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
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

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

Watershed Evaluation and Planning
AWQMS Benefits

Project Planning and Interpretation
# Raw Data File

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AWQMS Home Page
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
# Quartiles Report

**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

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<th>Location</th>
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<th>25th Quartile</th>
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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

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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

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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

- **Dissolved oxygen (DO)~mg/l~**
- **Temperature, water ~deg C~

**ML1 ~ Blue River**
**ML2 ~ Red River**
**ML3 ~ Yellow River**

Monitoring Location(s)
Multiple Characteristic Line Graph

R1 ~ River1
01-01-2008 to 11-09-2011

- Dissolved oxygen (DO) ~ mg/l ~ Total
- pH None ~ Total
- Temperature, water ~ deg F ~ Total

Activity Date

Measure
Single Characteristic Cumulative Frequency Graph

Aluminum (mg/l) Total
01-01-2009 to 06-13-2011

Frequency

mg/l

0.016
0.0899999999999999
0.164
0.238
0.312
0.386
0.46
0.534
0.608
0.682

0
25
50
75
100
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

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Links to USGS Data Pages
Exceedance Mapping
Partner Network - Tribes

• Region V
  – Red Lake and Fond du Lac Tribe

• Region VI
  – Iowa Tribe, Kickapoo, Sac and Fox Tribes, Otoe Missouria, 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
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