Pakistan Water Resources Data Warehouse Project & Nat’l Data Standards Committee

Sandy Williamson & Dr. Ingrid Verstraeten
27 April, 2009
Session H3 Data Sharing
NWQMC, Denver, CO
Project Visits

- October, 2007 2 weeks Pakistan – 3 Cities
- Jan / Feb 2009 hosting 8 Pakistanis for 4 weeks in Tacoma and Madison.
- April 4-5, 2009 - Pakistan 1st Water Data Standards & Data Warehouse meeting
- Aug., 2009 20 Pakistanis and 4 from USGS in Nepal for a week
- Feb., 2010 - hosting 8 Pakistanis for 2 weeks in Madison
- June, 2010 – 15 Pakistanis in Turkey
Pakistan General Info./ Hydrology

- For size & Physiography, Think of CA+AZ+NV plus part of Himalayas (K2).
- 165M people (#6 in world), ½ of USA
- National Language is English, required in all government meetings and publications
- Largest City, Karachi, 16M -- larger than all but NY and LA in US.
Indus River

- 168 M acre-feet/year flow \(\sim\) Columbia R.
- 1800 miles long, Columbia R. is 1200 miles
- Pakistan has 5 very large dams, two larger than Grand Coulee, largest Columbia R.
- Two Pakistan Dams in the top 10 in the world, according to Wikipedia, based on dam volume
Indus R. Irrigation System

- 200 years old, British designed
- Irrigates 35 million acres (WA CBIP <1M ac) (CA <10M ac.)
- The largest Irrigation System in the world, according to World Bank
- Agriculture is ¼ of Pakistan’s GDP
- Ag is 2/3 of its employment
- Ag is about 80 % of Pakistan’s exports,
2 Year Project Overview

- Few (2) water data systems exist
- System of local transactional data entry and maintenance systems based on NPSTORET – thanks to NPS
- National data warehouse system web based with map output
- National Data Standards Committee
- 18 organizations agreed, 5 already have stored & Shared data for >10,000 sites
This committee would develop **agreements about data standards and terminology:**

- A national system of Unique site identifiers:
  - `ASSIGNER_ID+SEQ.NO.`
- Data field definitions
- Domains of acceptable entries for characteristics such as well types
- Chemical constituent definitions and grouping-
  - `STORET`
- field and laboratory analytical methods
- mandatory data elements,
- and data-quality assurance methods
WELCOME TO HONORABLE GUESTS
National Workshop on
“Establishment of Water Resource Data Warehouse and Consensus on Data Standards”
14-15 April 2009, Islamabad-Pakistan
Jointly Organized by: PCRWR-USGS
Basic Requirements for Selection of NPSTORET Data Entry System

- MS Access based – distributed
- Already developed and proven by other users
- Free and adaptable
- Aggregation to central data warehouse
- Modern development and architecture
- Export to other systems for analysis
- Modifiable yet connected to future enhancements
Scope of Data Included

PSTORET & PakWaters DW System

Project1
Project2
Project3
Project4
Project5
Project6
## Datasets currently in PakWaters

<table>
<thead>
<tr>
<th>Organization</th>
<th># Stations</th>
<th># Results</th>
<th># Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWASRI</td>
<td>2,700</td>
<td>34,000</td>
<td>11</td>
</tr>
<tr>
<td>PCRWR</td>
<td>4,000</td>
<td>106,000</td>
<td>22</td>
</tr>
<tr>
<td>Punjab ID</td>
<td>3,300</td>
<td>4,000,000</td>
<td>9</td>
</tr>
<tr>
<td>SIDA</td>
<td>24</td>
<td>2,400</td>
<td>5</td>
</tr>
<tr>
<td>WAPDA SMO</td>
<td>50</td>
<td>617</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10,074</td>
<td>137,000</td>
<td>25</td>
</tr>
</tbody>
</table>
Map of Exceedances

Organization: IWASRI
Project: GUGERA
Station ID: IWALAH-000433
Primary Type: WELL
Latitude: 31.0925
Longitude: 72.473611
Characteristic Name: Solids, Dissolved
Max Result (Standard Units): 1677 mg/l
Standard Name: PakEPA Drinking Water Standards
Standard Value: 1000 mg/l

Legend
(Note: Exceedance based on maximum result)
- Ground Water
- Surface Water
- Facility
- Result > Standard Value
- 0.5 Standard Value < Result <= Standard Value
- Result <= 0.5 Standard Value

Submit Checkbox or Textbox

Help Page
Export as Excel spreadsheet (XLS)
Export as Key Markun Language (KML)
Report export to KML
Distribution of Specific Conductance in Wells

Pakistan National Water Database System
PAKWATERS V. 1.0

Specific Conductance (in ohm cm)

Distribution of Specific Conductance in Wells

Number of Wells

- Low conductivity
- Normal conductivity

Specific Conductance intervals:
- 0-999
- 1000-1999
- 2000-2999
- 3000-3999
- 4000-4999
- 5000-5999
- 6000-6999
- 7000-7999
- 8000-8999
- 9000-9999

Water Research for Changing World
Example time-series graph

**Characteristic Time Series Chart** – displays all of the sampling results over time for one characteristic at one station.

- **Filter data** – use Query Parameters located in the upper right hand corner of the page: Organization, Project, Station, and Characteristic in hierarchical order. The chart will automatically regenerate after each new filter entry is chosen.

### Chart Data

<table>
<thead>
<tr>
<th>Organization</th>
<th>Project</th>
<th>Station Id</th>
<th>Characteristic Name</th>
<th>Sampling Date</th>
<th>Result</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIDA</td>
<td>LBOD</td>
<td>SIDHYD000001</td>
<td>pH</td>
<td>03-SEP-06</td>
<td>7.5</td>
<td>None</td>
</tr>
<tr>
<td>SIDA</td>
<td>LBOD</td>
<td>SIDHYD000001</td>
<td>pH</td>
<td>01-OCT-06</td>
<td>7.6</td>
<td>None</td>
</tr>
</tbody>
</table>
Cars all full, Luggage racks are for people
Motor bikes for families and construction
Lawyers demonstrate
Science Advisor to the President in her office
The End

- Sandy Williamson  
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- PS In the break ask me about

- **Stream View** – Contributed Photos linked to stream reaches