

# Tribes Partnering with Tribes - An Exchange Network Tribal Intersection



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Scientist and Quality Assurance  
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# Background

- Iowa Tribe has been monitoring Water Quality data since 2000 and initially loaded it into STORET
- Vickie Kujawa, Director of Environmental Services
  - Joined the Iowa Tribe in August 2009
  - Worked with water quality Peer Trainers while employed by Flandreau Sioux and Southern Ute Tribes in Region VIII
  - Identified that the Iowa Tribe needed a water quality data management system that integrated with WQX
  - Wanted to set up a Peer Training group in Region VI like she saw working in Region VIII

# Leveraging Other's Efforts

- Vickie knew of the STORET/WQX efforts of Region VIII and wanted to mimic the success
- Solicited neighboring tribes in 2009 to create a consortium
- Found two other tribes with similar water quality data management needs
  - Sac and Fox Tribe of Oklahoma
    - Had historical data
  - Kickapoo Tribe of Oklahoma
    - Just starting a water quality program
- Needed funding

# NEIEN Grant process

- Vickie knew of the NEIEN grant process from her time at Southern Ute Tribe
  - Used the previous grant responses from Region VIII grants as a template
  - Used the existing Ambient Water Quality Monitoring System (AWQMS) as the data management tool
  - Identified areas GIS, and reporting needs that the tribes would need
  - Proposed setting up Peer Training group to assist future tribes that join the consortium
- Won NEIEN grant!

# NEIEN Grant Goals

- Goal 1 – Implement AWQMS application and database
  - Status – Complete!
- Goal 2 – Load water quality data and flow it to WQX regularly
  - Status – On-going
    - Initial data has been loaded, but will continue
- Goal 3 – Creation of Peer Trainer Network
  - Status – On-going
    - Peer Trainers have been selected and are coming up to speed on the tools
- Goal 4 – Provide Tribal Trainings
  - Status – On-going
    - Initial training is complete, this will be on-going through the grant
- Goal 5 – Enhance database security for specific data sharing
  - Status – On-going
    - Task has been started and will be available for next training session (likely in the fall 2011)
- Goal 6 – Enhance reporting, data analysis and integrate database with GIS component
  - Status – On-going
    - Map is deployed and working. Additional mapping features to be added as well as enhancements to graphing and statistical reporting.

# NCAI Conference 2010

- Vickie met with Christa Tyrell of Fort Peck Tribe in Region VIII and Gold Systems
- Both tribes had won NEIEN grants with emphasis on water quality using AWQMS
- Endorsed collaboration between tribal groups to get more bang for buck
  - Fort Peck to enhance the biological data tracking and reporting of AWQMS
  - Iowa Tribe to focus on the GIS capabilities and other reporting needs in AWQMS
  - Both to support Peer Training efforts in each region but sharing documentation and best practices

# AWQMS Capabilities

- 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



# Data Management

- Enforces WQX Standards
- Provides Additional Data Elements for Local Use
- Provides Web-Based Interface to View / Edit Data
- Rapid Data Entry Windows for Field Data
- Flexible Import Tool to Load Data from Labs
- Secure Environment for Data Review (QA/QC)



# Data Sharing

- Regional Solution Allows Tribes to Share Data with other Participating Tribes
- Generates WQX formatted XML files
- Integrated Node Client to Share Data Nationally via the Exchange Network
- Configurable Security Allows Tribes to Control who can View, Add, Edit, and Submit Data

# Data Analysis

- Exporting
  - Flat File and CrossTab Format
- Reporting
  - Ad Hoc and Custom Reporting
- Graphing
  - Web-Based Graphing Module
- Mapping
  - Google Maps Mapping Interface

# AWQMS Home Page

Home - Windows Internet Explorer provided by MSN & Bing

http://awqms.goldsystems.com/Homepage.aspx

File Edit View Favorites Tools Help

★ Favorites Home



## Ambient Water Quality Monitoring System

You are here: Home

### Home

**Data Summary:**

Organization	Total Results	Last 90 Days	YTD	Last WQX Export
IOWATROK_WQX	10,002	0	7,961	01-25-2011
KICKAPOO	194	0	194	
SFNOES_WQX	5,555	5,401	5,555	
WQXTEST	4,931	20	232	04-11-2011

  
WATER QUALITY EXCHANGE

**My Navigation History:**

Type	ID	Context	
Activity	<a href="#">NCR01 11/05/2009 F</a>	11-05-2009	
	<a href="#">NCR06 28 Sep 2009 AB</a>	09-28-2009	
	<a href="#">NCR01 7 JUL 2009 AB</a>	07-07-2009	
	<a href="#">ML5 07072009 L</a>	07-07-2009	
	<a href="#">BR1 04/02/2007 F</a>	04-02-2007	
	<a href="#">DG1 07/02/2007 F</a>	07-02-2007	
	<a href="#">ML5-07072009-L</a>	07-07-2009	
	<a href="#">ml5-10-28-2009-F</a>	10-28-2009	
	<a href="#">ML5-09282009-F</a>	09-28-2009	
	<a href="#">CDF2 102909</a>	10-29-2009	
	<b>Monitoring Location</b>	<a href="#">NCR01</a>	Bridge north of Jones

- Import Configurations
- Create New Dataset
- Datasets
- Lookup Tables
- Organizations
- Projects
- Monitoring Locations
- Activities
- Activity Groups
- Results
- Bio/Habitat Indices
- Data Analysis
- WQX Export
- Event Log
- User Information
- Rapid Entry
- Preferences
- Logout (45 min.)

# Data Analysis - Reporting

- Custom Reports
  - Percent Exceedence
  - Statistics by Location
  - Exceedence by Location
  - Quartiles
  - Activities and Results Summary
- Ad Hoc Reporting

# Data Analysis Criteria Page

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

## Single Characteristic Line Graph

Activity Date between\*:  and\*  (MM-DD-YYYY)

Result Status:\* 

- Accepted
- Final
- Preliminary
- Rejected
- Validated

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

Y-Axis Scale Logarithmic

Display values as:\*

Don't show values

Show values as labels

Show values as tooltips on mouseover

# Quartiles Report

## Quartiles Report

4/26/2011

**Selected Location(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

# Exceedence Report

## Percent Exceedence 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 Exceedence Value:** 23.633333  
**Number Exceedances:** 3                      **Mean Exceedence Diff:** 3.633333  
**Percent Exceedances:** 43%                      **Mean Exceedence % 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

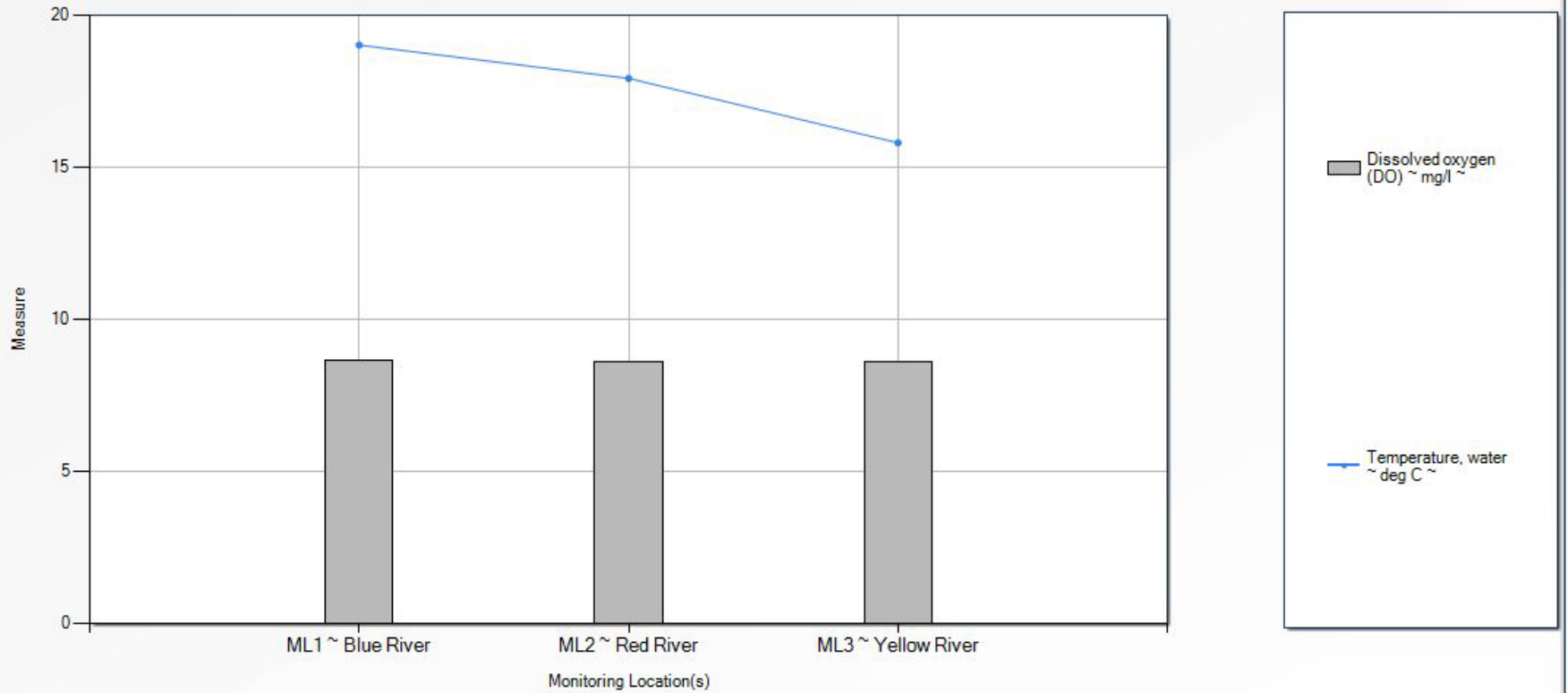


# Data Analysis - Graphing

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

# Multiple Characteristic Mean Line/Bar Graph

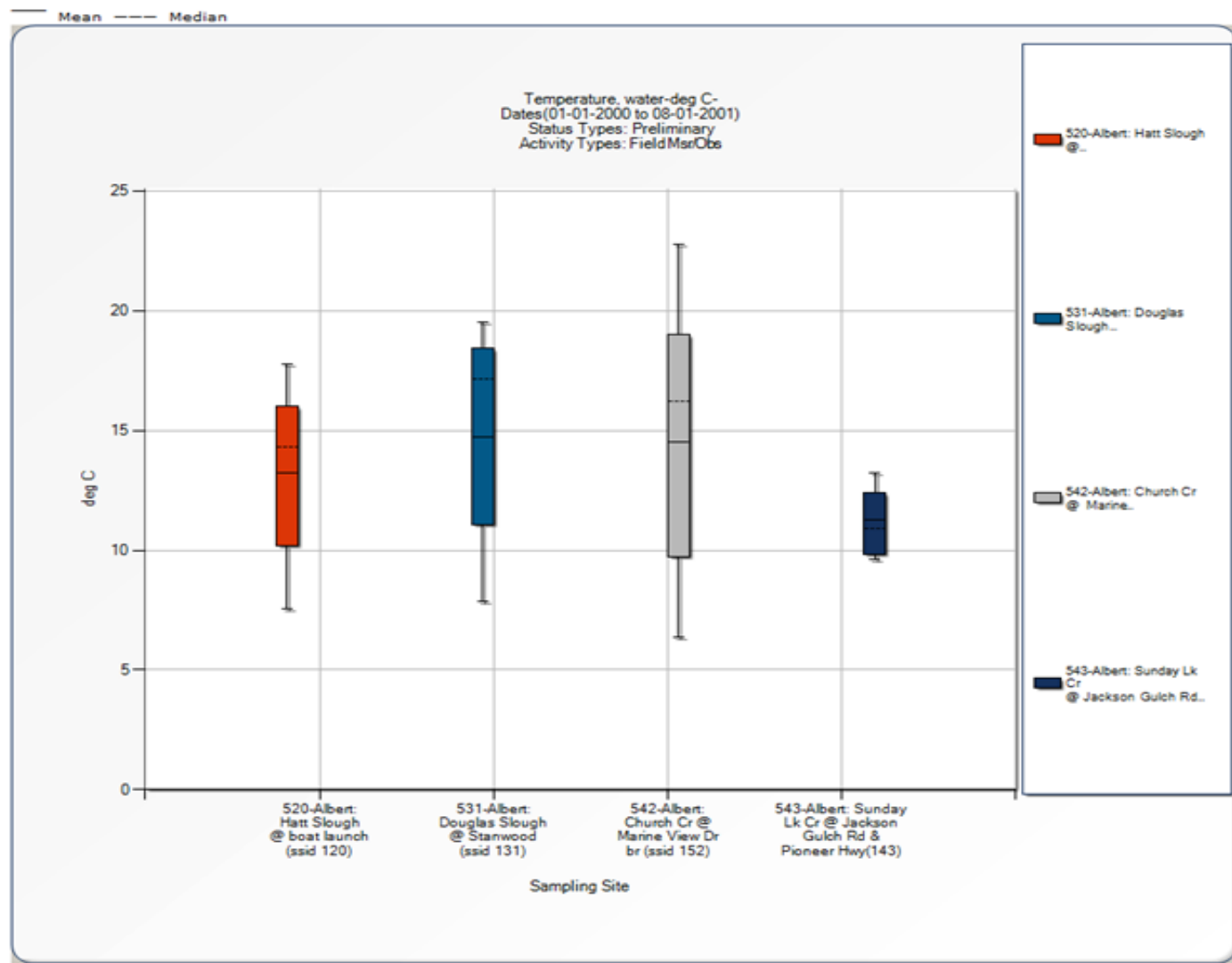
Dates: 04-01-2008 to 10-01-2008



# Ambient Water Quality Monitoring System

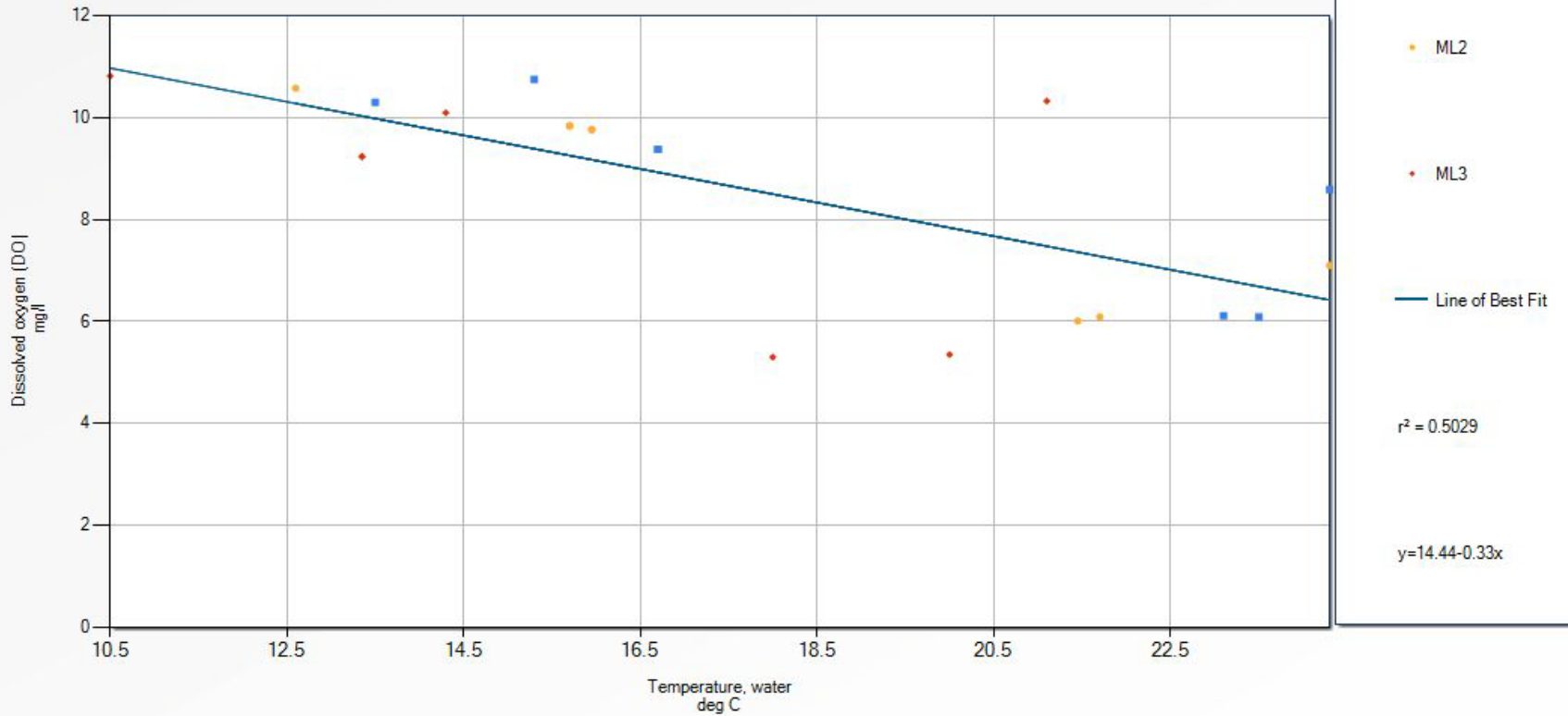
You are here: [Home](#) >> [Graphs and Reports](#) >> [Graph and Report Criteria](#) >> Box and Whiskers Plot

## Box and Whiskers Plot



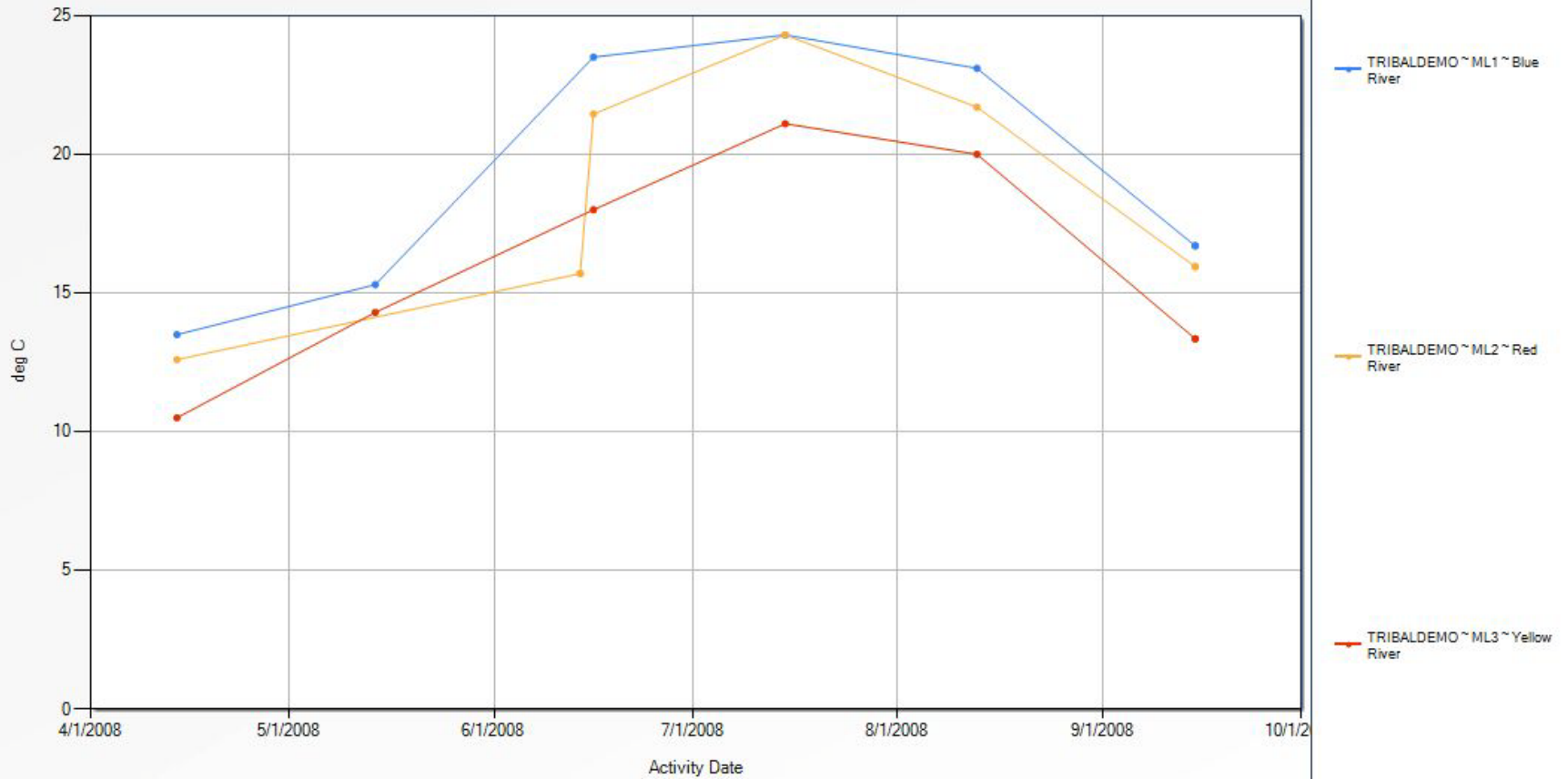
# Bi-variate Scatter Plot

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



# Single Characteristic Line Graph

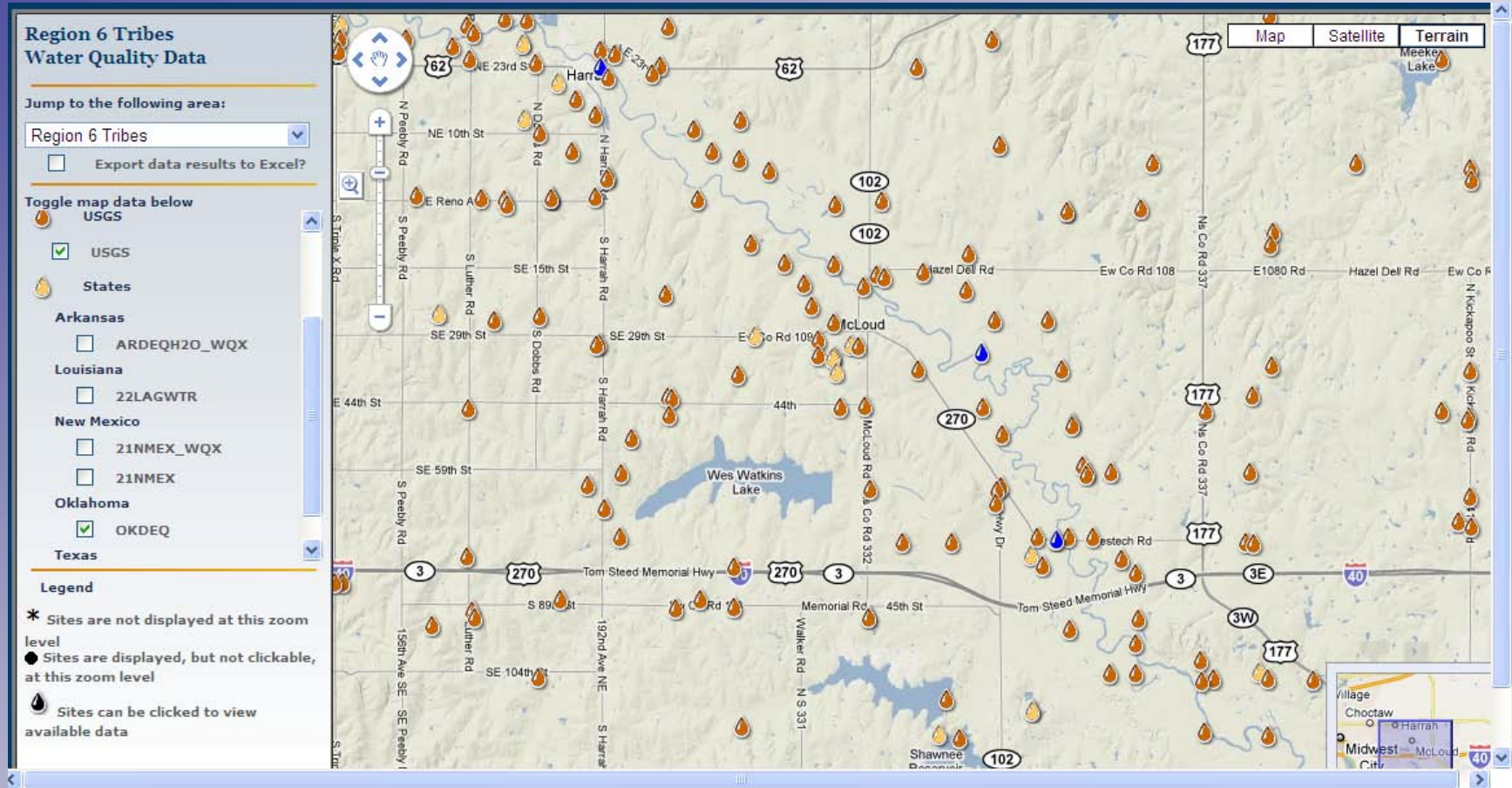
Temperature, water  
Dates: 04-01-2008 to 10-01-2008



# Data Analysis - Mapping

- Google Map Interface
- Layers for USGS and State Data
- Drill down to view Raw Data
- Criteria Selection Page
- Report and Graph Integration

# Google Maps Interface





# Drill Down to AWQMS Data

**Region 6 Tribes Water Quality Data**

Jump to the following area:

Region 6 Tribes

Export data results to Excel?

Toggle map data below

**Tribes**

Iowa Tribe of Oklahoma

Kickapoo

Sac and Fox

**USGS**

USGS

**States**

**Arkansas**

ARDEQH2O\_WQX

**Louisiana**

22LAGWTR

**New Mexico**

21NMEX\_WQX

21NMEX

**Oklahoma**

OKDEQ

**Texas**

TCEQMAIN

**Summary - Google Chrome**

r6tribesmap.goldsystems.com/Summary.aspx?uid=386737&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	Result Measure Unit
NCR04	Ernestine Green	35.43151	-97.05951	kick 106	NCR04 10 Jul 2009 F	Water	Field Msr/Obs	07-10-2009	03:02:00 PM	CDT	pH	9.020	None
NCR04	Ernestine Green	35.43151	-97.05951	kick 106	NCR04 10 Jul 2009 F	Water	Field Msr/Obs	07-10-2009	03:02:00 PM	CDT	Specific conductance	1080.00	uS/cm
NCR04	Ernestine Green	35.43151	-97.05951	kick 106	NCR04 10 Jul 2009 F	Water	Field Msr/Obs	07-10-2009	03:02:00 PM	CDT	Dissolved oxygen (DO)	12.480	mg/l
NCR04	Ernestine Green	35.43151	-97.05951	kick 106	NCR04 10 Jul 2009 F	Water	Field Msr/Obs	07-10-2009	03:02:00 PM	CDT	Temperature, water	33.01	deg C
NCR04	Ernestine Green	35.43151	-97.05951	kick 106	NCR04 20 Jul 2009 F	Water	Field Msr/Obs	07-20-2009	02:10:00 PM	CDT	Escherichia coli	0.0	MPN

# Drill Down to USGS Data Pages

The screenshot displays the USGS National Water Information System (NWIS) Web Interface. The browser address bar shows the URL: [nwis.waterdata.usgs.gov/usa/nwis/qwdata/?site\\_no=352330097014601&agency\\_cd=USGS&inventory\\_output=0&rdb\\_inventory\\_output=value&TZoutput=0&pm\\_cd\\_compare=](http://nwis.waterdata.usgs.gov/usa/nwis/qwdata/?site_no=352330097014601&agency_cd=USGS&inventory_output=0&rdb_inventory_output=value&TZoutput=0&pm_cd_compare=)

The page features the USGS logo and the text "science for a changing world". The main heading is "National Water Information System: Web Interface". Below this, there are navigation options for "Data Category" (set to "Water Quality") and "Geographic Area" (set to "United States").

The page title is "Water Quality Samples for the Nation". A red warning message states: "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." Below this, it provides instructions on how to view additional data-quality attributes and a link to the help page: [http://waterdata.usgs.gov/nwis/qwdata?help#Data\\_retrievals\\_precautions](http://waterdata.usgs.gov/nwis/qwdata?help#Data_retrievals_precautions).

The specific site information is displayed as follows:

**USGS 352330097014601 11N-03E-30 CDC 1**

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

Pottawatomie County, Oklahoma  
Hydrologic Unit Code 11100302  
Latitude 35°23'30", Longitude 97°01'46" NAD27  
Land-surface elevation 1,030 feet above NGVD29  
This well is completed in the Quaternary Alluvium (110ALVM) local aquifer.

The "Output formats" section lists the following options:

- 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

# Drill Down to State Data Pages

**Region 6 Tribes  
Water Quality Data**

Jump to the following area:

Region 6 Tribes

Export data results to Excel?

Toggle map data by:

**Tribes**

- Iowa Tribe
- Kickapoo
- Sac and Fox

**USGS**

- USGS

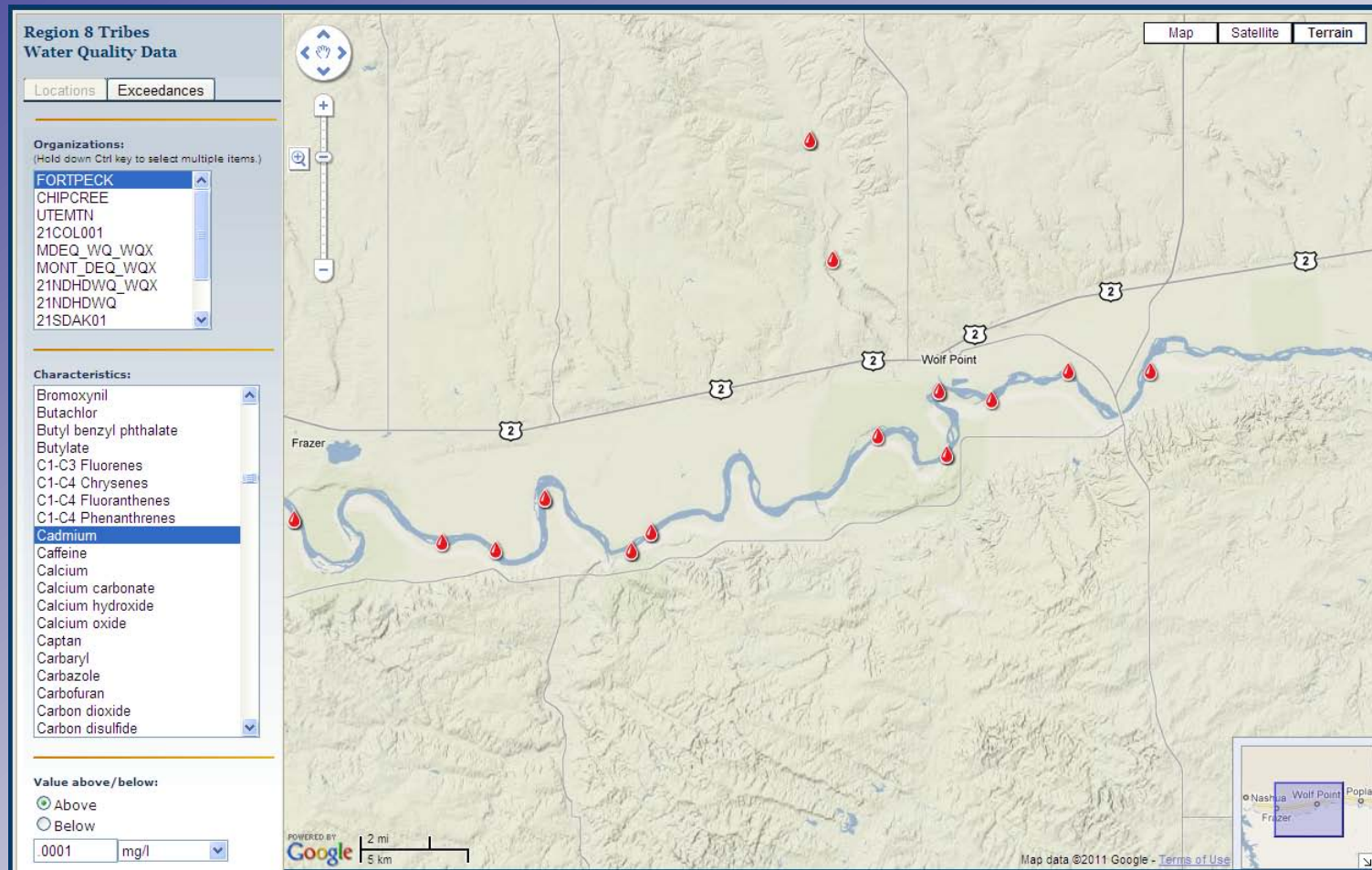
**States**

- Arkansas
- Louisiana
- New Mexico
- Oklahoma
- Texas

**Organization: OKDEQ**

Monitoring Location ID	Monitoring Location Name	Project ID	Activity ID	Activity Media Name	Activity Type	Activity Start Date	Activity Start Time	Characteristic Name	Result Measure Value	Result Measure Units	Result Value Type Name	Sample Fraction Name	Result Detection/Quantitation Limit Measure
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	339777	Water	Sample	2003-09-26	00:00:00	Alkalinity, Total (total hydroxide+carbonate+bicarbonate)	212000	ug/l	Actual	Total	
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	365569	Water	Sample	2004-12-13	00:00:00	Alkalinity, Total (total hydroxide+carbonate+bicarbonate)	199000	ug/l	Actual	Total	
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	339777	Water	Sample	2003-09-26	00:00:00	Aluminum	300	ug/l	Actual	Total	
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	365569	Water	Sample	2004-12-13	00:00:00	Aluminum	300	ug/l	Actual	Total	
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	339777	Water	Sample	2003-09-26	00:00:00	Calcium	6000	ug/l	Actual	Total	
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	365569	Water	Sample	2004-12-13	00:00:00	Calcium	7000	ug/l	Actual	Total	
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	339777	Water	Sample	2003-09-26	00:00:00	Chloride	52400	ug/l	Actual	Total	
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	365569	Water	Sample	2004-12-13	00:00:00	Chloride	51700	ug/l	Actual	Total	
2006314-WELL 1	DALE SCHOOL-WELL 1	WQ-GW	339777	Water	Sample	2003-09-26	00:00:00	Copper	7	ug/l	Actual	Total	

# Exceedence Mapping





# Collaboration with Region VIII

- Map built and deployed for both groups
- Additional reporting features being deployed by the end of May
  - e.g. Regression line for scatter plots
- Region VIII has completed first phase of biological data inventory and are proceeding to enhancements of system
  - First phase should be completed by mid-summer

# Secondary Collaboration

- AWWQMS was originally built for States but is used by many organizations
- Tribal Programs
  - Regions VI
    - Iowa Tribe, Kickapoo, Sac and Fox Tribes, Chickasaw Nation
  - Region VIII
    - 20 of 21 Tribes with Water Programs
  - Region X
    - Nez Perce Tribe

# Secondary Collaboration

- State Programs
  - Alaska, Iowa, Illinois, Kansas, Maryland, and Utah
- Volunteer / Watershed Programs
  - Colorado Data Sharing Network
    - 17 Organizations from Municipalities, Universities, Watershed Management Groups
  - Leonard Rice Engineers
    - Provide AWQMS to several volunteer programs
- AWQMS is built so users can collaborate on enhancements



# What's Next

- Add additional Region VI tribes
- Continue to work with other AWQMS users
- Prepare to take over O&M after grant
  - Hosting costs are currently \$500 a month for the three tribes (\$167 per tribe)
  - As more tribes join get a discount (Region VIII is about \$100 a tribe per month)
  - Need to also fund user support, but will be less with the Peer Trainers being able to provide most of it

# Mapping Demo

<http://r6tribesmap.goldsystems.com/>

<http://r8tribesmapdev.goldsystems.com/>

# Questions?

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