

Transition to WaterSTAR for Groundwater Quality Data Management

Wyoming Department of Environmental Quality

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The Hidden Costs of Data (mis)Management



- ▶ Employee Time
- ▶ Responsiveness
- ▶ Storage Costs
- ▶ Data Quality
- ▶ Decision Making

Good Data Management Recognizes Data as a Valuable Resource

“Siloing” of Water Quality Data

Every State Agency, Section, or Group is responsible for data management related to projects under their programs

➤ Groundwater Data can be found with:

- USGS
- WOGCC
- SEO
- WDEQ
- Others?

Groundwater data touched by at least 8 Programs at the WDEQ alone

➤ Different data management protocols and/or formats

- Electronic Databases
- Excel Spreadsheets
- Hardcopy Tables
- Hardcopy Lab Reports (usually included in report submittals)

EASY



HARD

Why Groundwater Data Management?

Governor's Water Strategy Initiative - Requested Agency Groundwater Data Stored in One System

- ▶ Ease of sharing data between Programs, other State Agencies and/or the Public
- ▶ Better Understanding of Groundwater Quality in a Region (or even across the street!)
- ▶ Reduction of Potentially Redundant Data Collection
- ▶ Standardization of Data Collection and Sharing
- ▶ Access to Groundwater Data Can Lead to More Informed Decision Making Regarding Permitting Activities and Remediation

Wyoming's RBDMS System

- ▶ The “One Database to Rule Them All” idea
 - ▶ Programs with existing electronic databases would continue use
 - ▶ RBDMS would pull from these databases on a nightly basis
 - ▶ Programs without databases would utilize RBDMS to warehouse data
 - ▶ A one-time upload of USGS NWIS Data
- ▶ RBDMS was envisioned to include
 - ▶ A Map Search Feature
 - ▶ Search Filters
 - ▶ Tabulated Data Display
 - ▶ Uploading of Data in an EDD format
 - ▶ Limited Data Visualization and Statistical Graphing

But There Were Issues.....

Non-Intuitive User Interface

 Browse Facility ▼

Details Water Levels

Facility Name	1-OWD-7	Section	Coord Source
Media Type	GW	Township	Source
Latitude83	43.0400349521	Township Dir	Quarter
Longitude83	-105.685140008	Range	Quarter Quarter
Elevation (ft)	0	Range Dir	Quarter Quarter Quarter
Elevation Measuring Point			State

Select Sample Date	Analysis	Method	Units	Result	Qualifier	Detection Limit	Modify Date	Modify User
No items								
No items								

Navigating Through Multiple Screens to Find Data Was Time Consuming

WDEQ's RBDMS Path Forward

- ▶ Requested assistance from GWPC
- ▶ Detailed bug list and UI issues
- ▶ WOGCC had developed and launched their RBDMS in much shorter timeframe
- ▶ GWPC Contractor identified a different UI for Wyoming
- ▶ New Contractor worked with WDEQ Staff to ID needs and wants
- ▶ Border Wars Initiated!
- ▶ Wyoming will be utilizing the Nebraska UI framework going forward

New Landing Page

Explorer ▾ RBDMS Groundwater Warehouse This is a non-production environment ! ? [Reset All Filters](#) [Export Filter Results](#) [Download Database](#)

Sample Result Explorer

Applied Filters:

RBDMS ID	Sample Date	Analyte/CAS #	Concentration
1288732-USGS-06636000-NWIS	2015/11/24	pH (CAS #:10-29-7)	8.3
1289372-USGS-09217000-NWIS	2015/11/19	pH (CAS #:10-29-7)	8.7
1290293-USGS-06304500-NWIS	2015/11/19	CARBON DIOXIDE (CAS #:124-38-9)	2.8
1290293-USGS-06304500-NWIS	2015/11/19	pH (CAS #:10-29-7)	8.3
1288750-USGS-06642000-NWIS	2015/11/19	pH (CAS #:10-29-7)	8.4
1290291-USGS-06299980-NWIS	2015/11/19	pH (CAS #:10-29-7)	8.2
1288762-USGS-06641000-NWIS	2015/11/19	pH (CAS #:10-29-7)	8.5
1290315-USGS-06306250-NWIS	2015/11/19	pH (CAS #:10-29-7)	8.2
1290313-USGS-06306020-NWIS	2015/11/19	pH (CAS #:10-29-7)	8.3
1289520-USGS-09205000-NWIS	2015/11/18	pH (CAS #:10-29-7)	8.3
1289490-USGS-09209400-NWIS	2015/11/18	pH (CAS #:10-29-7)	8.5
1289320-USGS-09211200-NWIS	2015/11/18	pH (CAS #:10-29-7)	8.8
1288188-USGS-06324000-NWIS	2015/11/17	CARBON DIOXIDE (CAS #:124-38-9)	2.4
1288188-USGS-06324000-NWIS	2015/11/17	pH (CAS #:10-29-7)	8.2
1288736-USGS-06635000-NWIS	2015/11/17	pH (CAS #:10-29-7)	8.7
1288532-USGS-06630000-NWIS	2015/11/17	pH (CAS #:10-29-7)	8.2
1289634-USGS-09258980-NWIS	2015/11/16	pH (CAS #:10-29-7)	8.1
1289631-USGS-09258050-NWIS	2015/11/16	pH (CAS #:10-29-7)	8.4
1288634-USGS-06645000-NWIS	2015/11/12	pH (CAS #:10-29-7)	8.4
1290224-USGS-06313400-NWIS	2015/11/06	pH (CAS #:10-29-7)	8
1290226-USGS-06313500-NWIS	2015/11/05	pH (CAS #:10-29-7)	8.2
1289555-USGS-06320210-NWIS	2015/11/05	pH (CAS #:10-29-7)	8.8

<< < > >> 1066681 Total Results | Page 1 of 21334
| Go to page: Show 50 ▾

Map

Well Explorer

Applied Filters:

RBDMS ID	Facility Name	Well Name	Permit Number	Facility Type	National Aquifer	Township	Range	Section
1235167-Blink MW-01-CBM	Blink MW-01	Blink MW-01		Well		0	0	
1235170-MW14-23C1-CBM	MW14-23C1	MW14-23C1		Well		46	76	23
1235173-MW14-2-CBM	MW14-2	MW14-2		Well		47	76	14
1235175-MW13-3-4275-CBM	MW13-3-4275	MW13-3-4275		Well		42	75	3

Information such as the Map, Facility Search and Sample Results all on one display page.



Facility Search Feature

lution environment



Reset All Filters

Export Filter Results

Download Database



OpenStreetMap contributors.

Well Explorer

This search will produce 14334 results.

Well Detail

Facility Name:

LIKE

Well Name:

LIKE

Permit Number:

=

Facility Number:

=

Facility Type:

Select Multiple...

Facility Depth (Feet):

=

Program:

Select Multiple...

National Aquifer:

Select Multiple...

Sampling Count:

=

Location

Township:

=

Township Dir:

Select Multiple...

Range:

=

Range Dir:

Select Multiple...

Section:

=

County:

Select Multiple...

Lat/Long

If searching within this section, all three fields must be entered. Radius can remain zero if location is exact. Latitude must be between 40.920655 and 45.057786 degrees and Longitude must be between -111.1136841 and -103.990079 degrees.

Latitude (NAD83):

=

Longitude (NAD83):

=

Radius (ft):

=

Apply Filter

Clear All Filters



Sample Explorer

Search by
Analyte
Analyte Groups

Filter by
Sample Dates
Concentration

Sample Result Explorer

Applied Filters: Analyte Grouping LIKE BTEX

RBDMS ID	Sample Date	Analyte/CAS #	Concentration
1300704-USGS-411814104062601-NWIS	2015/09/23	BENZENE (CAS #:71-43-2)	1
1300704-USGS-411814104062601-NWIS	2015/09/23	TOLUENE (CAS #:108-88-3)	1
1300704-USGS-411814104062601-NWIS	2015/09/23	o-XYLENE (CAS #:95-47-6)	1
1300704-USGS-411814104062601-NWIS	2015/09/23	ETHYLBENZENE (CAS #:100-41-4)	1
1300704-USGS-411814104062601-NWIS	2015/09/23	NAPHTHALENE (CAS #:91-20-3)	1
1299657-USGS-444219106570601-NWIS	2015/07/30	ETHYLBENZENE (CAS #:100-41-4)	0.25
1299657-USGS-444219106570601-NWIS	2015/07/30	NAPHTHALENE (CAS #:91-20-3)	0.25
1299657-USGS-444219106570601-NWIS	2015/07/30	BENZENE (CAS #:71-43-2)	0.25
1299657-USGS-444219106570601-NWIS	2015/07/30	TOLUENE (CAS #:108-88-3)	0.25
1299657-USGS-444219106570601-NWIS	2015/07/30	o-XYLENE (CAS #:95-47-6)	0.25
1298785-USGS-445154107152201-NWIS	2015/07/29	TOLUENE (CAS #:108-88-3)	0.25
1298785-USGS-445154107152201-NWIS	2015/07/29	NAPHTHALENE (CAS #:91-20-3)	0.25
1298785-USGS-445154107152201-NWIS	2015/07/29	BENZENE (CAS #:71-43-2)	0.25
1298785-USGS-445154107152201-NWIS	2015/07/29	o-XYLENE (CAS #:95-47-6)	0.25
1298785-USGS-445154107152201-NWIS	2015/07/29	ETHYLBENZENE (CAS #:100-41-4)	0.25
1298123-USGS-444936106563901-NWIS	2015/07/29	ETHYLBENZENE (CAS #:100-41-4)	0.25
1298123-USGS-444936106563901-NWIS	2015/07/29	BENZENE (CAS #:71-43-2)	0.25
1298123-USGS-444936106563901-NWIS	2015/07/29	NAPHTHALENE (CAS #:91-20-3)	0.25
1298123-USGS-444936106563901-NWIS	2015/07/29	TOLUENE (CAS #:108-88-3)	0.25
1298123-USGS-444936106563901-NWIS	2015/07/29	o-XYLENE (CAS #:95-47-6)	0.25
1300415-USGS-444523106570401-NWIS	2015/07/28	ETHYLBENZENE (CAS #:100-41-4)	0.25
1300415-USGS-444523106570401-NWIS	2015/07/28	NAPHTHALENE (CAS #:91-20-3)	0.25

<< < > >> 353915 Total Results | Page 1 of 7079

| Go to page: Show 50 ▾

Future for Wyoming's Groundwater Database

- ▶ Rollout new UI to Agency Sections
 - ▶ Need to get by-in from other Sections for inclusion into database
 - ▶ WDEQ Staff will have database cleanup
- ▶ Update Database to Incorporate Updated EDD
 - ▶ Ability to load data to existing facilities
 - ▶ Ability to enter new facility information
 - ▶ Start additional roll-out and training on new system
 - ▶ Begin uploading data from Groundwater Section Programs with no database
- ▶ Add in Graphing and Statistical Analysis Features

THANK YOU



Coordinate ^{• solutions}

WDEQ Contacts

Nicole Twing, P.G.
nicole.twing@wyo.gov

Steve Girt
steve.girt@wyo.gov

Chad Kopplin
chad.kopplin@wyo.gov

