Innovations in the Western Ontario WISKI Hub

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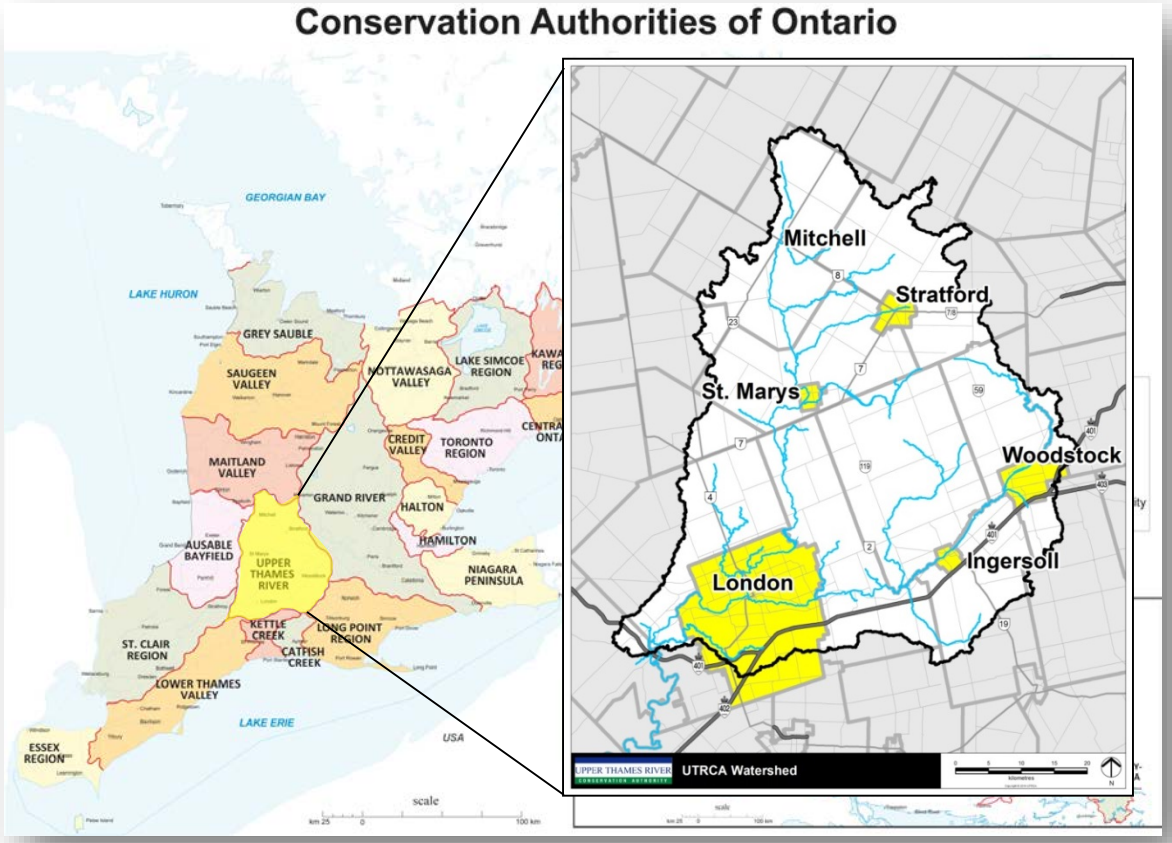
Outline

- UTRCA and Western Ontario WISKI Hub
- WISKI Overview
- WOED Webpage
- Tools and Reporting

Upper Thames River Conservation Authority (UTRCA)

- 3,400 square km
- 515,000 residents
- Mix of rural and urban land uses
- Thames River goes to Lake St. Clair, which flows into Lake Erie, Lake Ontario and the St. Lawrence River



History

- Pre 2010 – UTRCA custom software solutions
- WISKI 7 - 2010 – present
- WISKI hub, started organizing 2016
- Formal participation by other members in 2017

Western Ontario WISKI Hub

- 10 openings possible (as per Eastern Ontario Hub, out of Quinte Region CA)
- Currently 9 CA members
  - 7 in the South
  - 2 in the North

WISKI Hub Model

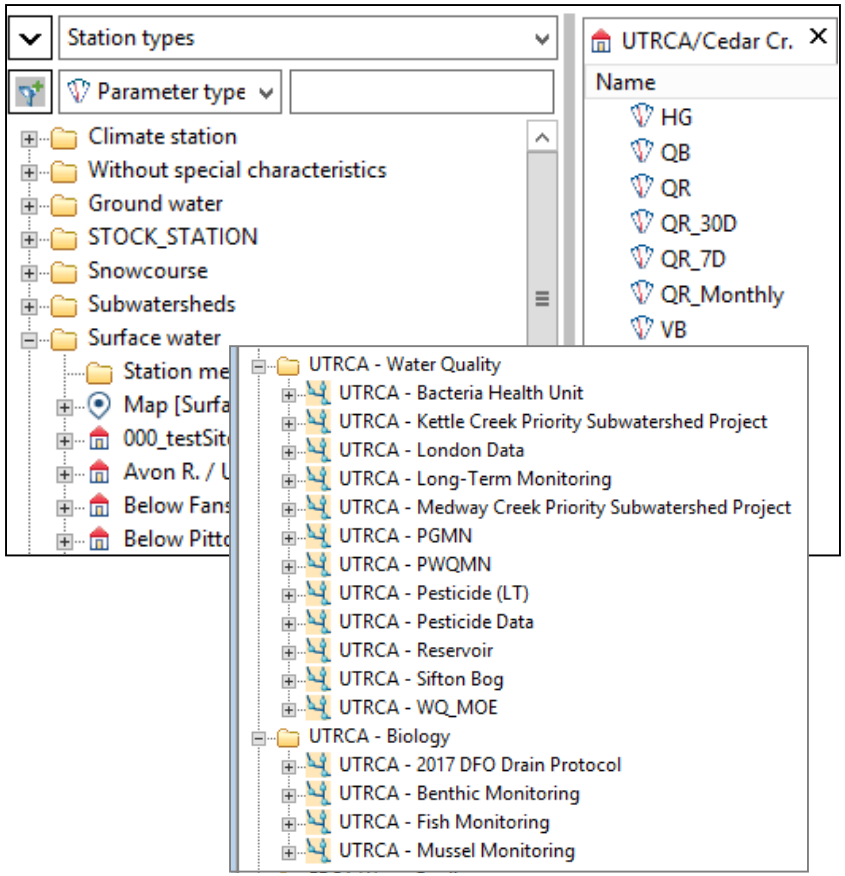
- Each member purchases and maintains own WISKI license, but server based license costs are shared
  - i.e. SODA, kiWIS, Alarm Manager
- Hardware costs and hardware reserve funds shared
- Also looking at subscription models for small CAs

WISKI Hub Advantages

- Shared costs
- Shared knowledge
- Shared standards
  - e.g. WQ report card standards only need to be built once
- Shared scripts, kiWIS applications, data input methods
- Shared training sessions and costs

WISKI Overview

- Relational database that incorporates:
  - Data acquisition and storage
  - Data validation and editing
  - Analysis and reporting
  - Controlled data sharing
- Used for continuous time series and discreet sampling data (hydrometric, water quality, biological)



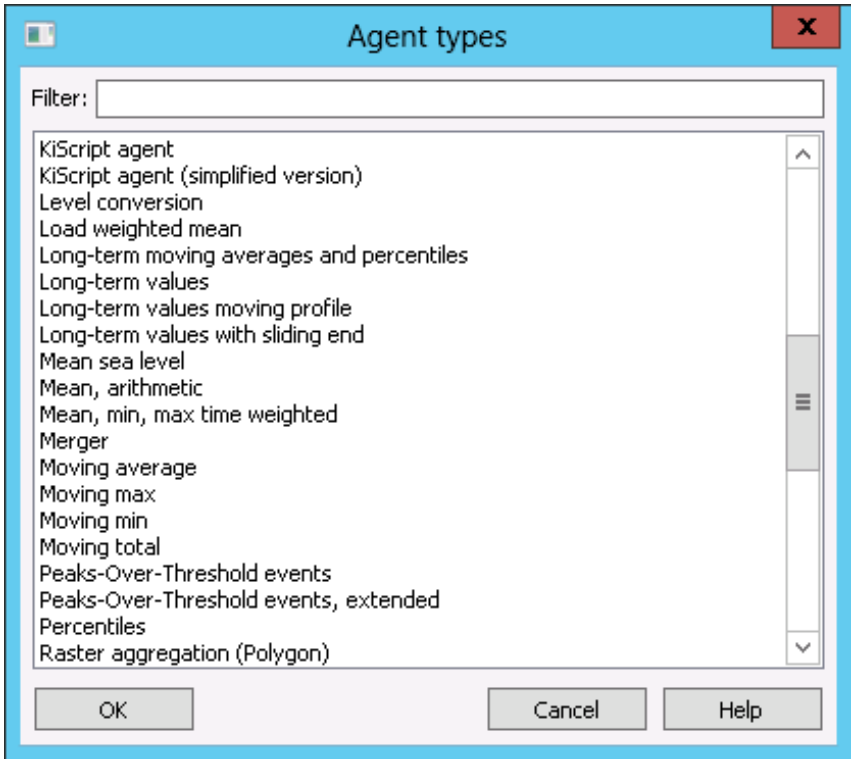
WISKI Overview

Data type	Current use	Imported via	
Hydrometric	Surface water, climate, snow course and ground water monitoring stations	SODA • data acquisition program • connects remotely to stations through phone lines (and cell)	kiDAT • Collects data from web sites, ftp sites and hot folders, and/or • Converts data files to ZRXP files for import
Sampling (water quality & biology)	Water quality monitoring, land use surveys and aquatic wildlife inventory/ monitoring	WISKI Importer • customized import configurations built to match file formats (e.g. lab reports)	kiDSM • Automated data transfer jobs (hot folders) • .bat and .txt files link to import configurations

Time Series Agents

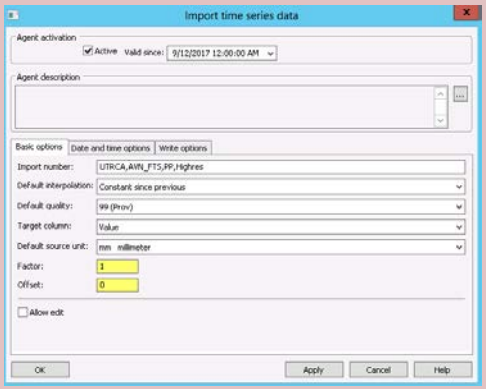
- What are they?
  - Algorithms that operate on time series data
  - Import new data into a time series

  and/or
  - Derive a new time series from a set source time series



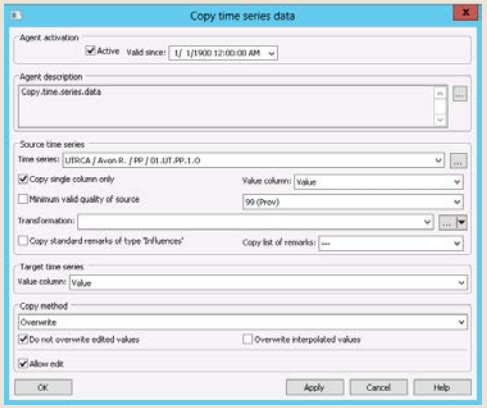
Agent Progression

Name	Data from	Data until
01.UT.PP.1.O	7/13/1984 14:00:00	9/17/2018 11:00:00



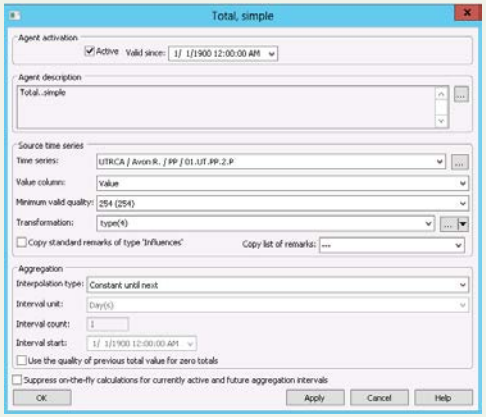
"Import time series data" agent

Name	Data from	Data until
01.UT.PP.1.O	7/13/1984 14:00:00	9/17/2018 11:00:00
01.UT.PP.2.P	7/13/1984 14:00:00	9/17/2018 11:00:00



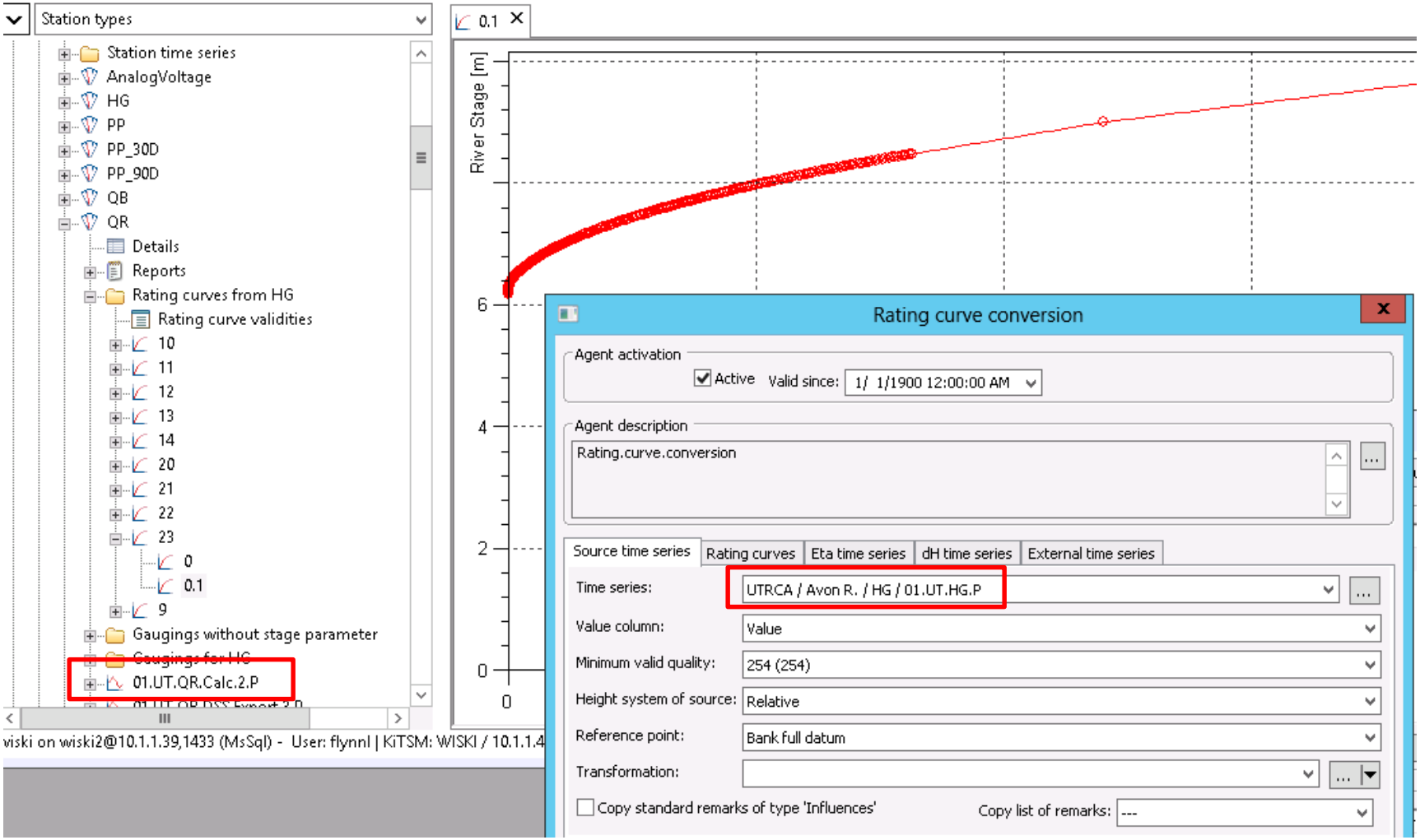
"Copy time series" agent

Name	Data from	Data until
01.UT.PP.1.O	7/13/1984 14:00:00	9/17/2018 11:00:00
01.UT.PP.2.P	7/13/1984 14:00:00	9/17/2018 11:00:00
01.UT.PP.daily.P	7/13/1984 00:00:00	9/17/2018 00:00:00
01.UT.PP.monthly.P	7/1/1984 00:00:00	9/1/2018 00:00:00



Other: e.g. "Total, simple"

“Rating Curve Conversion” Agent



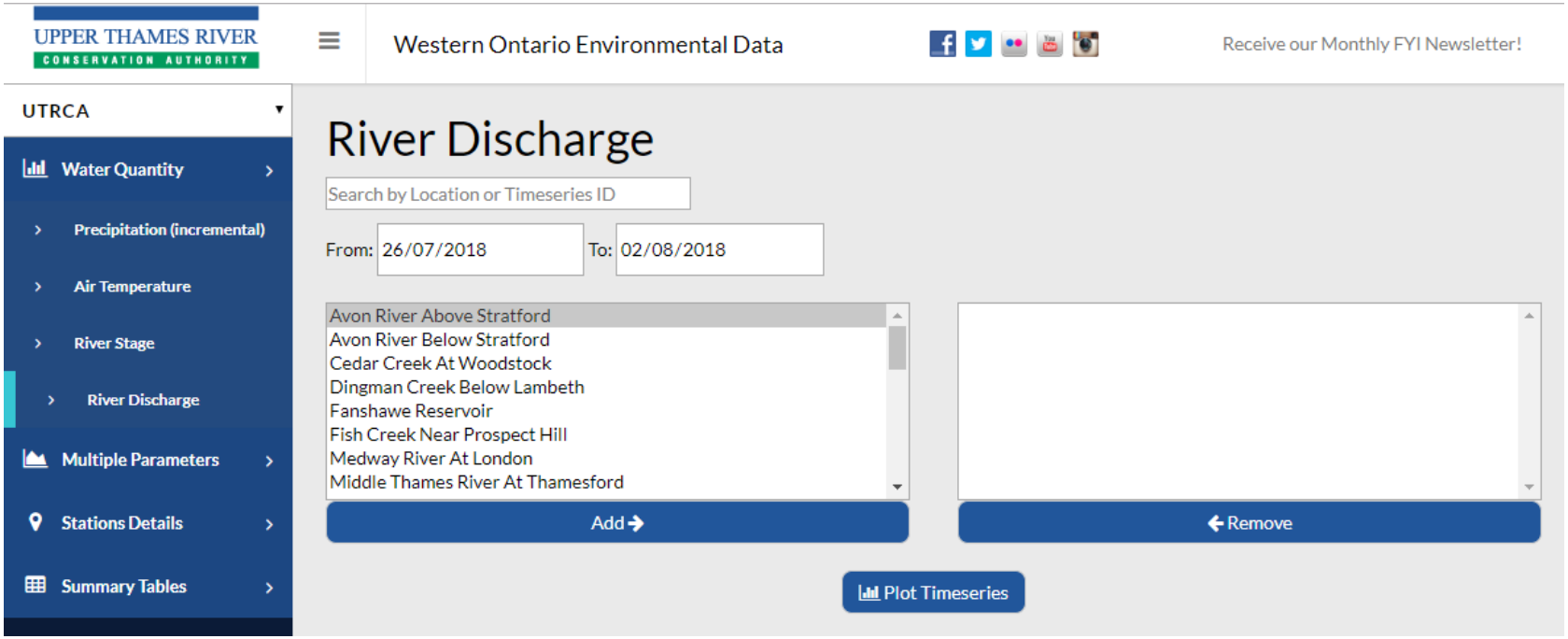
Western Ontario Environmental Data (WOED) Webpage

- Interactive webpage for accessing hydrometric data that is stored within WISKI
- kiWIS pulls data using customized URLs

http://10.1.1.49:8090/KiWIS/KiWIS?service=kisters&type=queryServices&request=getStationList&datasource=0&format=html&returnfields=station_name,object_type,station_no,station_longname,site_name,station_id,station_latitude,station_longitude,custom_attributes&custattr_returnfields=GENERAL.WOED&site_name=UTRCA

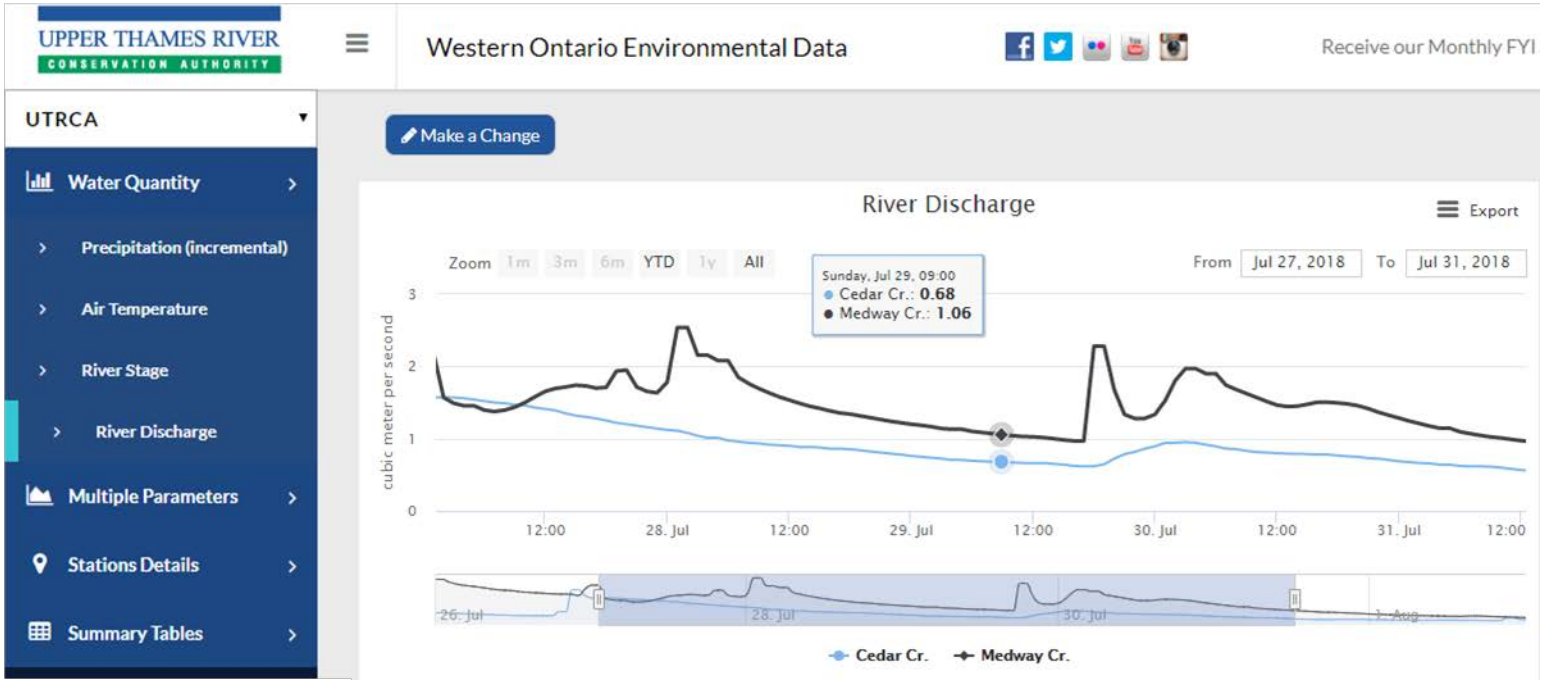
WOED Webpage

- WISKI groups allow kiWIS to refine data pulls and maintain flexibility in the webpage (e.g. include new stations, new CAs, etc.)



WOED Webpage

- Along with kiWIS, HiCharts and customized scripts display the station and time series data in interactive maps, graphs, charts and tables.



Tools and Reporting

- kiScript
- kiWIS
- Data Entry
- WISKI features

KiScript

- Written in a relatively easy to understand language
- Online support forum
- Kisters NA experts
- Documentation
  - Reference HTML doc plus extensive course notes
- Run automatically on a set schedule via task scheduler (or could use kiDat or KiDSM)
- Automatically post relevant reports to UTRCA web site

KiScript

- Summary tables
  - Based on parameters to be summarized, and station groups
  - Helpful in the daily planning cycle process

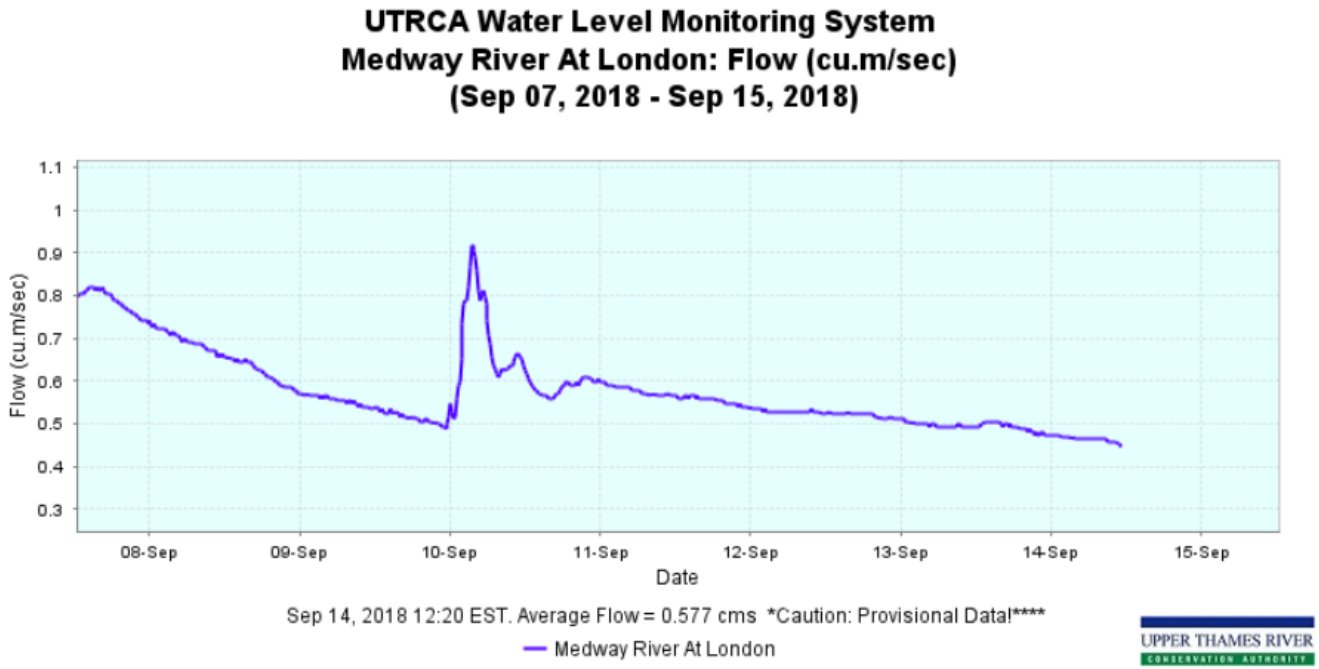
Data Summary Table

UTRCA 14-Sep-2018 12:22 EST

☑	Last poll okay	Discharge Summaries													
☒	Last poll missed														
☒	Last poll yesterday, or before														
Last Poll	Location	Last Data Time (EST)	Hourly Change (m^3/sec)	Last hour (m^3/sec)	Last 2 hr (m^3/sec)	Last 3 hr (m^3/sec)	Today's Average (m^3/sec)	Today max (m^3/sec)	Today Min (m^3/sec)	2 Day Average (m^3/sec)	2d max (m^3/sec)	2D min (m^3/sec)	7 Day Average (m^3/sec)	7D max (m^3/sec)	7D min (m^3/sec)
☑	Mitchell	14-Sep-2018 11:00	-0.0	2.2	2.23	2.25	2.19	2.27	2.15	2.14	2.27	2.0	1.47	2.27	0.77
☑	Avon R.	14-Sep-2018 11:00	-0.0	0.34	0.35	0.36	0.38	0.41	0.34	0.38	0.42	0.32	0.45	0.85	0.32
☑	Wildwood Reservoir	14-Sep-2018 11:00	0.0	1.99	1.99	1.99	1.99	1.99	1.99	1.99	2.0	1.99	2.35	2.94	1.99
☑	St. Marys	14-Sep-2018 11:00	+0.0	2.63	2.61	2.61	2.58	2.63	2.53	2.59	2.66	2.51	2.89	4.05	0.36
☑	Plover Mills	14-Sep-2018 11:00	-0.0	3.1	3.11	3.13	3.14	3.19	3.1	3.16	3.23	3.1	3.67	5.05	1.19
☑	Fanshawe Reservoir	14-Sep-2018 11:00	0.0	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	3.11	4.66	2.17
☑	Below Fanshawe Dam	14-Sep-2018 11:00	-0.0	3.43	3.46	3.44	2.43	3.54	1.44	2.62	3.71	1.44	4.98	7.94	1.44
☑	Medway Cr.	14-Sep-2018 11:00	-0.0	0.45	0.46	0.46	0.46	0.48	0.45	0.48	0.51	0.45	0.56	0.92	0.45
☑	Innerkip	14-Sep-2018 11:00	-0.0	0.19	0.2	0.2	0.21	0.22	0.19	0.22	0.25	0.19	0.24	0.34	0.19
☑	Pittock Reservoir	14-Sep-2018 11:00	0.0	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
☑	Cedar Cr.	14-Sep-2018 11:00	-0.0	0.91	0.92	0.93	0.92	0.93	0.9	0.93	0.97	0.9	0.97	1.53	0.83
☑	Ingersoll	14-Sep-2018 11:00	-0.0	2.37	2.42	2.54	2.5	2.59	2.37	2.54	2.67	2.37	2.62	3.31	2.05
☑	Thamesford	14-Sep-2018 11:00	+0.0	1.13	1.12	1.12	1.13	1.14	1.12	1.15	1.2	1.12	1.27	1.51	1.12
☑	Waubuno Cr.	14-Sep-2018 11:00	0.0	0.31	0.31	0.31	0.32	0.33	0.31	0.33	0.35	0.31	0.35	0.4	0.31
☑	Ealing	14-Sep-2018 11:00	0.0	7.01	7.01	6.98	6.95	7.04	6.86	7.07	7.28	6.86	7.61	8.81	6.86
☑	Byron	14-Sep-2018 11:00	+0.0	10.04	10.03	9.93	10.11	10.54	9.79	9.47	10.79	8.47	12.36	16.67	8.47
☑	Dingman Cr. - Westdel Bourne	14-Sep-2018 11:00	0.0	0.16	0.16	0.16	0.17	0.19	0.16	0.18	0.21	0.16	0.25	0.71	0.16
☑	Reynolds Cr.	14-Sep-2018 11:00	0.0	0.45	0.45	0.46	0.46	0.47	0.45	0.46	0.47	0.44	0.47	0.53	0.42
☑	Fairview	14-Sep-2018 11:00	0.0	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.08	0.09	0.09	0.08
☑	Oxbow Cr.	14-Sep-2018 11:00	0.0	0.35	0.35	0.35	0.34	0.35	0.33	0.36	0.39	0.33	0.36	0.45	0.28
☒	Stoney Cr.	14-Sep-2018 01:00	0.0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.15	0.04
☑	Upper Avon	14-Sep-2018 11:00	+0.0	0.21	0.2	0.2	0.21	0.21	0.2	0.21	0.22	0.2	0.23	0.27	0.2
☒	Fish Cr.	14-Sep-2018 09:00	0.0	0.07	0.07	0.07	0.07	0.08	0.07	0.09	0.1	0.07	0.1	0.16	0.07
☑	Below Wildwood Dam	14-Sep-2018 11:00	-0.0	4.21	4.23	4.21	4.21	4.28	4.19	4.21	4.28	4.19	4.7	5.57	4.12
☑	Tavistock	14-Sep-2018 10:00	0.0	0.14	0.14	0.14	0.14	0.15	0.14	0.15	0.15	0.14	0.15	0.17	0.14
☒	Dingman Cr. US	13-Sep-2018 09:00	---	---	---	---	---	---	---	---	---	---	---	---	---
☒	Pottersburg Cr.	31-Jul-2018 08:30	---	---	---	---	---	---	---	---	---	---	---	---	---
☑	Nissouri Cr.	14-Sep-2018 11:00	0.0	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.13	0.16	0.11

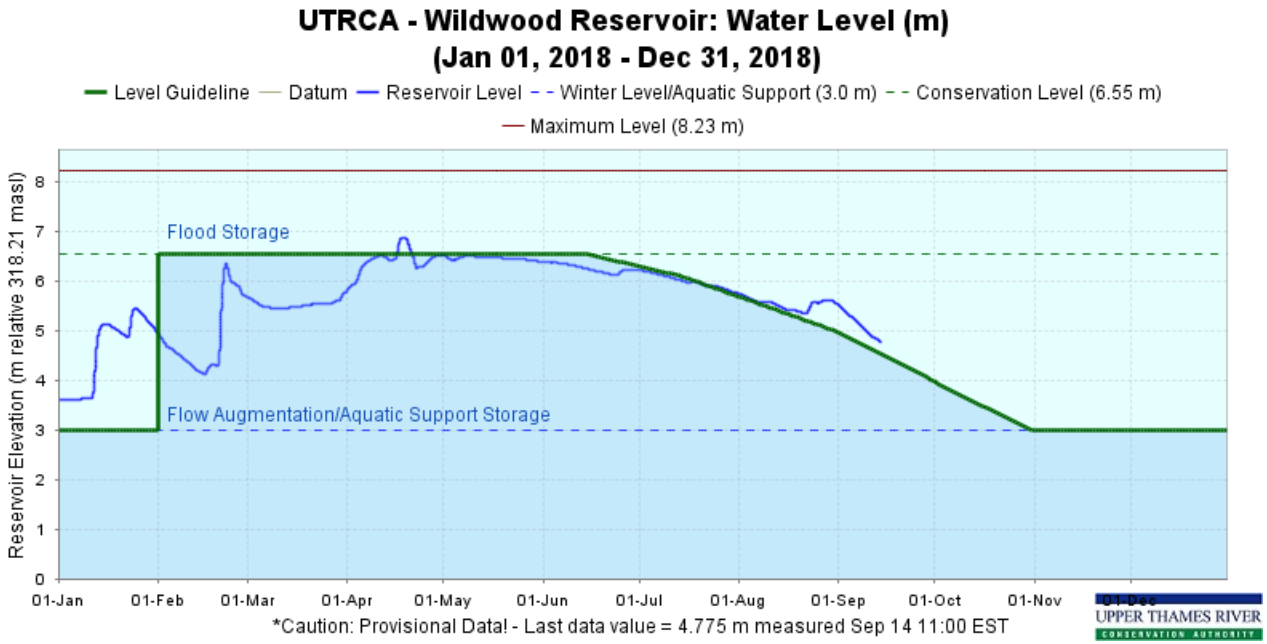
Data Plots

- Data Plots
  - Based on parameter to be plotted, and station groups



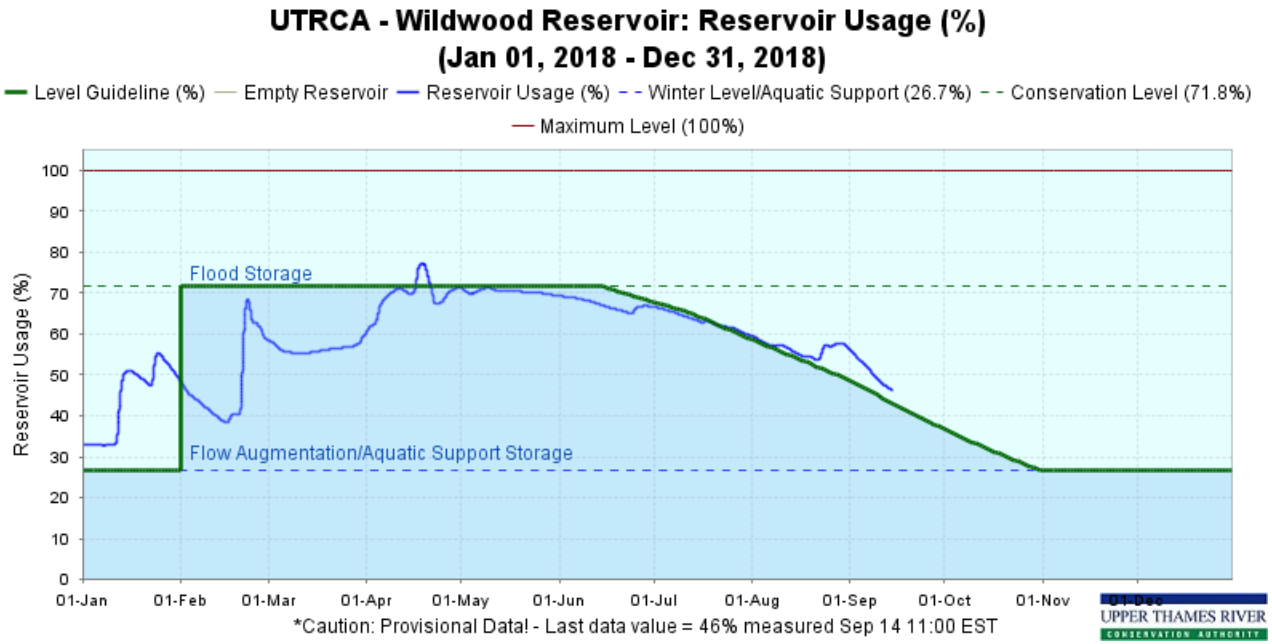
Reservoir Plots

- Reservoir levels



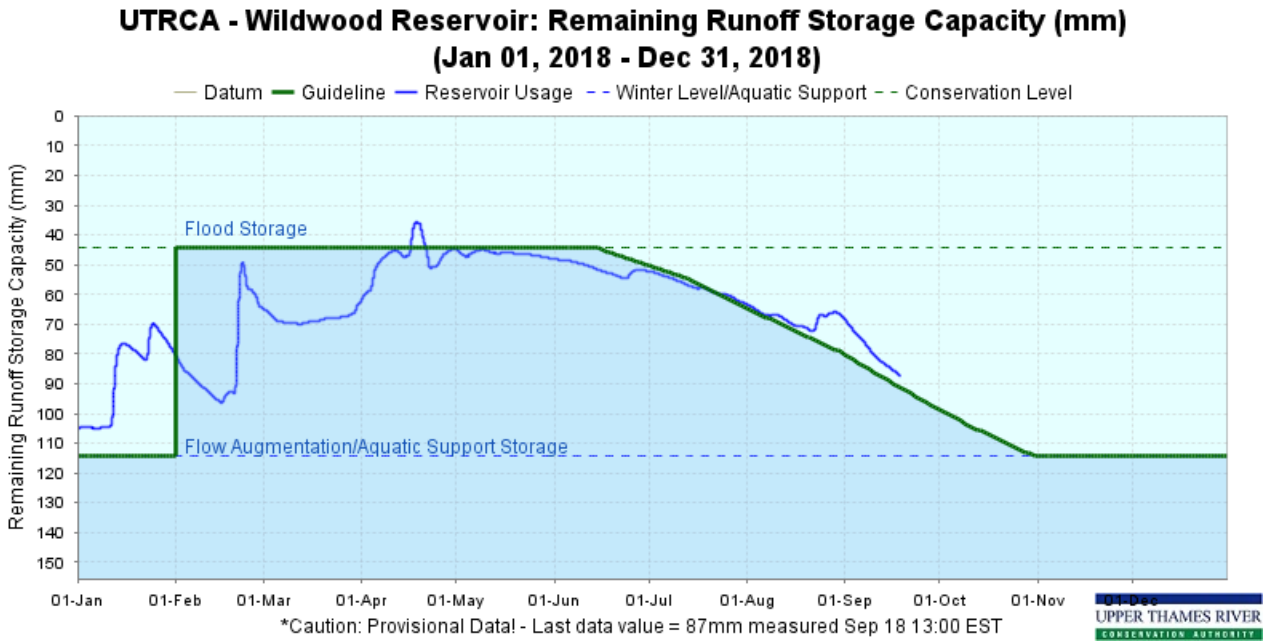
Reservoir Plots

- Percent reservoir usage



Reservoir Plots

- mm runoff storage remaining



Dam Operations Summary

UTRCA Gate Summary (Manual Entry) 14-Sep-2018 14:03

Gate Settings							
Location	Last Operation Time	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5	Gate 6
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Wildwood Reservoir	10-Sep-2018 10:50	0.00	0.00	0.06	0.00		
Fanshawe Reservoir	13-Sep-2018 10:30	30.00	30.00	30.00	30.00	30.00	6.00
Pittock Reservoir	07-Sep-2018 13:55	0.00	0.00	3.00	0.00	0.00	

Blank cell --- control does not exist at that dam

UTRCA Valve Summary (Manual Entry) 14-Sep-2018 14:03

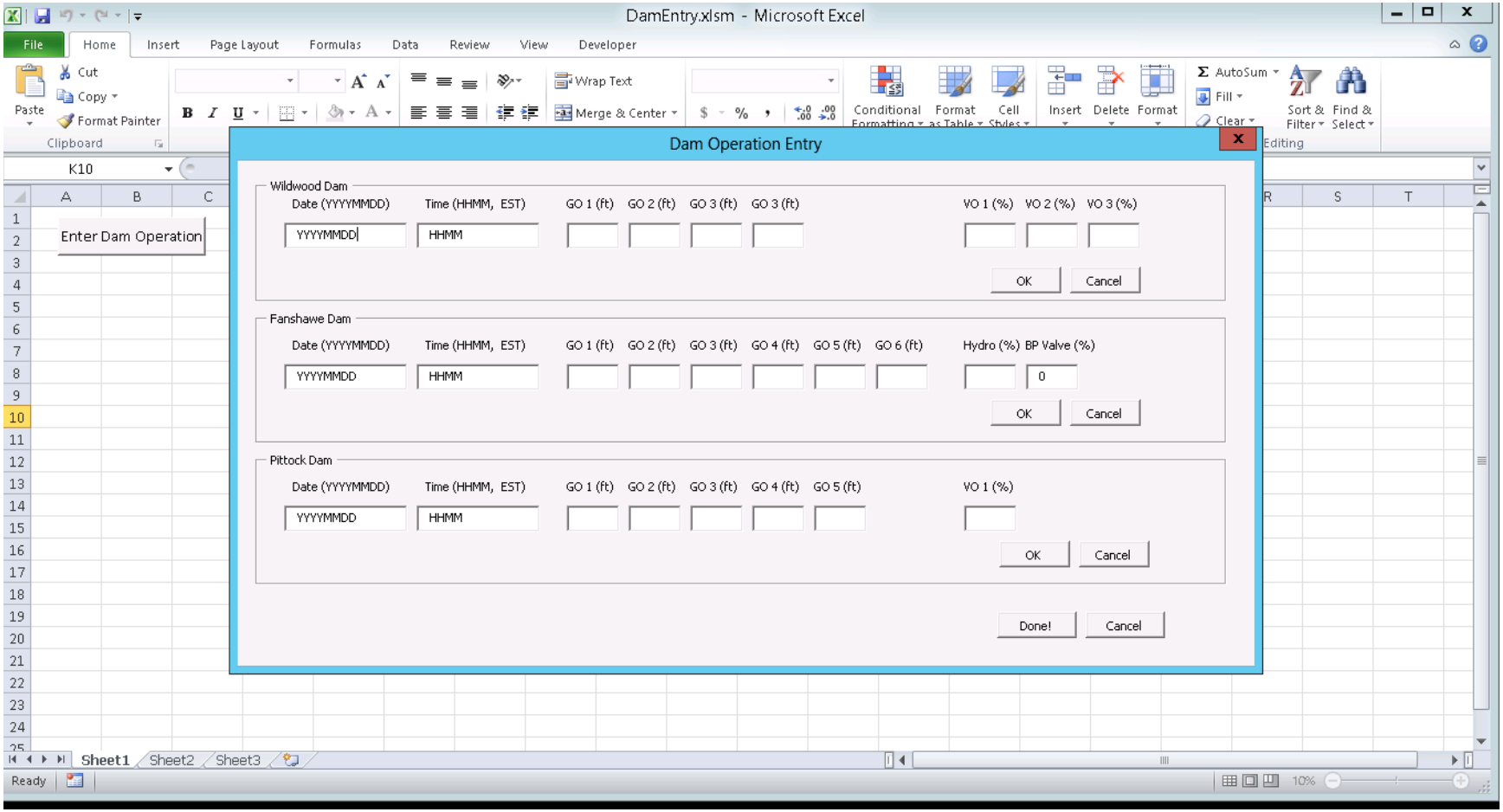
Valve Settings					
Location	Last Operation Time	Valve 1 / Hydro	Valve 2 / Large Vane	Valve 3 / Small Vane	Bypass Valve
		(%)	(%)	(%)	(%)
Wildwood Reservoir	10-Sep-2018 10:50	0.00	75.00	100.00	
Fanshawe Reservoir	13-Sep-2018 10:30	30.00	0.00	90.00	0.00
Pittock Reservoir	07-Sep-2018 13:55	15.00			

Blank cell --- control does not exist at that dam

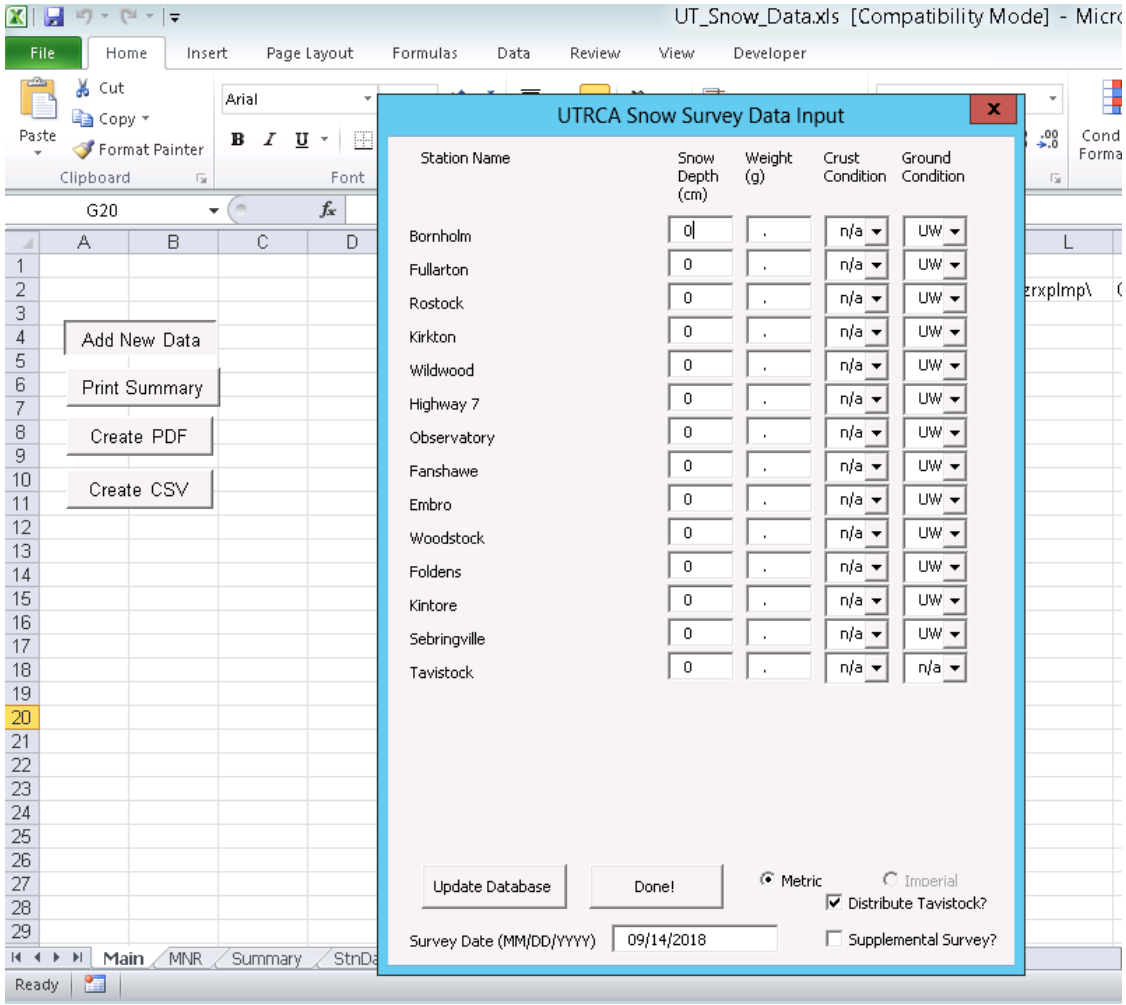
Misc KiScript

- Daily export of hourly data to HEC-DSS database for use in HEC-HMS model
- Inverse distance model to distribute snow data (or other parameters that make sense) to defined subwatersheds
- Data plots in groups of stations for same parameter
- Annual percentile plots (for OWLR)

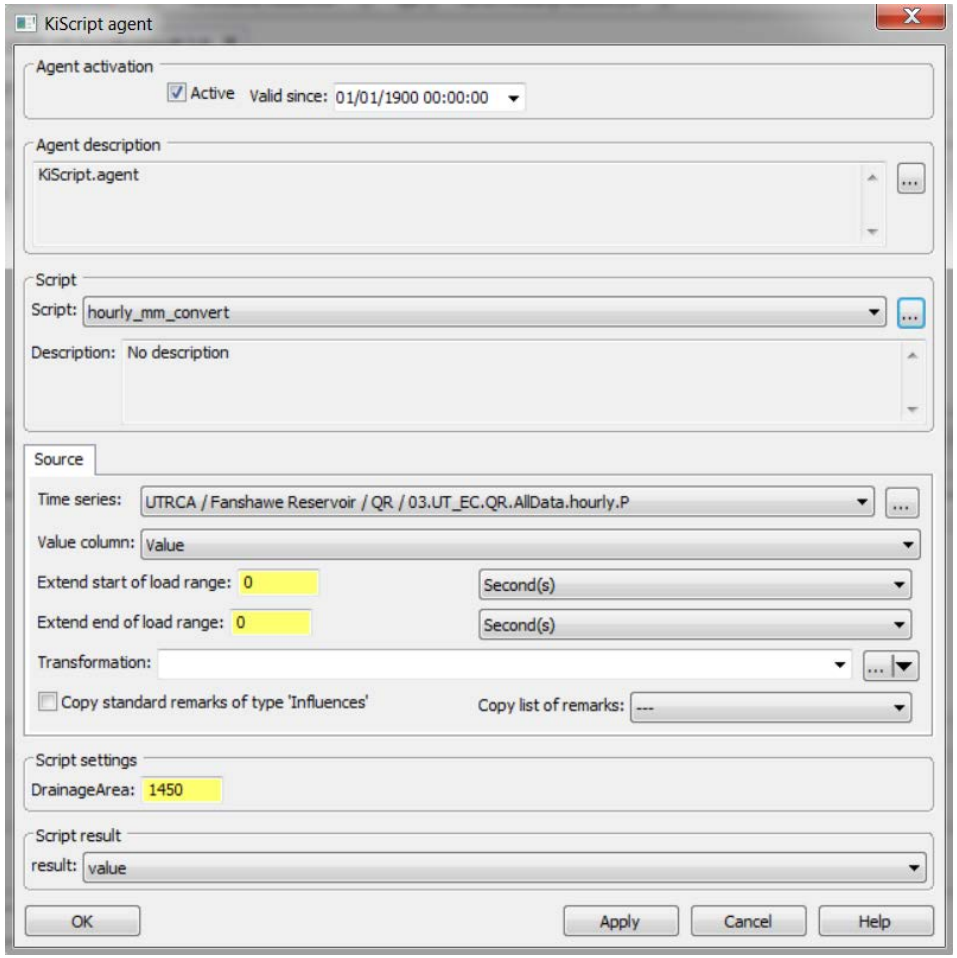
Dam operations



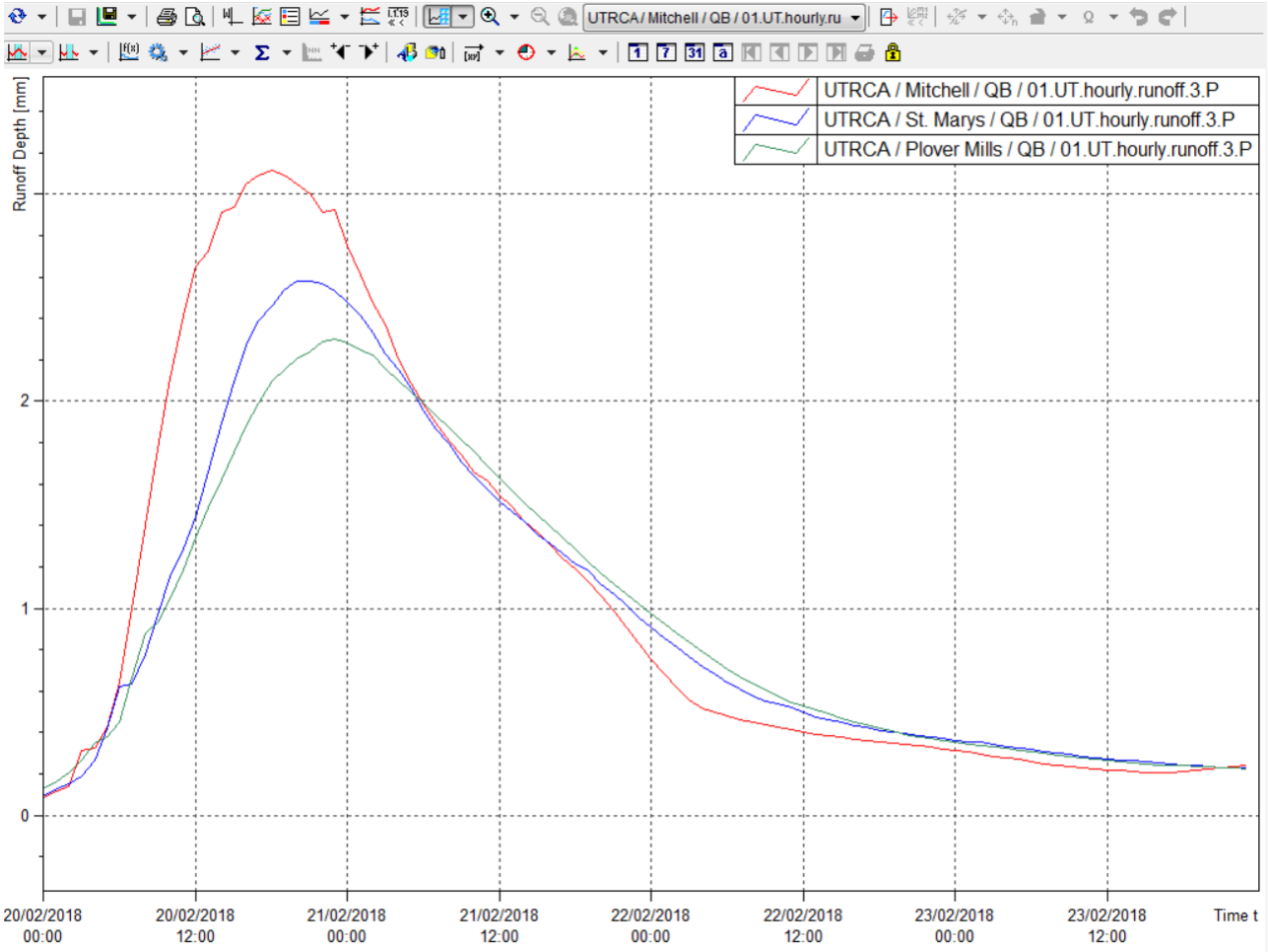
Snow Survey Data



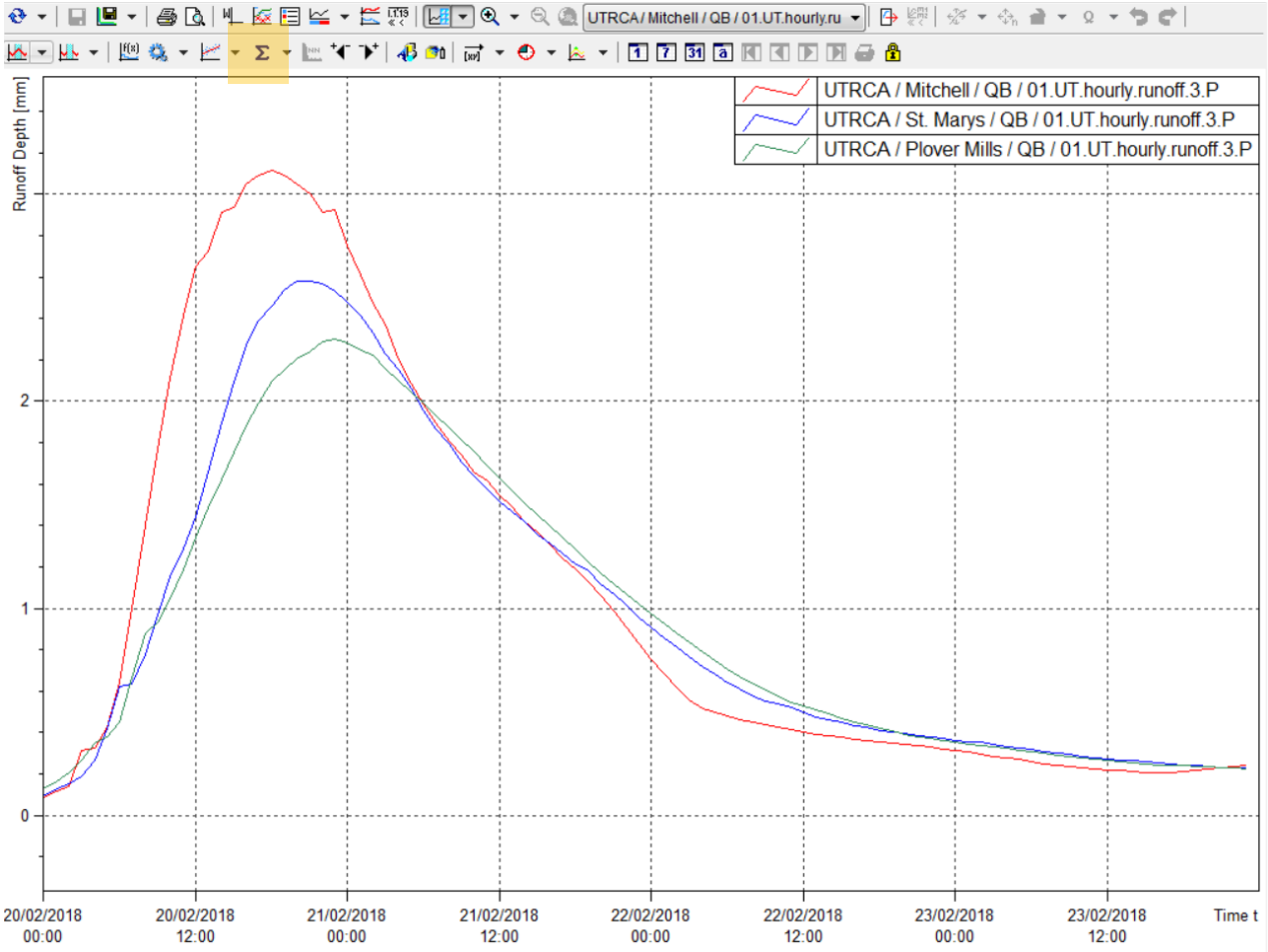
Hourly Runoff Depth Calculation, QB (mm)



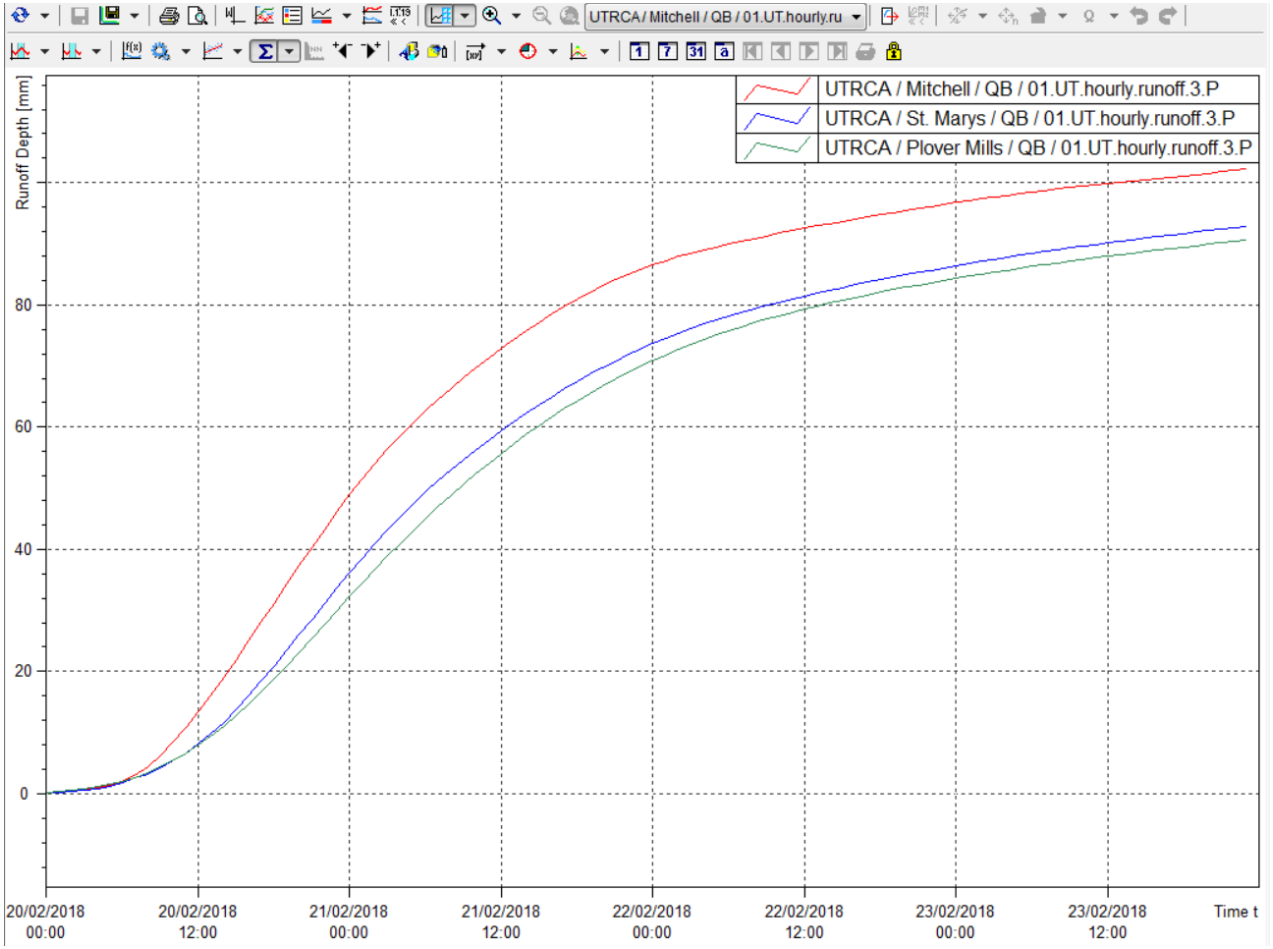
Hourly runoff plotting



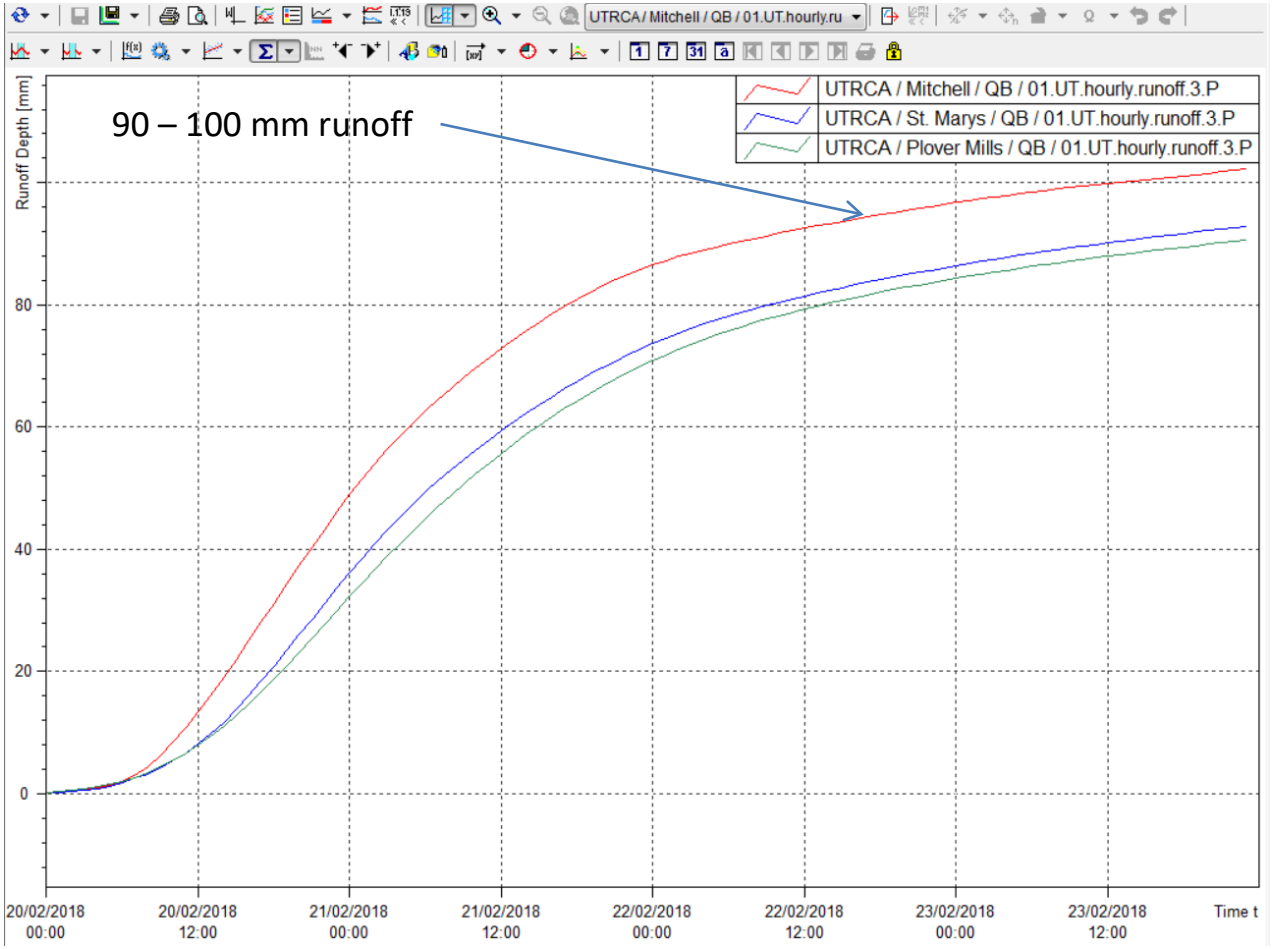
Hourly runoff plotting



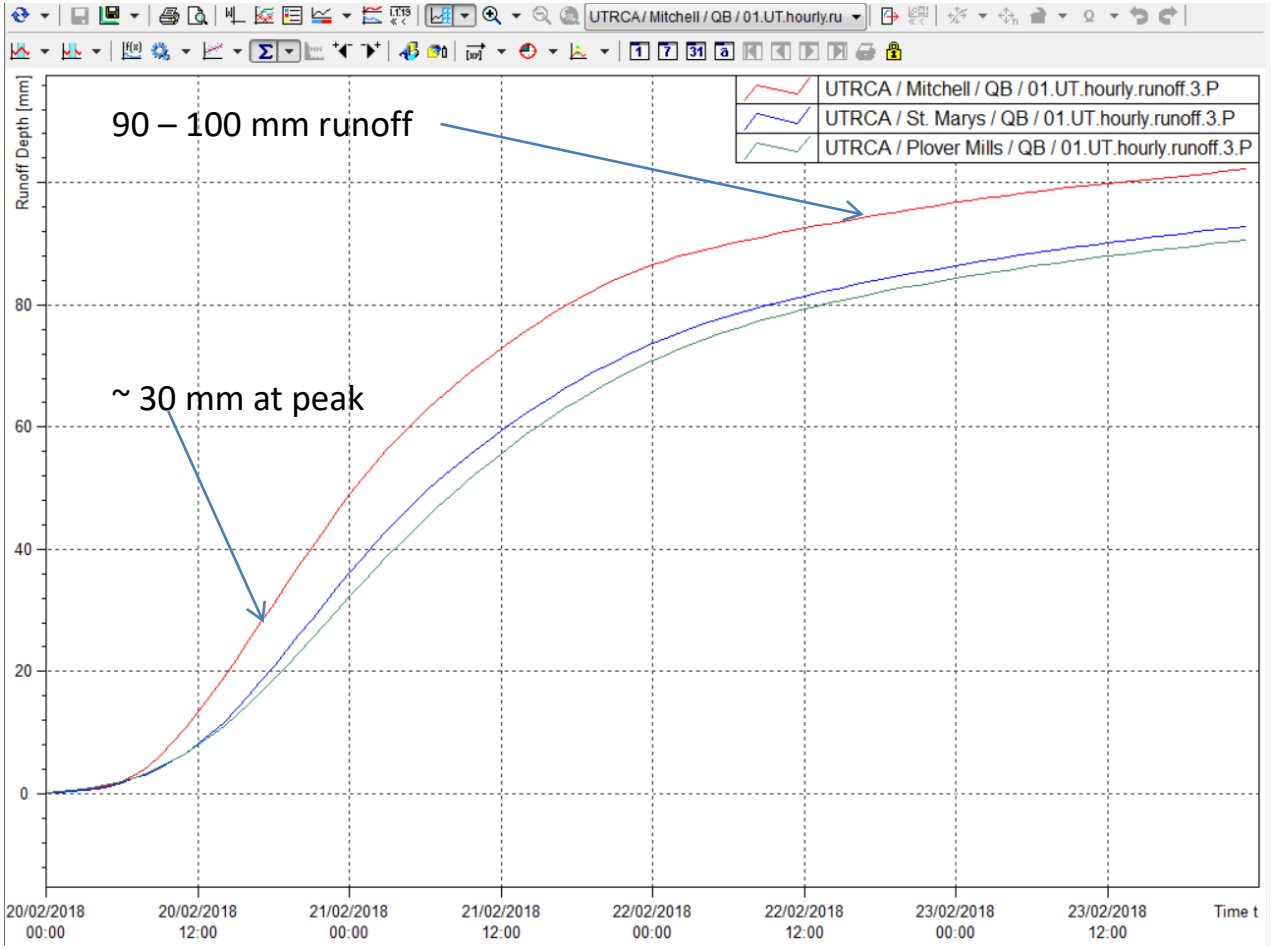
Hourly runoff plotting



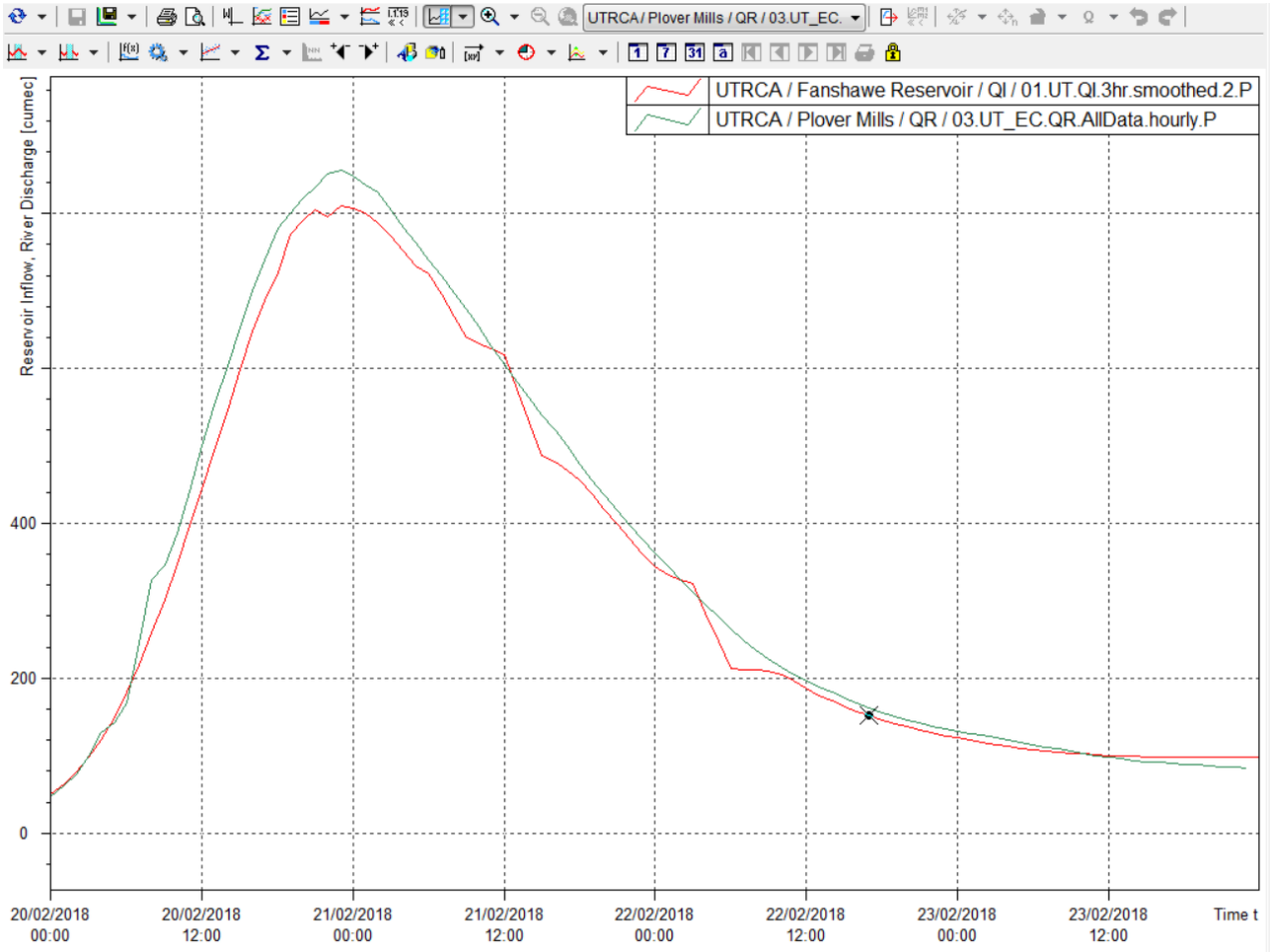
Hourly runoff plotting



Hourly runoff plotting



Reservoir backrouting



kiWIS data plots

Questions?

- Thanks!

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