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.

Mashhad
(カブール) Kabol
Afghanistan
Islamabad
(ラワルピンディ) Rawalpindi
(アムリトサル)
(ラホール) Lahore
Okara
Indus River Valley
Pakistan
(Nova
(ジャイプール) Jaipur
(ハイデラバード) Hyderabad
(カラチ) Karachi
Image © 2007 TerraMetrics
© 2007 Europa Technologies
Image NASA
285 mi

Indus River

- 168 M acre-feet/year flow ~= Columbia R.
- 1800 miles long, Columbia R. is 1200
- 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,

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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

Scope of Data Standard Committee

- 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
USGS
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

National Workshop On
"Establishment of Water Resource Data Warehous
and Consensus on Data St rds"
14-15-April 009, Islamabad-
by: P USGS
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National Workshop on
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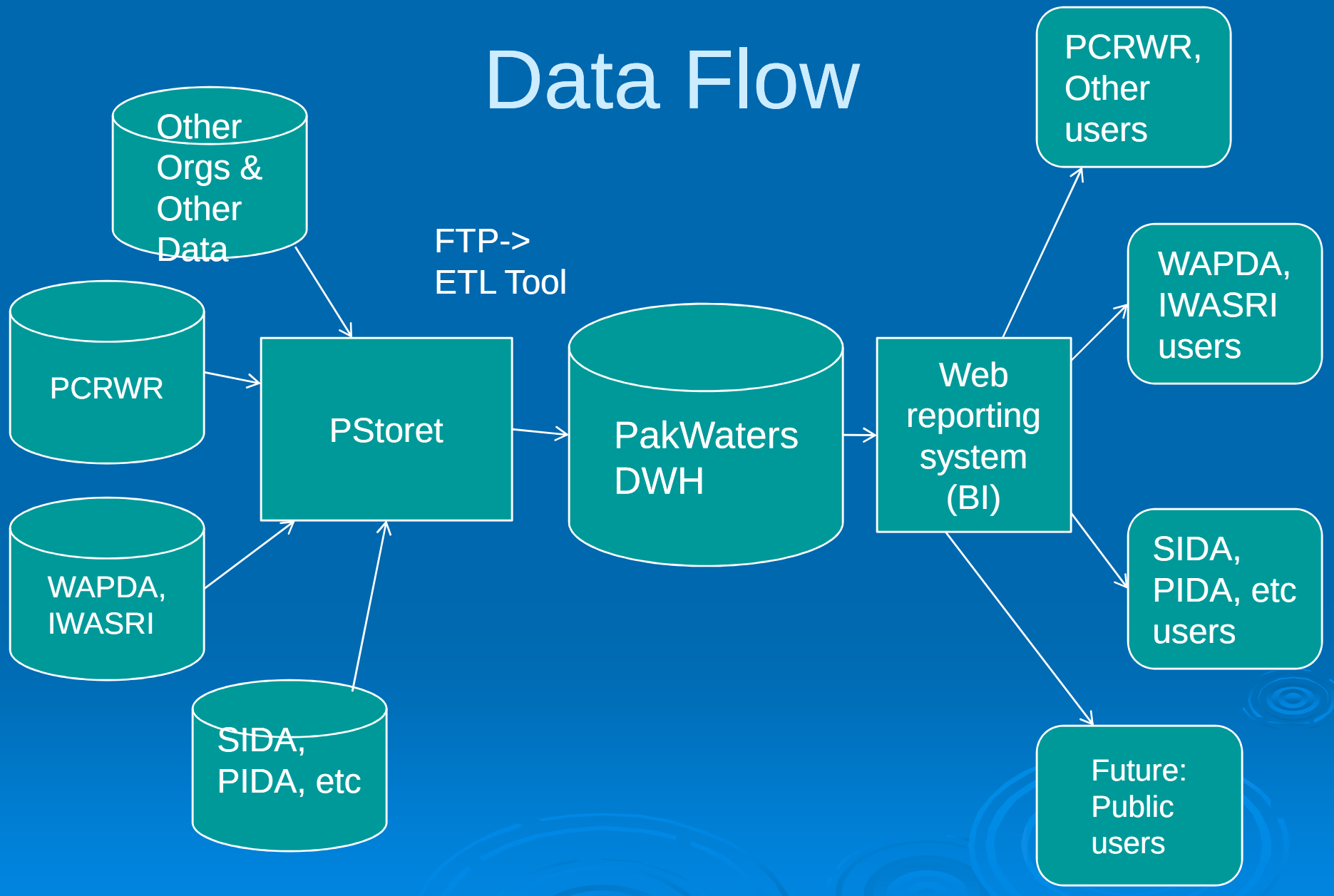
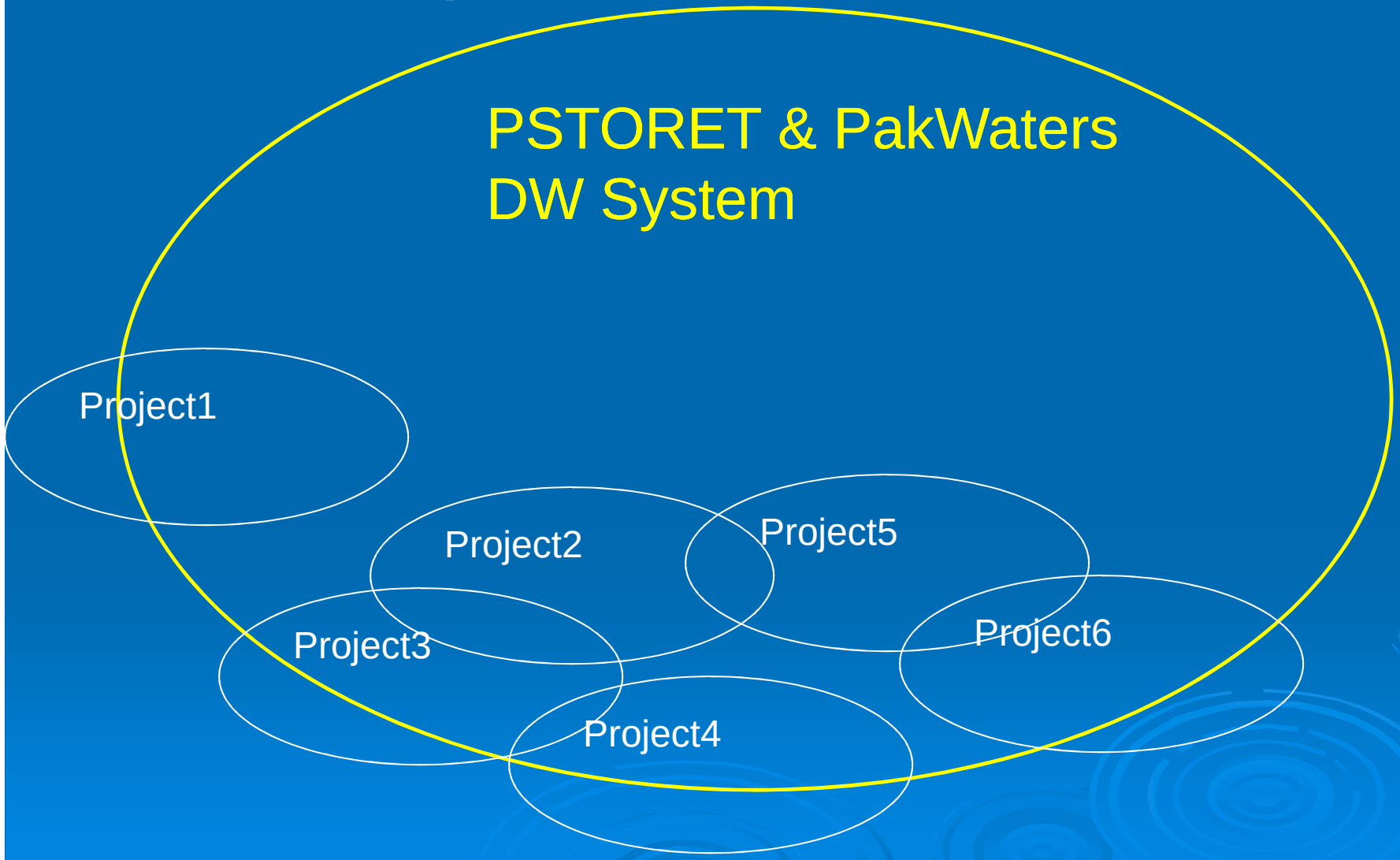
Basic Requirements for Selection of NPSTORET Data Entry System

- 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

Data Flow


Other Orgs & Other Data
PCRWR
WAPDA, IWASRI
SIDA, PIDA, etc
FTP-> ETL Tool
PStoret
PakWaters DWH
Web reporting system (BI)
PCRWR, Other users
WAPDA, IWASRI users
SIDA, PIDA, etc users
Future: Public users

Scope of Data Included



Datasets currently in PakWaters

Organization	# Stations	# Results	# Characteristics
IWASRI	2,700	34,000	11
PCRWR	4,000	106,000	22
Punjab ID	3,300	4,000,000	9
SIDA	24	2,400	5
WAPDA SMO	50	617	1
TOTAL	10,074	137,000	25

PakWaters Data Warehouse

PAKWATERS

Pakistan National Water Resources Database System

Information

About Pakwaters
About Psdoret
National Station ID Naming Scheme
National Water Quality Standards
Links and Downloads
Contact Us

Select a Report

Station Info Report — Site information for all stations
Well Report — Well information for all stations that are wells
Water Quality Standards Report — Information for water quality standards assigned to each organization
Characteristic Exceedance Report — Sample results compared to water quality standards
Characteristic Results Report — Chemical and physical data for all sample results
Discharge Report — Measured flows and gauge heights at rivers and canals
Water Supply Scheme Report — Capacity, treatment, and infrastructure details for existing water supply systems

Select a Map

Map of Stations — Location of stations on national map
Map of Characteristic Exceedances — Map showing location of samples that exceed a selected water quality standard
Map of Characteristic Results — Map showing sample-averaged results for a selected characteristic

Select a Chart

Characteristic Histogram Chart — Chart showing the distribution of a selected characteristic for many stations
Characteristic Time Series Chart — Chart showing the change in a selected characteristic over time at one station

Map of Exceedances

PAKWATERS

Pakistan National Water Resources Database System

Home > Map of Characteristic Exceedances

Map of Characteristic Exceedances

Organization: IWASRI
Project: GUGERA
Station ID: IWALAH000433
Primary Type: WELL
Latitude: 31.0925
Longitude: 72.473611
Characteristic Name: Solids, Dissolved
Max Result Value: 1677 mg/l
Max Result (Standard Units): 1677 mg/l
Standard Name: PakEPA Drinking Water Standards
Standard Value: 1000 mg/l
Go to Station Data Detail

Query Parameters

Organization	IWASRI
Project	All
Primary Type	All
Station	All
Province	All
District	All
Tehsil	All
Water Quality Standard	PakEPA Drinking Water St
Characteristic	Solids, Dissolved

Result Greater Than Standard

Result Greater Than Standard ☐

Custom Standard Value

Submit Checkbox or Textbox

Legend

(Note: Exceedance based on maximum result)

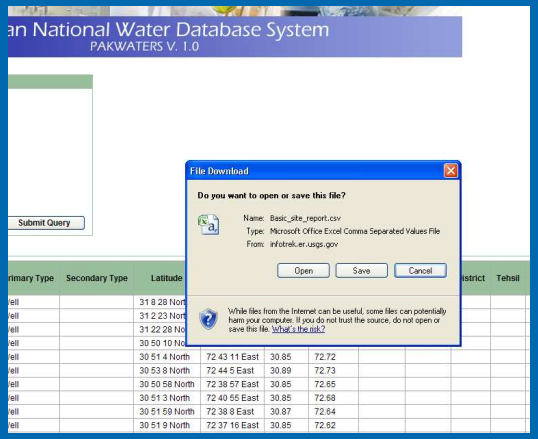
- ○ Ground Water
- ▽ Surface Water
- ☐ Facility
- ■ Result > Standard Value
- ☐ 0.5 Standard Value < Result <= Standard Value
- ■ Result <= 0.5 Standard Value

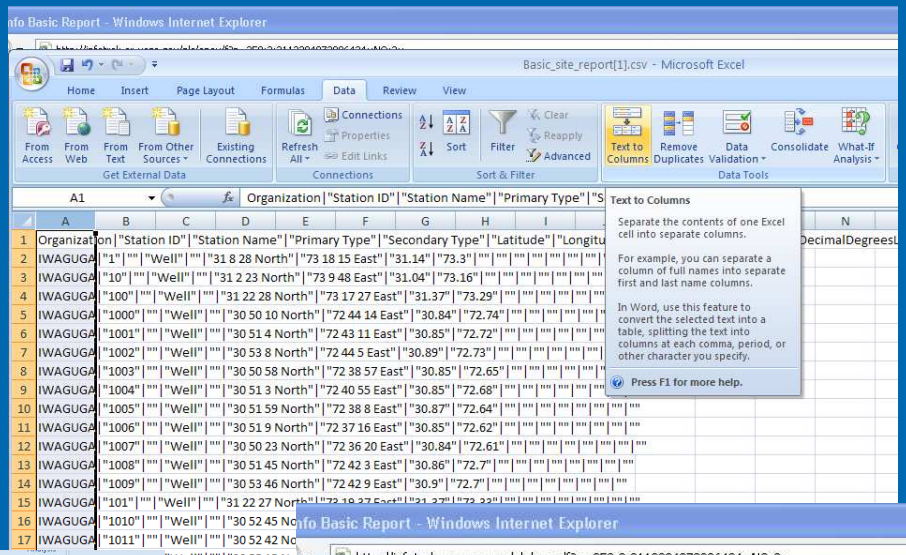
Help Page

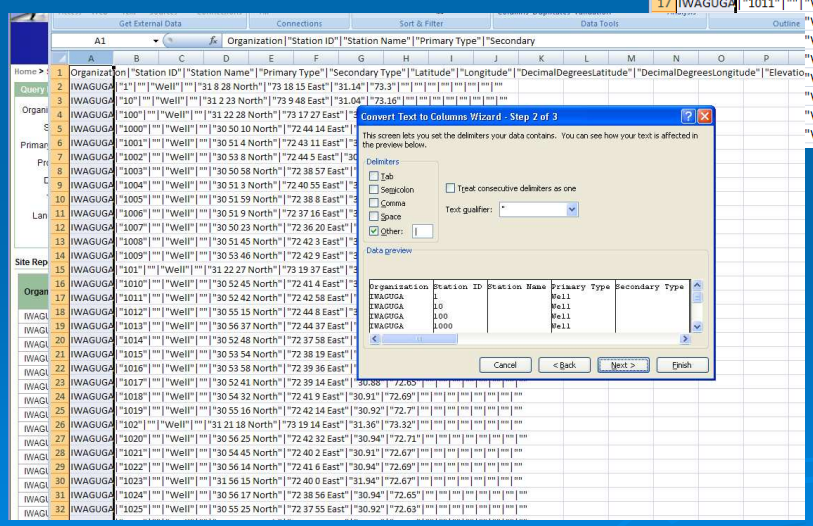
Export as Excel spreadsheet (XLS)

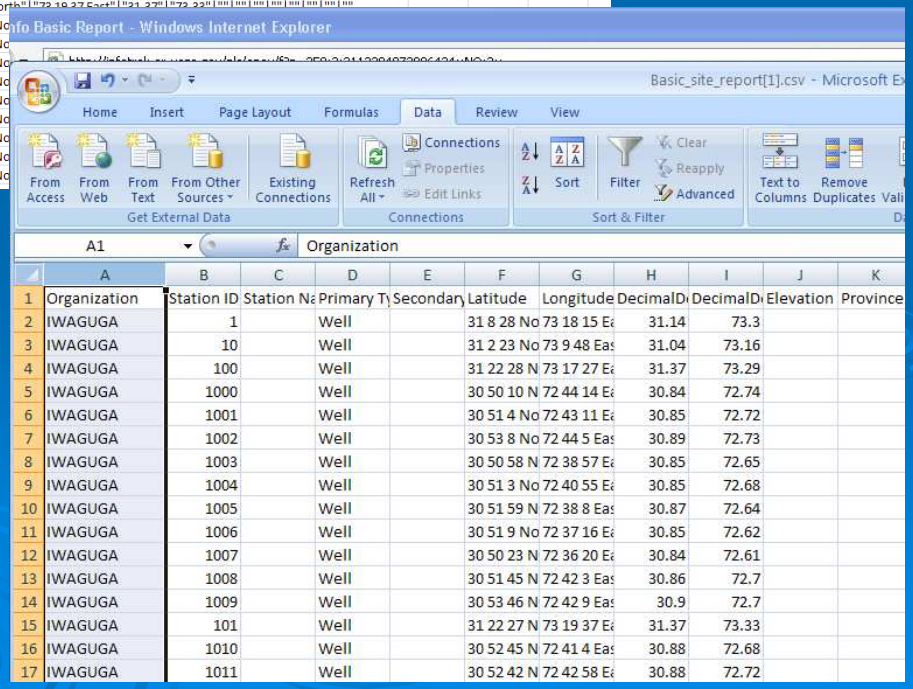
Export as Key Markup Language (KML)

Report export to CSV



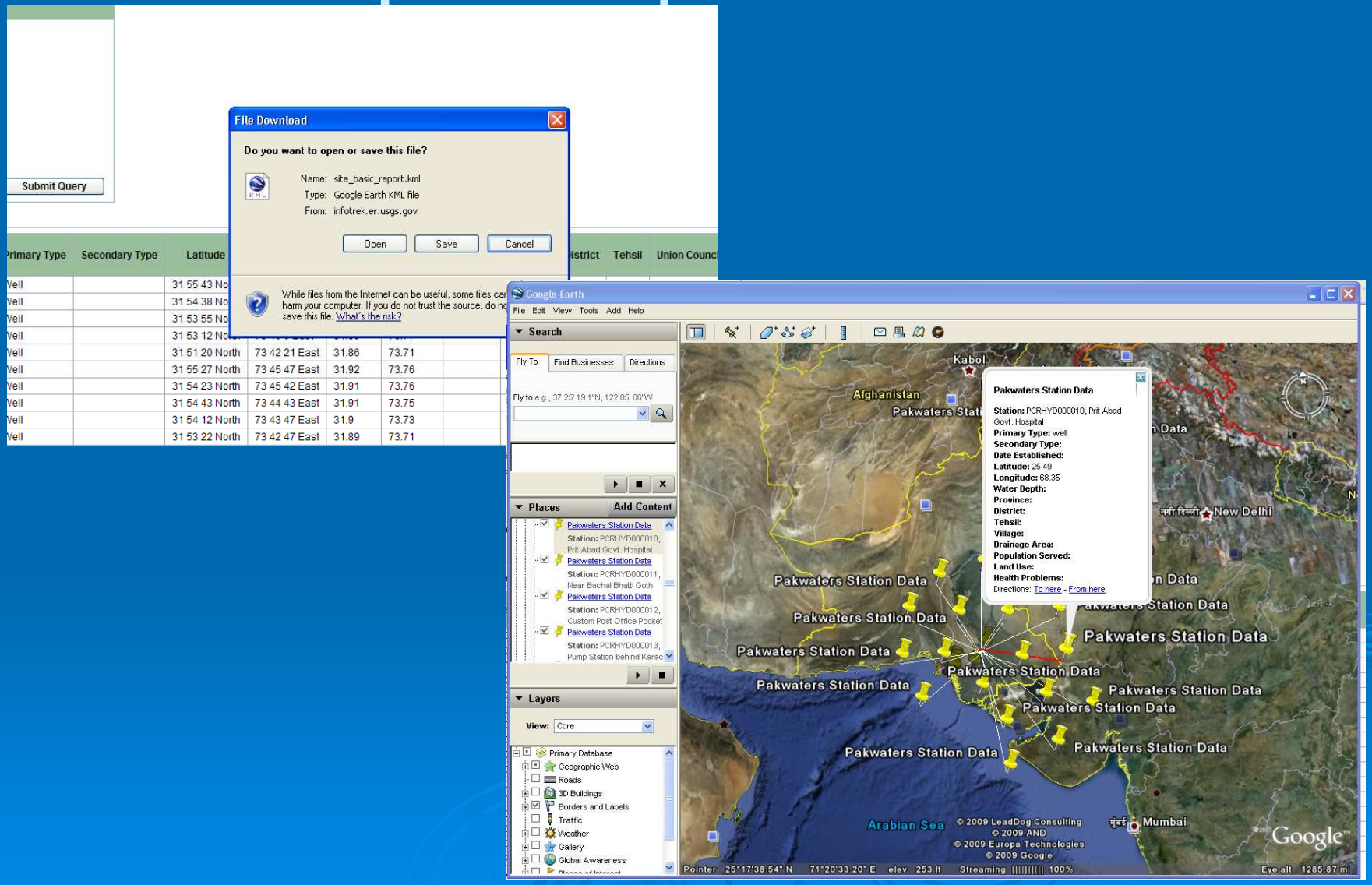




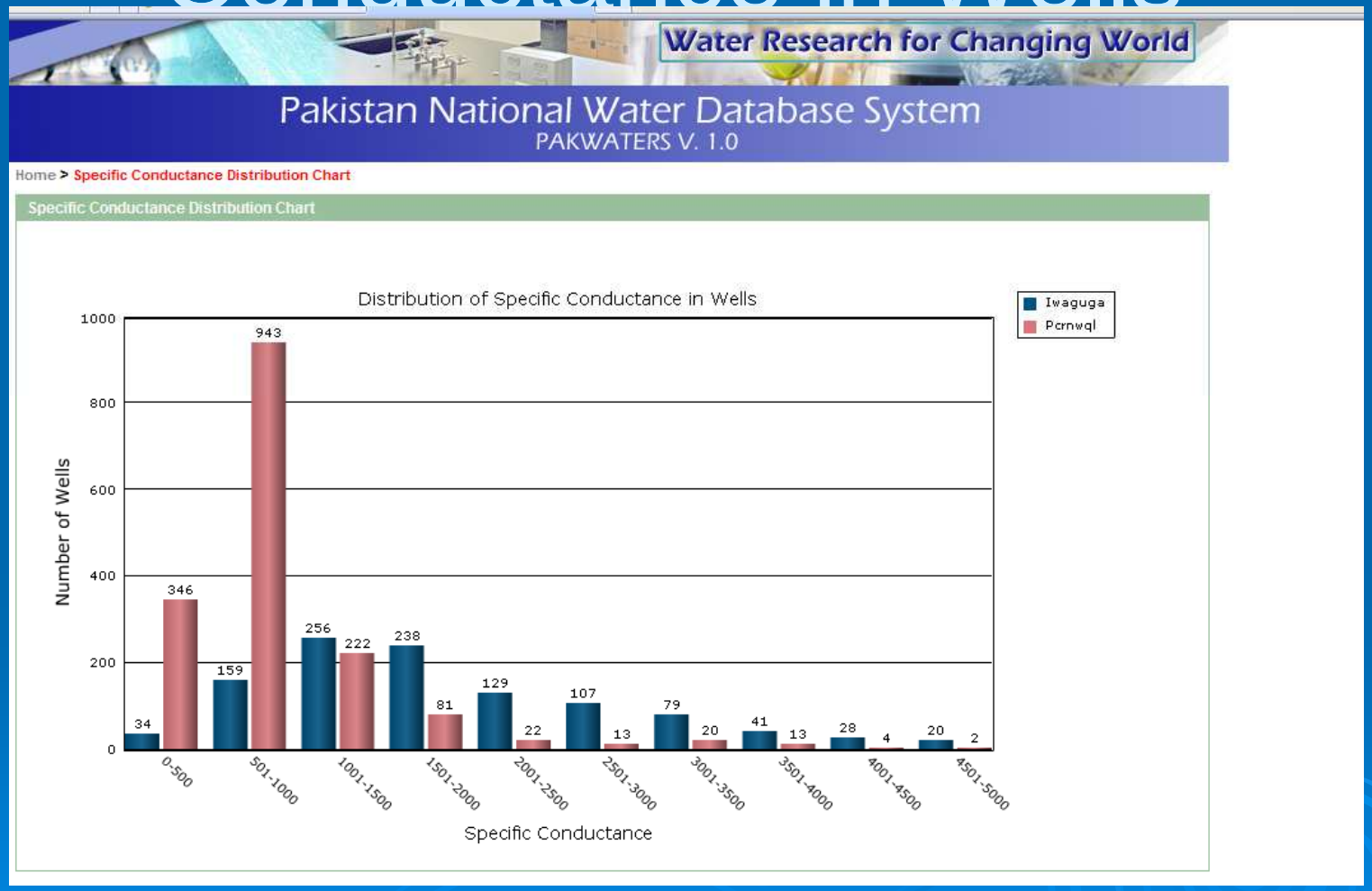


	A	B	C	D	E	F	G	H	I	J	K
1	Organization	Station ID	Station Na	Primary Ty	Secondary	Latitude	Longitude	DecimalDe	DecimalDe	Elevation	Province
2	IWAGUGA	1		Well		31 8 28 No	73 18 15 Ea	31.14	73.3		
3	IWAGUGA	10		Well		31 2 23 No	73 9 48 Eas	31.04	73.16		
4	IWAGUGA	100		Well		31 22 28 N	73 17 27 Ea	31.37	73.29		
5	IWAGUGA	1000		Well		30 50 10 N	72 44 14 Ea	30.84	72.74		
6	IWAGUGA	1001		Well		30 51 4 No	72 43 11 Ea	30.85	72.72		
7	IWAGUGA	1002		Well		30 53 8 No	72 44 5 Eas	30.89	72.73		
8	IWAGUGA	1003		Well		30 50 58 N	72 38 57 Ea	30.85	72.65		
9	IWAGUGA	1004		Well		30 51 3 No	72 40 55 Ea	30.85	72.68		
10	IWAGUGA	1005		Well		30 51 59 N	72 38 8 Eas	30.87	72.64		
11	IWAGUGA	1006		Well		30 51 9 No	72 37 16 Ea	30.85	72.62		
12	IWAGUGA	1007		Well		30 50 23 N	72 36 20 Ea	30.84	72.61		
13	IWAGUGA	1008		Well		30 51 45 N	72 42 3 Eas	30.86	72.7		
14	IWAGUGA	1009		Well		30 53 46 N	72 42 9 Eas	30.9	72.7		
15	IWAGUGA	101		Well		31 22 27 N	73 19 37 Ea	31.37	73.33		
16	IWAGUGA	1010		Well		30 52 45 N	72 41 4 Eas	30.88	72.68		
17	IWAGUGA	1011		Well		30 52 42 N	72 42 58 Ea	30.88	72.72		

Report export to KML



Distribution of Specific Conductance in Wells



Example time-series graph

PAKWATERS

Pakistan National Water Resources Database System

Home > Characteristic Time Series Chart

Help

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.

Query Parameters

Organization: SIDA
Project: LBOD
Station: SIDHYD000001
Characteristic: pH

Characteristic Time Series Chart

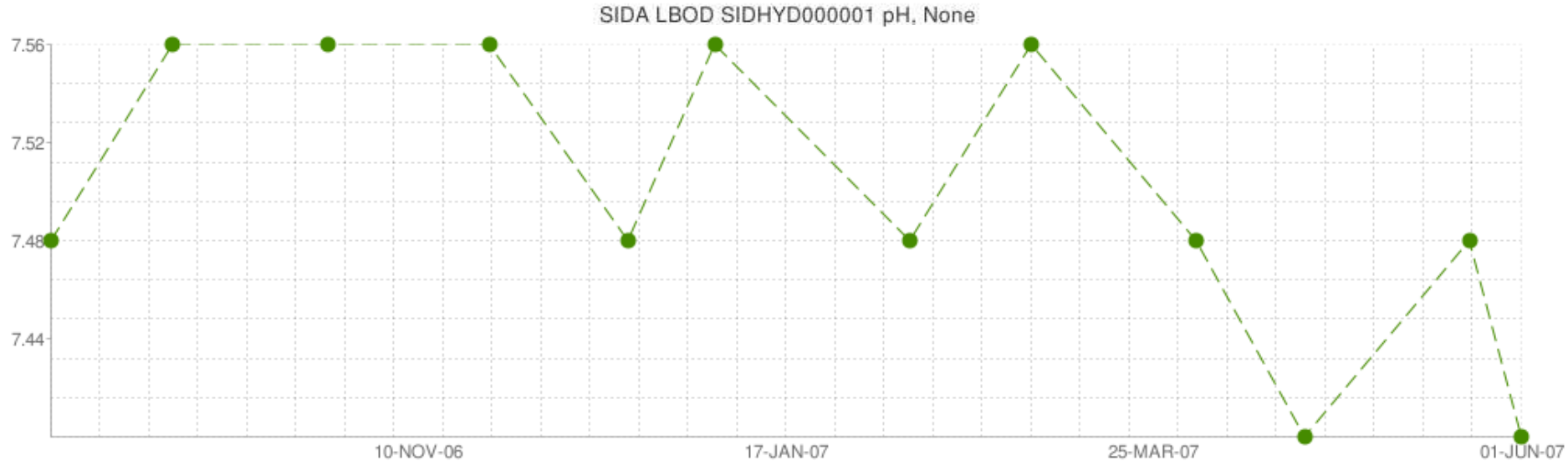


Chart Data

Organization	Project	Station Id	Characteristic Name	Sampling Date	Result	Units
SIDA	LBOD	SIDHYD000001	pH	03-SEP-06	7.5	None
SIDA	LBOD	SIDHYD000001	pH	01-OCT-06	7.6	None

Cricket Stadium
10.02.2007 01:09

10.02.2007 01:08

Islamabad International
اسلام آباد انٹرنیشنل
CAA
10.02.2007 00:54

10.02.2007 00:13

Cars all full, Luggage racks are for people

Motor bikes for families and construction

Lawyers demonstrate

PCRWR
PAKISTAN COUNCIL OF
RESEARCH IN

AAS vario 6
10.01.2007 01:23

Coca-Cola

Science Advisor to the President in her office

PAK-EPA

Marriott
04.15.2009 05:13

RUMOR
Marketing
EXIT
RUMOR
09.28.2007 11:35

The End

- Sandy Williamson akwill@usgs.gov
- PS In the break ask me about
- Stream View – Contributed Photos linked to stream reaches