

Environmental Information



EN2015

Improving Access to Utah Water Chemistry Data

Paul Inkenbrandt, *Utah DNR*

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Supporting the Business of Environmental Protection

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<http://www.exchangenetwork.net/en2015>

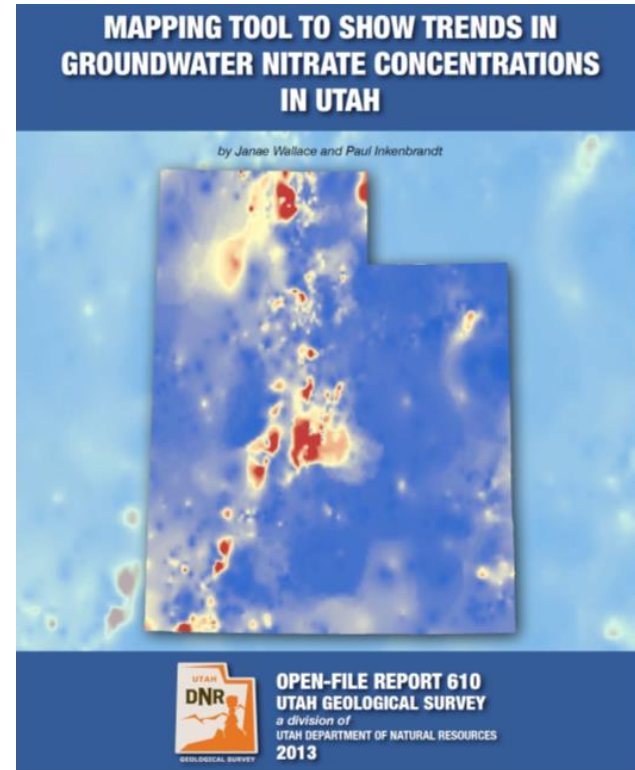
ABSTRACT

The Utah Geological Survey is working to make state and federal water chemistry data (including SDWIS and NWIS databases) consistent and provide those data to the WQX and public users in an efficient and geographic format, served up via a web portal. We are also creating open-source, Python-based scripted tools to analyze those data.



Impetus

- Work funded by the Utah Division of Drinking Water
- Compile and interpolate nitrate data throughout the state of Utah
- Created a (buggy) toolset using ArcGIS ModelBuilder that allowed for compilation and interpolation of nitrate values over space and time.



<http://files.geology.utah.gov/online/ofr/ofr-610.pdf>

Problem

- When conducting the former project on nitrate and other similar projects, we encountered many issues:
 - Data unit/type consistency
 - Format consistency
 - Geospatial availability
- The process to send data from Utah Division of Drinking Water to the EPA took some time and required a lag

Problem

- Utah agencies need an efficient flow of data from the field to the end user via a geographic-based web portal.
- This not only includes the SDWIS (public water supply db) data flow, but also WQX (general water quality db).
- While the data are eventually reaching the EPA,
 - the lag can be significant,
 - and some of it is never accessed by the public

Goals

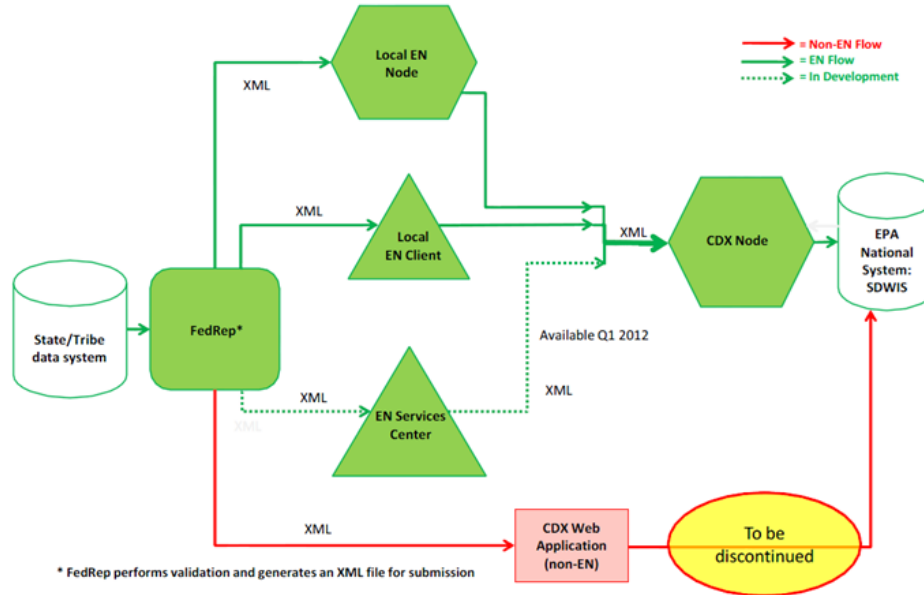
1. Implement an automatic flow of data from the SDWIS to the EN.
2. Create a public portal to access compiled water chemistry data in an intuitive geospatial interface.
3. Create tools that examine compiled statewide water chemistry data for notable spatial and temporal trends.

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Goal 1: SDWIS EN Flow

Exchange Network Flows: Safe Drinking Water Information System (SDWIS)



EXCHANGE NETWORK (EN) OPTIONS:

- Submit an XML file via FedRep to CDX through a local EN Node, EN Client or the Services Center when it is available.
- Other EN submission methods are possible (e.g., directly via a local EN node or client), but are not commonly implemented.

NON-EXCHANGE NETWORK OPTIONS:

- Submit an XML file via the non-EN CDX Web Application. This is presently the most common submission path. This pathway will be discontinued once the EN Services Center is available.

Goal 1: Progress So Far

- Mike Casey and Rob Sandberg have successfully coordinated repair of the Utah DEQ node!
- Contractors have repaired the node under budget and have money left for schema alterations
- Rachael Cassidy and Rob Sandberg have researched schemas and are optimistic about setting up an efficient flow for SDWIS.

Goal 1: What's Next?

- Contact support personnel at the EN to discuss the future of data flow for SDWIS
- Implement reporting workflow from DDW to the node (EPA).
 - New schema
 - Train personnel in use of node

Goals

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Goal 2: Public Portal

- Most of the current drawdown is associated with this goal
- The AGRC is Utah's go-to agency for distribution of geospatial data
- The AGRC has been working diligently to construct the portal
- I have been working closely with those at AGRC to ensure that the resulting portal meets the needs of the end user.

Goal 2: Progress so far

- Spreading the word:
 - Utah Geographic Information Council
 - Meetings with DEQ
 - Meetings with USGS
 - NGMN Participation
 - Utah Water Data Users Group

Goal 2: Portal backend

- Making the app work:
 - Created a schema appropriate for compiling various agency data based on WQP schema
 - Created a script that pulls in different data sources and loads them into a Geospatial database
 - Created scripts that
 - remove duplicates
 - Standardize units
 - Quality check the data
 - <https://github.com/agrc/ugs-chemistry>
 - Over 170,000 lines of code

Goal 2: Data Compiled

- **Utah Agencies:**

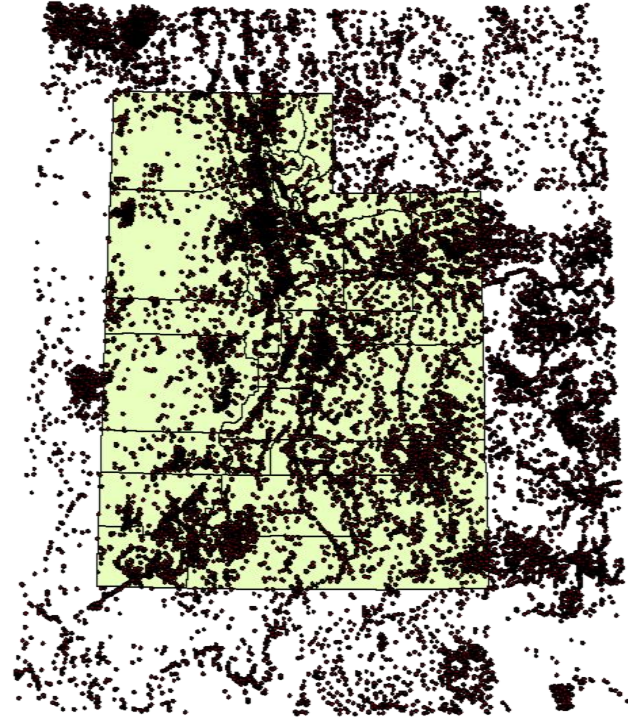
- Division of Oil, Gas, and Mining
- Division of Water Rights
- Geological Survey
- Division of Drinking Water (SDWIS)
- Department of Food and Agriculture

- **Federal Data:**

- Water Quality Portal
 - essentially USGS and WQX data
 - <http://maps.waterdata.usgs.gov/mapper/>
 - <http://www.waterqualitydata.us/portal.jsp>

Goal 2: Geospatial

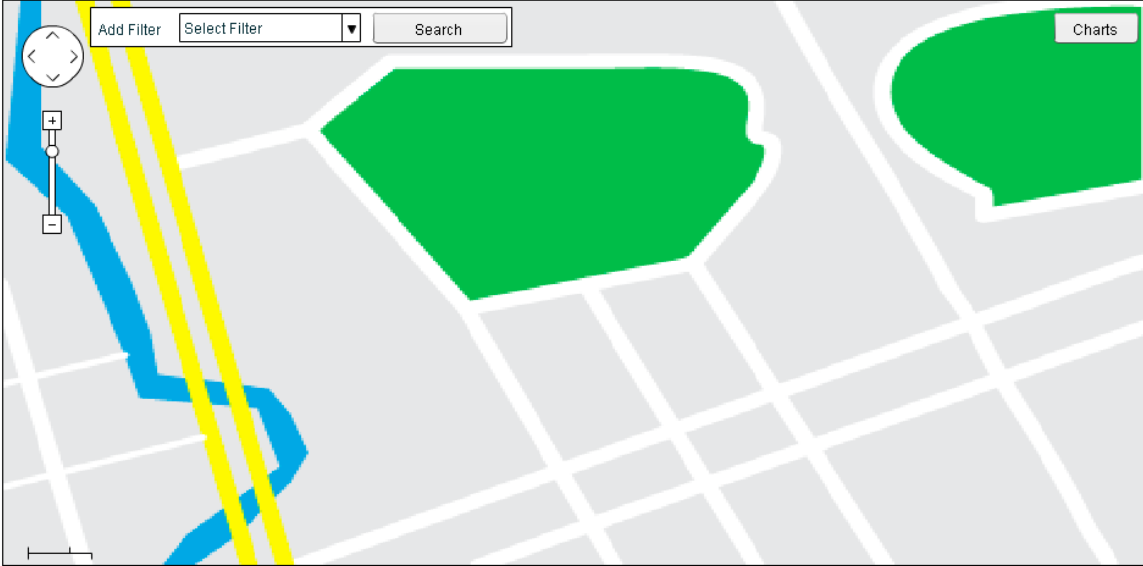
- Over 41,000 stations
- Over 12 million records



Goal 2: Portal Layout

UGS Logo <Need a name to go here> login SDWIS Logo

Add Filter Select Filter Search Charts



Results Stations Download Data

Database Source	Monitoring Location Id	Monitoring Location Name	Monitoring Location Type

<http://test.mapserv.utah.gov/ugschemistry/>

Goal 2: What's next?

- Put finishing touches on the Portal backend
- Once the backend is finished and tested, Scott will finish his work on the frontend
- Then we will test and refine

Goal 2: What's next?

- Utah Department of Health
 - Improving data flow to the UGS from the DOH
 - Digital results files
- Utah Division of Oil, Gas, and Mining
 - Bettering their Portal
- Utah Division of Water Rights
 - Attaching well log and water right info to chemistry info
- National Groundwater Monitoring Network

Goals

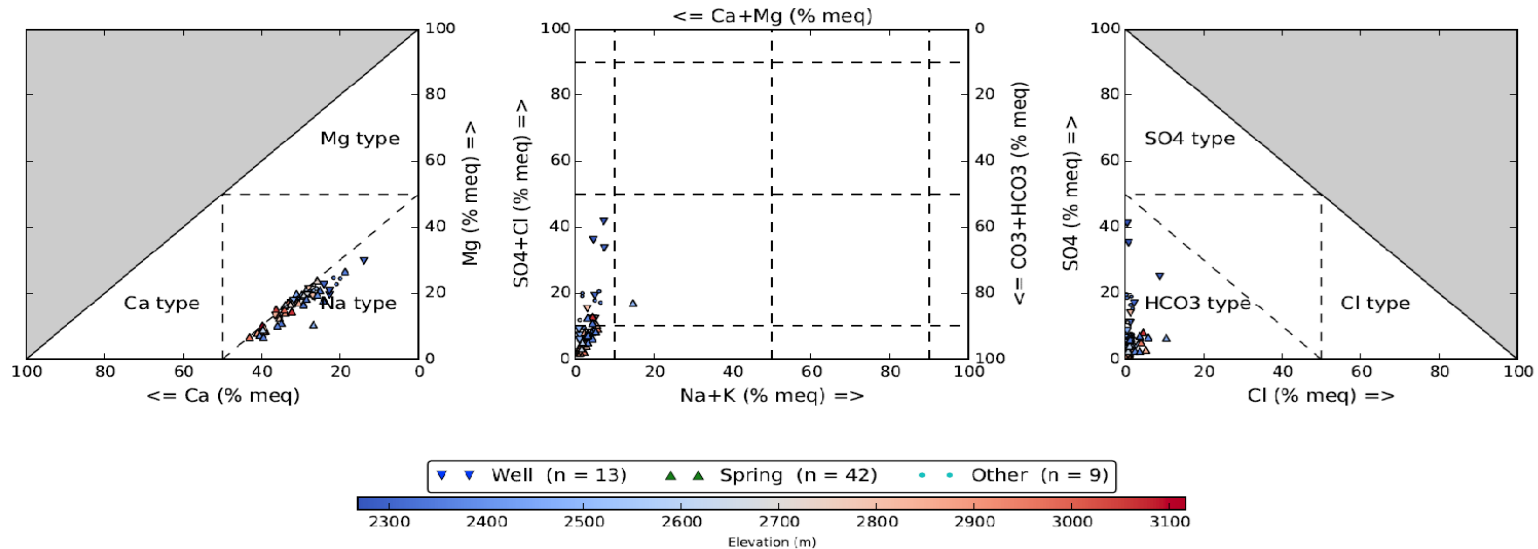
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Goal 3: Analysis Tools

- Using Python, I have created a few tools already in use.
- Once the portal is complete, we will further develop tools to analyze it
- Will also implement tools especially for SDWIS
- Most of the current tools are for use with ArcGIS, but I plan to have more open source tools.

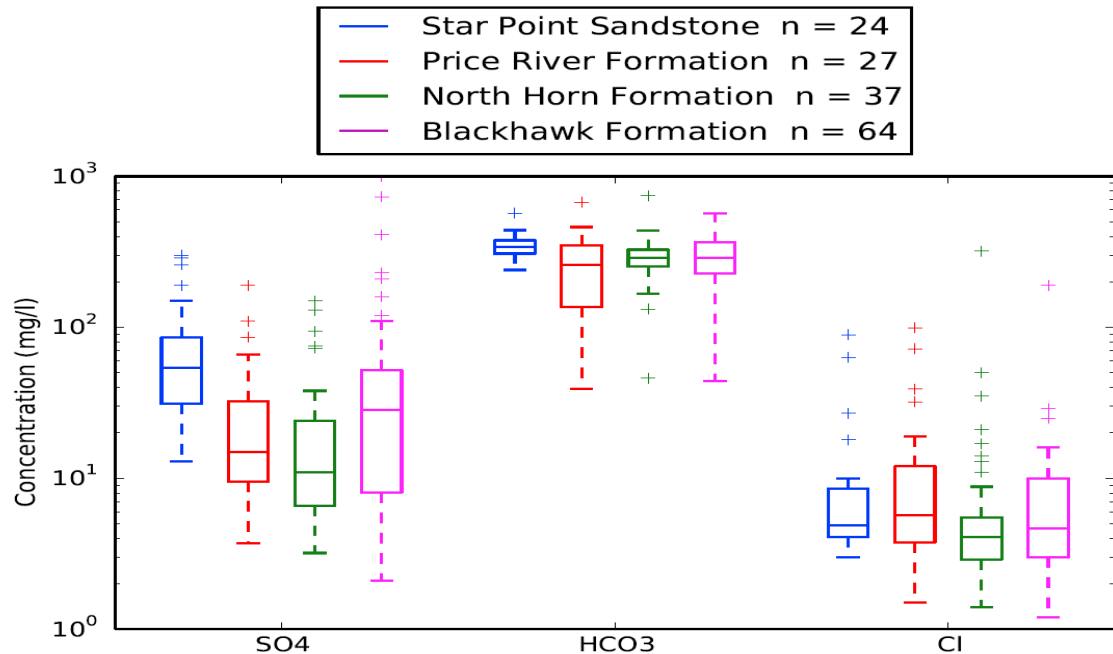
Goal 3: Analysis Tools

<https://github.com/inkenbrandt/ArcPy>



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Goal 3: What's Next?

- After completing the portal, make tools that work with the portal output.
- Make tools that are open source and easily accessible.
- Upload tools and framework to the EPA shared network sites.

Summary

- The focus of this project was to create a portal available to the public where compiled and normalized chemistry data could be easily accessed.
- End data from this portal will be compatible with federal databases and can be analyzed with open-source tools.
- Cooperation between the State of Utah and the US EPA will be improved via this portal and by future EN efforts