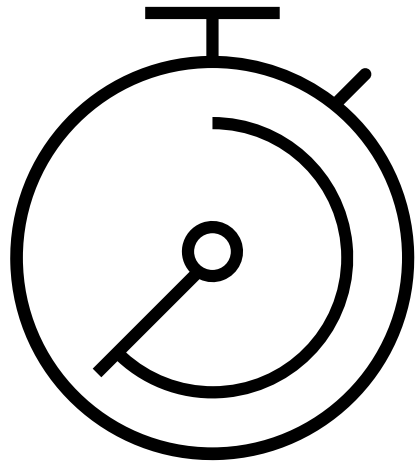# Continuous Monitoring: Tools and Approaches

Tips for collecting, managing, summarizing, and sharing your continuous data

Britta Bierwagen (EPA HQ), Adam Griggs (EPA HQ)

Agenta

- Session Introduction
- Challenges with Managing/Integrating Continuous Data
- Novel data collection
  - Game camera flow surveys
- Archiving/Sharing Cont Data in WQX/WQP
- Discussion - What are your current challenges with managing/serving high-frequency data?

Sensors Jargon (high frequency time series)

- Time series data
- Multi-parameter water quality sondes
- High frequency data
- Long term sensor deployments
- Data loggers
- Continuous data
- Real-time sensors
- Web enabled sensors

Monitoring strategies which include sensor data collection vary in two main ways:
1) frequency of measurements
2) web enabled or not

high frequency time series data

Real time data

The Storage/Retrieval Issue

Continuous time-series data generated from loggers and deployed sensors has a somewhat different data structure
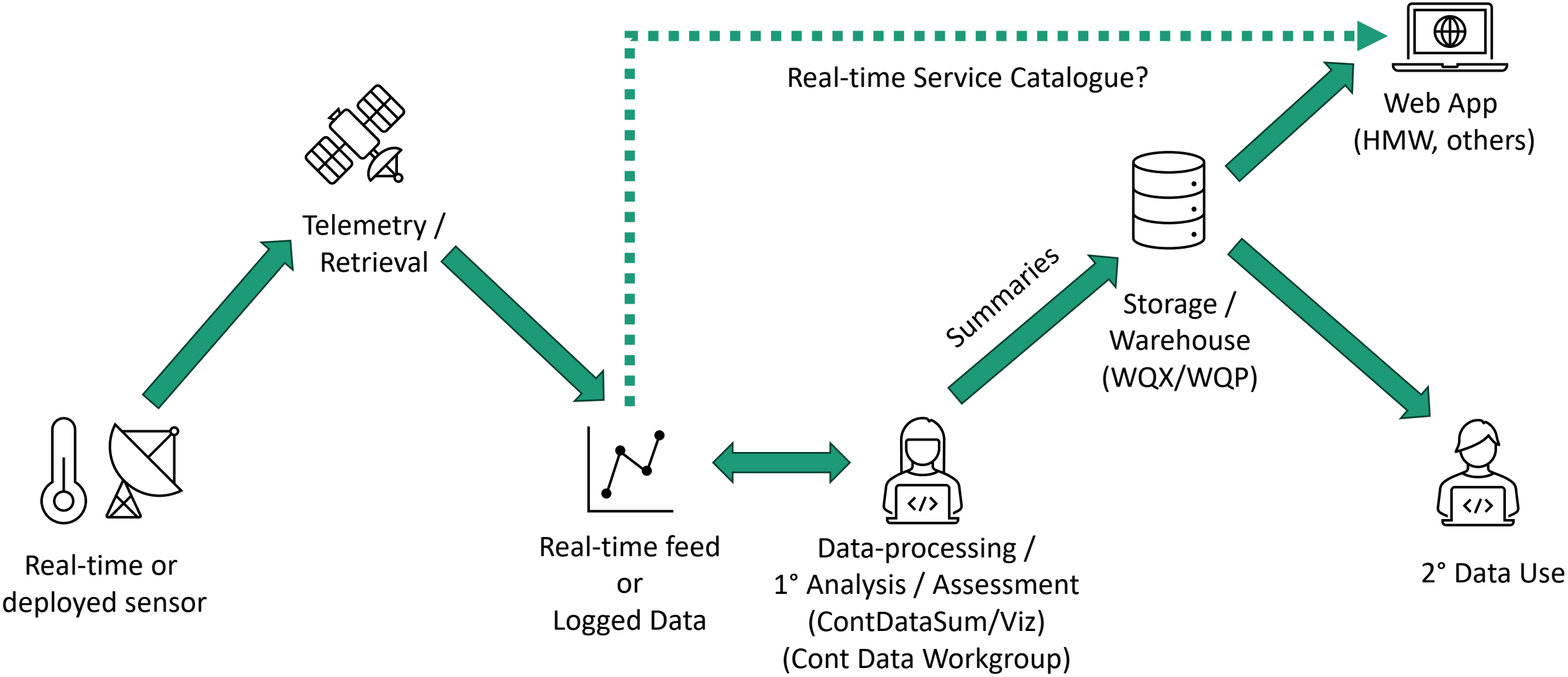
- Fewer measurable characteristics

- Data > metadata

- **Many measurements per deployment**

The WQX/STORET Data Standard and Warehouse was designed to be a discrete water sample database

- Many different characteristics

- Data < Metadata

- Individual unique measurements per event

Managing Continuous Data

Real-time Service Catalogue?

Telemetry /
Retrieval

Web App
(HMW, others)

Summaries

Storage /
Warehouse
(WQX/WQP)

Real-time or
deployed sensor

Real-time feed
or
Logged Data

Data-processing /
1° Analysis / Assessment
(ContDataSum/Viz)
(Cont Data Workgroup)

2° Data Use

Big data and systems integration – what's happening?

Where we are

- WQX/WQP designed to serve discrete sample data
- We support discovery of historical time-series data and summaries stats/values through the WQX/WQP
- Real-time data being published elsewhere (NWIS, Sensor software, local endpoints, etc.)

Where we want to go

- Integration point (UI) delivers combined discrete and continuous datasets
- Systematized resources for real-time data delivery and archival
- Select and generate appropriate statistics from archived continuous data

Next… Game Cameras and Continuous Data R packages

Britta Beirwagen

Archiving Continuous Data with WQX

Current WQX Guidance

- Summarize or subsample the continuous data time-series for WQX upload, and attach the full time-series data file to the submission
  - (WQX supports attachments at Project, Location, Activity, and Result Levels)

One day of data (15 min int)

One day of data (Summary statistics)

PARAM	Value	Unit
SPCOND	208	$\mu S/cm^2$
SPCOND	208	$\mu S/cm^2$
SPCOND	208	$\mu S/cm^2$
SPCOND	209	$\mu S/cm^2$
SPCOND	209	$\mu S/cm^2$
SPCOND	209	$\mu S/cm^2$
SPCOND	209	$\mu S/cm^2$

1

96

Characteristic Name	Statistical Base Code	Result Value	Result Unit
Specific Conductance	Daily Minimum	196	uS/cm
Specific Conductance	Median	204	uS/cm
Specific Conductance	Daily Maximum	208	uS/cm
Specific Conductance	7DADM	209	uS/cm

Continuous Data Web Template

- We have provided a WQX Web Template to assist in formatting continuous time-series data for upload to WQX

The Continuous Data Web Template

Worksheets are color coded by function. The single pink tab contains buttons used to export data, the three yellow tabs are used to enter data, and the green tabs are reference lists for data columns that allow only specific values.

Group Name	Use	Worksheet Name	Description
Export	Use buttons on this tab convert Data Entry Worksheets (yellow tabs) to .txt files	Export	The Export tab contains buttons to automatically export data from each of the data entry worksheets into tab delimited files ready to be imported into WQXWeb.
Data Entry Worksheets	A template for submission of water quality monitoring data. Projects, Monitoring Locations and Results templates are provided for users	Projects	The Project tab contains information about the water quality data collection program. Import Configuration# 7039
		Monitoring Locations	The Monitoring Locations tab contains information about the sites were water quality data is being collected. Import Configuration# 7040
		Results	The Results tab contains the field and laboratory water quality data collected. Import Configuration# 7047
		ALL Monitoring Locations elements	The Monitoring Locations tab contains information about the sites were water quality data is being collected. (alphabetical elements). Import Configuration# 7004
		ALL Results elelments	The Results tab contains the field and laboratory water quality data collected. (alphabetical elements) Import Configuration# 5838
		PeriodOfRecord	Yearly data stored 1-activity per year (Optional DataLoggerLine). Import Configuration# 6588 Generated values: Activity Type, Activity Media elements
		Daily by Day	Daily data stored 1-activity per day (Optional DataLoggerLine). Import Configuration# 6588 Generated values: Activity Type, Activity Media elements
		Monthly by Month	Monthly data stored 1-activity per Month (Optional DataLoggerLine). Import Configuration# 6588 Generated values: Activity Type, Activity Media elements
		Temperature7DADM	7-day Moving average of daily maximum water temperature (Optional DataLoggerLine). Import Configuration# 6588 Generated values: Activity Type, Activity Media elements
Allowable Values/ Look-up Lists/ Domain Values	Tables of allowable values for specific columns in the Data Entry worksheets. All green-colored cells contain the values that should be used in the worksheets. Others cells are included for additional reference.	Allowed Values - Monitoring Locs	This tab contains multiple tables of listing the values that can be entered in particular columns in the Monitoring Locations tab.
		Allowed Values - Results	This tab contains multiple tables of listing the values that can be entered in particular columns in the Results tab.
		Characteristics	This tab contains a table of all Characteristics in STORET that can be used in the Characteristic Name field in the Results tab. The table also has fields to indicate if a particular Characteristic requires a Sample Fraction or Field/Lab Analytical Procedure (or both) for a particular characteristic.
		Analytical Methods	This tab contains a list of all nationally available result analytical methods. Additional methods can be defined by an organization in the "Analytical & Collection Methods" tab.
		Units of Measure	This tab contains a single table listing all result units of measure available in WQX.
		Analytical & Collection Methods	This tab can be used to record organization specific Result Analytical Methods and Sample Collection Methods. Data entered in this tab is not exported to WQXWeb.

For assistance with using this template, please refer to the US EPA STORET/WQX online resources at http://www.epa.gov/storet/

The most recent copy of this template and corresponding dictionary can be downloaded from http://www.epa.gov/storet/wqx/wqxweb downloads.html

If you have questions or comments about this template, please send email to the STORET Help Desk at STORET@epa.gov

Continuous Time-Series Template

The Template provides several examples of summarizing your time series-data for upload. We don't necessarily want all the individual discrete measures uploaded as sample data

Discrete summary (real measurements)

Statistical summaries over time (Daily means, running avg, monthly high…)

Continuous Time-Series Template

	A	B	C	D	E	F	G	H	I	J
1	**Project ID**	**Monitoring Location ID**	**Activity ID**	**Activity Attachment File Name**	**Activity Attachment Type**	**Start Date - COPY / PASTE not imported**	**Activity Start Date (monitoring period)**	**Activity End Date COPY / PASTE (monitoring period)**	**Sample Collection Method ID**	**Sample Collection Equipment Name**
2	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/7/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
3	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/8/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
4	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/9/2011	1/1/2011	9/30/2011	Portal	Probe/Sensor
5	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/10/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
6	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/11/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
7	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/12/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
8	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/13/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
9	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/14/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
10	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/15/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
11	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/16/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
12	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/17/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
13	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/18/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
14	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/19/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
15	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/20/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
16	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/21/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
17	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/22/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
18	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/23/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
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21	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/26/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
22	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/27/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
23	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/28/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
24	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/29/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
25	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/30/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
26	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/31/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
27	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/1/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
28	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/2/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
29	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/3/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
30	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/4/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
31	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/5/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
32	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/6/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
33	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/7/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
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35	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/9/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
36	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/10/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
37	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/11/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
38	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/12/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
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Sheet tabs: Definitions | Projects - config#7039 | Monitoring Locations - cfg#7040 | Results - config#7047 | PeriodOfRecord - config#6588 | DailyByDay - config#6588 | MonthlyByMonth - conf

IDs – Same approach used for other data types

Every set of results needs to include a Project ID, Location ID, and Activity ID.

Continuous Time-Series Template

	A	B	C	D	E	F	G	H	I	J
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36	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exa txt		2/10/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
37	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exa txt		2/11/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
38	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exa txt		2/12/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
39	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exa txt		2/13/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor

Sheet tabs: Definitions | Projects - config#7039 | Monitoring Locations - cfg#7040 | Results - config#7047 | PeriodOfRecord - config#6588 | DailyByDay - config#6588 | MonthlyByMonth - conf

Activity Attachments - We recommend attaching your full time-series record file as an unformatted .txt or .csv file.

*Anyone wanting to use the full time-series would be able to download the original file

Continuous Time-Series Template

	Project ID	Monitoring Location ID	Activity ID	Activity Attachment File Name	Activity Attachment Type	Start Date - COPY / PASTE not imported	Activity Start Date (monitoring period)	Activity End Date COPY / PASTE (monitoring period)	Sample Collection Method ID	Sample Collection Equipment Name
2	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/7/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
3	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/8/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
4	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/9/2011	1/1/2011	9/30/2011	Portal	Probe/Sensor
5	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/10/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
6	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/11/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
7	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/12/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
8	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/13/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
9	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/14/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
10	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/15/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
11	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/16/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
12	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/17/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
13	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/18/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
14	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/19/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
15	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/20/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
16	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/21/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
17	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/22/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
18	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/23/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
19	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/24/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
20	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/25/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
21	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/26/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
22	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/27/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
23	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/28/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
24	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/29/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
25	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/30/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
26	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		1/31/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
27	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/1/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
28	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/2/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
29	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/3/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
30	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/4/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
31	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/5/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
32	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/6/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
33	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/7/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
34	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/8/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
35	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/9/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
36	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/10/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
37	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/11/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
38	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/12/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor
39	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exar txt		2/13/2011	1/1/2011	9/30/2011	YSI6600V2Sonde(	Probe/Sensor

Sheet tabs: Definitions | Projects - config#7039 | Monitoring Locations - cfg#7040 | Results - config#7047 | PeriodOfRecord - config#6588 | DailyByDay - config#6588 | MonthlyByMonth - conf

Activity Start/End Date – The date for the full deployment of the continuous time-series record or attachment

Start Date – The date of the value being submitted, that being either a discrete measure value or a statistical summary value

Continuous Time-Series Template

	A	B	C	D	E	F	G	H	I	J
1	Project ID	Monitoring Location ID	Activity ID	Activity Attachment File Name	Activity Attachment Type	Start Date - COPY / PASTE not imported	Activity Start Date (monitoring period)	Activity End Date COPY / PASTE (monitoring period)	Sample Collection Method ID	Sample Collection Equipment Name
2	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/7/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
3	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/8/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
4	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/9/2011	1/1/2011	9/30/2011	Portal	Probe/Sensor
5	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/10/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
6	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/11/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
7	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/12/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
8	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/13/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
9	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/14/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
10	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/15/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
11	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/16/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
12	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/17/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
13	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/18/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
14	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/19/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
15	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/20/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
16	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/21/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
17	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/22/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
18	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/23/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
19	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/24/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
20	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/25/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
21	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/26/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
22	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/27/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
23	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/28/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
24	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/29/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
25	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/30/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
26	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		1/31/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
27	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/1/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
28	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/2/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
29	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/3/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
30	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/4/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
31	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/5/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
32	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/6/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
33	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/7/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
34	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/8/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
35	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/9/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
36	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/10/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
37	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/11/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
38	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/12/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor
39	TEMPLATE_CONTINUOUS	WQXTEST16465	CM:WQXTEST16465:M2011	yearly_data_exam txt		2/13/2011	1/1/2011	9/30/2011	YSI6600V2Sonde	Probe/Sensor

Sheet tabs: Definitions | Projects - config#7039 | Monitoring Locations - cfg#7040 | Results - config#7047 | PeriodOfRecord - config#6588 | DailyByDay - config#6588 | MonthlyByMonth - conf

Sample Collection Method ID – Matches the values you registered for your Org in the WQXWeb application.

Sample Collection Equipment Name

*From allowable values

*Use 'Probe/Sensor'

Continuous Time-Series Template

ResultTimeBasis	Analysis Start Date (measuring cycle)	Analysis End Date (measuring cycle)	Data Logger Line	...ethod Speciation	ResultTemperatureBasis	Statistical Base Code	Result Value	Result Unit
PeriodOfRec	1/1/2007	12/31/2007	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2008	12/31/2008	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2009	12/31/2009	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2010	12/31/2010	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2011	12/31/2011	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2012	12/31/2012	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2013	12/31/2013	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2014	12/31/2014	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2007	6/30/2007	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	7/1/2007	12/31/2007	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2008	6/30/2008	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	7/1/2008	12/31/2008	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2009	6/30/2009	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	7/1/2009	12/31/2009	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2010	6/30/2010	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	7/1/2010	12/31/2010	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2011	6/30/2011	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	7/1/2011	12/31/2011	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2012	6/30/2012	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	7/1/2012	12/31/2012	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2013	6/30/2013	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	7/1/2013	12/31/2013	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	1/1/2014	6/30/2014	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	7/1/2014	12/31/2014	Line1				Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	8/7/2014	8/7/2014					Mean	see ActivityFileURL	None
PeriodOfRec	8/8/2014	11/8/2015		Flow			Mean	http://waterdata.usgs.g	ft3/sec
PeriodOfRec	8/8/2014	11/8/2015		Temperature, water			Mean	see ActivityFileURL	Deg C
PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Specific conductance	25 Deg C	Mean	see ActivityFileURL	uS/cm
PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Dissolved Oxygen (DO)		Mean	see ActivityFileURL	mg/l
PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	pH		Mean	see ActivityFileURL	None
PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Turbidity		Mean	see ActivityFileURL	FNU
PeriodOfRec	10/1/2007	11/8/2015		Flow			Mean	see ActivityFileURL	ft3/sec
PeriodOfRec	8/8/2014	11/8/2015		Temperature, water			Mean	see ActivityFileURL	Deg C
PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Specific conductance	25 Deg C	Mean	see ActivityFileURL	uS/cm
PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Dissolved Oxygen (DO)		Mean	see ActivityFileURL	mg/l
PeriodOfRec	8/7/2014	11/8/2015		Unfiltered	pH		Mean	see ActivityFileURL	None
PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Turbidity		Mean	see ActivityFileURL	FNU
PeriodOfRec	6/1/2013	6/30/2013		Flow			Mean	see ActivityFileURL	ft3/sec

ResultTimeBasis– The period of time that the results are summarizing. Choose a period or 'PeriodOfRecord' for a summary of the entire period.

Analysis Start/End Date

The dates over which a value has been calculated to summarize the record.

Monitoring Locations - cfg#7040 | Results - config#7047 | **PeriodOfRecord - config#6588** | DailyByDay - config#6588 | MonthlyByMonth - config#6588 | Temperature7DADM - config#6588

Continuous Time-Series Template

	ResultTimeBasis	Analysis Start Date (measuring cycle)	Analysis End Date (measuring cycle)	Data Logger Line	Result Sample Fraction	Characteristic Name	Method Speciation	ResultTemperatureBasis				
2	PeriodOfRec	1/1/2007	12/31/2007	Line1		Flow						
3	PeriodOfRec	1/1/2008	12/31/2008	Line1		Flow						
4	PeriodOfRec	1/1/2009	12/31/2009	Line1		Flow						
5	PeriodOfRec	1/1/2010	12/31/2010	Line1		Flow						
6	PeriodOfRec	1/1/2011	12/31/2011	Line1		Flow						
7	PeriodOfRec	1/1/2012	12/31/2012	Line1		Flow						
8	PeriodOfRec	1/1/2013	12/31/2013	Line1		Flow						
9	PeriodOfRec	1/1/2014	12/31/2014	Line1		Flow						
10	PeriodOfRec	1/1/2007	6/30/2007	Line1		Flow						
11	PeriodOfRec	7/1/2007	12/31/2007	Line1		Flow						
12	PeriodOfRec	1/1/2008	6/30/2008	Line1		Flow						
13	PeriodOfRec	7/1/2008	12/31/2008	Line1		Flow						
14	PeriodOfRec	1/1/2009	6/30/2009	Line1		Flow						
15	PeriodOfRec	7/1/2009	12/31/2009	Line1		Flow						
16	PeriodOfRec	1/1/2010	6/30/2010	Line1		Flow						
17	PeriodOfRec	7/1/2010	12/31/2010	Line1		Flow						
18	PeriodOfRec	1/1/2011	6/30/2011	Line1		Flow						
19	PeriodOfRec	7/1/2011	12/31/2011	Line1		Flow						
20	PeriodOfRec	1/1/2012	6/30/2012	Line1		Flow						
21	PeriodOfRec	7/1/2012	12/31/2012	Line1		Flow						
22	PeriodOfRec	1/1/2013	6/30/2013	Line1		Flow						
23	PeriodOfRec	7/1/2013	12/31/2013	Line1		Flow						
24	PeriodOfRec	1/1/2014	6/30/2014	Line1		Flow						
25	PeriodOfRec	7/1/2014	12/31/2014	Line1		Flow						
26	PeriodOfRec	8/7/2014	8/7/2014		Unfiltered	pH						
27	PeriodOfRec	8/8/2014	11/8/2015			Flow						
28	PeriodOfRec	8/8/2014	11/8/2015			Temperature, water						
29	PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Specific conductance		25 Deg C				
30	PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Dissolved Oxygen (DO)			Mean	see ActivityFileURL	mg/l	
31	PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	pH			Mean	see ActivityFileURL	None	
32	PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Turbidity			Mean	see ActivityFileURL	FNU	
33	PeriodOfRec	10/1/2007	11/8/2015			Flow			Mean	see ActivityFileURL	ft3/sec	
34	PeriodOfRec	8/8/2014	11/8/2015			Temperature, water			Mean	see ActivityFileURL	Deg C	
35	PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Specific conductance		25 Deg C	Mean	see ActivityFileURL	uS/cm	
36	PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Dissolved Oxygen (DO)			Mean	see ActivityFileURL	mg/l	
37	PeriodOfRec	8/7/2014	11/8/2015		Unfiltered	pH			Mean	see ActivityFileURL	None	
38	PeriodOfRec	8/8/2014	11/8/2015		Unfiltered	Turbidity			Mean	see ActivityFileURL	FNU	
39	PeriodOfRec	6/1/2013	6/30/2013			Flow			Mean	see ActivityFileURL	ft3/sec	

ResultTimeBasis– The period of time that the results are summarizing. Choose a period or 'PeriodOfRecord' to indicate the calculation was performed over the full record.

Analysis Start/End Date

The dates over which a value has been calculated to summarize the record.

Monitoring Locations - cfg#7040 | Results - config#7047 | **PeriodOfRecord - config#6588** | DailyByDay - config#6588 | MonthlyByMonth - config#6588 | Temperature7DADM - config#6588

Continuous Time-Series Template

	Result Sample Fraction	Characteristic Name	Method Speciation	ResultTemperatureBasis	Statistical Base Code	Result Value	Result Unit	Result Detection Condition	Result Status ID	Result Value Type	Result Comment
2		Flow			Mean	4.78	ft3/sec		Final	Calculated	
3		Flow			Mean	4.61	ft3/sec		Final	Calculated	
4		Flow			Mean	5.27	ft3/sec		Final	Calculated	
5		Flow			Mean	4.82	ft3/sec		Final	Calculated	
6		Flow			Mean	4.56	ft3/sec		Final	Calculated	
7		Flow			Mean	4.52	ft3/sec		Final	Calculated	
8		Flow			Mean	40.73	ft3/sec		Final	Calculated	
9		Flow			Mean	27.81	ft3/sec		Final	Calculated	
10		Flow			Mean	7.47	ft3/sec		Final	Calculated	
11		Flow			Mean	6.70	ft3/sec		Final	Calculated	
12		Flow			Mean	9.55	ft3/sec		Final	Calculated	
13		Flow			Mean	6.17	ft3/sec		Final	Calculated	
14		Flow			Mean	42.87	ft3/sec		Final	Calculated	
15		Flow			Mean	41.28	ft3/sec		Final	Calculated	
16		Flow			Mean	9.94	ft3/sec		Final	Calculated	
17		Flow			Mean	6.00	ft3/sec		Final	Calculated	
18		Flow			Mean	8.00	ft3/sec		Final	Calculated	
19		Flow			Mean	153.04	ft3/sec		Final	Calculated	
20		Flow			Mean	86.39	ft3/sec		Final	Calculated	
21		Flow			Mean	13.46	ft3/sec		Final	Calculated	
22		Flow			Mean	9.38	ft3/sec		Final	Calculated	
23		Flow			Mean	7.78	ft3/sec		Final	Calculated	
24		Flow			Mean	8.11	ft3/sec		Final	Calculated	
25		Flow			Mean	7.82	ft3/sec		Final	Calculated	
26		Flow			Mean	7.29	ft3/sec		Final	Calculated	
27		Flow			Mean	7.07	ft3/sec		Final	Calculated	
28		Flow			Mean	6.84	ft3/sec		Final	Calculated	
29		Flow			Mean	6.80	ft3/sec		Final	Calculated	
30		Flow			Mean	6.68	ft3/sec		Final	Calculated	
31		Flow			Mean	6.69	ft3/sec		Final	Calculated	
32		Temperature, water			Maximum	21.8	Deg C		Final	Actual	
33		Temperature, water			Maximum	21.8	Deg C		Final	Actual	
34		Temperature, water			Maximum	20.9	Deg C		Final	Actual	
35		Temperature, water			Maximum	20.4	Deg C		Final	Actual	
36		Temperature, water			Maximum	20.1	Deg C		Final	Actual	
37		Temperature, water			Maximum	18.8	Deg C		Final	Actual	
38		Temperature, water			Maximum	20.6	Deg C		Final	Actual	
39		Temperature, water			Maximum	20.9	Deg C		Final	Actual	

Tabs: Instructions | Definitions | Projects - config#7039 | Monitoring Locations - cfg#7040 | Results - config#7047 | PeriodOfRecord - config#6588 | **DailyByDay - c**

Statistical Base Code – The statistic you are choosing to summarize the results with.

*From allowable values

Result Value – Either the subsetted value or the calculated statistic value

Result Value Type Should be 'Calculated' for statistical summary values or 'Actual' for discrete values like "Maximum"

Questions/Discussion