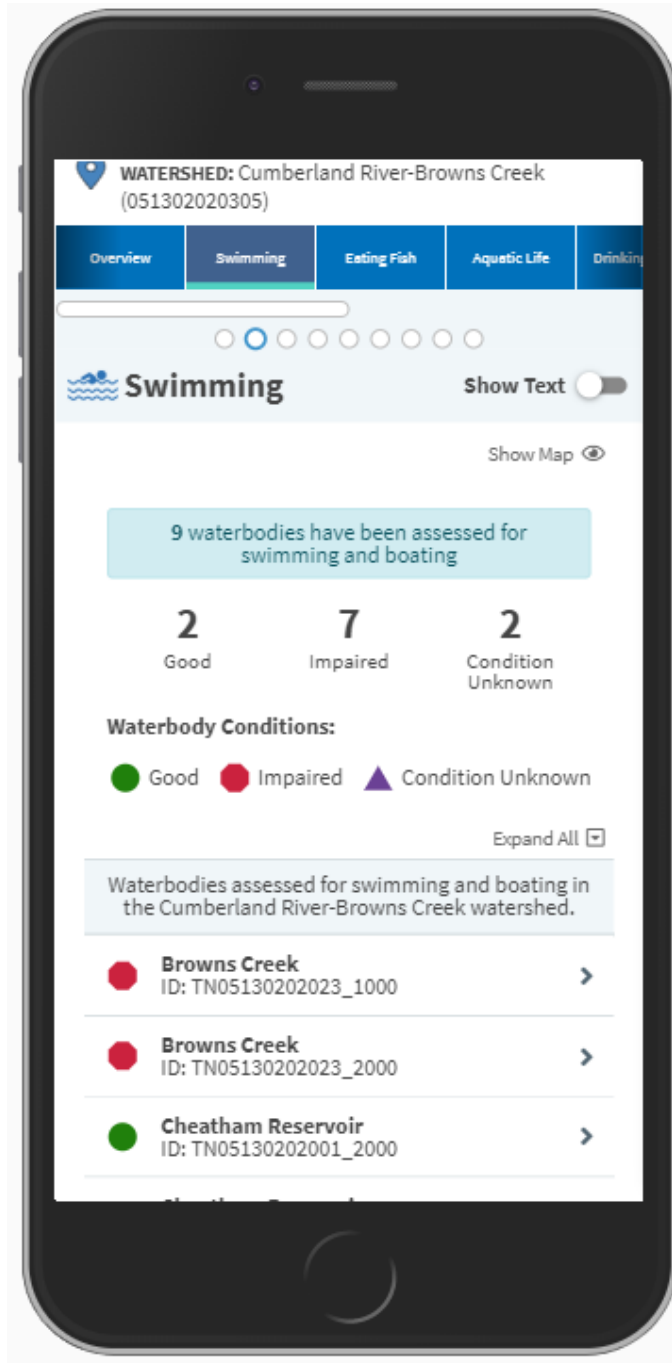
Shared Governance and Design

Data Standards (i.e. WQX)

How's My Waterway: Principles

- All information is based on a service (API First Strategy)
- Data standards matter
- Mobile first design
- Integrate data across systems
- Shared ownership between states/tribes/EPA
- User centered design
- Strategy for navigating 'Change'

<https://mywaterway.epa.gov>



Workshop Series on Water Quality Monitoring – Opening Workshop



Thank you!

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