

Region 10

Sharing Analytical Data

Office of Water - Water Quality Exchange
(WQX Schemas)

WQX/STORET Outbound Web Service (Schemas)

Region 10 Contacts

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Topics

- Region 10 - data management
- Analytical data - what do analysts need
- Hidden Gem for Superfund Data:
 - WQX Schema - possible solution for data sharing
 - WQX / STORET System - R10 uses
- Examples - potential of WQX
 - WQX/STORET System as a data repository
 - Superfund and Scribe data
 - WQX outbound XML web services / schema
 - Means for sharing data between systems

➤ Region 10 Data Management

- Resources are limited compared to other EPA regions: no EQUIS, no Response Manager....
- Tend to leverage HQ expertise and products

➤ Region 10 - Data Sharing is Essential

- Large Superfund Sites - CDA Basin
- Regional Initiatives - Puget Sound Partnership
- Emergency Response
- Daily Work – regularly incorporate analytical data into tools (GIS, spreadsheets...). This analytical data can originate from external systems

Analytical Data for Decision Making

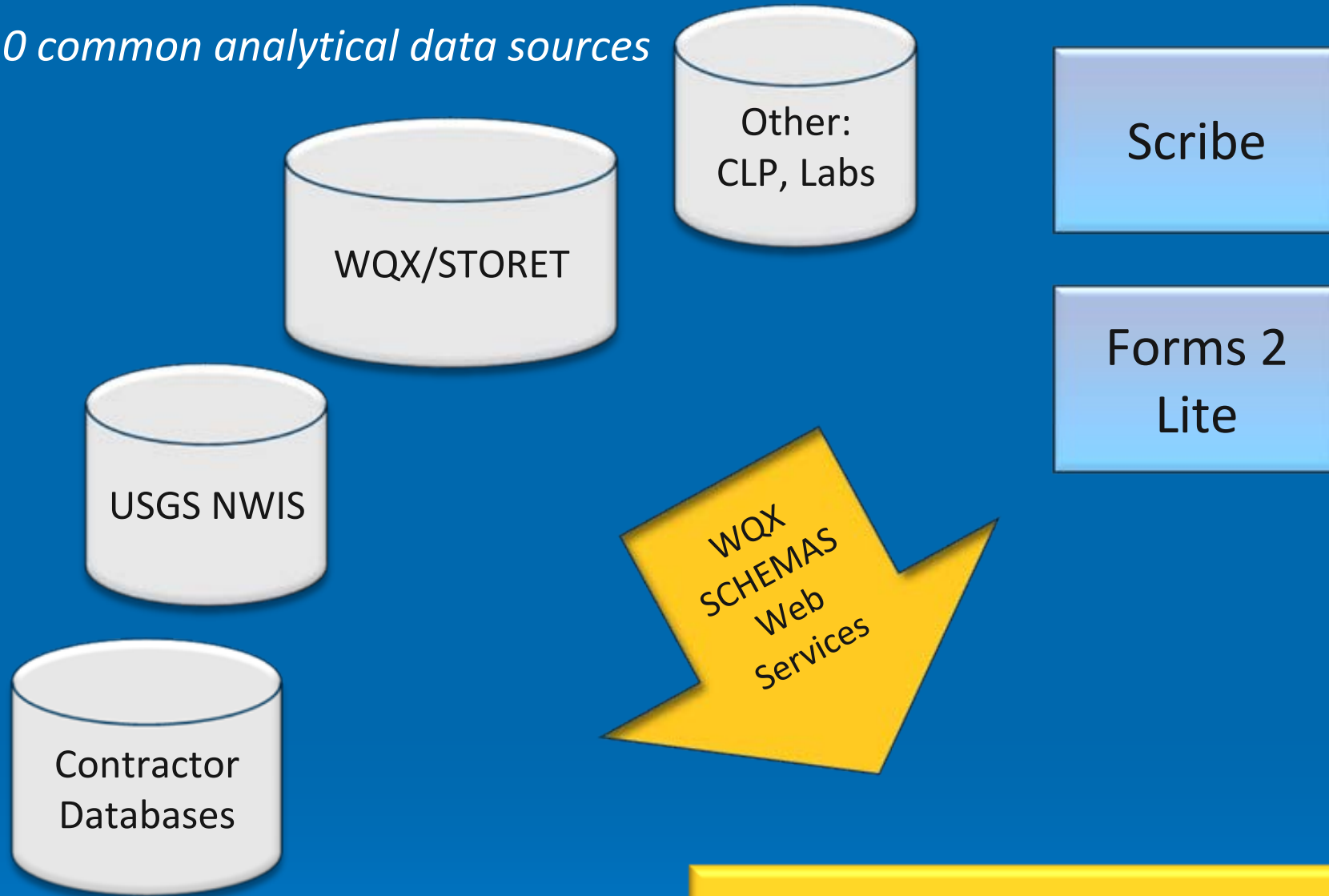
➤ What basic information is necessary?

- Project Information
- Sample Locations
- Sample Results - analytes, media
- QA, QAPP information

➤ What would be nice – easy means of exchanging data between different data originators:

- Data Schema (format) that is simple, versatile
- Schema/tools that are adaptable to different data sources

R10 common analytical data sources



If we can map data to a simple common schema - data from different sources can be combined for analysis

Analytical Tools
Web Mapping Services
Mapping Applications
Spreadsheets , Models...




What is WQX?

- A framework that facilitates the storage and retrieval of environmental monitoring data
- WQX uses standard data sharing templates (schemas) that specify data elements and data structure (XML)
- The WQX schema is an implementation of the ESAR (Environmental Sampling, Analysis and Results) data standard – Nationally Accepted Standard
- WQX based on the Environmental Data Standards Council (EDSC) Standards, EPA Standards - Uses EPA's Substance Registry System (SRS), IT IS
- More Info - <http://www.epa.gov/storet/wqx.html>
 - Kristen Gunthardt
 - Kevin Christian
 - Dwane Young



WQX Schema

- Primary components: Organization, Project, Monitoring Location, Monitoring Activity - **Samples, and Results**
 - Data elements currently accommodate physical, chemical, fish tissue, biological, habitat monitoring data
 - *Superfund: field and analytical results, methods, media/matrices – water, soil, sediment, tissue, QA information (up to a SEDD 2a), References to QAPPs*
- 

WQX History

- February 2007 – WQX version 1.0
 - Physical, chemical, fish tissue schemas
- May 2008 Version 2.0
 - Biological, Habitat released
- EPA's WQX/STORET System: 2 Methods are now supported for submitting data – using the Inbound Schemas
 - Node on the NEIEN – states or large organizations with IT staffs
 - PNW Node, State nodes - exchange XML
 - WQX Web – smaller organizations without IT staff
 - A flat file (excel or access) is imported into WQX Web where it is converted and corrected to make it compatible with WQX
 - Data is submitted through CDX into WQX database/STORET Warehouse (Region10 – CDA)
- WQX Outbound Schemas/web services for retrieving data ~ 2008-2009
- USGS Web Services - implementation of WQX outbound schema for analytical data from NWIS - 2009

R10 Superfund and WQX – Why Now?

- Efficient – WQX is a headquarters system developed by OW
 - Technically state of the art - well designed, standardized, non-proprietary
 - Data repository - it can house historical and current site data
 - Leverage CLP - house a subset of CLP data in WQX and use it for data analysis.

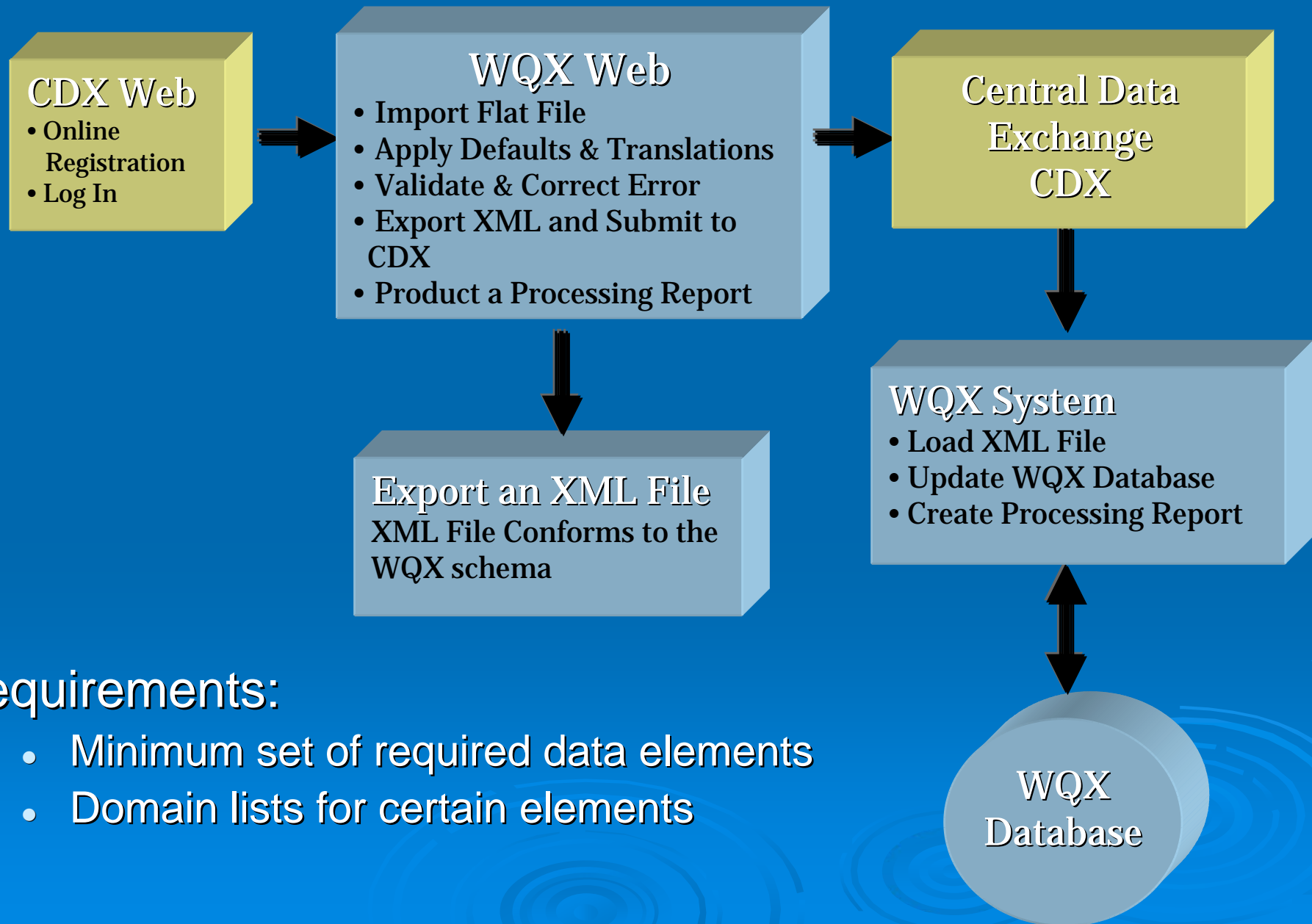
- Data is Accessible
 - Site Stakeholders can have access to the data
 - Facilitates Secondary Use of Superfund Data – Puget Sound Partnership
 - Mega Sites – multiple: site managers; operable units; agencies; contractors
 - Data download is available via the web – WQX/STORET outbound web services

- Data Analysis - Utilize WQX/STORET Outbound Web Services
 - Retrieve data for mapping, data analysis, and reporting in a simple schema
 - Access and use other data both in and outside of WQX using simple schema
 - Data submitted to WQX by Tribes, States, other EPA offices, other agencies
 - USGS NWIS web services – WQX schema
 - By Mapping to a common schema - data from disparate sources can be combined for analysis

Examples Uses of WQX/STORET Inbound Web Services and WQX Web



R10 WQX Data Flow WQX Web



Requirements:

- Minimum set of required data elements
- Domain lists for certain elements


WQX Web

Untitled 1 - Windows Internet Explorer - [Working Offline]

C:\Projects\WQX\xml_gen_tool\Page Mockups\index.htm

File Edit View Favorites Tools Help

Untitled 1



Home
Contact Information
Create New Dataset
Continue with Existing Dataset
Domain Values
Event Log
Export Dataset
Import Configurations
Organizations
Projects
Preferences

XML Generation Tool

You are here: [Home](#) » Create Dataset

Create a New Dataset

To Insert or Update Data:

- [Import a File of Projects](#)
- [Import a File of Monitoring Locations](#)
- [Import a File of Activities and Results](#)

To Delete Data:

- [Import a File of Project Identifiers to be deleted](#)
- [Import a File of Monitoring Location Identifiers to be deleted](#)
- [Import a File of Activity Identifiers to be deleted](#)
- [Flag specific Projects from WQX to be deleted](#)
- [Flag specific Monitoring Locations from WQX to be deleted](#)
- [Flag specific Activities from WQX to be deleted](#)

Done

Lab Results

- Superset/CLP
- SEDD
- Forms 2 Lite



WQX Web Data Submission Tool

Provide:

- Organization - F2L
- Project - F2L
- Monitoring Location - F2L
- Results (example below)

	A	B	C	D	E	N	O	P	Q	R	T	U	W
	Project ID	Station ID	Cooperating Org	Sample ID	Activity Type	Characteristic Name	Result Value	Unit of Measure	Result Measure Qual	Sample Medium	Sample Date	Sample Time	Result
1	TEC-701Z	B6-01	CH2M	06414000	Sample	SIEVE #60 (0.250MM)	2.5	%		Soil	10/9/2006		F
2	TEC-701Z	B6-01	CH2M	06414000	Sample	SIEVE #230 (0.063MM)	0.6	%		Soil	10/9/2006		F
3	TEC-701Z	B6-01	CH2M	06414000A	Sample	MERCURY	*Not Detected	mg/kg	U	Soil	10/9/2006		F
4	TEC-701Z	B6-01	CH2M	06414000A	Sample	LEAD	113	mg/kg		Soil	10/9/2006		F
5	TEC-701Z	B6-01	CH2M	06414000A	Sample	SILVER	3	mg/kg		Soil	10/9/2006		F
6	TEC-701Z	B6-01	CH2M	06414000A	Sample	ARSENIC	14	mg/kg		Soil	10/9/2006		F
7	TEC-701Z	B6-01	CH2M	06414000A	Sample	CADMIUM	0.87	mg/kg		Soil	10/9/2006		F
8	TEC-701Z	B6-01	CH2M	06414000A	Sample	COPPER	68.3	mg/kg		Soil	10/9/2006		F
9	TEC-701Z	B6-01	CH2M	06414000A	Sample	ZINC	298	mg/kg		Soil	10/9/2006		F
10	TEC-701Z	B6-01	CH2M	06414000B	Sample	MERCURY	0.144	mg/kg		Soil	10/9/2006		F
11	TEC-701Z	B6-01	CH2M	06414000B	Sample	LEAD	281	mg/kg		Soil	10/9/2006		F
12	TEC-701Z	B6-01	CH2M	06414000B	Sample	SILVER	1.8	mg/kg		Soil	10/9/2006		F
13	TEC-701Z	B6-01	CH2M	06414000B	Sample	ARSENIC	22	mg/kg		Soil	10/9/2006		F
14	TEC-701Z	B6-01	CH2M	06414000B	Sample	CADMIUM	2.6	mg/kg		Soil	10/9/2006		F
15	TEC-701Z	B6-01	CH2M	06414000B	Sample	COPPER	219	mg/kg		Soil	10/9/2006		F
16	TEC-701Z	B6-01	CH2M	06414000B	Sample	ZINC	649	mg/kg		Soil	10/9/2006		F
17	TEC-701Z	B6-02	CH2M	06414001	Sample	SIEVE #60 (0.250MM)	4.8	%		Soil	10/9/2006		F
18	TEC-701Z	B6-02	CH2M	06414001	Sample	SIEVE #230 (0.063MM)	0.6	%		Soil	10/9/2006		F
19	TEC-701Z	B6-02	CH2M	06414001A	Sample	MERCURY	5.79	mg/kg		Soil	10/9/2006		F
20	TEC-701Z	B6-02	CH2M	06414001A	Sample	LEAD	11000	mg/kg		Soil	10/9/2006		F
21	TEC-701Z	B6-02	CH2M	06414001A	Sample	SILVER	27	mg/kg		Soil	10/9/2006		F
22	TEC-701Z	B6-02	CH2M	06414001A	Sample	ARSENIC	54.3	mg/kg		Soil	10/9/2006		F
23	TEC-701Z	B6-02	CH2M	06414001A	Sample	CADMIUM	35.3	mg/kg		Soil	10/9/2006		F
24	TEC-701Z	B6-02	CH2M	06414001A	Sample	COPPER	230	mg/kg		Soil	10/9/2006		F
25	TEC-701Z	B6-02	CH2M	06414001A	Sample	ZINC	5990	mg/kg		Soil	10/9/2006		F
26	TEC-701Z	B6-02	CH2M	06414001B	Sample	MERCURY	15.3	mg/kg		Soil	10/9/2006		F
27	TEC-701Z	B6-02	CH2M	06414001B	Sample	LEAD	18700	mg/kg		Soil	10/9/2006		F
28	TEC-701Z	B6-02	CH2M	06414001B	Sample	SILVER	47.6	mg/kg		Soil	10/9/2006		F
29	TEC-701Z	B6-02	CH2M	06414001B	Sample	ARSENIC	123	mg/kg		Soil	10/9/2006		F

R10 Scribe to WQX Pilot (ERU)

ERU Scribe

- Custom Data Views : WQXViews
- Lab Results
- Custom Lists - WQX Domain Values



WQX Web
Data
Submission
Tool

Scribe - [WQXActivityResultsShort]

File Lists Scriblets Help

Print Export View Edit Add Copy Delete Filter Sort Select Find

Black Butte Mine Removal Acti

WQXActivityResultsShort **Read Only** Remove Filter Save Layout Layout: Default Layout

WQXActivityResultsShort

WQXActivityResultsShort: 118 [Filtered]

Project ID	Location	ActivityIdentifier	ActivityType	ActivityMediaName	ActivityStart	ActivityT	ActivityStar	ActivityCond	Sample	Characteristic	Result	Result_Units
10EK082007	New Furnace	10EK-2001		Soil	8/20/2007		15.36	EQM		Mercury	189	mg/kg
10EK082007	New Furnace	10EK-2002		Soil	8/20/2007		15.39	EQM		Mercury	673	mg/kg
10EK082007	New Furnace	10EK-2003		Soil	8/20/2007		15.42	EQM		Mercury	137	mg/kg
10EK082007	New Furnace	10EK-2004		Soil	8/20/2007		15.43	EQM		Mercury	106	mg/kg
10EK082007	New Furnace	10EK-2005		Soil	8/20/2007		15.46	EQM		Mercury	1625	mg/kg
10EK082007	New Furnace	10EK-2006		Soil	8/20/2007		15.48	EQM		Mercury	185	mg/kg
10EK082007	New Furnace	10EK-2007		Soil	8/20/2007		15.46	EQM		Mercury	1616	mg/kg
10EK082007	New Furnace	10EK-2008		Soil	8/20/2007		15.48	EQM		Mercury	180	mg/kg
10EK082007	New Furnace	10EK-2009		Soil	8/20/2007		15.56	EQM		Mercury	119	mg/kg
10EK082007	New Furnace	10EK-2010		Soil	8/20/2007		15.58	EQM		Mercury	154	mg/kg
10EK082007	New Furnace	10EK-2011		Soil	8/20/2007		16.01	EQM		Mercury	94	mg/kg
10EK082007	New Furnace	10EK-2012		Soil	8/20/2007		16.03	EQM		Mercury	112	mg/kg
10EK082007	New Furnace	10EK-2013		Soil	8/20/2007		16.05	EQM		Mercury	165	mg/kg
10EK082007	New Furnace	10EK-2014		Soil	8/20/2007		16.07	EQM		Mercury	172	mg/kg
10EK082007	New Furnace	10EK-2015		Soil	8/20/2007		16.10	EQM		Mercury	1001	mg/kg
10EK082007	New Furnace	10EK-2016		Soil	8/20/2007		16.12	EQM		Mercury	649	mg/kg
10EK082007	New Furnace	10EK-2017		Soil	8/20/2007		16.18	EQM		Mercury	54.3	mg/kg
10EK082007	New Furnace	10EK-2018		Soil	8/20/2007		16.21	EQM		Mercury	125	mg/kg
10EK082007	New Furnace	10EK-2019		Soil	8/20/2007		16.23	EQM		Mercury	134	mg/kg
10EK082007	New Furnace	10EK-2020		Soil	8/20/2007		16.24	EQM		Mercury	65.4	mg/kg
10EK082007	New Furnace	10EK-2021		Soil	8/20/2007		16.25	EQM		Mercury	32.6	mg/kg
10EK082007	New Furnace	10EK-2022		Soil	8/20/2007		16.29	EQM		Mercury	63.8	mg/kg
10EK082007	New Furnace	10EK-2023		Soil	8/20/2007		16.34	EQM		Mercury	62	mg/kg
10EK082007	Old Furnace	10EK-3001		Soil	8/21/2007		07.59	EQM		Mercury	661	mg/kg
10EK082007	Old Furnace	10EK-3002		Soil	8/21/2007		08.03	EQM		Mercury	181	mg/kg
10EK082007	Old Furnace	10EK-3003		Soil	8/21/2007		08.05	EQM		Mercury	1936	mg/kg
10EK082007	Old Furnace	10EK-3004		Soil	8/21/2007		08.12	EQM		Mercury	298	mg/kg
10EK082007	Old Furnace	10EK-3005		Soil	8/21/2007		08.13	EQM		Mercury	33.5	mg/kg
10EK082007	Old Furnace	10EK-3006		Soil	8/21/2007		08.14	EQM		Mercury	63.7	mg/kg
10EK082007	Old Furnace	10EK-3007		Soil	8/21/2007		08.16	EQM		Mercury	34.4	mg/kg
10EK082007	Old Furnace	10EK-3008		Soil	8/21/2007		08.18	EQM		Mercury	62.3	mg/kg
10EK082007	Old Furnace	10EK-3009		Soil	8/21/2007		08.21	EQM		Mercury	186	mg/kg
10EK082007	Old Furnace	10EK-3010		Soil	8/21/2007		08.23	EQM		Mercury	141	mg/kg
10EK082007	Old Furnace	10EK-3011		Soil	8/21/2007		08.26	EQM		Mercury	298	mg/kg

Close

File Name: D:\Program Files\Scribe\Projects\Black Butte Mine_Scribe2WQX.mdb 5/18/2009 2:07 PM



WQX/STORET Outbound Web Services



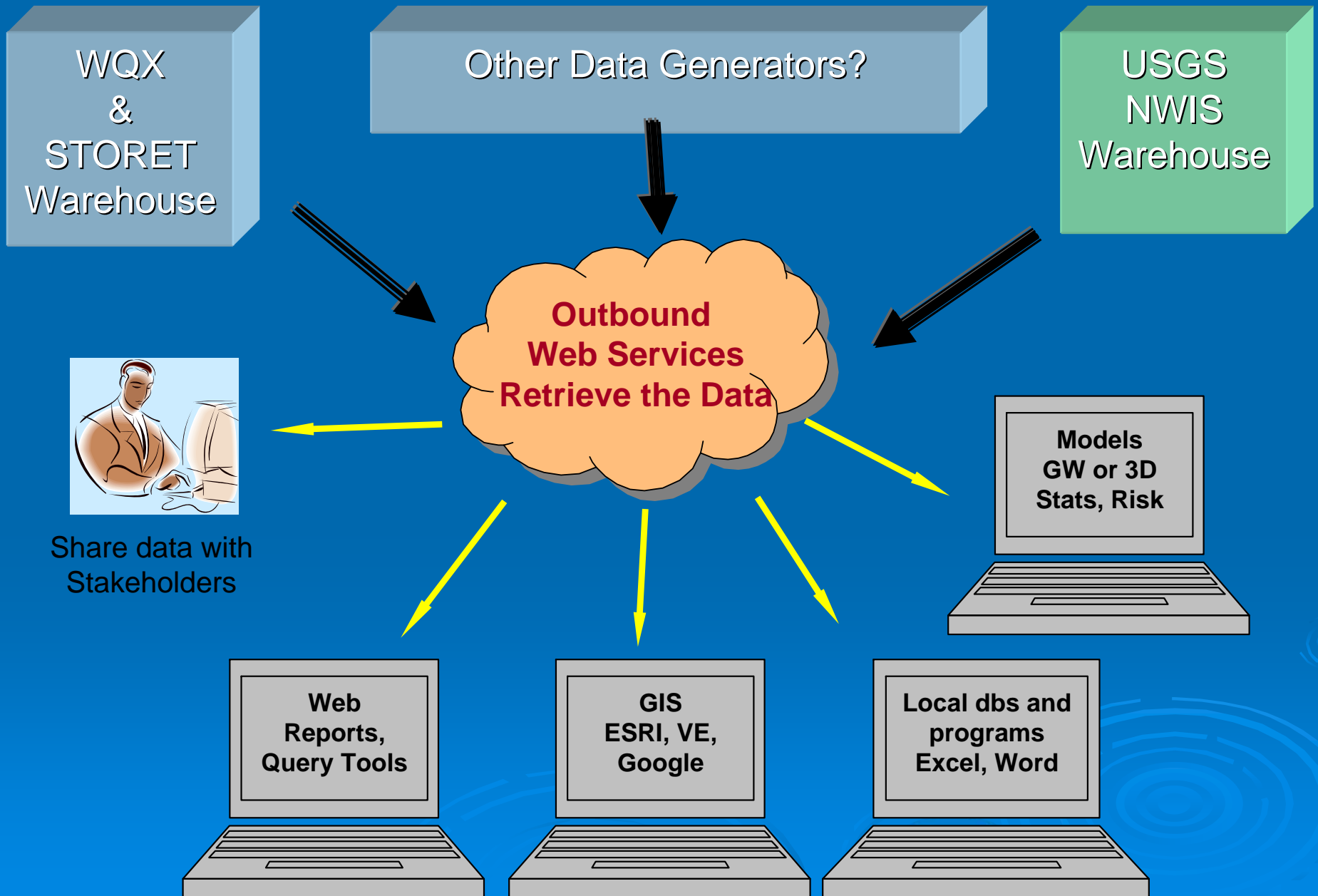


WQX/STORET Outbound Web Services

http://www.epa.gov/storet/web_services.html

- Four Core Services based upon schemas:
 - **Stations service** – provides specific station information
 - **Results service** – provides results data
 - **Watershed/Station Catalog service** – provides summary information
 - **Project Catalog service** – provides summary information by projects based on an input of min/max latitude/longitude
- USGS NWIS database is implementing similar stations and results services based upon the WQX Outbound Schemas

WQX/STORET Outbound Web Services



Mapping WQX/STORET Stations

**Call: Get Stations For Map
Supply Lat - Long**

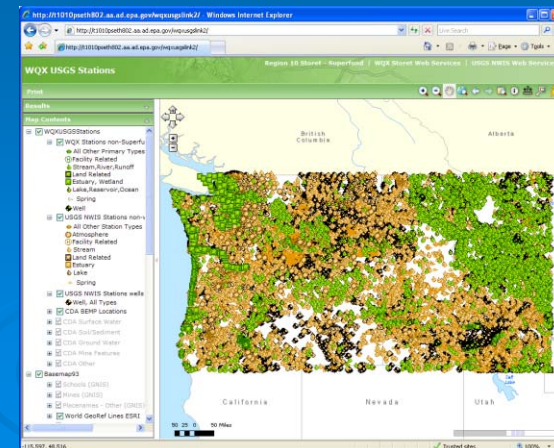
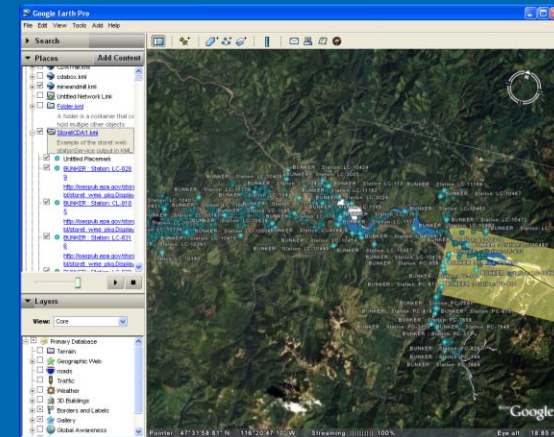
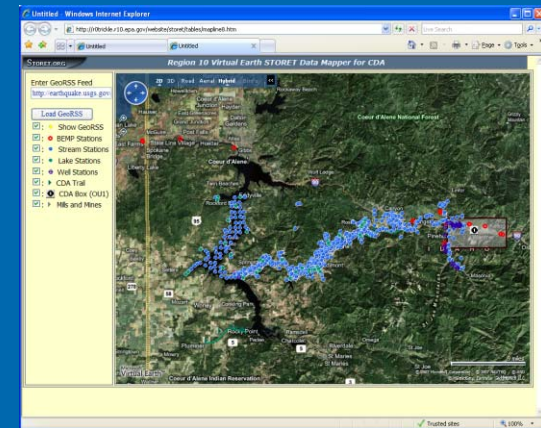
**Process: Converts data
to different
mapping formats**

Virtual
Earth

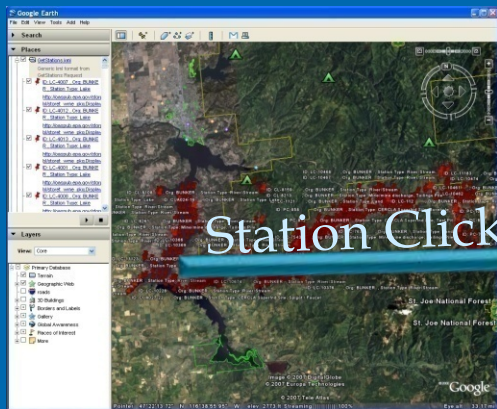
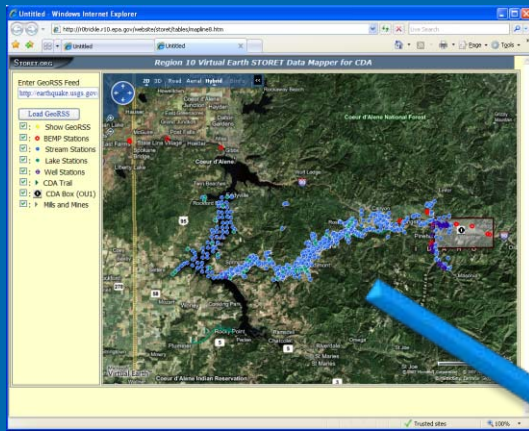
Google
Earth

ESRI
Products

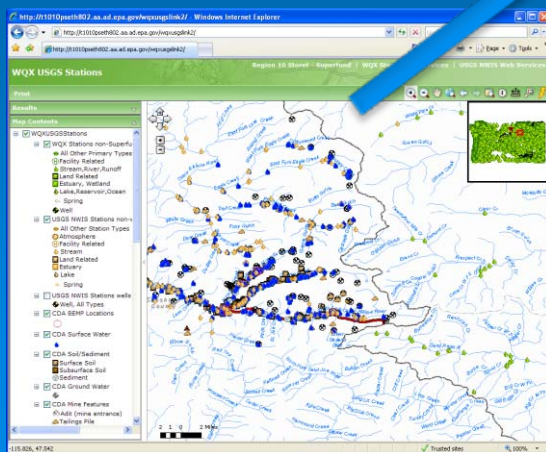
- Example of a scheduled, automated process that runs against the outbound web services and populates a GIS database



Web Service: Get Results (Using Mouse Click)



**Call:
Get Results
Web Service**



Region 10: Storet StationResults Web Service Query

Organization: Bunker Hill Mining and Metallurgical Complex

Org ID	Station ID	Activity Identifier	Activity Type	Activity Matrix	Activity Start Date		
BUNKER	LC-8261	188003	Sample	Water	1997-07-23		
CharacteristicName	Result	Measure	Measure Unit	CommentText	SampleFraction	Result Type	DetectionCondition
Barium				U/None/U	Total	Actual	*Non-detect
Cadmium	4		ug/l	None/None/A	Total	Actual	
Chromium				U/None/U	Total	Actual	*Non-detect
Copper				U/None/U	Total	Actual	*Non-detect
Zinc				U/None/U	Total	Actual	*Non-detect
Aluminum				U/None/U	Dissolved	Actual	*Non-detect
Iron				U/None/U	Dissolved	Actual	*Non-detect
Manganese				U/None/U	Dissolved	Actual	*Non-detect
Nickel	12		ug/l	None/None/A	Dissolved	Actual	
Barium	4.8		ug/l	None/None/A	Dissolved	Actual	
Cadmium	2.9		ug/l	None/None/A	Dissolved	Actual	
Chromium				U/None/U	Dissolved	Actual	*Non-detect
Copper	14		ug/l	None/None/A	Dissolved	Actual	
Zinc				U/None/U	Dissolved	Actual	*Non-detect
Mercury				U/None/U	Total	Actual	*Non-detect
Iron				U/None/U	Total	Actual	*Non-detect
Lead				U/None/U	Total	Actual	*Non-detect
Manganese				U/None/U	Total	Actual	*Non-detect
Nickel				U/None/U	Total	Actual	*Non-detect
Arsenic				U/None/U	Total	Actual	*Non-detect

➤ Example of an interactive real-time request to the outbound web service

Get Station, Get Result, Get Organizations From Excel

Microsoft Excel - Web_Service_Data_browser.xls

Type a question for help

File Edit View Insert Format Tools Data Window Help

100%

Reply with Changes... End Review...

Arial 10 B I U

C5 7/11/1979

ID	Monitoring Location	ActivityStartDate	ActivityMedia	Analyte	MeasureValue	Units	Comment	Detection	AnalyMethod
790005	4900420	7/11/1979	Water	Dissolved oxygen (DO)	6500	ug/l			FIELD MEASURE
790005	4900420	7/11/1979	Water	pH	7.8	None			FIELD MEASURE
790005C	4900420	7/11/1979	Water	Turbidity	8.6	NTU			GENERIC METHC
790005C	4900420	7/11/1979	Water	Silica	1000	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Mercury	0	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Arsenic	5	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Chloride	11000	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Nickel	0	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Carbon dioxide	1000	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Magnesium	15000	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Specific conductance	33	uS/cm			GENERIC METHC
790005C	4900420	7/11/1979	Water	Total Coliform	93	#/100ml			9221-C
790005C	4900420	7/11/1979	Water	Boron	65	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Silver	0	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Calcium	4000	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Carbonate ion (CO3-2)	2000	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	pH	8.5	None			GENERIC METHC
790005C	4900420	7/11/1979	Water	Nitrogen, Nitrite (NO2) as NO2	0	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Hardness, Ca + Mg	16000	ug/l			GENERIC METHC
790005C	4900420	7/11/1979	Water	Phosphorus, orthophosphate as P	50	ug/l			GENERIC METHC
790006	4900420	10/2/1979	Water	Temperature, water	13.5	deg C			FIELD MEASURE
790006	4900420	10/2/1979	Water	Specific conductance	140	uS/cm			FIELD MEASURE
790006	4900420	10/2/1979	Water	Dissolved oxygen (DO)	7800	ug/l			FIELD MEASURE

WATERSHED DATA Sheet3

Ready

Example of an interactive real-time request to the outbound web services from Excel

Beta Tabular Query Tool using the Get Results Web Service

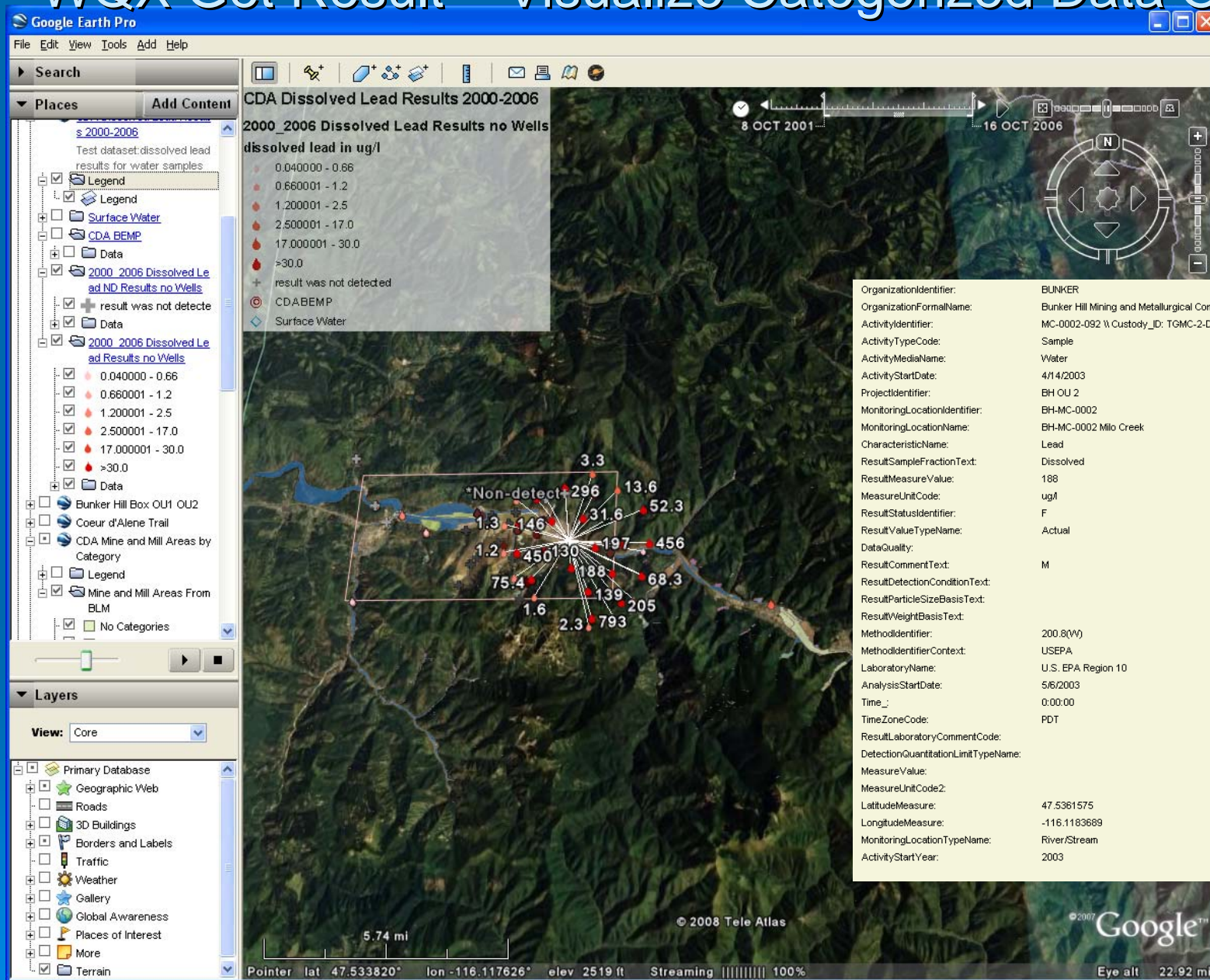
The screenshot displays the EPA Region 10 Superfund STORET Site interface. On the left, a navigation menu includes links for HOME, Coeur d'Alene SOP, Coeur d'Alene EDD, About STORET, Region 10 Cleanup, and Contact Us. The main content area features the EPA and USGS logos, a title 'EPA Region 10 Superfund STORET Site', and 'Usage Notes'. Below this, there are sections for 'Influence Area (required)' (SF - South Fork of the Coeur d'Alene River), 'Monitoring Locations' (SF-941, SF-BSED-01, SF-BSED-06, SF-BSED-07, SF-BSED-09), and 'Characteristics' (All Characteristics, Acid - Base Potential, Acid Generation Potential, Acid Neutralization Potential Ac, Acid Neutralization Potential As).

The 'STORET Tabular Query Results' window shows a table of data for the U.S. Environmental Protection Agency. The table has the following columns: Location, Org Name, Sample ID, Characteristic, Fraction, Matrix, Particle Size Basis, Result, Reporting Limit, Units, Result Comments, Qualifier, Status, Depth, Units, Sample Date, and Sampling Entity.

Location	Org Name	Sample ID	Characteristic	Fraction	Matrix	Particle Size Basis	Result	Reporting Limit	Units	Result Comments	Qualifier	Status	Depth	Units	Sample Date	Sampling Entity
SF-BSED-01	BUNKER	MJ69S9 \\ Custody_ID: 10-393454312-110805-0001	Cadmium	Total	Sediment		2200	0.53	ug/kg			F			2005-10-17	
SF-BSED-01	BUNKER	MJ69S9 \\ Custody_ID: 10-393454312-110805-0001	Copper	Total	Sediment		130000	2.7	ug/kg	J		F			2005-10-17	
SF-BSED-01	BUNKER	MJ69S9 \\ Custody_ID: 10-393454312-110805-0001	Lead	Total	Sediment		256000	1.1	ug/kg			F			2005-10-17	
SF-BSED-01	BUNKER	MJ69S9 \\ Custody_ID: 10-393454312-110805-0001	Mercury	Total	Sediment		200	0.11	ug/kg			F			2005-10-17	
SF-BSED-01	BUNKER	MJ69S9 \\ Custody_ID: 10-393454312-110805-0001	Silver	Total	Sediment		4100	1.1	ug/kg	J		F			2005-10-17	

Google Earth Screen Captures

WQX Get Result – Visualize Categorized Data Over Time



Advanced analytical use of outbound web services

Summary - Looking Forward

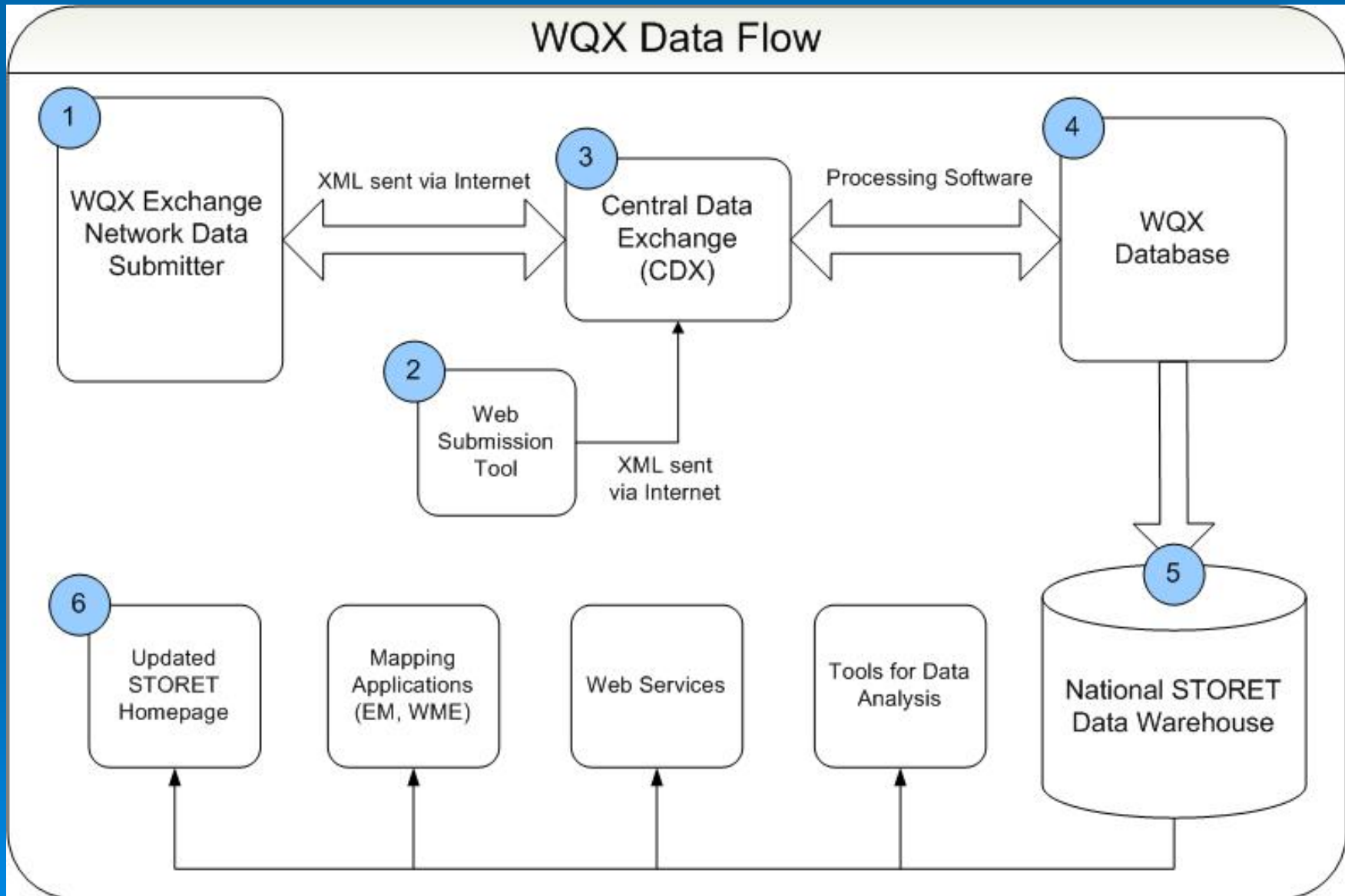
- Urge OSWER and other data providers to investigate the WQX schema and database
 - Emergency Response Data
 - Investigate Scribe - WQX Schema crosswalk
 - WQX version of Scribe with custom lists and views
 - Superfund Data
 - Investigate SEDD /WQX Schema similarities
 - Pilot flow of data from SMO/CLP to WQX
 - WQX version of Forms 2 Lite
- Leverage the expertise of the Office of Water (Kristen Gunthardt, Kevin Christian)
Gunthardt.kristen@epa.gov, Christian.kevin@epa.gov

Extra Informational Slides Follow





WQX Data Flow



Example WQX XML Submittal

The screenshot displays an XML Notepad window titled "XML Notepad - E:\smccarth_data requests\cdx\wqx_update\submission\WQX_Demotest.xml". The interface is split into two main panes: "Tree View" on the left and "XSL Output" on the right.

Tree View: Shows the XML document structure. The root is "xml", with a child "WQX". Under "WQX", there are nodes for "xmlns", "xmlns:xsi", and "xsi:schemaLocation". The main structure includes "Organization", "MonitoringLocation", "Activity", "ActivityLocation", "SampleDescription", "Result", and "LabSamplePreparation". The "Activity" node is expanded to show "ActivityDescription" (with sub-nodes for ActivityIdentifier, ActivityTypeCode, ActivityMediaName, ActivityStartDate, ActivityStartTime, ActivityEndDate, ActivityEndTime, ActivityRelativeDepthName, ActivityDepthHeightMeasure, ActivityDepthAltitudeReferencePointText, ProjectIdentifier, and MonitoringLocationIdentifier) and "Result" (with sub-nodes for ResultDescription, ResultAnalyticalMethod, and ResultLabInformation).

XSL Output: Shows the XML content generated by the XSL transformation. The output is an XML document with the following content:

```
version="1.0" encoding="UTF-8"
http://www.exchangenetwork.net/schema/wqx/1
http://www.w3.org/2001/XMLSchema-instance
http://www.exchangenetwork.net/schema/wqx/1..
```

The output continues with the following values for various elements:

ActivityIdentifier	02-91-003-02
ActivityTypeCode	Sample-Routine
ActivityMediaName	Water
ActivityStartDate	1991-02-02
ActivityEndDate	1991-02-02
ActivityRelativeDepthName	Midwater
ActivityDepthAltitudeReferencePointText	SURFACE
ProjectIdentifier	CBCP-001
MonitoringLocationIdentifier	CBC-003
CharacteristicName	Cadmium
ResultSampleFractionText	Dissolved
ResultStatusIdentifier	Final
StatisticalBaseCode	Mean
ResultValueTypeName	Calculated
MethodIdentifier	PMD-CD
MethodIdentifierContext	USEPA
MethodName	Cadmium by AAS

Example of data returned from the outbound web services XML (USGS)

```
http://qwwebservices.usgs.gov/Result/search?organization=USGS-WA&siteid=USGS-12102450 - Windows Internet Explorer
http://qwwebservices.usgs.gov/Result/search?organization=USGS-WA&siteid=USGS-12102450
http://qwwebservices.usgs.gov/Result/search?organi...

<?xml version="1.0" encoding="UTF-8" ?>
- <WQX xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://qwwebservices.usgs.gov/schemas/WQX-Outbound/2_0/
  http://qwwebservices.usgs.gov/schemas/WQX-Outbound/2_0/index.xsd"
  xmlns="http://qwwebservices.usgs.gov/schemas/WQX-Outbound/2_0/">
- <Organization>
- <OrganizationDescription>
  <OrganizationIdentifier>USGS-WA</OrganizationIdentifier>
  <OrganizationFormalName>USGS Washington Water Science Center</OrganizationFormalName>
</OrganizationDescription>
- <Activity>
- <ActivityDescription>
  <ActivityIdentifier>sun2dwatcm.01.98300105</ActivityIdentifier>
  <ActivityTypeCode>Sample-Routine</ActivityTypeCode>
  <ActivityMediaName>Sediment</ActivityMediaName>
  <ActivityMediaSubdivisionName>Bottom material</ActivityMediaSubdivisionName>
  <ActivityStartDate>1983-08-25</ActivityStartDate>
- <ActivityStartTime>
  <Time>07:00:00</Time>
  <TimeZoneCode>PDT</TimeZoneCode>
</ActivityStartTime>
  <ProjectIdentifier>USGS</ProjectIdentifier>
  <ActivityConductingOrganizationText>U.S. Geological Survey-Water Resources
  Discipline</ActivityConductingOrganizationText>
  <MonitoringLocationIdentifier>USGS-12102450</MonitoringLocationIdentifier>
  <HydrologicCondition>Stable, normal stage</HydrologicCondition>
  <HydrologicEvent>Routine sample</HydrologicEvent>
</ActivityDescription>
- <Result>
- <ResultDescription>
  <CharacteristicName>Instream features, est. stream width</CharacteristicName>
- <ResultMeasure>
  <ResultMeasureValue>660</ResultMeasureValue>
  <MeasureUnitCode>ft</MeasureUnitCode>
</ResultMeasure>
  <ResultStatusIdentifier>Historical</ResultStatusIdentifier>
  <ResultValueTypeName>Actual</ResultValueTypeName>
  <USGSPCode>00004</USGSPCode>
</ResultDescription>
</Result>
- <Result>
- <ResultDescription>
  <CharacteristicName>Kjeldahl nitrogen</CharacteristicName>
  <ResultSampleFractionText>Bed Sediment</ResultSampleFractionText>
- <ResultMeasure>
```