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Advisory Committee on Water Information

Subcommittee on Spatial Water Data Report to the Federal Geographic Data Committee Coordination Group

Al Rea, USGS

Ed Clark, NOAA

May 8, 2018

The Value of Water Information Sharing

Potential Value = (data x quality) sharing

- From blog post by Stu Hamilton, Aquatic Informatics:

http://aquaticinformatics.com/blog/hydrology/unbounded-data-value/

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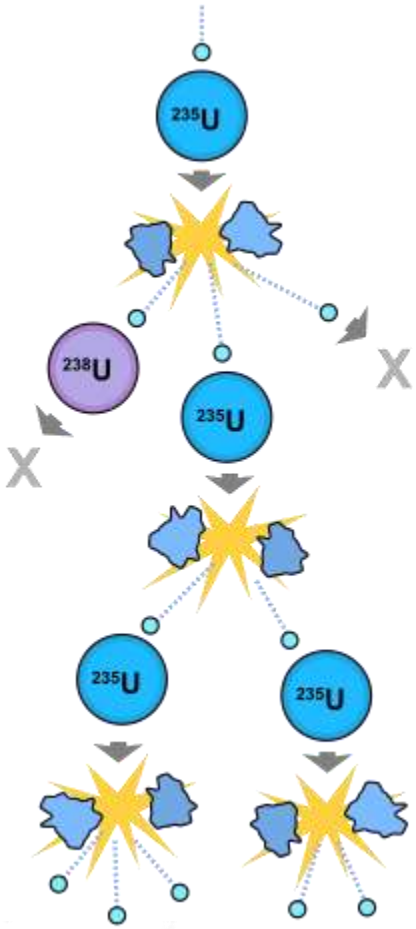
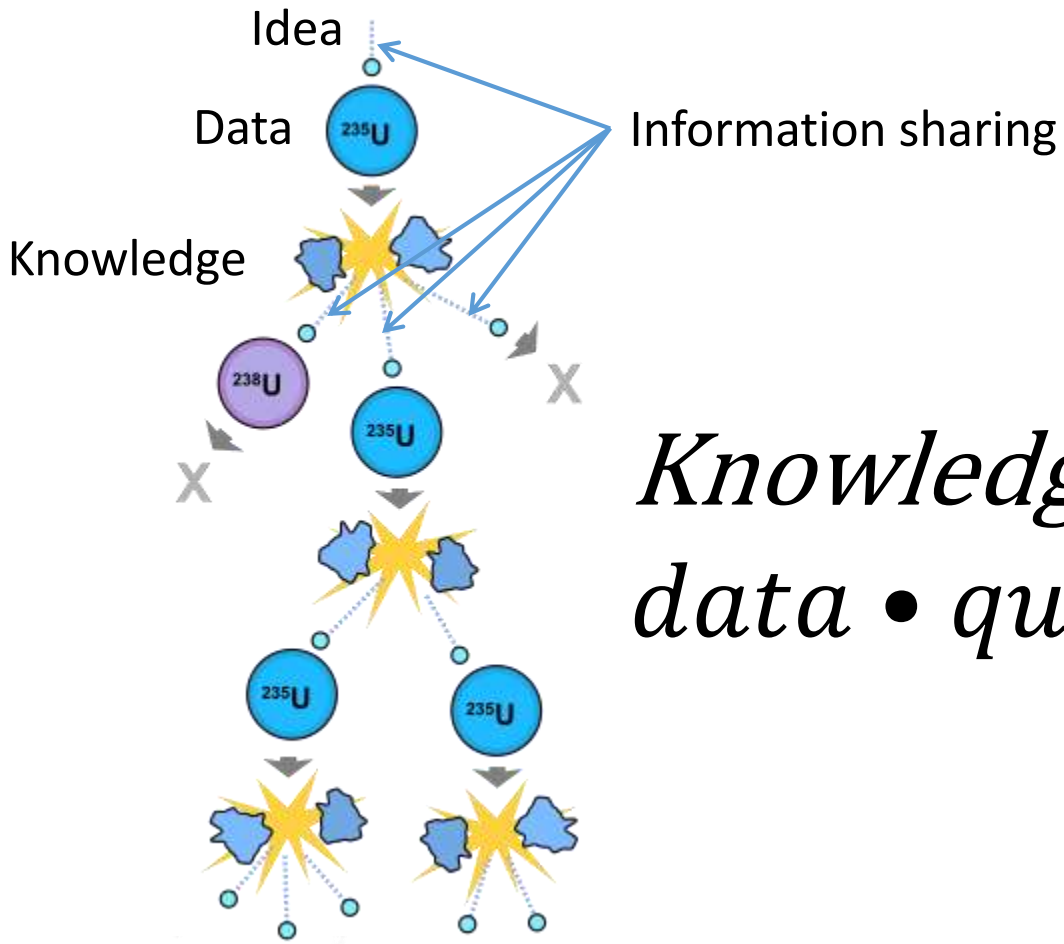
Chain Reaction—an example from Physics



$$E = mc^2$$

Information Sharing Chain Reaction



$$Knowledge = data \bullet quality^{InfoSharing}$$

How can we facilitate water information sharing?

- Discoverability
  - Standard frame of reference – NHDPlus HR
  - Search engine for water data – NLDI
- Interoperability
  - Network navigation functionality
  - Data exchange via web services

Open Water Data Initiative (OWDI) Roadmap

Open Water Web

Water Data Catalog	Water Data as a Service	Enriching Water Data	Community for Water Data,Tools
Find Source Data	Consensus Standards	Network Routing	Marketplace for Knowledge
CreateThemes	Visualization and Delivery	Coupling Models	UsageTracking
Recruit / Engage Partners	Catalog and Serve	Geospatial Framework	Best Practices

OWDI Use Cases

Use Case 1:

National Flood Interoperability Experiment

Completed

Use Case 2:

Drought Decision Support System

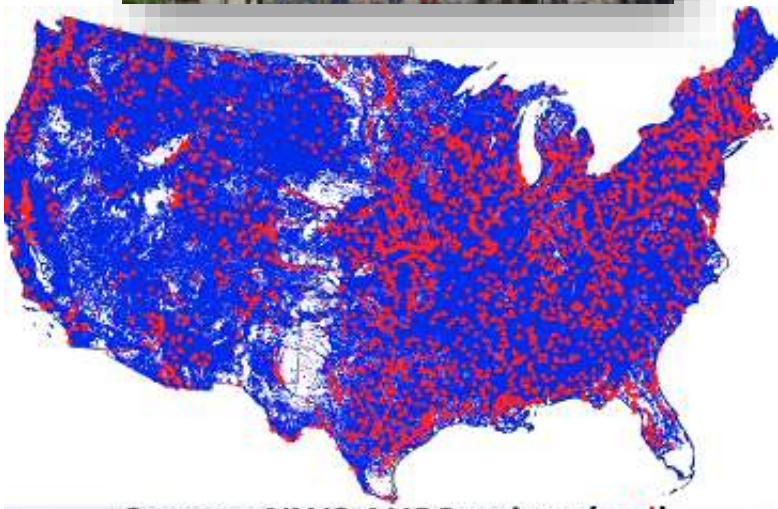
Paused

Use Case 3:

Spill Response Tool

National Flood Interoperability Experiment (NFIE)

- Partnership between NWS and the academic community
- Included a 2015 Summer Institute at the National Water Center for 44 graduate students from 19 Universities
- Goal - Help build a new high resolution, near real-time hydrologic simulation and forecasting model for the nation
- Results
  - Moving from modeling ~3,600 river forecast points at gages to forecasts for all 2.7 M NHDPlus flowlines – 750x the spatial resolution and better, more complete coverage
  - NWS accelerated their plans to make the National Water Model operational



Current NWS AHPS points (red)
NWM output points (blue)

CUAHSI
UNIVERSITIES ALLIED FOR WATER RESEARCH

Drought Use Case Work Group

Public release of USBR data portal: Reclamation Water Information System (RWIS)

- ❖Access to current and historical USBR water data
- ❖Machine readable data downloads
- ❖Web services and API
- ❖https://water.usbr.gov/

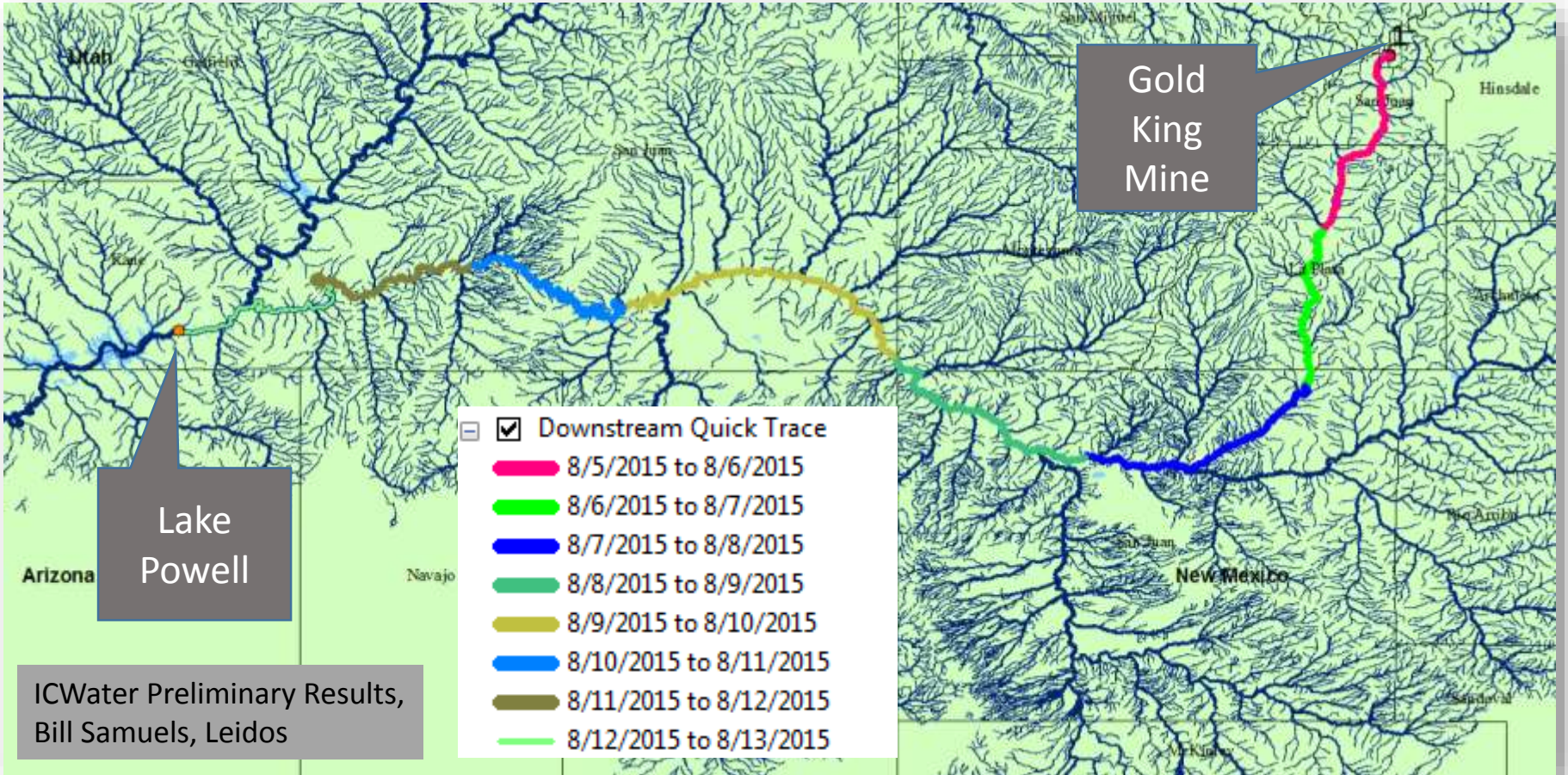
Reassignment of Bureau of Reclamation personnel

- ❖Need USBR participation on SSWD
- ❖Need someone to lead Drought work group

Spill Response
Gold King Mine Spill

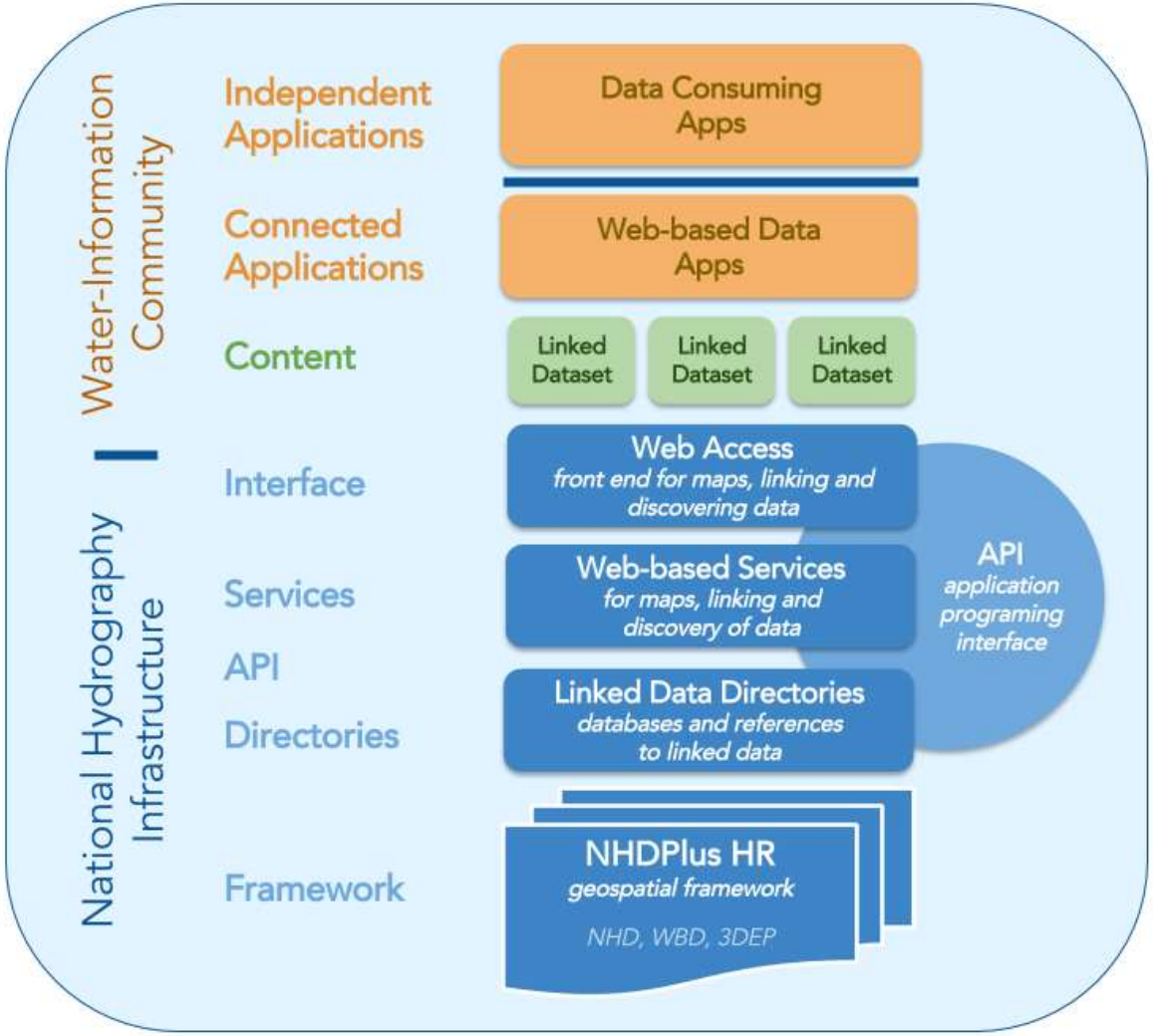
Identifying datasets for use case, ex. improving time of travel estimates

ICWater on desktop – ultimate goal to provide as a web service



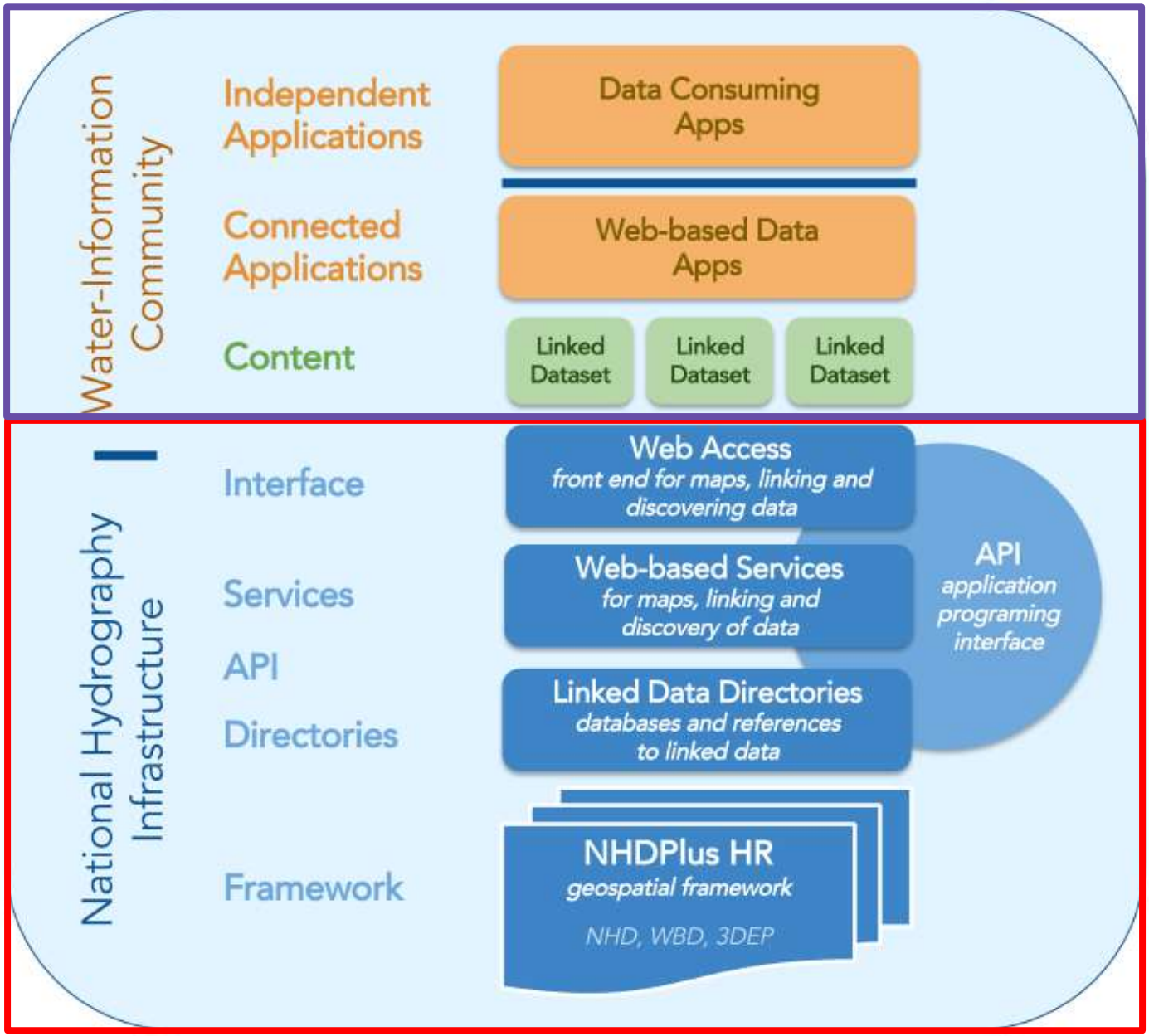
ICWater Preliminary Results, Bill Samuels, Leidos

A System Approach to Water Information



Subcommittee on Spatial Water Data

Focus of National Hydrography Infrastructure Working Group



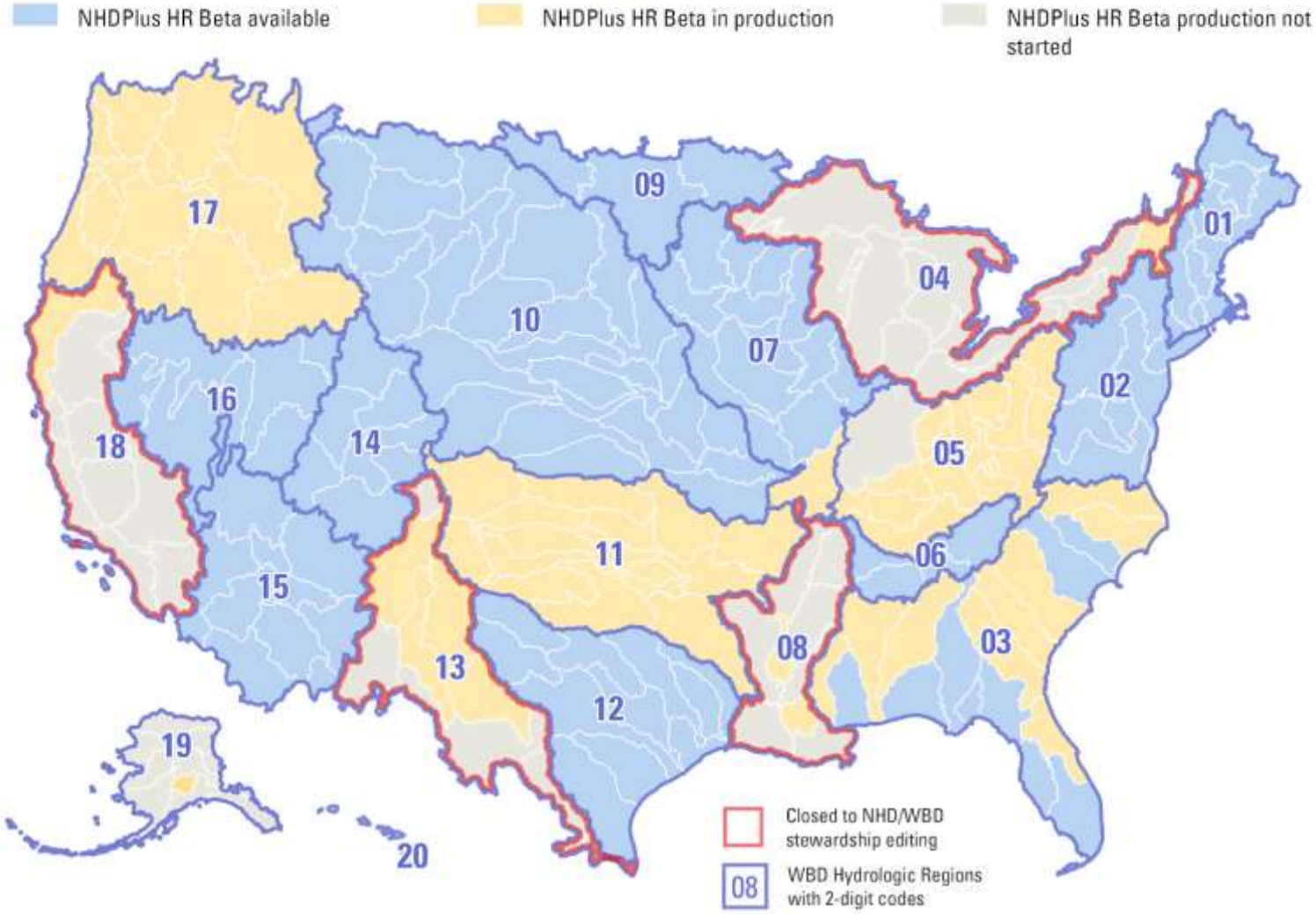
NHDPlus High Resolution Status (USGS)

Public release of Beta products began in April, 2017

- FY 18 Goal (70% of U.S.)
- Foundation of a scalable hydrographic reference framework
- Built using:
  - NHD-HR data at 1:24,000 scale or better
  - 10-meter 3DEP elevation
  - Watershed Boundaries Dataset (WBD)
- Additional data will be released as completed by drainage area
- Beginning Beta QC effort
  - Community participation is critical
  - New web-based Markup Tool will be used

USGS
science for a changing world

NHDPlus High Resolution Availability



U.S. Department of the Interior
U.S. Geological Survey

Date updated: 5/3/2018

Network Linked Data Index (NLDI)

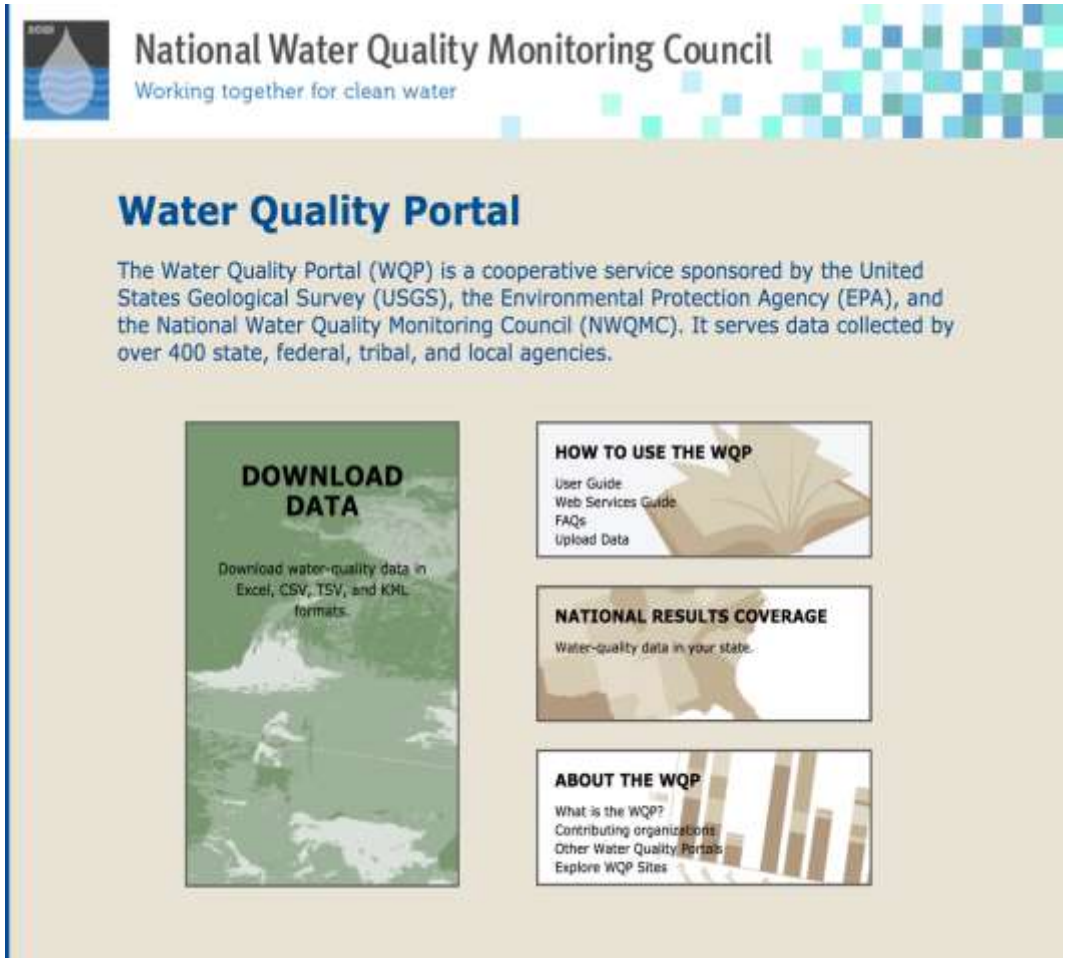
- Linked data, e.g. flow or water quality observations
- Search engine for Hydro Linked Data
  - "crawls" and indexes sources for fast access
  - Web services enable upstream/downstream queries using NHDPlus stream network
- **Web-based extensible design**—any surface-water data can be linked and shared via web services
  - Currently implemented as pre-filter in Water Quality Portal
  - Could be added to any web app
  - Currently no general-purpose front end

Network Linked Data Index—Status Update

- Available data sources:
  - NHDPlus ComID
  - HUC12 pourpoints
  - NWIS sites
  - WQP sites
- In testing data sources
  - NJ sensor network
  - NPDES
- Basin delineation
- Basin characteristics – in testing
- ArcGIS wrapper for NLDI services – in testing

Water Quality Data Discovery

Using the Hydro-Network Linked Data Index



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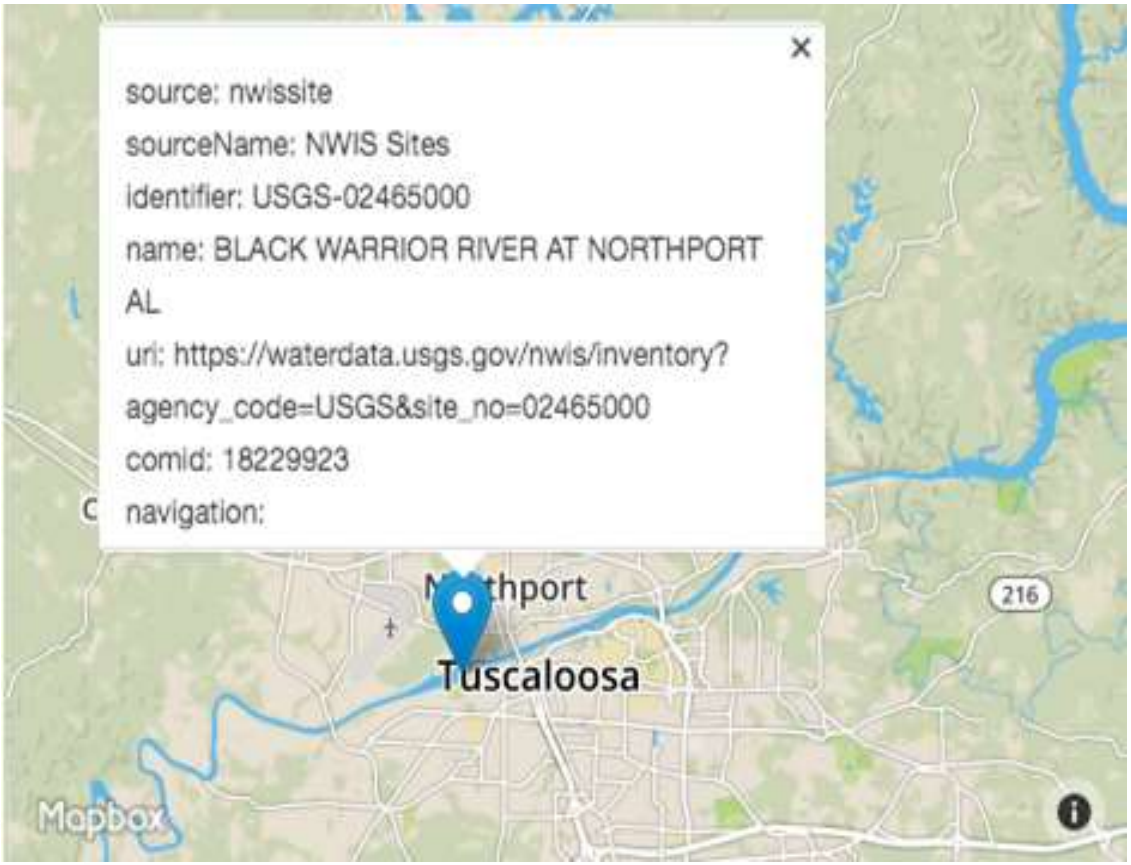
NLDI NWIS Site

https://cida.usgs.gov/nldi/nwissite/USGS-02465000



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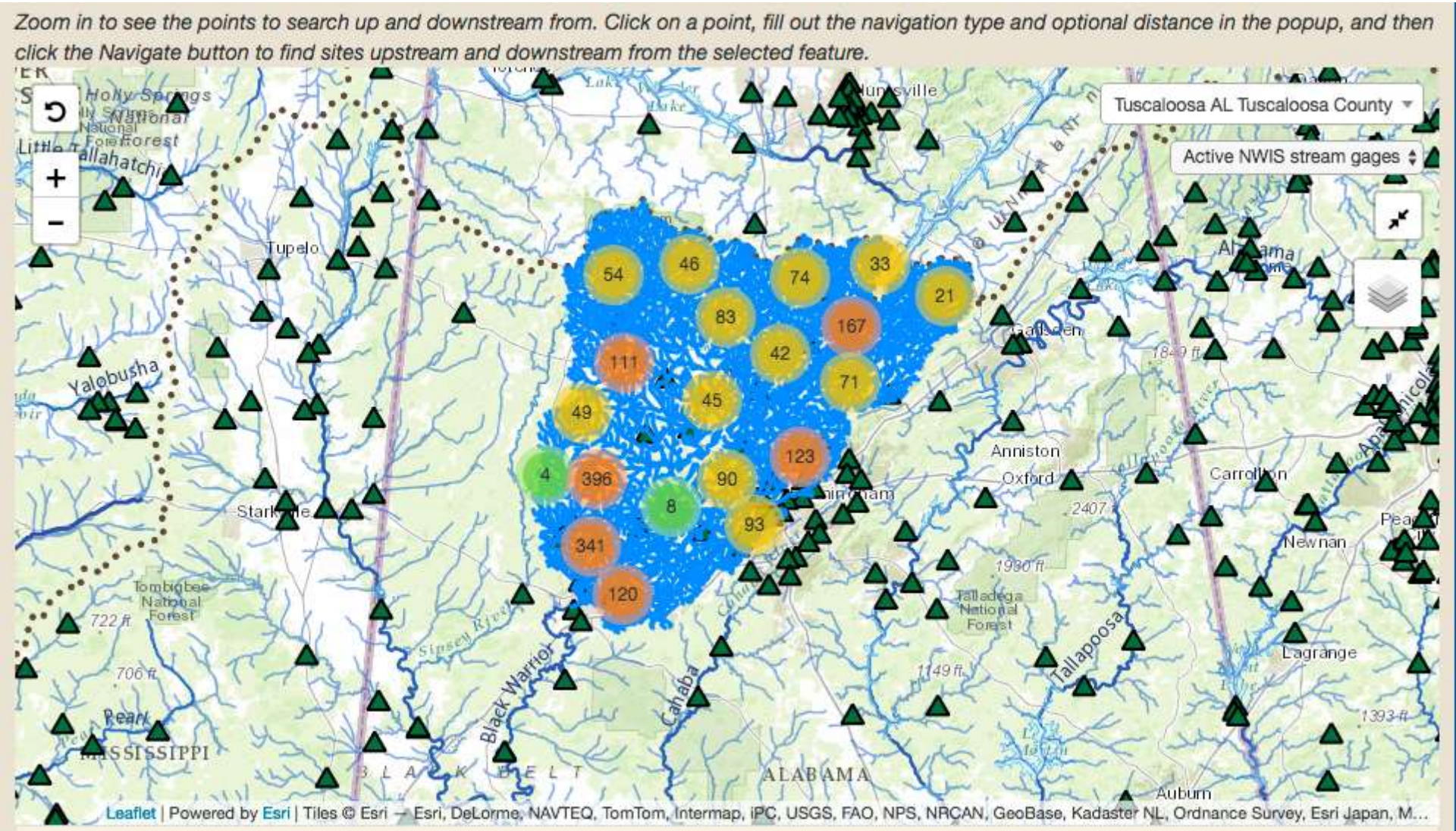
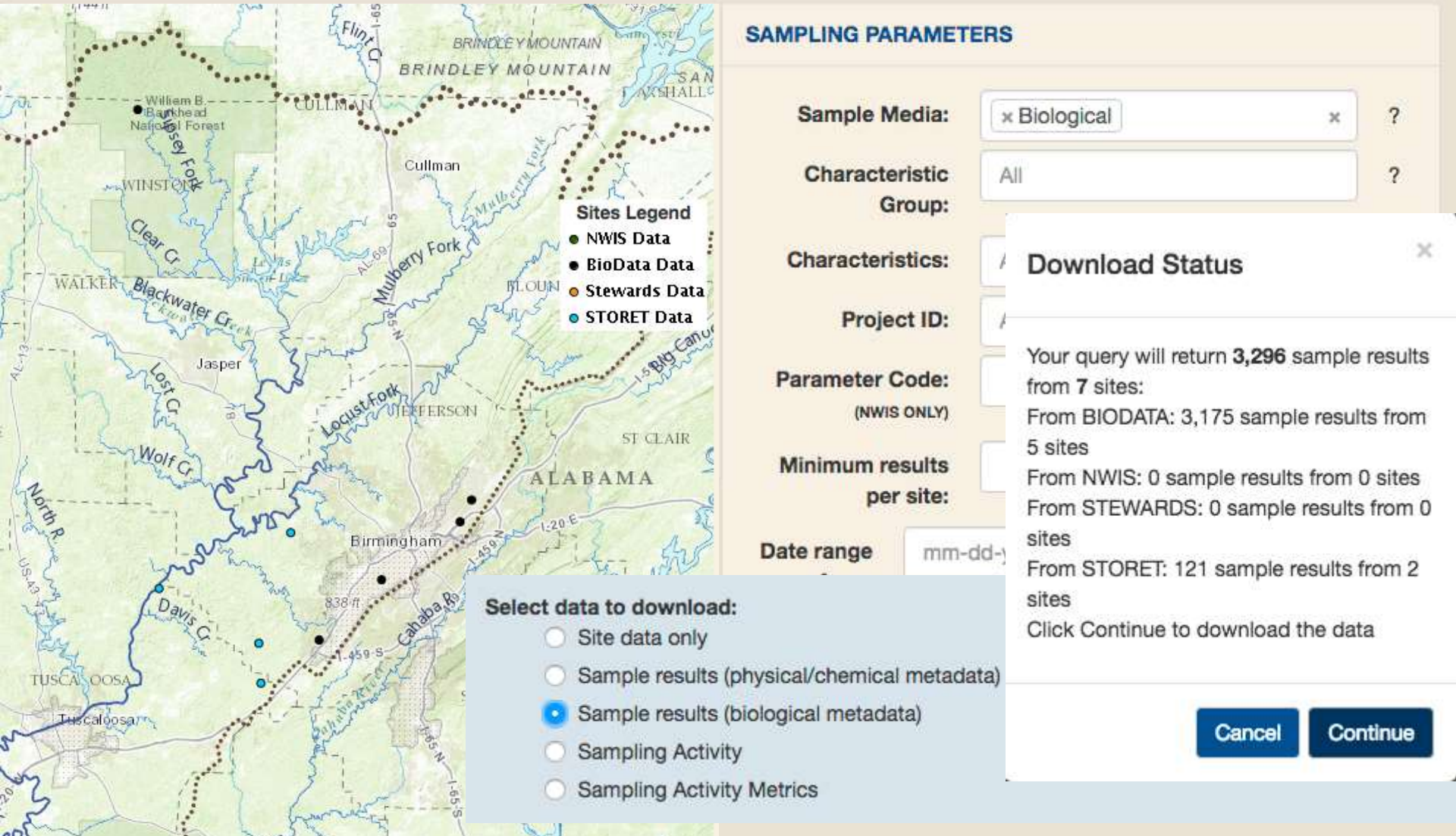
Water Quality Data Discovery

Using the Hydro-Network Linked Data Index



Water Quality Data Discovery

Using the Hydro-Network Linked Data Index



https://cida.usgs.gov/nldi/nwissite/USGS-02465000/navigate/UT
https://cida.usgs.gov/nldi/nwissite/USGS-02465000/navigate/UT/wqp
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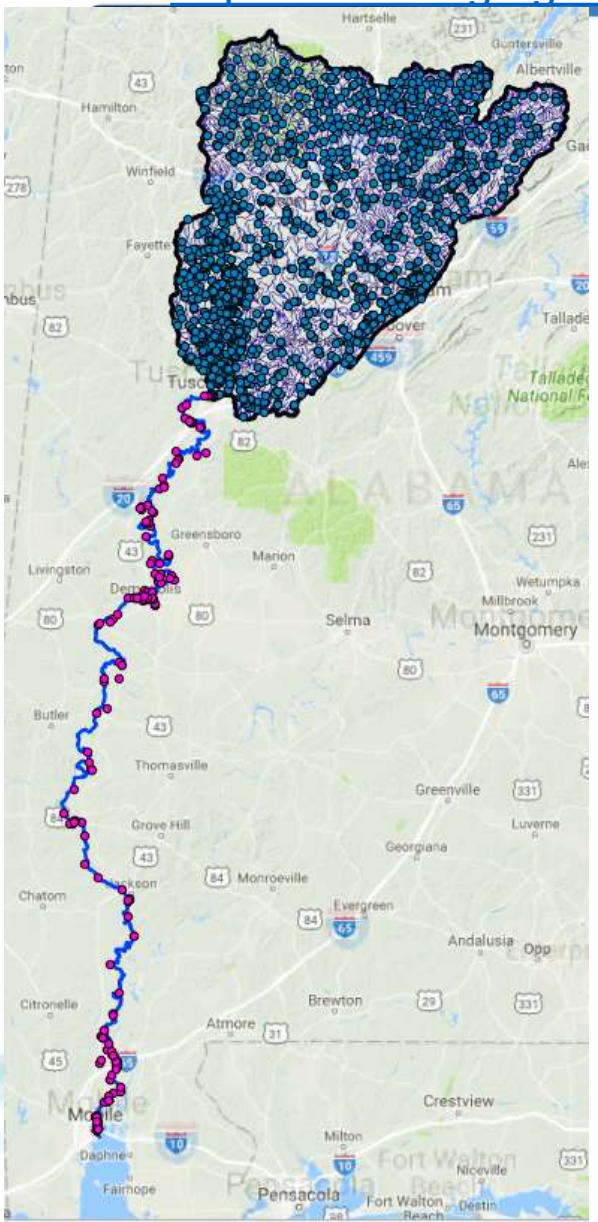

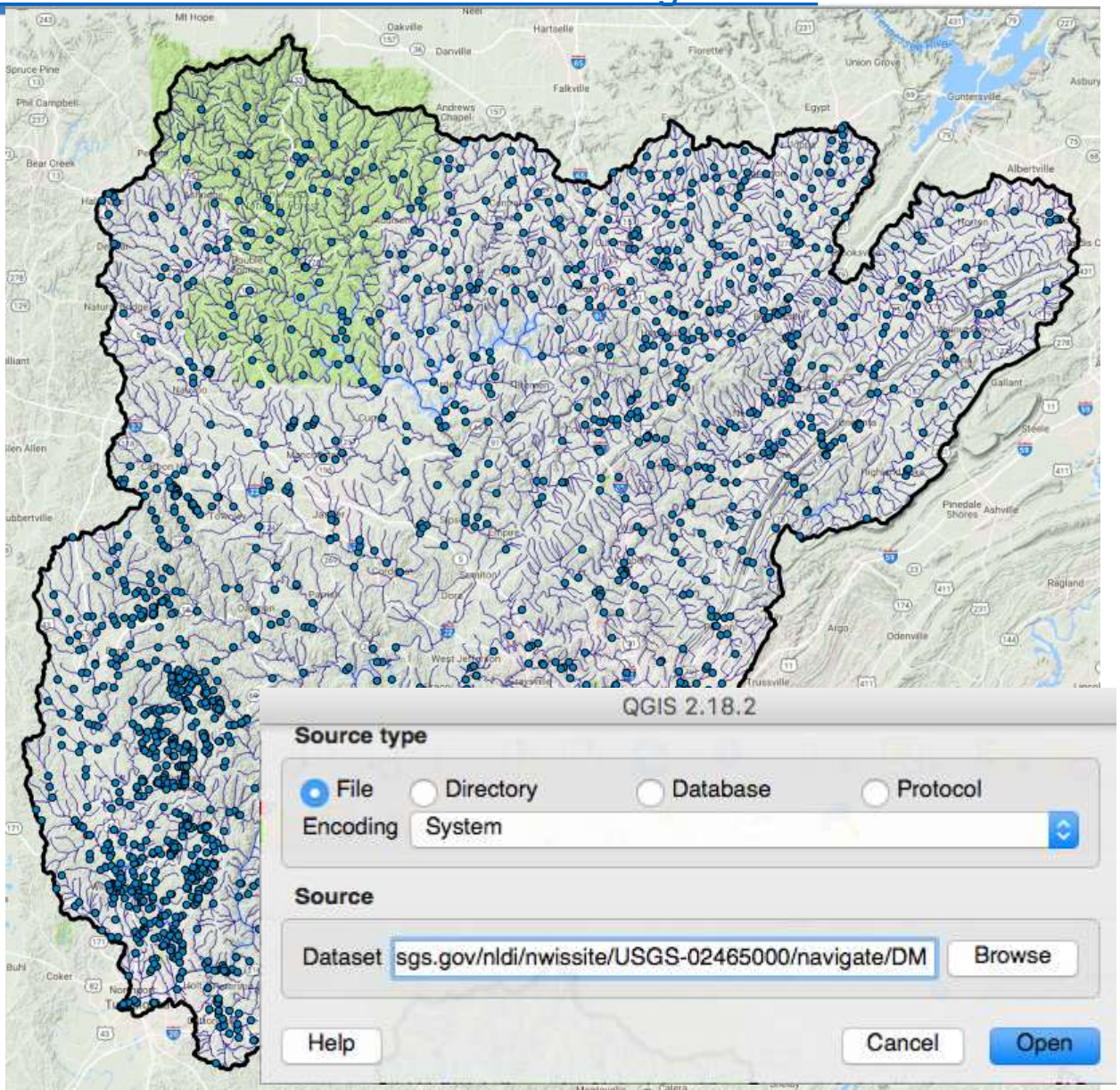

NLDI is embedded in the Water Quality Portal

- https://www.waterqualitydata.us/

- Enables entirely new queries, e.g. “All metals analyses downstream of X,Y for 500 km”

NLDI Additional Information

- https://owi.usgs.gov/blog/nldi-intro/
- https://cida.usgs.gov/nldi/about

- jkreft@usgs.gov
- dblodgett@usgs.gov

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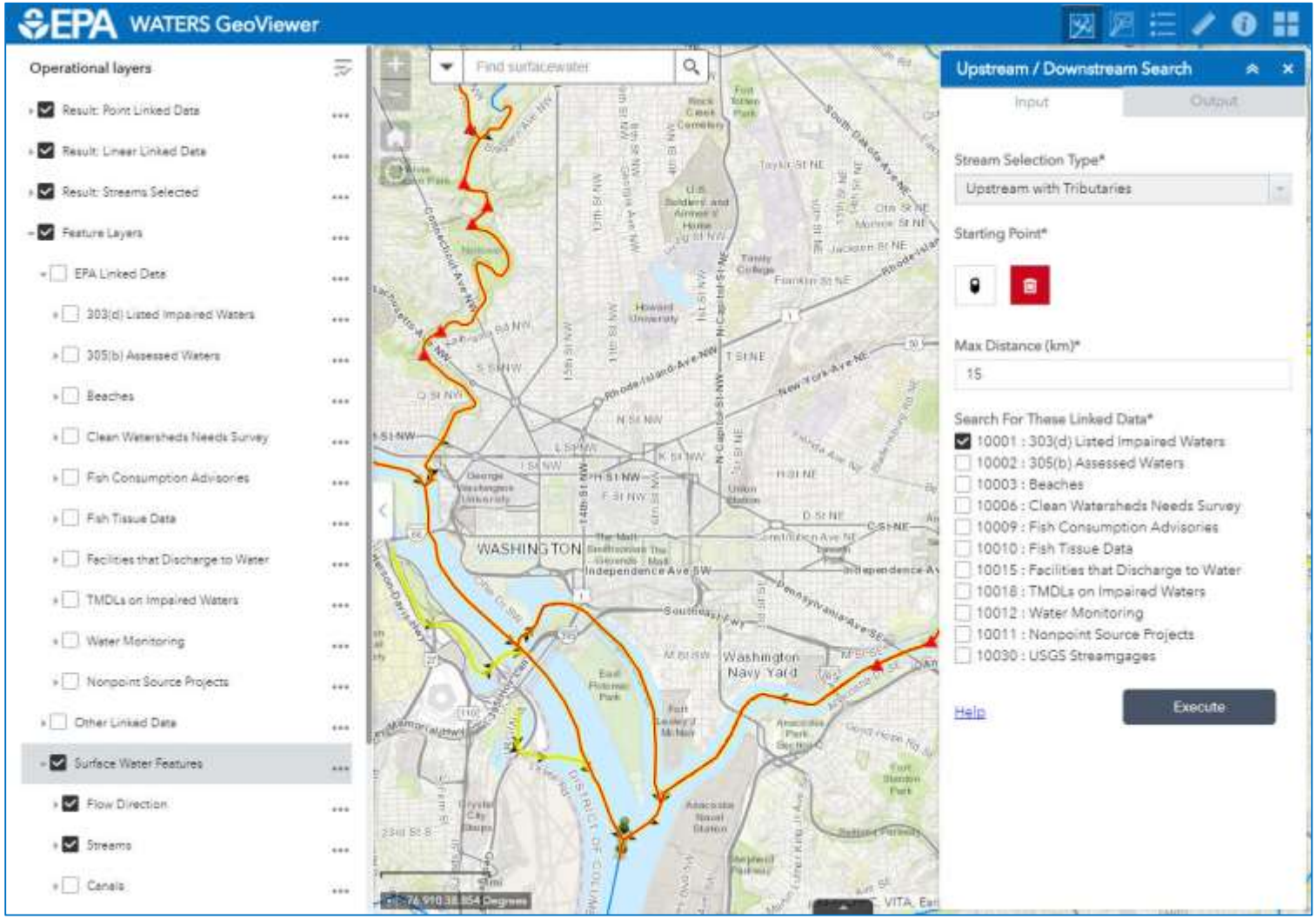
A similar application: EPA's WATERS GeoViewer



https://www.epa.gov/waterdata/waters-geoviewer

NLDI Current Capabilities

- What can you do with this now?
  - Water Quality Portal is initial application
  - EPA's WATERS GeoViewer is a general browse and query app for NHDPlus Medium Resolution (1:100,000)
  - NLDI for NHDPlus HR is being researched
- Reference your data to NHD (MR or HR)
  - Linked data (e.g. water withdrawals, permits, water rights)
  - Hydro Event Management (HEM) desktop application
  - Web-based tools in development https://maps.usgs.gov/hydrolink/

Linked Data Challenges

Planning for support and scaling up of common spatial data infrastructure

- ❖ Develop similar services for NHDPlus HR
- ❖ Where should NLDI services be hosted?
- ❖ Plan for scaling up based on demand
- ❖ Further development of functionality
- ❖ Further development will require funding support

inlandwaters.geoplatform.gov is a possibility, but can it support the load long-term?

Possible New Use Case

Inland bathymetric data

- ❖ Strong interest from many parties
- ❖ Short term – inventory existing bathy data, link to NHD
- ❖ Longer term
  - Data model and standards development
  - Develop a strategy to acquire widespread bathy data

For more information

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