Groundwater Data Management in support of Basin Scale Water Management Planning

Presenter: Dan Yoshisaka, M.Sc., P.Eng.

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One Team. Infinite Solutions

Stantec

Presentation Outline

- Introduction and Issues
- Project Team
- GDS Structure and Technology
- GDS Population
- GDS Functionality
- Conclusions
- Questions/Answers

Introduction and Issues

- Basin scale water management planning is a data intensive undertaking
- A large quantity of data has been collected in the CLBRB over the past 50 years, but does not reside in a single location
- Collectors of groundwater data include AENV, AGS, municipalities, oil & gas operators, and others.
- Sources of data are varied spatially, temporally, and the quality of data varies between providers
- Stantec retained by AENV and BRWA to develop a Groundwater Database System (GDS)

Project Team

- Comprised of people from Stantec, AENV, and BRWA
- Support from LICA members
- Team includes:
  - Hydrogeologists/Environmental Engineers
  - Database Analysts
  - GIS Programmers
  - Web Portal Programmers
- Support from Analytical Laboratories

GDS Structure and Technology

- Client – Server architecture
- Relational database structure
- Scalable, flexible
- EQuIS5 data management
- SharePoint collaboration
- GIS integration
- Stantec proprietary programming to integrate various technologies

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Cold Lake - Beaver River Groundwater Data Management System

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Discussions
Forum
Data Access
Chemistry
Water Level
Well Completion

Links

- Cold Lake - Beaver River water management plan
- Regional Groundwater Resource Appraisal, Cold Lake-Beaver River Drainage Basin
- Regional Groundwater Quality Appraisal, Cold Lake-Beaver River Drainage Basin
- Watershed Planning and Advisory Councils
- Cold Lake - Beaver River state of the basin reports
- Alberta Environment Groundwater Observation Well Network

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Events

Title | Location | Begin | End

There are no items to show in this view of the "Events" list. To create a new item, click "New item" above.

Previous

Add new event

Contacts

Last Name	First Name	Job Title	E-mail Address	Business Phone
Company : Alberta Environment (3)				
Prusak	Joe	Environmental Education and Awareness Specialist	joe.prusak@gov.ab.ca	(780) 415-8495
Siad-Omar	Abdi	Water Management Planner	abdi.siad-omar@gov.ab.ca	(780) 427-7227
Welsh	Brent	Hydrogeologist	brent.welsh@gov.ab.ca	(780) 644-5112
Company : Beaver River Watershed Alliance (1)				
Kneffel	Eleanor	Program Manager	ek.brwa@lica.ca	(780) 812-2182 Ext 226
Company : Stantec (5)				
Konkle	Scott	Senior Software Developer	scott.konkle@stantec.com	(519) 585-7396
Lernout	Matt	Environmental Data Analyst	matthew.lernout@stantec.com	(519) 585-7401
Lieu	Carole	Environmental Data Analyst	carole.lieu@stantec.com	(519) 585-7283
Sukkurwala	Gus	Environmental Engineer	gus.sukkurwala@stantec.com	(519) 585-7357
Yoshisaka	Dan	Managing Senior Associate	dan.yoshisaka@stantec.com	(780) 917-7497

Add new item

GDS Data Fields

- General well details including well coordinates, elevations, total depths, screen elevations
- Chemistry data including lab and field analysis results
- Chemistry data grouped into parameter groups
- Water level data

GDS Population – Legacy Data

- Many challenges associated with compiling data from different providers
- Internal inconsistency in how data is stored poses the biggest obstacle
- Storage of data in spreadsheets is unfavourable
- Data populated in the GDS to date:
  - Approximately 13,000 well records
  - Approximately 500,000 chemistry records

GDS Population – Future Data Imports

- Automated import routines using Electronic Data Deliverables (EDD's)
- Automated internal data validation to promote data quality
- Reduces the amount of human involvement in handling the data, reducing costs and promoting quality

GDS Functionality

- Queries by filter fields or by GIS
- Browse data through use of the GIS pane
- Export data in various formats
- Generate crosstab data reports
- Generate guideline exceedance tables
- Generate time series graphs
- Overlay GIS features: isopach and structure maps, potentiometric maps, physiographic features, thalwegs, topographic contours, etc.

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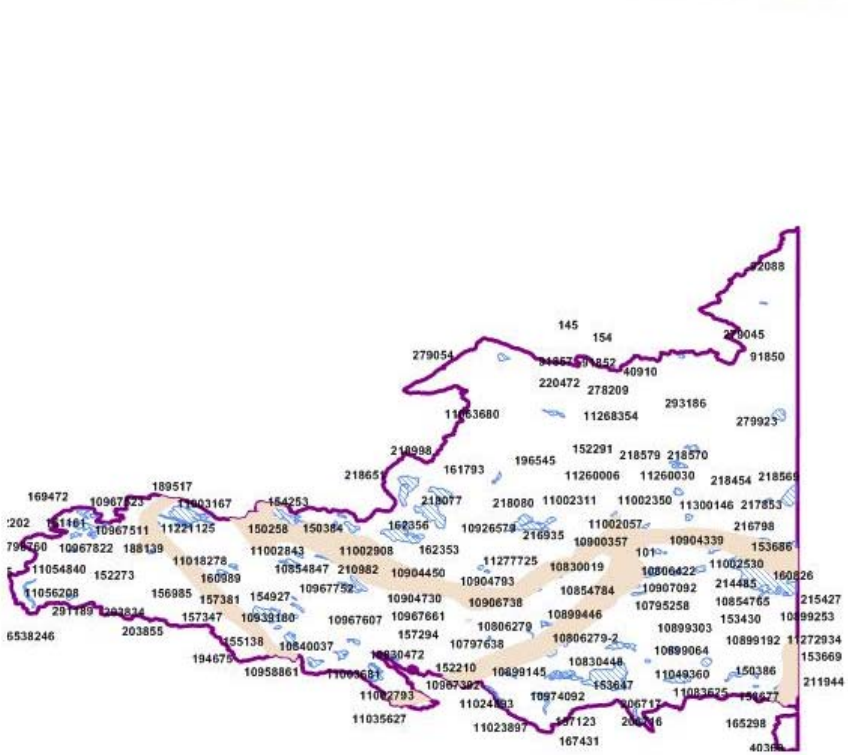
Chemistry

Modify Shared Page

Help



Search | DataGrid | Graph Properties

Location:

FWDU-2 (ML) FWE 1-1 (E1) FWE 1-2 (E1) FWE 3-1 (E3) GEW 05-12 (BN GEW 05-3 (BN GEW 05-3 (SR)	GEW 05-3 (BNV)

Start Date: 01/06/1901

End Date: 12/19/2007

Coord Type:

LONG/LAT NAD83	

Provider:

ALBERTA ENVIRONMENT ALBERTA GEOLOGICAL SURVEY CANADIAN NATURAL RESOURCES LTD. IMPERIAL OIL LTD.	

Chemical Name:

Carbonate (as CaCO3) Cation Sum Chemical Oxygen Demand Chloro-3-methylphenol, 4- Chlorobenzene (Monochlorobenzene) Chloroethane Chloroform Chloromethane	Chloride

Parameter Group:

BTEX-PHC CARBOXYLICACID	

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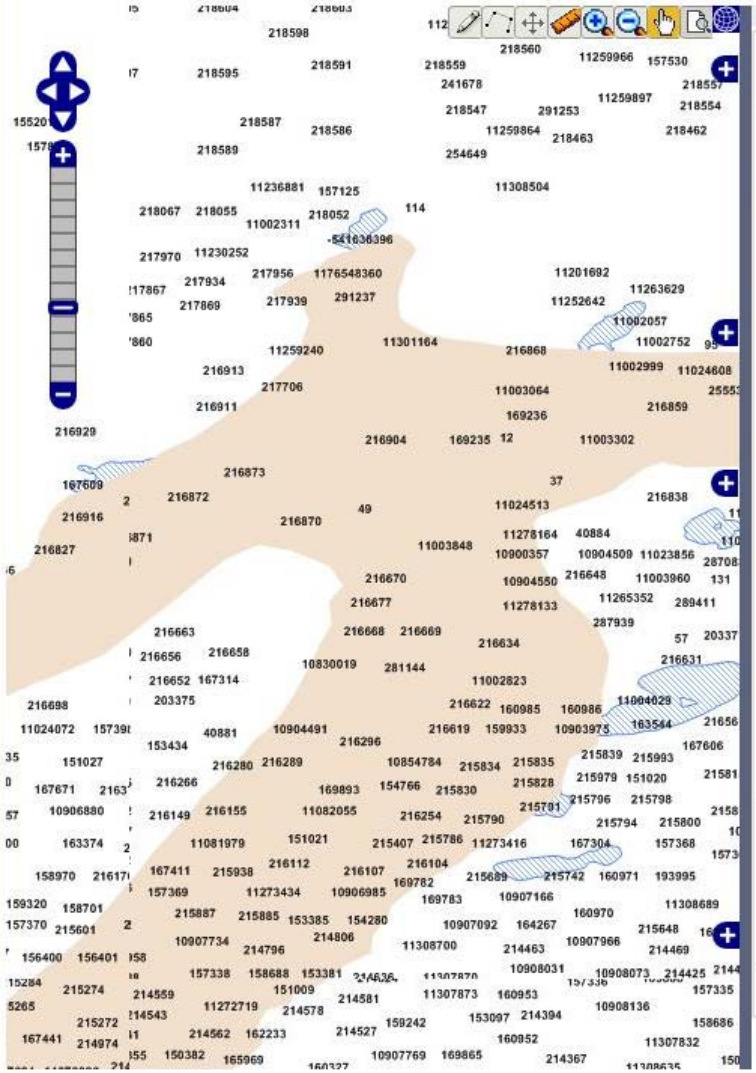


Search | DataGrid | Graph Properties

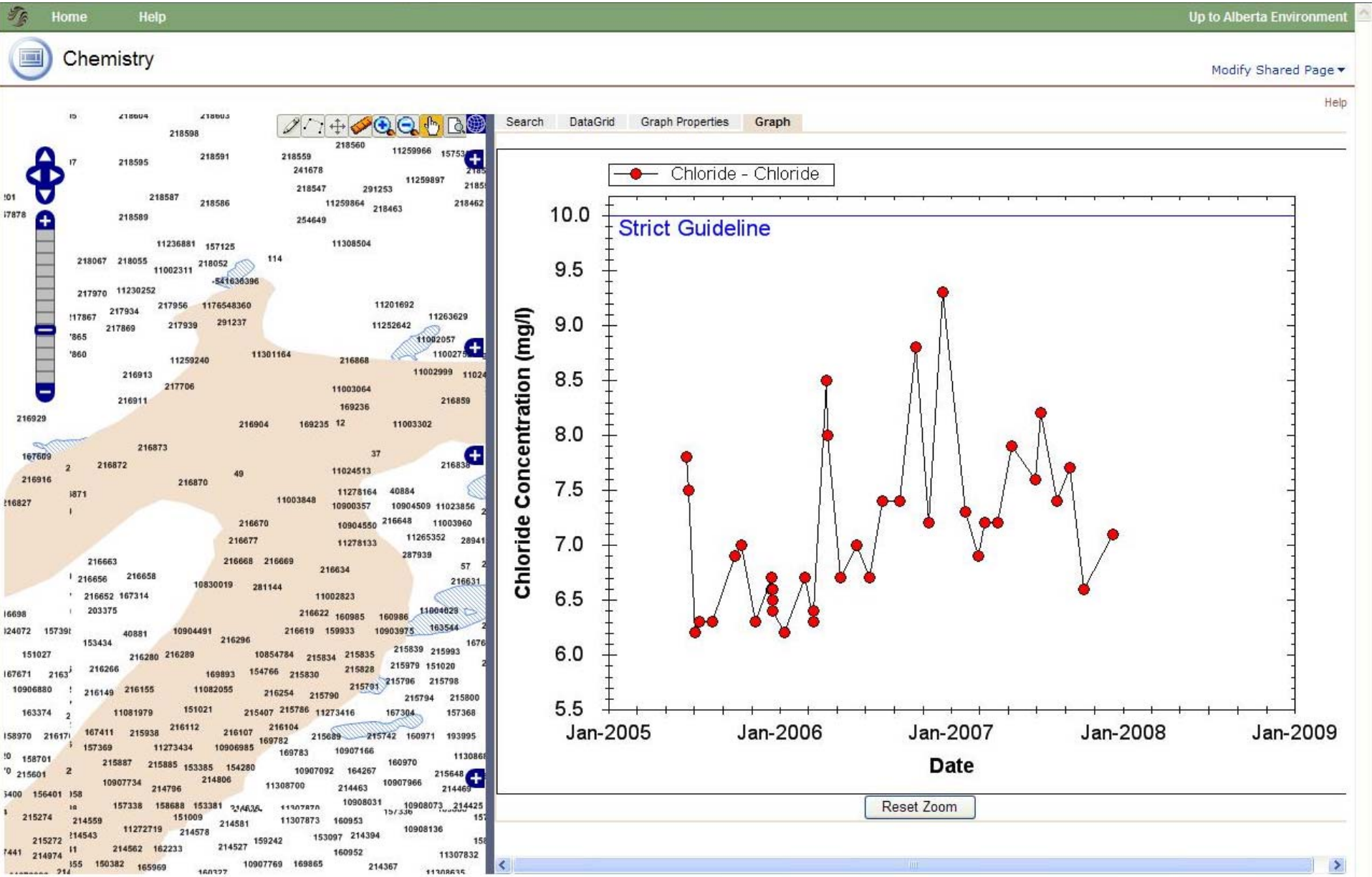
Location	Date	Prov	Parameter Group	Chemical Name	Type	Matrix	Result	Unit	XCoo	YCoo	Coor
GEW 05-3 (BN	6/15/2005	IOL	GENCHEM	Chloride	N	WG	7.8	mg/l			
GEW 05-3 (BN	6/20/2005	IOL	GENCHEM	Chloride	N	WG	7.5	mg/l			
GEW 05-3 (BN	7/4/2005 3	IOL	GENCHEM	Chloride	N	WG	6.2	mg/l			
GEW 05-3 (BN	7/12/2005	IOL	GENCHEM	Chloride	N	WG	6.3	mg/l			
GEW 05-3 (BN	8/9/2005 1	IOL	GENCHEM	Chloride	N	WG	6.3	mg/l			
GEW 05-3 (BN	9/27/2005	IOL	GENCHEM	Chloride	N	WG	6.9	mg/l			
GEW 05-3 (BN	10/11/200	IOL	GENCHEM	Chloride	N	WG	7.0	mg/l			
GEW 05-3 (BN	11/8/2005	IOL	GENCHEM	Chloride	N	WG	6.3	mg/l			
GEW 05-3 (BN	12/14/200	IOL	GENCHEM	Chloride	N	WG	6.7	mg/l			
GEW 05-3 (BN	12/15/200	IOL	GENCHEM	Chloride	FD	WG	6.6	mg/l			
GEW 05-3 (BN	12/15/200	IOL	GENCHEM	Chloride	N	WG	6.6	mg/l			
GEW 05-3 (BN	12/16/200	IOL	GENCHEM	Chloride	FD	WG	6.4	mg/l			
GEW 05-3 (BN	12/16/200	IOL	GENCHEM	Chloride	N	WG	6.5	mg/l			
GEW 05-3 (BN	1/10/2006	IOL	GENCHEM	Chloride	N	WG	6.2	mg/l			
GEW 05-3 (BN	2/23/2006	IOL	GENCHEM	Chloride	N	WG	6.7	mg/l			
GEW 05-3 (BN	3/14/2006	IOL	GENCHEM	Chloride	FD	WG	6.3	mg/l			
GEW 05-3 (BN	3/14/2006	IOL	GENCHEM	Chloride	N	WG	6.4	mg/l			
GEW 05-3 (BN	4/11/2006	IOL	GENCHEM	Chloride	FD	WG	8.5	mg/l			
GEW 05-3 (BN	4/11/2006	IOL	GENCHEM	Chloride	N	WG	8.0	mg/l			
GEW 05-3 (BN	5/9/2006 1	IOL	GENCHEM	Chloride	N	WG	6.7	mg/l			
GEW 05-3 (BN	6/13/2006	IOL	GENCHEM	Chloride	N	WG	7.0	mg/l			
GEW 05-3 (BN	7/11/2006	IOL	GENCHEM	Chloride	N	WG	6.7	mg/l			
GEW 05-3 (BN	8/8/2006 9	IOL	GENCHEM	Chloride	N	WG	7.4	mg/l			

[First / Prev] 1, 2 [Next / Last]

38 items found, displaying 1 to 25.

Graph

Sample (Row) by Parameter (Column) | Report


Home
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Chloride - Chloride
Strict Guideline
Chloride Concentration (mg/l)
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Date
Reset Zoom

Conclusions

- Regional water management planning is a data intensive exercise
- It is exceedingly difficult and inefficient to analyze regional data which is stored in separate locations
- Development of an integrated GDS allows hydrogeologists to tackle regional issues
- Hydrogeologists/Engineers are not database analysts. (A team approach is required)
- Web based applications are preferred but require a significant IT infrastructure
- Data collectors need to invest resources to better manage their data if it is to be useful in the future
- Spreadsheets are not meant for data storage and retrieval
- Various technologies are on the market to better manage data

Acknowledgements

- Alberta Environment
- Beaver River Watershed Alliance
- Lakeland Industry & Community Association members