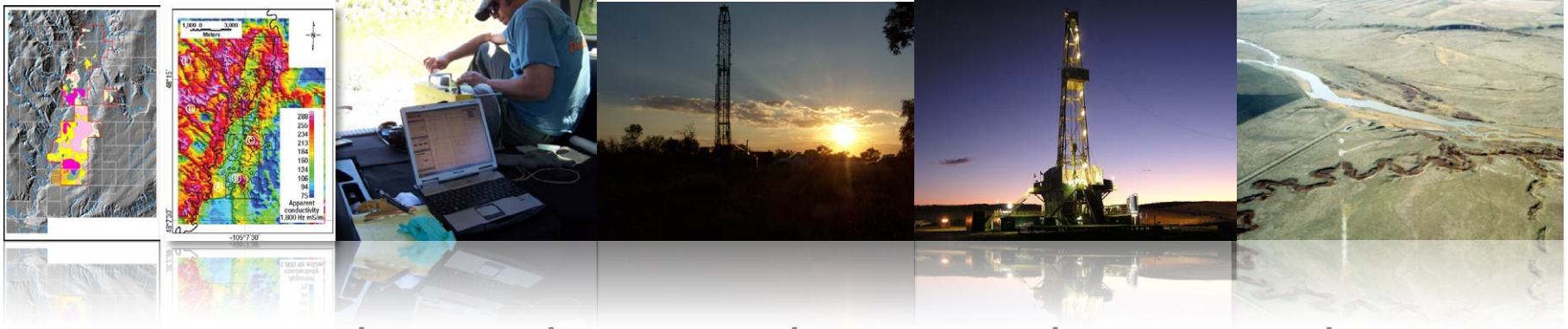


Water Quality Data Management, Program Integration, and Sharing



RVIII Tribes and EPA working together toward a
common goal... data to information

2011 National Tribal Water Quality Conference

Santa Fe, New Mexico, November 15, 2011

Deb Madison and Andy Van den Akker

Challenges for Tribal WQ Programs



- High Staff Turn Over
- Wide Spectrum of Technical Abilities within the Region
- Large Range of Water Quality Program Maturity Levels
- Geographically Isolated Areas

Region 8 Reservations & Indian Country



U.S. Census Bureau's TIGER Line Files 2000
 Some small Reservations and Trust Lands held for individuals, as identified by the U.S. Census Bureau, are too small to see clearly at this scale.
 Lakes and Reservoirs
 State Capital Cities
 Interstate Highway
 Rivers
 State Boundary
*A Tribe's Trust Lands and its Reservation may be situated from one another or located in different States.

Tribe	Reservation
Assiniboine & Sioux Tribes	Fort Peck
Blackfeet Tribe	Blackfeet
Cheyenne River Sioux Tribe	Cheyenne River
Chippewa Cree Tribe	Rocky Boy's
Confederated Salish and Kootenai Tribes	Flathead
Crow Creek Sioux Tribe	Crow Creek
Crow Tribe	Crow
Eastern Shoshone Tribe and Northern Arapaho Tribe	Wind River
Flandreau Santee Sioux Tribe	Flandreau Santee Sioux
Gros Ventre & Assiniboine Tribes	Fort Belknap
Lower Brule Sioux Tribe	Lower Brule
Northern Cheyenne Tribe	Northern Cheyenne
Northwestern Band of Shoshone	Northwestern Band of Shoshone
Ogala Sioux Tribe	Pine Ridge
Paute Indian Tribe of Utah	Paute
Rosebud Sioux Tribe	Rosebud
Sisseton-Wahpeton Sioux Tribe	Lake Traverse
Skull Valley Band of Goshute	Skull Valley Band of Goshute
Southern Ute Indian Tribe	Southern Ute
Spirit Lake Tribe	Spirit Lake
Standing Rock Sioux Tribe	Standing Rock
Three Affiliated Tribes	Fort Berthold
Turtle Mountain Band of Chippewas	Turtle Mountain
Ute Indian Tribe	Uintah & Ouray
Ute Mountain Ute Tribe	Ute Mountain
Yankton Sioux Tribe	Yankton

Sources:
 The Indian country boundaries and the State boundaries were extracted from the U.S. Census Bureau's 2000 TIGER Line data set.
 The scale of the data were reported to be 1:100,000 unless otherwise noted. The shaded relief map of Region 8 was created from the U.S. Geological Survey's 30 Meter Digital Elevation Model.

Disclaimer:
 EPA makes no claims regarding the accuracy, precision, or use of this data. Questions concerning the data should be referred to the source agency, the U.S. Census Bureau. This map does not necessarily represent EPA's position on any Indian country boundaries or the jurisdictional status of any specific location. There may be additional Indian country areas not represented on the map.

Overview



- Project History
- Data to Information Case Study
- Pulling Information from AWQMS
 - Reporting
 - Graphing
 - Mapping
- Partner Network
- Demo (time permitting)

History



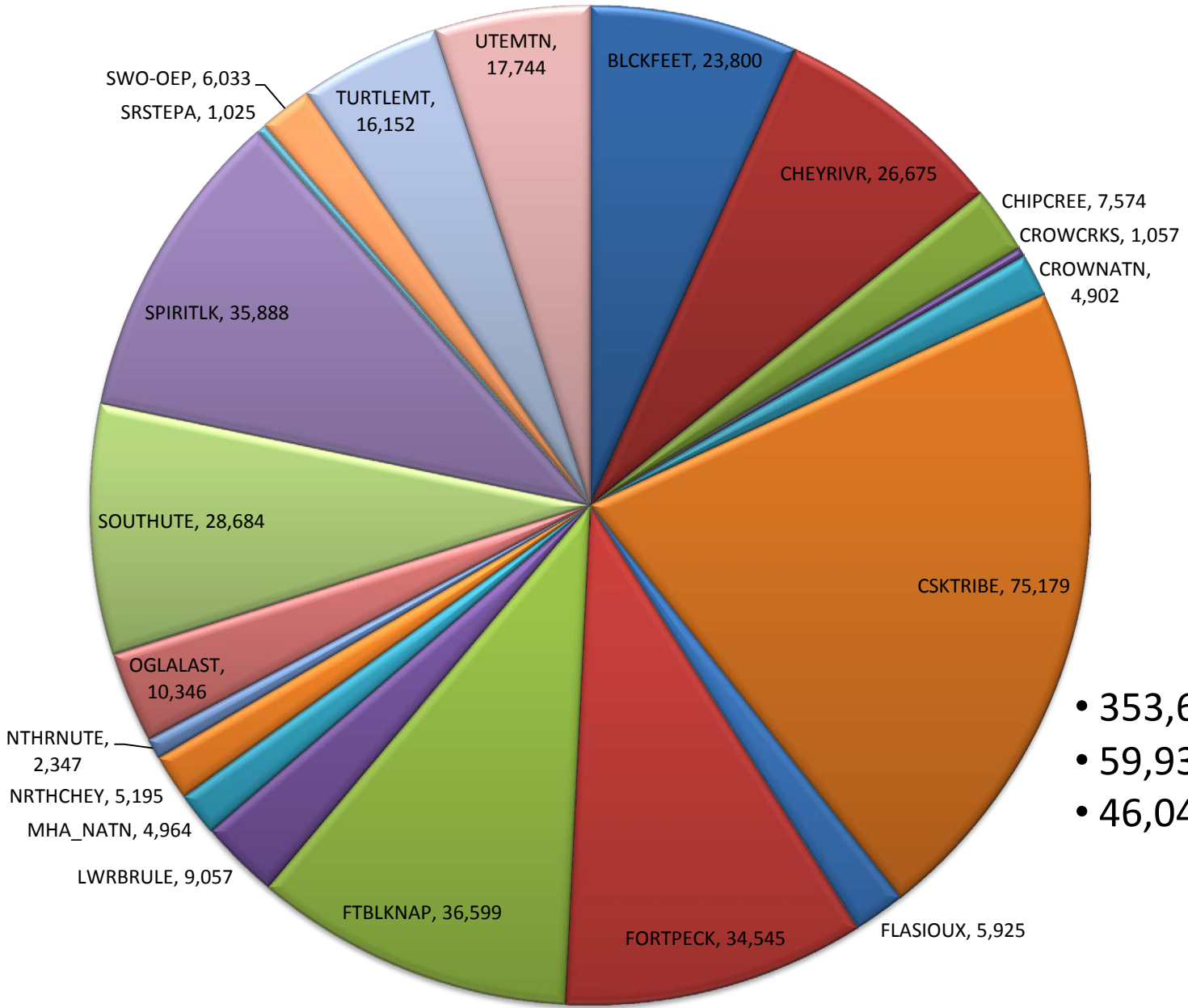
Project Phases

- Data Management – Managing Data into a Consistent Format Across the Region
- Data Sharing – Sharing Data locally, Regionally, and Nationally
- Data Analysis – Turning Data into Information

Phase I - Data Management



- Leadership Provided by Southern Ute Tribe
- Objectives
 - Get all Tribal programs to meet the STORET data standard
 - Consolidate Tribal data locally
 - Provide options for data management in the region ranging from databases to spreadsheets
- Outcomes
 - Developed STORET templates that are still in use around country
 - Got Tribes in the region to move to STORET data standard
 - Peer Trainers Network



- 353,691 Total Records
- 59,935 Year to Date
- 46,046 in last 90 days

Phase 2 - Data Sharing



- Leadership provided by Southern Ute Tribe and the Peer Trainers Network
- Objectives
 - Allow Tribes to share data locally
 - Allow Tribes to share data Regionally (w/ EPA)
 - Allow Tribes to share nationally (via Exchange Network)
- Outcomes
 - Adoption of AWQMS (developed for several state partners)
 - Secure Tribal Regional Warehouse
 - Data Loaded via Flexible Data Import Module
 - Generation and Submission of WXQ XML data via Node client

AWQMS as a Solution



- Enforces WQX Standards
- Local Data Management
- Provides Additional Data Elements for Local Use
- Secure Environment for Data Review (QA/QC)
- Integrated Analytical Graphs and Reports
- Integrated Node Client for National Sharing
- Integrated Google Map

Region VIII Tribal Network



- 20 of 21 Tribes with Water Programs Participate
- Share Data across All of EPA Region VIII
- Provides Access to Regional EPA for Data Review and Analysis
- View Partner Data via Reports and Graphs
- Configurable Security
 - Restricted Add, Edit, View Rights
- Peer Trainer Assistance Capabilities
- Leveraged State AWQMS Development

Phase 3 - Data Analysis



- Leadership Provided by Fort Peck and the Peer Trainer Network
- Objectives
 - Better analysis tools available for all tribes in the region
 - Viewing data spatially
 - Integrating State and National data sets into the analysis
- Outcomes
 - On going

AWQMS Benefits

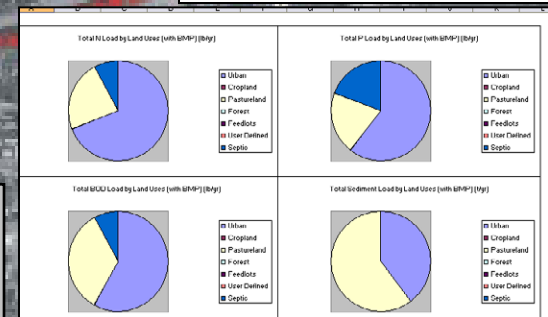
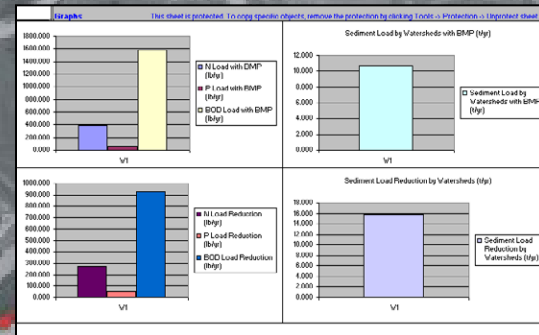


Disaster and Emergency Response

AWQMS Benefits

1. Total load by subwatershed(s)																
Watershed	N Load (no BMP)	P Load (no BMP)	BOD Load (no BMP)	Sediment Load (no BMP)	N Reduction	P Reduction	BOD Reduction	Sediment Reduction	N Load (with BMP)	P Load (with BMP)	BOD (with BMP)	Sediment Load (with)	%N Reduction	%P Reduction	%BOD Reduction	%Sed Reduction
	lb/year	lb/year	lb/year	t/year	lb/year	lb/year	lb/year	t/year	lb/year	lb/year	lb/year	t/year	%	%	%	%
v1	667.4	115.0	2506.2	26.5	270.8	53.2	922.5	15.8	396.6	61.8	1583.7	10.7	40.6	46.3	36.8	59.5
Total	667.4	115.0	2506.2	26.5	270.8	53.2	922.5	15.8	396.6	61.8	1583.7	10.7	40.6	46.3	36.8	59.5

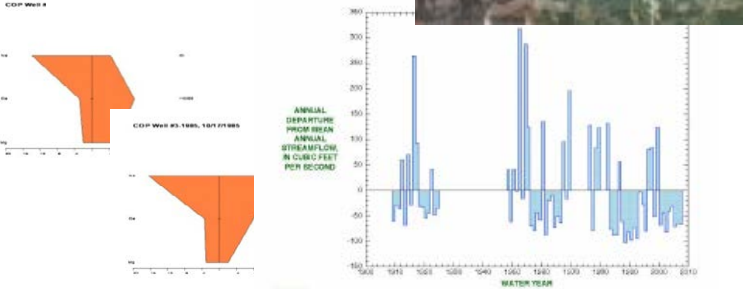
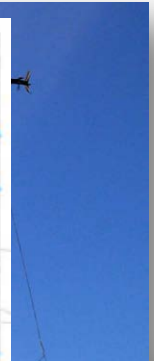
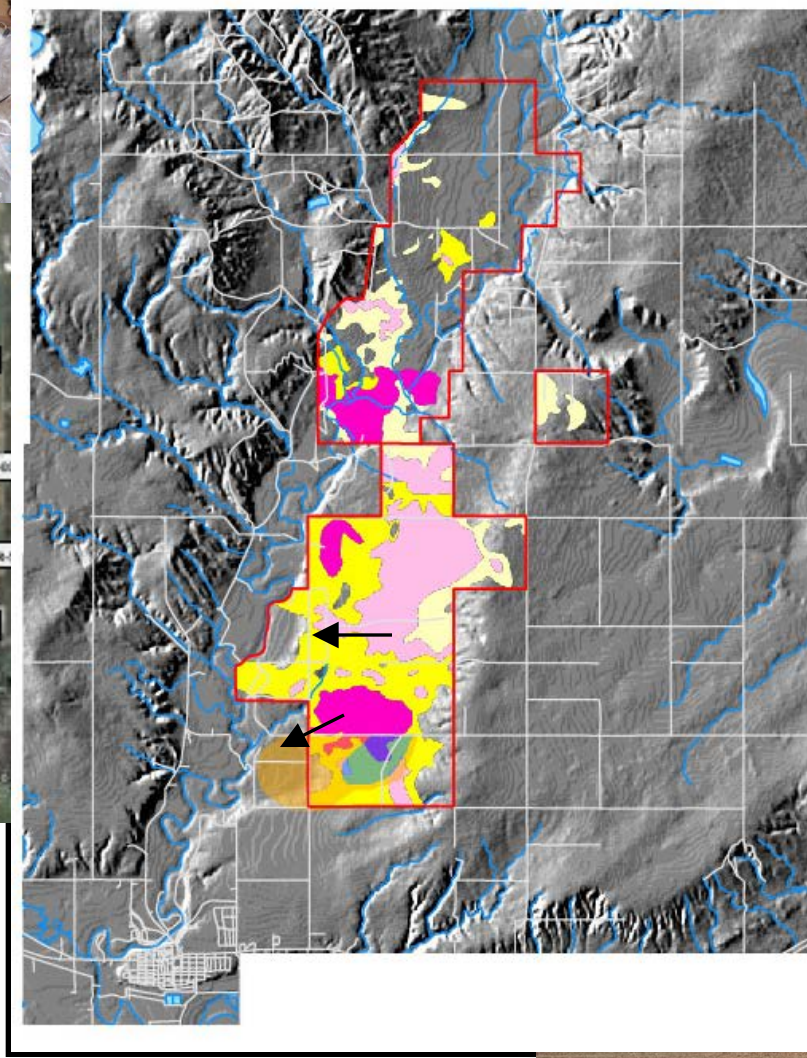
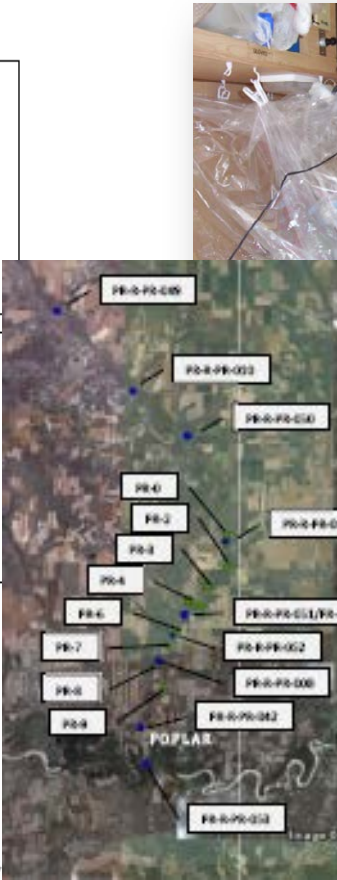
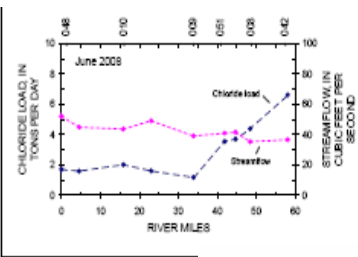
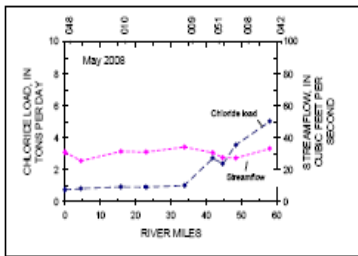
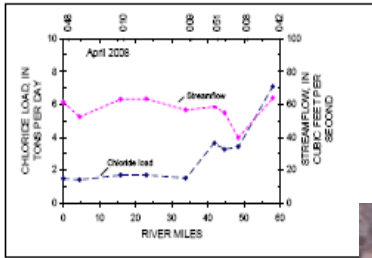
2. Total load by land uses (with BMP)				
Sources	N Load (lb/yr)	P Load (lb/yr)	BOD Load (lb/yr)	Sediment Load (t/yr)
Urban	273.1	37.3	916.0	4.3
Cropland	0.0	0.0	0.0	0.0
Pastureland	92.8	12.5	542.4	6.5
Forest	0.0	0.0	0.0	0.0
Feedlots	0.0	0.0	0.0	0.0
User Defined	0.0	0.0	0.0	0.0
Septic	30.7	12.0	125.4	0.0
Total	396.6	61.8	1583.7	10.7



STEPL Predicted Reductions:

- 30.0% Reduction in Sediment Loading (7.9 tons/yr)
- 20.3% Reduction in Nitrogen
- 23.2% Reduction in Phosphorus
- 18.4% BOD Reduction

AWQMS Benefits



Project Planning and Interpretation


Raw Data File



	RES_UID	ACT_UID	ANLMTH_UID	BIOINT_UID	CHR_UID	CPLVAL_UID	LAB_UID	MSUNT_UID _DEPTH_HEI GHT	MSUNT_UID _MEASURE	MSUNT_UID _GROUP_SU MMARY_CT_ WT
1	1858269	41920	1655		1815				60	
2	1858270	41920	1719		2849				246	
3	1858271	41921			2248				140	
4	1858272	41921	1951		985				15	
5	1858273	41921	1951		985				15	
6	1858957	42082	1719		2849				246	
7	1858958	42083			2248				140	
8	1858959	42083	1951		985				15	
9	1858960	42083	1951		985				15	
10	1858961	42083			1775				261	
11	1860201	42378			1775				261	
12	1860202	42378			1775				261	
13	1860203	42378	1655		1815				60	
14	1860204	42378	1655		1815				60	
15	1860205	42378	1719		2849				246	
16	1860206	42379			2248				140	
17	1860207	42379	1951		985				15	

AWQMS Home Page





ver. 1.16.08.11

Ambient Water Quality Monitoring System

You are here: Home

Home



WQX
WATER QUALITY EXCHANGE

Data Summary:

BLCKFEET	22,133	4,967	5,398	06-01-2011
CHEYRIVR	26,651	3,516	5,515	
CHIPCREE	7,574	0	718	08-25-2011
CROWCRKS	1,057	0	0	09-08-2009
CROWNATN	4,902	0	0	07-24-2009
CSKTRIBE	75,179	0	0	
FLASIOUX	5,925	4,917	4,917	10-11-2011

My Datasets:

ID	File Name	Type	Status	Created	Expires in Days
4585	Standard Export 0.zip		Exported Text File	10-26-2011 09:52 AM	59
4388	Fort Peck 2003-2010 compiled data_WQX format_9.9.11.txt	Activities and Results	Imported	09-09-2011 12:11 PM	12

My Navigation History:

Type	ID	Context
Activity	SUTFLORID113L68239-010	03-17-2008
	BM-S-BM-01419921B-10	07-21-1992
	Bel.Center2_E.T.5/25/2011	05-25-2011



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Rapid Data Entry

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Data Analysis

WQX Export

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Lookup Tables

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User Information

User Preferences

Log Out (45 min.)


Data Analysis - Reporting




- Custom Reports
 - Percent Exceedance
 - Statistics by Location
 - Exceedance by Location
 - Quartiles
 - Activities and Results Summary
- Ad Hoc Reporting
- Data Export
 - Flat File
 - Crosstab

Data Analysis Criteria Page







ver. 1.16.08.11

Ambient Water Quality Monitoring System

You are here: [Home](#) >> [Data Analysis](#) >> [Criteria](#)

Single Characteristic Line Graph

Saved Criteria:

Name:

Activity Date between: * 01-01-2008 and* 06-13-2011 (MM-DD-YYYY)

Result Status: *

Include results that are 'Not Detected' or 'Present Below Quantification Limit':
Use x MDL or LQL as the value

	Organization ID	Monitoring Location ID	Monitoring Location Name
remove <input type="text" value="1"/>	WQXTEST	Demo 1	Demo 1
remove <input type="text" value="2"/>	WQXTEST	Demo 2	Demo 2
remove <input type="text" value="3"/>	WQXTEST	Demo 3	Demo 3

Characteristic	Measurement Unit	Sample Fraction	Lower Standard	Upper Standard	Result Count
<input type="radio"/> Aluminum	mg/l	Total	<input type="text"/>	<input type="text"/>	13
<input type="radio"/> Ammonia-nitrogen	mg/l	Total	<input type="text"/>	<input type="text"/>	15
<input type="radio"/> Boron	mg/l	Total	<input type="text"/>	<input type="text"/>	13
<input type="radio"/> Calcium	mg/l	Total	<input type="text"/>	<input type="text"/>	13

Home

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 WQX Export

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 User Preferences

 Log Out (45 min.)

Quartiles Report



Quartiles Report

4/26/2011

Selected Locations(s): Blue River
Red River
Yellow River

Selected Date Range: 4/1/2008 12:00:00 AM - 10/1/2008 12:00:00 AM

Selected Characteristic: Temperature, water **Fraction:** Units: deg C

Organization	Location	Min	25th Quartile	Median	75th Quartile	Max
Tribal Demo	ML1 ~ Blue River	23.10	16.70	24.300	19.4000	13.50
Tribal Demo	ML2 ~ Red River	15.95	15.7625	17.150	17.1375	24.30
Tribal Demo	ML3 ~ Yellow River	13.35	13.8250	18.000	20.5500	10.50

Exceedance Report



Percent Exceedance Report

4/26/2011

Selected Locations(s): Blue River
 Red River
 Yellow River
Selected Date Range: 4/1/2008 12:00:00 AM - 10/1/2008 12:00:00 AM
Selected Characteristic: Temperature, water Fraction: Units: deg C
Lower Standard Entered: 10 **Upper Standard Entered:** 20

Location: Tribal Demo ML1 ~ Blue River

Date	Value	Lower Standard	Upper Standard	Diff	%Diff	Exceedance?
4/14/2008	13.50	10	20			No
5/14/2008	15.30	10	20			No
6/16/2008	23.50	10	20	3.50	18%	<u>Yes</u>
7/15/2008	24.30	10	20	4.30	22%	<u>Yes</u>
8/13/2008	23.10	10	20	3.10	16%	<u>Yes</u>
9/15/2008	16.70	10	20			No
9/15/2008	16.70	10	20			No

ML1 ~ Blue River Summary

Number Values: 7 **Mean Value:** 19.014286 **Mean Exceedance Value:** 23.633333
Number Exceedances: 3 **Mean Exceedance Diff:** 3.633333
Percent Exceedances: 43% **Mean Exceedance % Diff:** 18%

Location: Tribal Demo ML2 ~ Red River

Date	Value	Lower Standard	Upper Standard	Diff	%Diff	Exceedance?
4/14/2008	12.60	10	20			No
6/14/2008	15.70	10	20			No

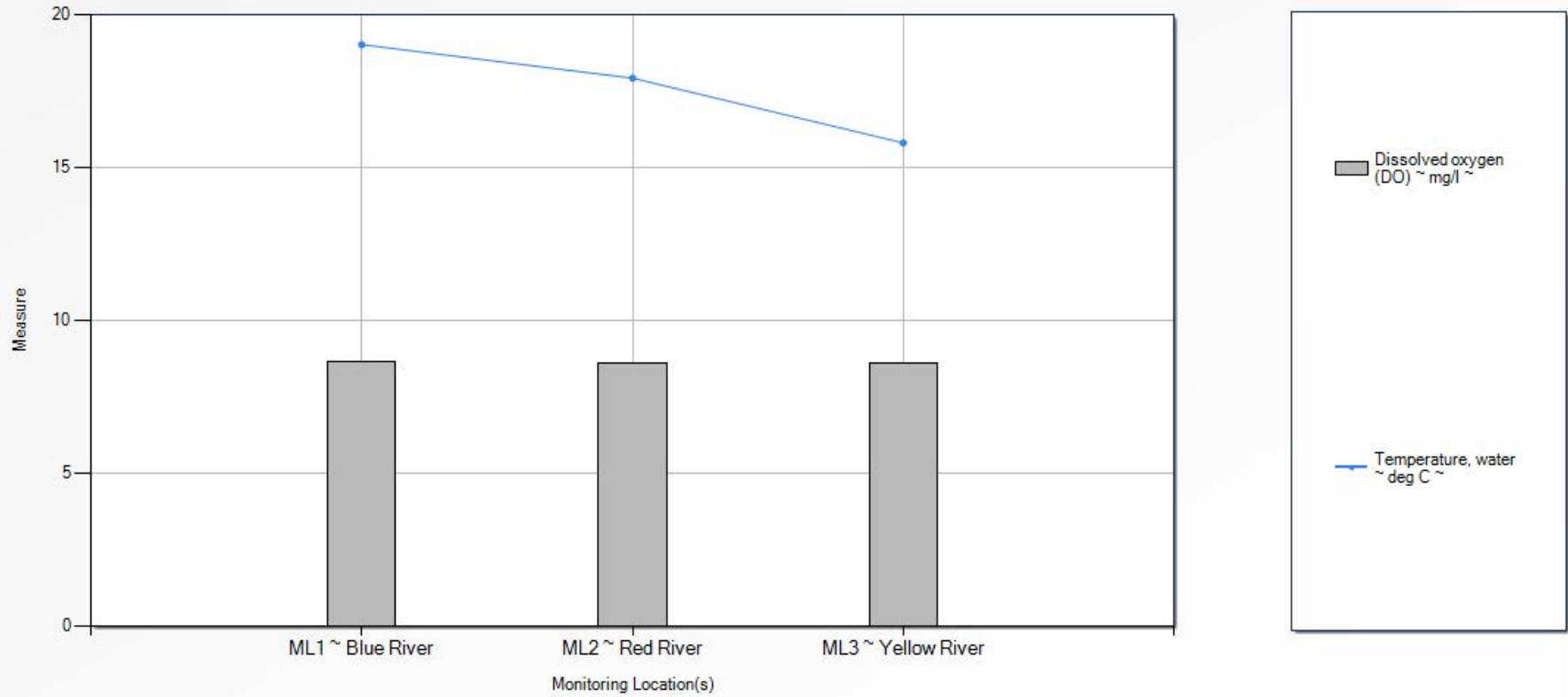
Data Analysis - Graphing



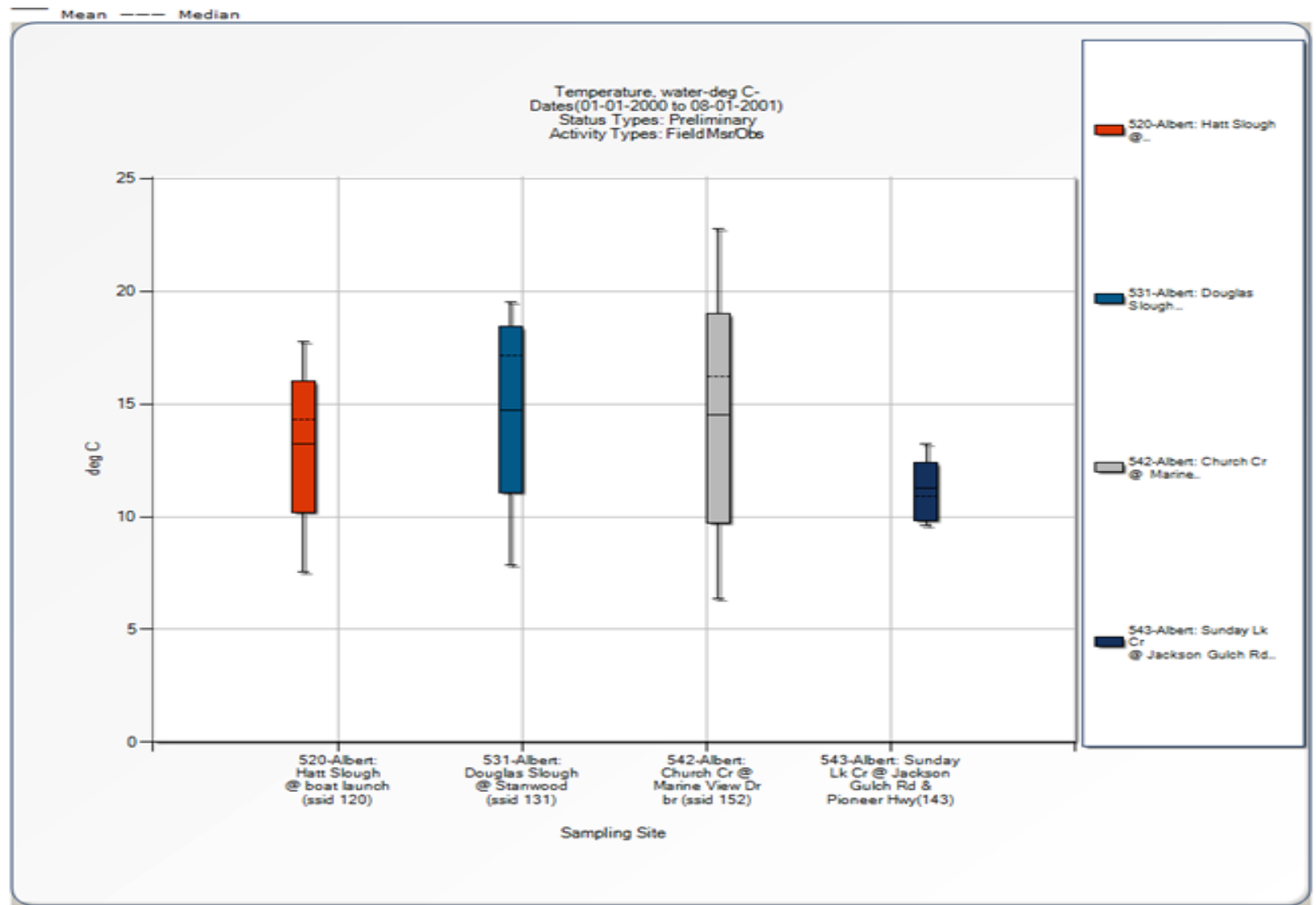
- Graph Types
 - Line Graphs
 - Bar Graphs
 - Box and Whiskers Plot
 - Bi-Variate Scatter Plot
- Graph Features
 - Regression Line
 - Standards Line
 - Single or Multiple Characteristic
 - Multi Scale
 - Ability to Apply Thresholds

Multiple Characteristic Mean Line/Bar Graph

Dates: 04-01-2008 to 10-01-2008

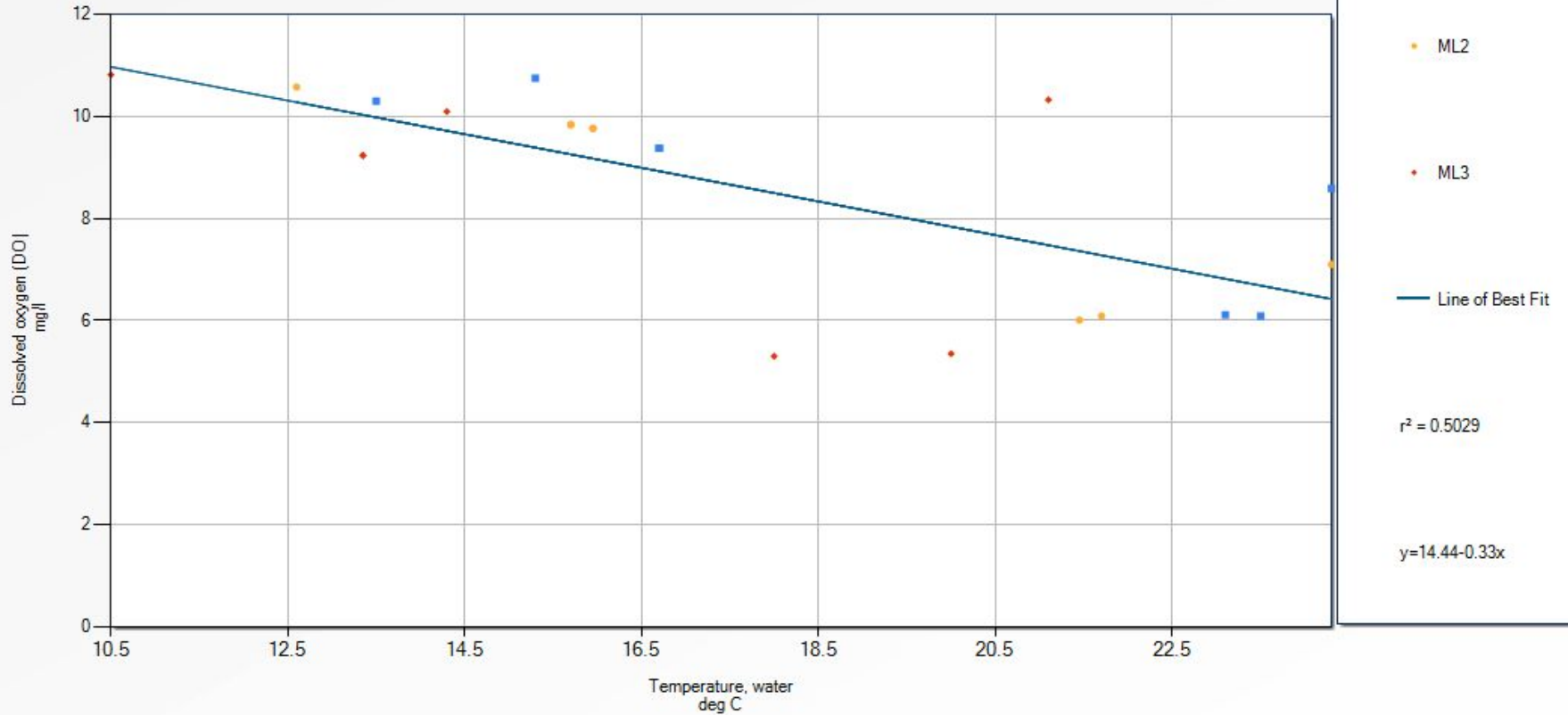


Box and Whiskers Plot



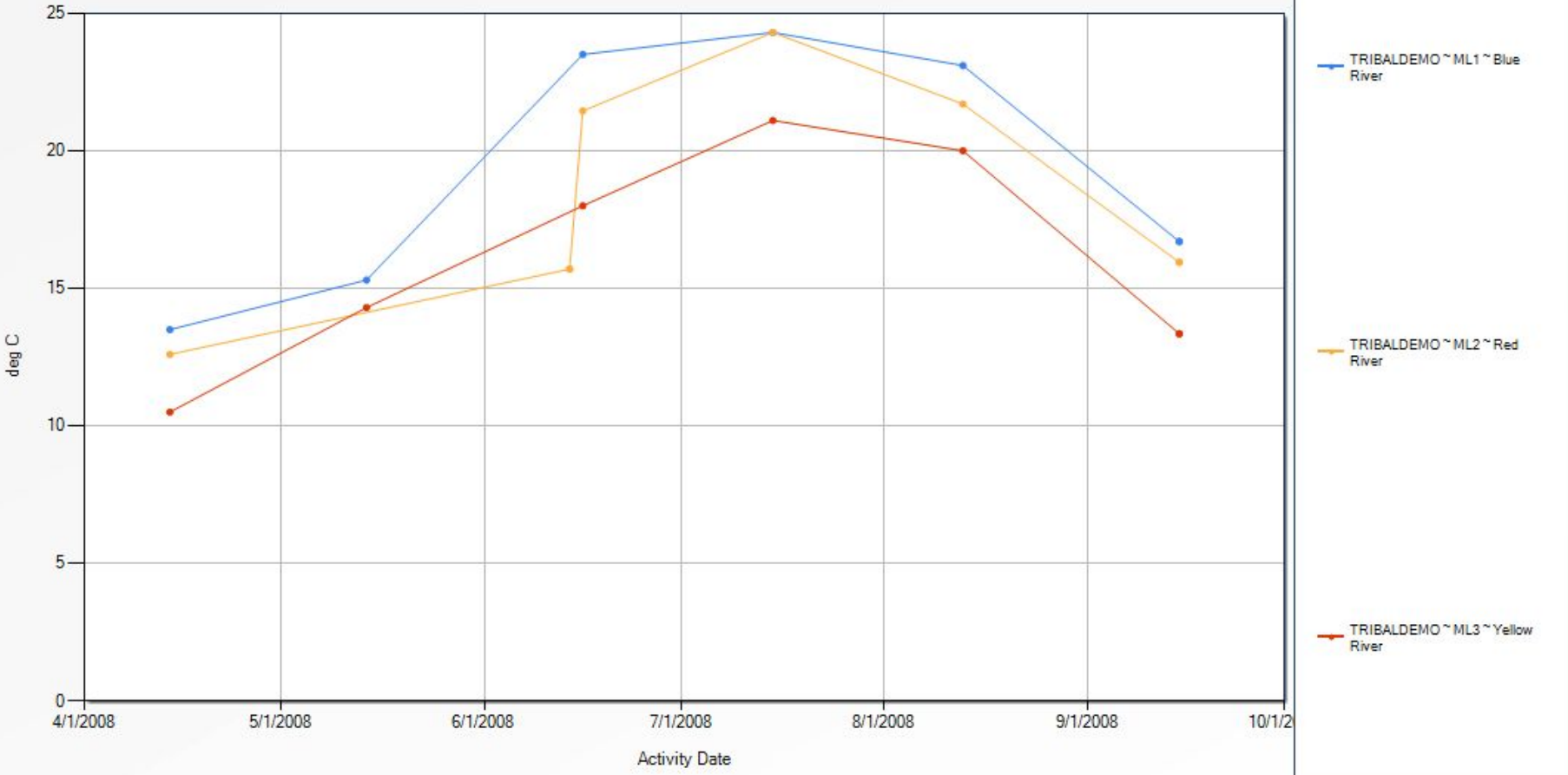
Bi-variate Scatter Plot

Dates: 04-01-2008 to 10-01-2008

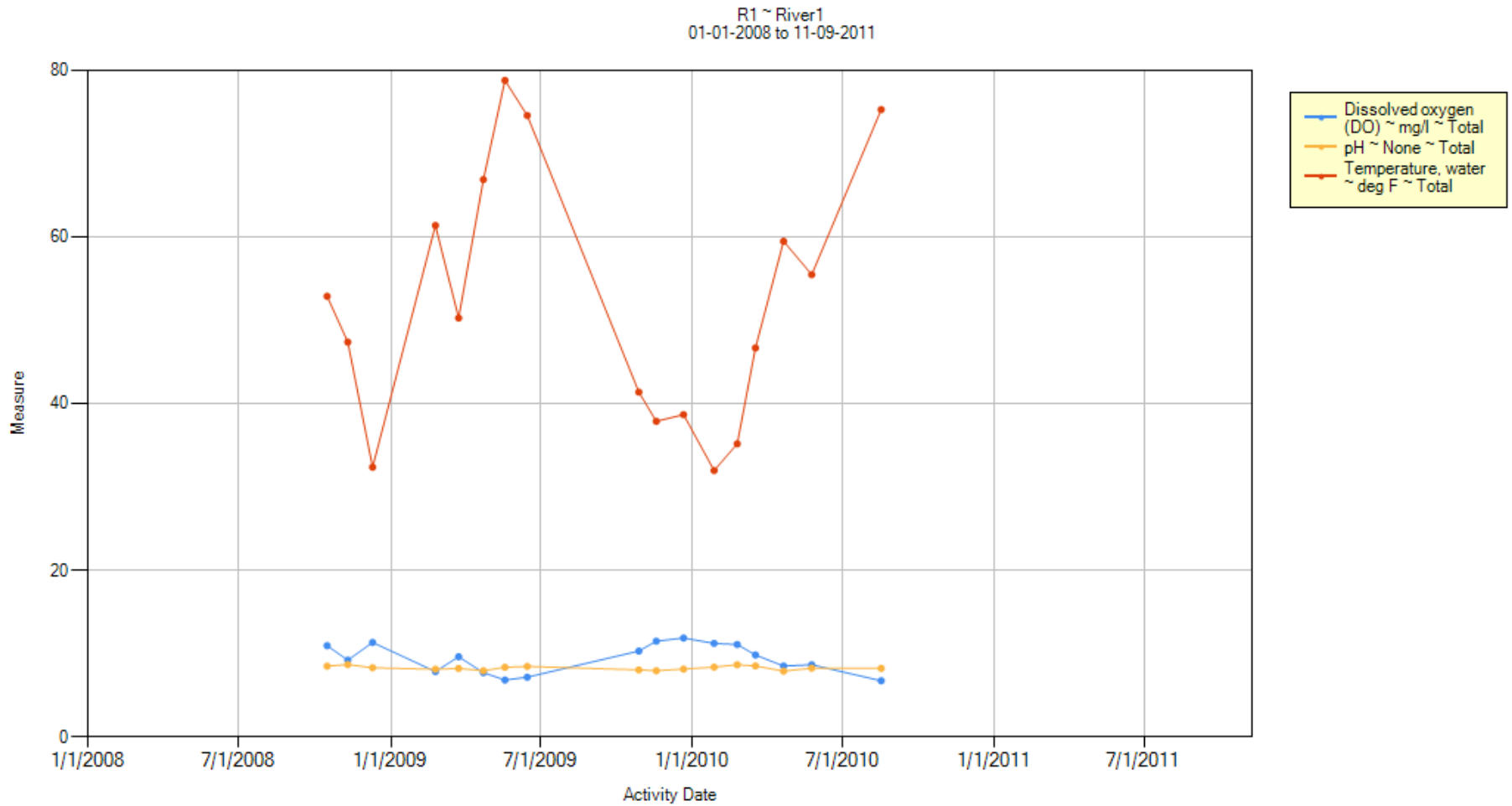


Single Characteristic Line Graph

Temperature, water
Dates: 04-01-2008 to 10-01-2008

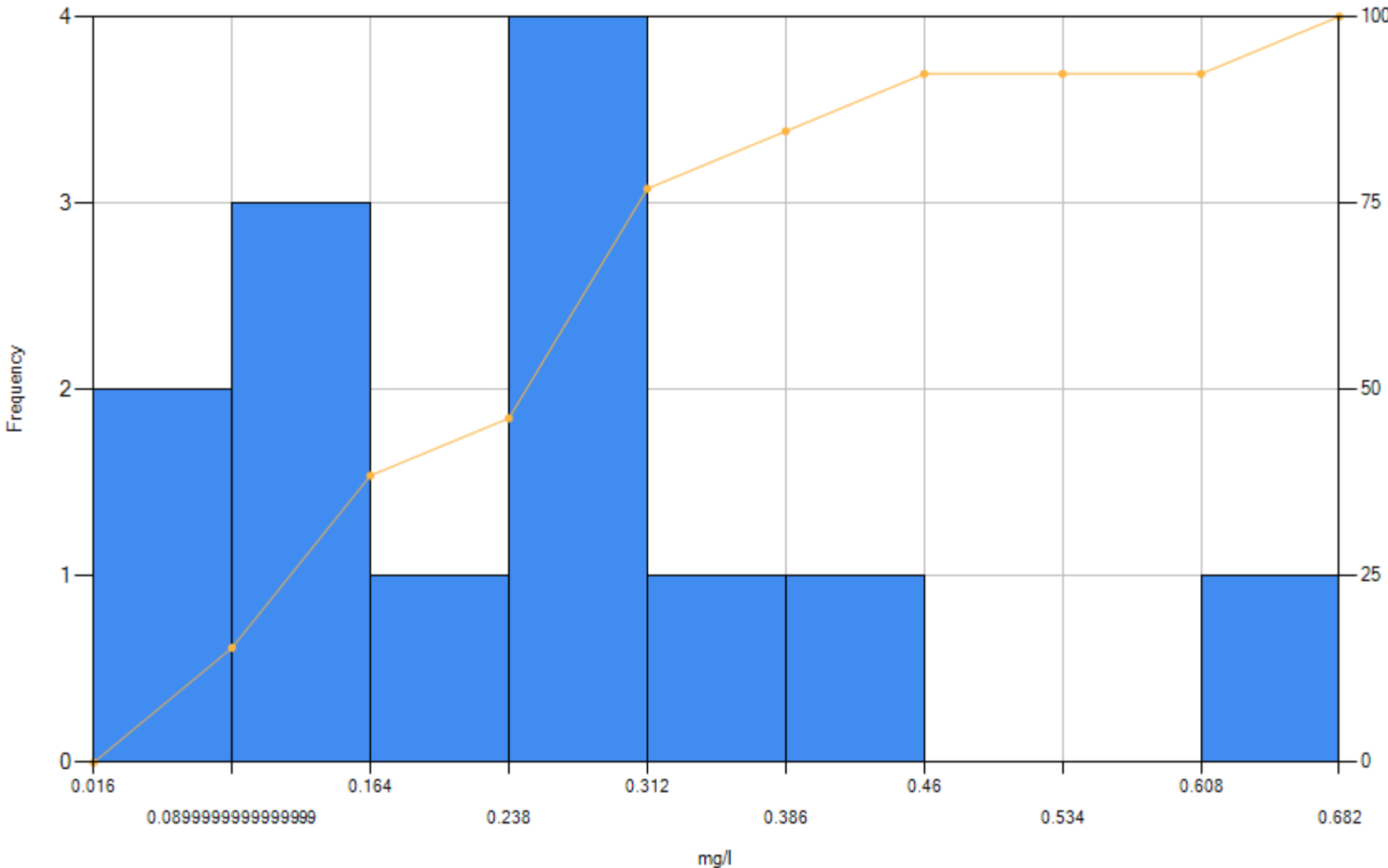


Multiple Characteristic Line Graph



Single Characteristic Cumulative Frequency Graph

Aluminum (mg/l) Total
01-01-2008 to 06-13-2011

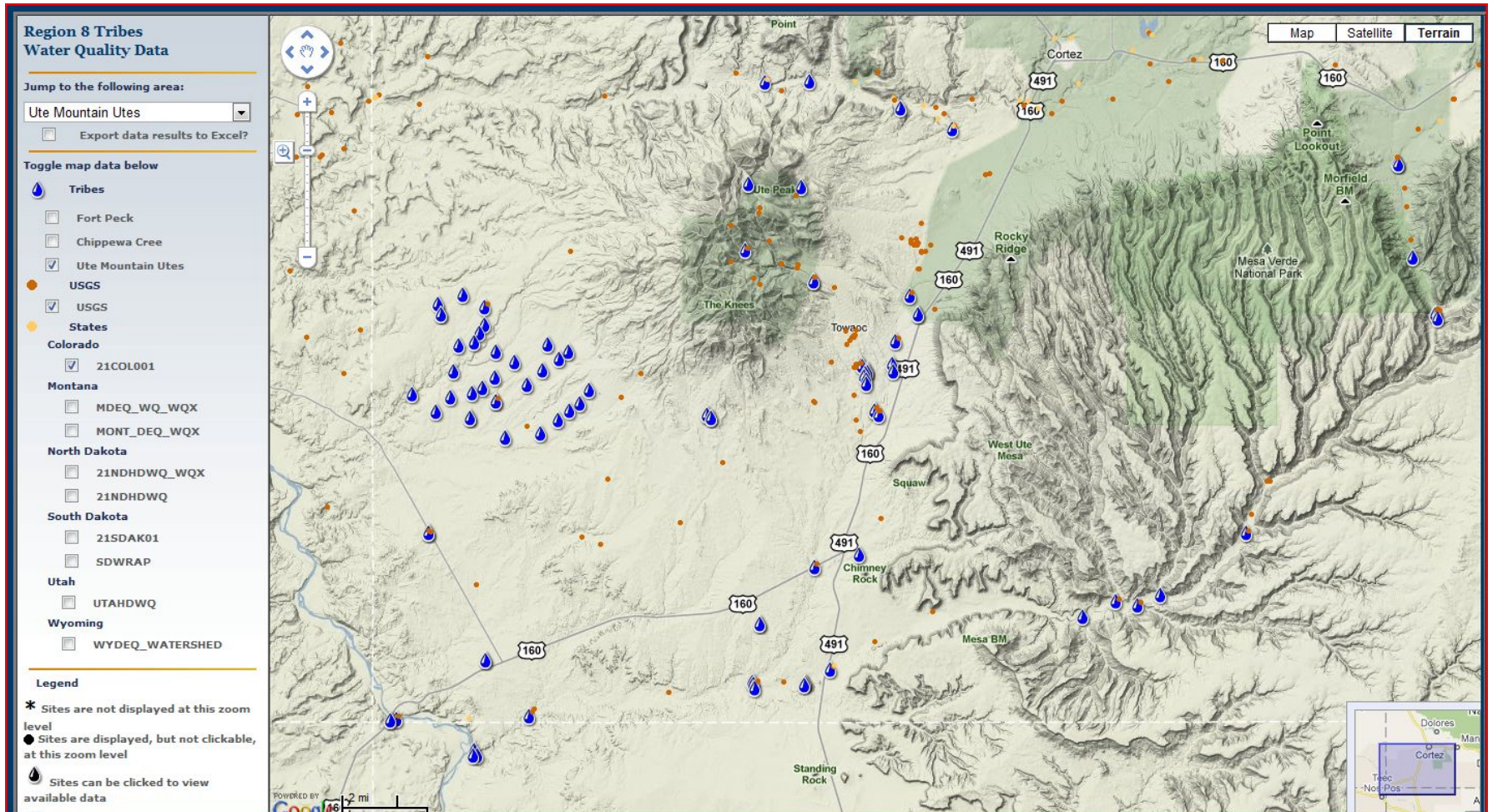


Data Analysis - Mapping



- Google Map Interface
 - <http://r8tribesmap.goldsystems.com>
- Layers for USGS and State Data
- Drill down to View Raw Data
- Criteria Selection Page

Google Maps Interface



Drill Down to AWQMS Data



r8tribesmap.goldsystems.com/Summary.aspx?uid=101750&Excel=false

Monitoring Location ID	Monitoring Location Name	Monitoring Location Latitude	Monitoring Location Longitude	Project ID	Activity ID	Activity Media Name	Activity Type	Activity Start Date	Activity Start Time	Activity Start Time Zone	Characteristic Name	Result Measure Value
HAYFIELD_RESVR	Former DW storage reservoir east of Towaoc, north of Casino	37.215123	-108.68372	UMU_106	HAYFIELD_RESVR19991PI1043-F0	Water	Field Msr/Obs	10-06-1999			pH	8.
HAYFIELD_RESVR	Former DW storage reservoir east of Towaoc, north of Casino	37.215123	-108.68372	UMU_106	HAYFIELD_RESVR19991PI1043-F0	Water	Field Msr/Obs	10-06-1999			pH	8.
HAYFIELD_RESVR	Former DW storage reservoir east of Towaoc, north of Casino	37.215123	-108.68372	UMU_106	HAYFIELD_RESVR19991PI1043-F0	Water	Field Msr/Obs	10-06-1999			Temperature, water	14
	Former DW storage											

Map Satellite Terrain

Utah
 UTAHDWQ
 Wyoming

Legend

- * Sites are not displayed at this zoom level
- Sites are displayed, but not clickable, at this zoom level
- Sites can be clicked to view available data

Chimney Rock

160 491

2 mi

POWERED BY Google

Cortez

160 491

Links to USGS Data Pages



[USGS Home](#)
[Contact USGS](#)
[Search USGS](#)

National Water Information System: Web Interface

Data Category: Water Quality
Geographic Area: United States
GO

[News](#) updated March, 2011

Water Quality Samples for the Nation

The data you have secured from the USGS NWISWeb database may include data that have not received Director's approval and as such are provisional and subject to revision. The data are released on the condition that neither the USGS nor the United States Government may be held liable for any damages resulting from its authorized or unauthorized use.

To view additional data-quality attributes, output the results using these options: one result per row, expanded attributes. Additional precautions are at: http://waterdata.usgs.gov/nwis/qwdata?help#Data_retrievals_precautions.

USGS 371112108443401 NB33501718CCAC B-10

Available data for this site: Water-Quality Field/Lab samples GO

Montezuma County, Colorado
Hydrologic Unit Code 14080107
Latitude 37°11'17", Longitude 108°44'32" NAD27
Land-surface elevation 5,848.00 feet above NGVD29
The depth of the well is 528 feet below land surface.
The depth of the hole is 528 feet below land surface.
This well is completed in the Burro Canyon Formation (217BRCN) local aquifer.

Output formats

[Parameter Group Period of Record Table](#)

[Inventory of available water-quality data for printing](#)

[Inventory of water-quality data with retrieval](#)

[Tab-separated data, one result per row](#)

[Tab-separated data one sample per row with remark codes combined with values](#)

[Tab-separated data one sample per row with tab-delimiter for remark codes](#)

[Reselect output format](#)

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Sampling depth, feet (00003)	Temperature, water, deg C (00010)	Specific conductance, wat unfiltered, us/cm @ 25 degC (00095)	Hydrogen ion, water, unfiltered, calcd, mg/L (00191)	pH, water, unfiltered, field, units (00400)	Carbon dioxide water, unfiltered, mg/L (00405)	ANC, wat unfiltered, end pt, field, mg/L as CaCO3 (00410)	Bicarbonate, wat unfiltered, end pt, field, mg/L (00440)	Hardness, water, mg/L as CaCO3 (00900)	Noncarb hardness, wat unfiltered, mg/L as CaCO3 (00902)	Calcium water, filtered, mg/L (00915)	Magnesium, water, filtered, mg/L (00925)	Sodium, water, filtered, mg/L (00930)	Sodium adsorption ratio (00931)	Sodium fraction of cations percent (00932)	Potassium, water, filtered, mg/L (00935)	Chloride, water, filtered, mg/L (00940)	Sulfate, water, filtered, mg/L (00945)	Fluoride, water, filtered, mg/L (00950)	Silica, water, filtered, mg/L as SiO2 (00955)	Iron, water, filtered, ug/L (01046)	Manganese, water, filtered, ug/L (01056)
1958-07-17	MST	T	WG		18.5	1300	0.00002	7.7																	
1958-07-18 09:30	MST	T	WG	528	17.0	1300	0.00002	7.7	13	344	420	120	0.0	27.0	14.0	260	10	81	4.40	57.0	256	0.30	8.00	0.0	0.0

[Questions about sites/data?](#) [Data Tips](#)

[Feedback on this web site](#) [Explanation of terms](#)

[Automated retrievals](#) [Subscribe for system changes](#)

[Help](#) [News](#)

SDWRAP

Utah

UTAHDWQ

Wyoming

Legend

* Sites are not displayed at this zoom level

● Sites are displayed, but not clickable, at this zoom level

● Sites can be clicked to view available data

Exceedance Mapping



Region 8 Tribes Water Quality Data

Locations | Exceedances

Organizations:
(Hold down Ctrl key to select multiple items.)

- FORTPECK
- CHIPCREE
- UTEMTN
- 21COL001
- MDEQ_WQ_WQX
- MONT_DEQ_WQX
- 21NDHDWQ_WQX
- 21NDHDWQ
- 21SDAK01

Characteristics:

- Bromoxynil
- Butachlor
- Butyl benzyl phthalate
- Butylate
- C1-C3 Fluorenes
- C1-C4 Chrysenes
- C1-C4 Fluoranthenes
- C1-C4 Phenanthrenes
- Cadmium**
- Caffeine
- Calcium
- Calcium carbonate
- Calcium hydroxide
- Calcium oxide
- Captan
- Carbaryl
- Carbazole
- Carbofuran
- Carbon dioxide
- Carbon disulfide

Value above/below:

Above
 Below

.0001 mg/l

Map | Satellite | Terrain

Frazer Wolf Point

2 2 2 2

Map data ©2011 Google - Terms of Use

Partner Network - Tribes



- Region V
 - Red Lake and Fond du Lac Tribe
- Region VI
 - Iowa Tribe, Kickapoo, Sac and Fox Tribes, Otoe Missouri, Chickasaw Nation
- Region VIII
 - 20 of 21 Tribes with Water Programs
- Region X
 - Nez Perce Tribe

Partner Network - States



- State of Alaska
 - 100% of Water Quality data is in WQX format
- State of Iowa
 - Over 1.2 million records have been migrated to AWQMS / WQX
- State of Illinois
- State of Kansas
 - Over 1 million records sent to WQX (over 90% via AWQMS)
- State of Maryland
 - All of there historical data migrated to AWQMS and WQX
- State of Utah
 - Over 4.5 million records migrated to AWQMS

Partner Network – Volunteers



- Colorado Data Sharing Network
 - Over 25 Organizations from Municipalities, Universities, Watershed Management Groups
 - Colorado RiverWatch alone has over 800,000 results
- Leonard Rice Engineers
 - Provide AWQMS to several volunteer programs

AWQMS Latest Features



- AWQMS demo www.awqms.com
 - Rapid Data Entry Tool
 - Map
 - Thresholds
 - Can be used on import for QA/QC measures
 - Can be applied in the Data Analysis section
 - Can have multiple Thresholds

Contact Information



Deb Madison

Environmental Program Manager
Office of Environmental Protection
Fort Peck Assiniboine & Sioux Tribes
603 Court Ave, Box 1027
Poplar, Montana 59925
T: 406.768.5155 ext 399
E: 2horses@nemontel.net

Andy Van den Akker

Gold Systems, Inc.
3330 South 700 East STE C
Salt Lake City, Utah 84106
T: 801.456.6140
E: andyv@goldsystems.com