

Please Mute Mics!



Remember to Start Recording!

iUTAH

EPSCoR



# Cyberinfrastructure Tools for iUTAH RFA1: *GAMUT Data Access and Beyond*



**Amber Spackman Jones**

Jeffery S. Horsburgh, Stephanie Reeder,  
and the rest of the iUTAH CI team

# Overview

- Access to GAMUT Data
  - Site and Watershed Pages: <http://gamut.iutahepscor.org>
  - Web Visualization: <http://data.iutahepscor.org>
  - Web Services:  
<http://data.iutahepscor.org/LoganRiverWOF/>
  - File-Based Archival: <http://repository.iutahepscor.org>
- Data Publication
  - Data Collection Plans
  - Metadata Submission
  - Data Submission
- QA/QC Support & Software
- Future Steps/Input



# Access to GAMUT Data

Dynamic site pages for each GAMUT site at  
<http://gamut.iutahepscior.org> with previews and links to data.

**iUTAH** Modeling and Data Federation  
innovative Urban Transitions and Aridregion Hydro-sustainability

Home Development Data About

## Logan River

The Logan River watershed is located in the heart of the Bear River range with headwaters near the Utah-Idaho border. The river flows southwest through Logan Canyon - a landscape dominated by formerly glaciated peaks, limestone cliffs, and the occasional sinkhole. The underlying bedrock has numerous caves that create natural springs that contribute to the river's year-round discharge. Near the canyon's mouth, the river is dammed in three locations (First, Second, and Third dams) for hydroelectric generation. After exiting the mountains, the river flows west through Cache Valley and is impacted by a mixture of agricultural and urban environments. The Logan River converges with the Little Bear River in central Cache Valley before flowing north to the main stem of the Bear River and Cutler Reservoir.

Multiple instruments are used to collect data.

Monitoring Sites: Click on a site code to visualize and download data  
The data presented here are provisional and subject to revision

Site Code	Site Name	Site Type
LR_Mendon_AA	Logan River at Mendon Road (600 South) Aquatic	Aquatic
LR_WaterLab_AA	Logan River at the USU Water Lab Aquatic	Aquatic
LR_MainStreet_BA	Logan River at the Main Street Bridge Aquatic	Aquatic
LR_GC_C	Golf Course Climate	Climate
LR_TWDEF_C	Experimental Forest Climate	Climate
LR_FB_C	Franklin Basin Climate	Climate
LR_TG_C	Tony Grove Climate	Climate
LR_TG_BA	Logan River near Tony Grove Aquatic	Aquatic
LR_Wilkins_R	Wilkins Repeater	Climate

This project is funded through EPS - 1208732. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

**NSF**

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Home Development Data About

## Logan River at the Utah Water Research Laboratory west bridge

Site Code	LR_WaterLab_AA		
Latitude	41.739034	Local Projection	None
Longitude	-111.795742	State	Utah
Lat/Long Datum	WGS84	County	Cache
Elevation	1414.0	Comments	
Local X	None	Watershed	Logan
Local Y	None	Site Type	Stream

Multiple instruments are used to collect data.

The data presented here are provisional and subject to revision

Most Recent Instantaneous Measurements  
Data update time: 2014-06-25 11:45:00, past 24 hours shown.

Temperature WaterTemp_EXO 10.620 degC	Specific Conductance SpcCond 318.300 uS/cm	pH pH 8.460 pH
Oxygen, dissolved ODO 9.830 mg/L	Oxygen, dissolved ODO,sat 88.500 % Sat	Turbidity TurbMed 1.490 NTU
Blue-green algae (cyanobacteria), phycocyanin BCA -0.030 RFU	Chlorophyll Fluorescence Chlorophyll -0.090 RFU	Colored Dissolved Organic Matter CDOM 0.940 QSU
Gage height Stage 55.280 cm		

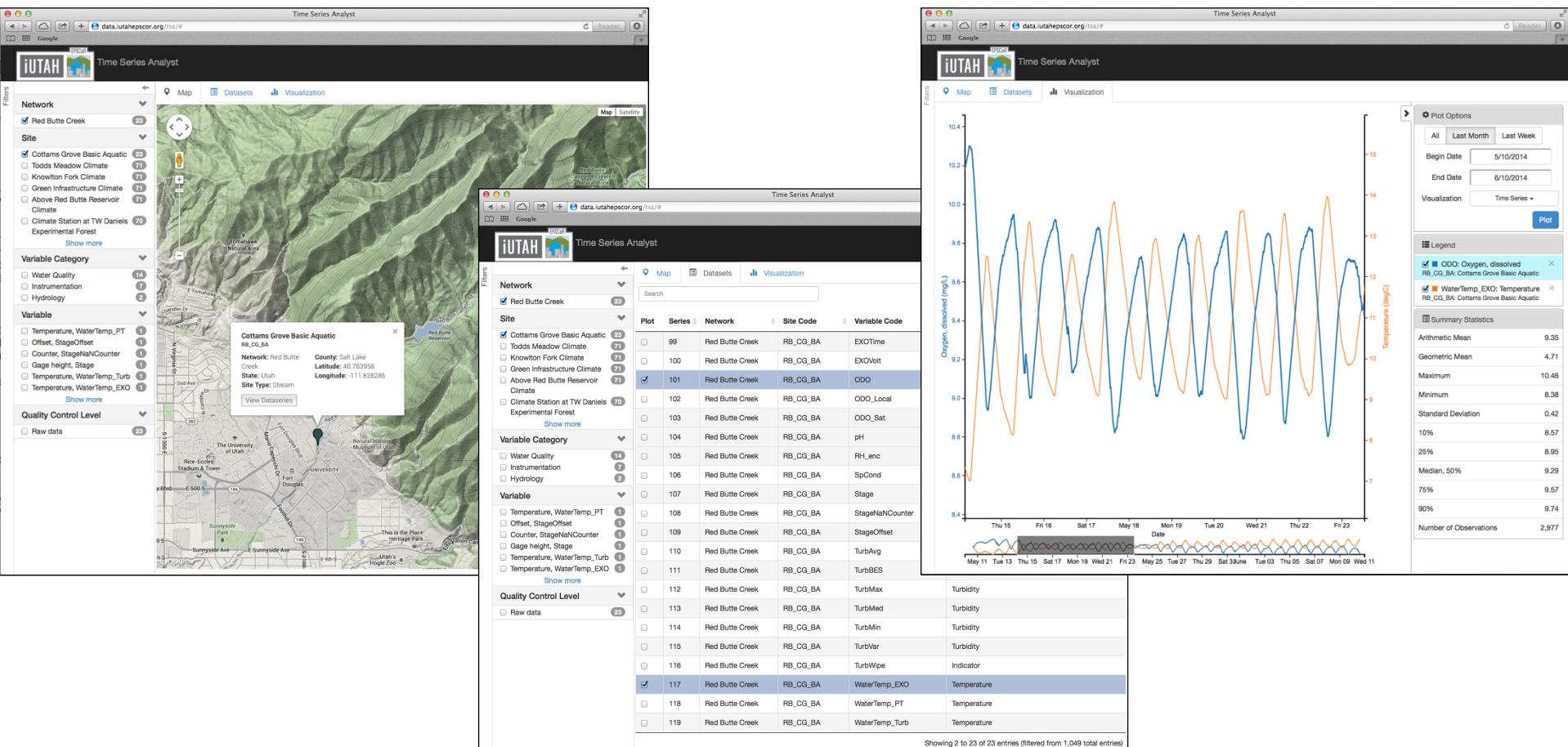
WARNING: These data may be provisional and subject to revision. The data are released on the condition that neither iUTAH, Utah State University, Brigham Young University, nor the University of Utah may be held liable for any damages resulting from their use.

This project is funded through EPS - 1208732. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

**NSF**

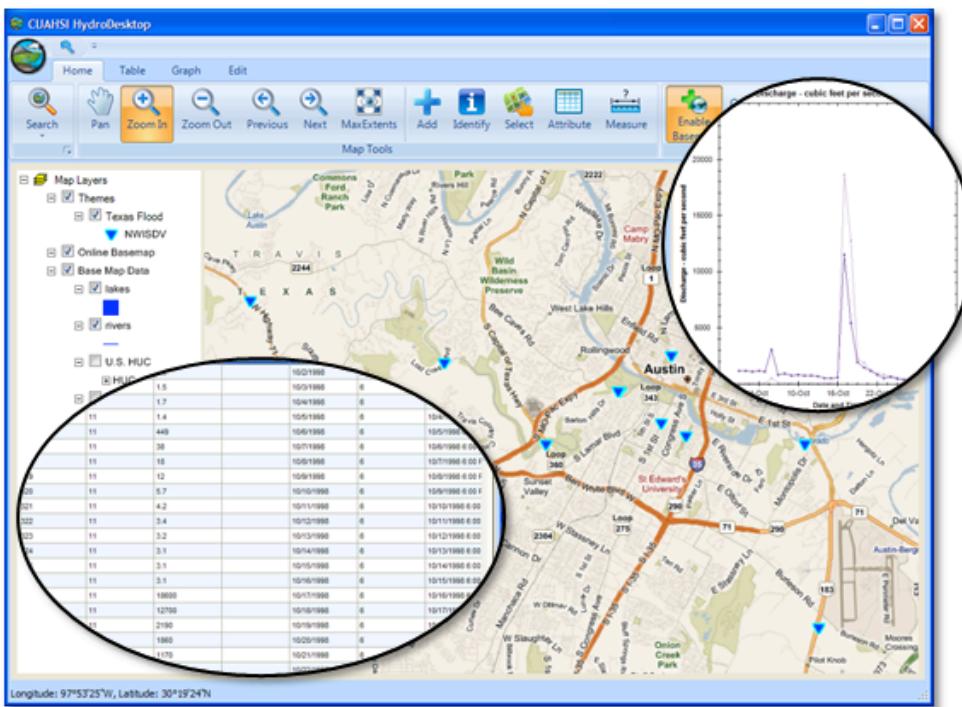
# Access to GAMUT Data

- Time Series Analyst: Enhanced web access and visualization of time series data at <http://data.iutahhepscor.org/tsa>
- Features map-based interface, faceted searching, and multiple plot types



# Access to GAMUT Data

- CUAHSI WaterOneFlow web services deployed
  - <http://data.iutahepscor.org/LoganRiverWOF/>
  - <http://data.iutahepscor.org/RedButteCreekWOF/>
  - <http://data.iutahepscor.org/ProvoRiverWOF/>
- Permit programmatic access- xml files
- Are we ready to register with CUAHSI Water Data Center?



[data.iutahepscor.org/LoganRiverWOF/WaterML\\_1\\_0.aspx](http://data.iutahepscor.org/LoganRiverWOF/WaterML_1_0.aspx)

**CUAHSI WATERML WEB SERVICES FOR ODM v1\_1 DATABASES**

Home WaterML 1.0 WaterML 1.1 WaterML 2.0 DataCart WFS Admin

WaterML is delivered over a SOAP API, called "WaterOneFlow". In this version, the API is updated to include a REST endpoint

There are two methods in these services:

- REST
- [SOAP API](#)

Test the Rest Interface

Site:

Variable:

Begin Date:

End Date:

Generate

[VariableURL](#) [Site + Series URL](#) [Values URL](#)

Run the Generated URL | Reset

WaterML is delivered over a SOAP API, called "WaterOneFlow".

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```

<?xml version="1.0" encoding="utf-8"?>
<sitesResponse xmlns="http://www.cuahsi.org/waterML/1.1/" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <@versionInfo>2014-03-31T06:28:45Z 9963205-06:00</versionInfo>
  <criterion MethodName="GetSiteInfo">
    <parameter name="site" value="iutah:LR_WaterLab_AA"/>
  </criterion>
  <sites>
    <site>
      <siteInfo>
        <siteName>Logan River at the Utah Water Research Laboratory west bridge</siteName>
        <siteCode network="iutah" siteId="1" />
        <geolocation>
          <point location="LatLonPointType">
            <latitude>-41.73934</latitude>
            <longitude>-111.793742</longitude>
          </point>
          <geopolygon>
            <location>
              <elevation_m>1414</elevation_m>
              <description>Cache</description>
              <siteProperty name="County">Cache</siteProperty>
              <siteProperty name="State">Utah</siteProperty>
              <siteProperty name="Site Comments"></siteProperty>
              <siteProperty name="Site Type">Stream</siteProperty>
            </location>
          </geopolygon>
        </geolocation>
        <variables>
          <variable code="volt">
            <unitAbbreviation>Battery voltage</unitAbbreviation>
            <unitCode>102</unitCode>
            <sampledMedium>Not Applicable</sampledMedium>
            <unitName>volt</unitName>
            <unitType>Potential Difference</unitType>
            <unitAbbreviation>V</unitAbbreviation>
            <unitCode>102</unitCode>
            <sampledValue>9999</sampledValue>
            <isImperial>ttrue</isImperial>
            <unit>
              <unitName>minute</unitName>
              <unitAbbreviation>m</unitAbbreviation>
              <unitCode>102</unitCode>
            </unit>
            <timeSupport></timeSupport>
          </variable>
        </variables>
        <specifications>Not Applicable</specifications>
        <valueCount>1</valueCount>
        <valueInterval type="impliedIntervalType">
          <beginDateTime>2013-10-02T11:15:00Z</beginDateTime>
          <endDateTime>2014-03-11T04:45:00Z</endDateTime>
          <beginDateTimeUTC>2013-10-02T11:15:00Z</beginDateTimeUTC>
          <endDateTimeUTC>2014-03-11T04:45:00Z</endDateTimeUTC>
        </valueInterval>
        <methodDescription>
          <methodDescription>Battery voltage measured by a Campbell Scientific CR3000 datalogger.</methodDescription>
        </methodDescription>
      </siteInfo>
    </site>
  </sites>
</sitesResponse>
```

Variables

```

<@variableInfo>2014-03-31T06:28:45Z 9963205-06:00</variableInfo>
<variables>
  <variable code="volt">
    <unitAbbreviation>Battery voltage</unitAbbreviation>
    <unitCode>102</unitCode>
    <sampledMedium>Not Applicable</sampledMedium>
    <unitName>volt</unitName>
    <unitType>Potential Difference</unitType>
    <unitAbbreviation>V</unitAbbreviation>
    <unitCode>102</unitCode>
    <sampledValue>9999</sampledValue>
    <isImperial>ttrue</isImperial>
    <unit>
      <unitName>minute</unitName>
      <unitAbbreviation>m</unitAbbreviation>
      <unitCode>102</unitCode>
    </unit>
    <timeSupport></timeSupport>
  </variable>
</variables>
```

VALUES/TIMESERIES

```

<@valueInfo>2014-03-31T06:28:45Z 9963205-06:00</valueInfo>
<values>
  <value site="iutah:LR_WaterLab_AA" variable="volt" time="2013-10-02T11:15:00Z">9999</value>
  <value site="iutah:LR_WaterLab_AA" variable="volt" time="2014-03-11T04:45:00Z">9999</value>
</values>
```

# Access to GAMUT Data

- File-based archival of raw data: <http://repository.iutahepscor.org>
- Files contain all of the variables measured at each site.
- Partitioned by year
- Updated daily

iUTAH\_GAMUT\_LR\_FB\_BA\_RawData\_2014.csv

URL-1: [http://repository.iutahepscor.org/storage/f/20141201T140952.545000/iUTAH\\_GAMUT\\_LR\\_FB\\_BA\\_RawData\\_2014.csv](http://repository.iutahepscor.org/storage/f/20141201T140952.545000/iUTAH_GAMUT_LR_FB_BA_RawData_2014.csv)

Raw Data for Calendar year 2014

Grid	Graph	Map	1000 records	0	- 100	+	Search data ...	Go »	Filters		
LocalDate...	UTCOffset	DateTime...	BattVolt	Door_Tot	EXOTime	EXOVolt	ODO	ODO_Lo...	ODO_Sat	RH_enc	S
2014-06-...	-7.0	2014-06-...	12.94	2.0	200104.0	12.84	9.8	97.2	81.8	23.22	21
2014-06-...	-7.0	2014-06-...	13.09	5.0	200104.0	12.84	9.8	97.2	81.8	13.71	7
2014-06-...	-7.0	2014-06-...	13.49	5.0	203130.0	13.37	9.73	97.0	81.7	16.55	21
2014-06-...	-7.0	2014-06-...	13.6	0.0	204630.0	13.51	9.71	97.0	81.7	13.91	21
2014-06-...	-7.0	2014-06-...	13.76	0.0	210130.0	13.57	9.7	96.9	81.6	14.01	21
2014-06-...	-7.0	2014-06-...	13.49	0.0	211630.0	13.4	9.67	96.4	81.2	15.94	21
2014-06-...	-7.0	2014-06-...	13.63	0.0	213130.0	13.51	9.71	96.7	81.4	16.18	21
2014-06-...	-7.0	2014-06-...	13.75	0.0	214630.0	13.63	9.71	96.5	81.3	17.73	21
2014-06-...	-7.0	2014-06-...	14.03	0.0	220130.0	13.93	9.72	96.8	81.5	17.83	21
2014-06-...	-7.0	2014-06-...	13.67	0.0	221630.0	13.56	9.67	96.3	81.0	18.04	21
2014-06-...	-7.0	2014-06-...	13.66	0.0	223130.0	13.56	9.67	96.2	81.0	18.88	21
2014-06-...	-7.0	2014-06-...	13.56	0.0	224630.0	13.44	9.66	96.0	80.9	20.0	21
2014-06-...	-7.0	2014-06-...	13.44	0.0	230130.0	13.32	9.61	95.6	80.5	22.27	21
2014-06-...	-7.0	2014-06-...	13.4	0.0	231630.0	13.29	9.61	95.4	80.3	23.9	21
2014-06-...	-7.0	2014-06-...	13.37	0.0	233130.0	13.26	9.6	95.2	80.2	25.02	21
2014-06-...	-7.0	2014-06-...	13.35	0.0	234630.0	13.24	9.6	95.1	80.1	25.46	21
2014-06-...	-7.0	2014-06-...	13.33	0.0	130.0	13.22	9.62	95.0	80.0	25.6	21
2014-06-...	-7.0	2014-06-...	13.31	0.0	1630.0	13.2	9.62	94.8	79.83	25.7	21
2014-06-...	-7.0	2014-06-...	13.3	0.0	3130.0	13.19	9.64	94.7	79.71	25.8	21
2014-06-...	-7.0	2014-06-...	13.27	0.0	4630.0	13.16	9.64	94.4	79.5	26.28	21
2014-06-...	-7.0	2014-06-...	13.27	0.0	10130.0	13.16	9.66	94.4	79.44	26.68	21
2014-06-...	-7.0	2014-06-...	13.26	0.0	11630.0	13.15	9.68	94.2	79.32	27.09	21
2014-06-...	-7.0	2014-06-...	13.25	0.0	13130.0	13.14	9.7	94.1	79.25	27.97	21

[Edit](#) [Download](#)

iUTAH\_GAMUT\_LR\_FB\_BA\_RawData\_2014.csv

URL-1: [http://repository.iutahepscor.org/storage/f/20141201T140952.545000/iUTAH\\_GAMUT\\_LR\\_FB\\_BA\\_RawData\\_2014.csv](http://repository.iutahepscor.org/storage/f/20141201T140952.545000/iUTAH_GAMUT_LR_FB_BA_RawData_2014.csv)

Raw Data for Calendar year 2014

**iUTAH**

iUTAH, innovative Urban Transitions and Aridregion Hydro-sustainability, is a statewide effort dedicated to maintaining and improving water sustainability in Utah. Funded by the... [read more](#)

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**Datasets** 31 [Follow](#)

[organization](#) [Clear All](#)

**iUTAH (40)**

Show More organization

[Groups](#) [Clear All](#)

There are no Groups that match this search

[Tags](#) [Clear All](#)

time series (32)

raw data (32)

GAMUT (32)

climate (19)

water quality (17)

soil (17)

**40 datasets found. However, Order by: Name Ascending** only the datasets that you have access to are listed.

**iUTAH GAMUT Network Raw Data at Tony Grove Climate Site (LR\_TG\_C)**

This dataset contains raw data for all of the variables measured for the iUTAH GAMUT Network climate site near Tony Grove (LR\_TG\_C). Each file contains a calendar year of data....

[CSV](#)

**iUTAH GAMUT Network Raw Data at Logan River near Franklin Basin Basic Aquatic...**

This dataset contains raw data for all of the variables measured for the iUTAH GAMUT Network aquatic site on the Logan River near Franklin Basin (LR\_FB\_BA). Each file contains a...  
[CSV](#)

**iUTAH GAMUT Network Raw Data at Franklin Basin Climate Site (LR\_FB\_C)**

This dataset contains raw data for all of the variables measured for the iUTAH GAMUT Network climate site near Franklin Basin (LR\_FB\_C). Each file contains a calendar year of...  
[CSV](#)

**iUTAH GAMUT Network Raw Data at Golf Course Climate Site (LR\_GC\_C)**

This dataset contains raw data for all of the variables measured for the iUTAH GAMUT Network climate site near the Logan River Golf Course (LR\_GC\_C). Each file contains a...  
[CSV](#)

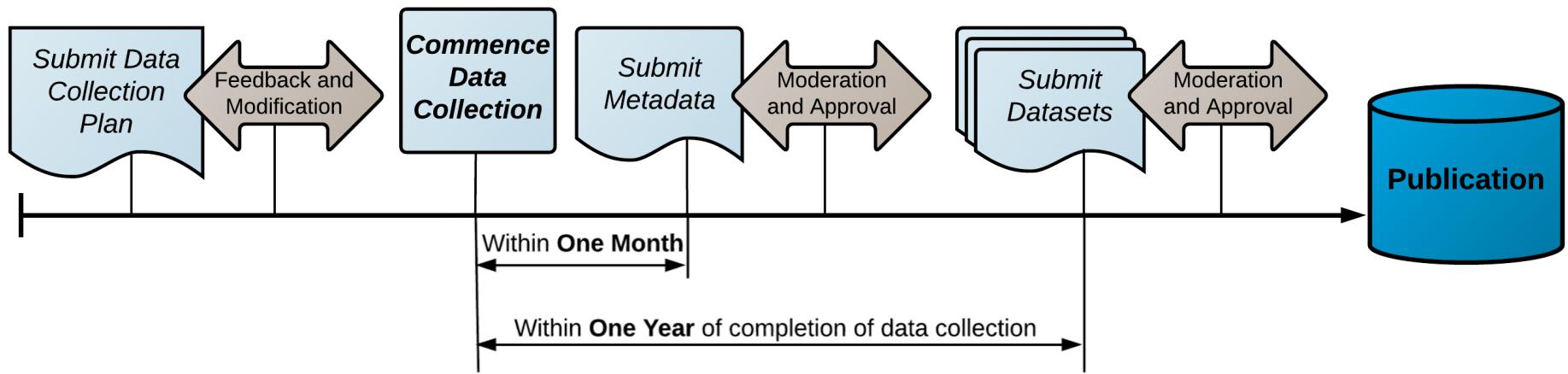
**iUTAH GAMUT Network Raw Data at Logan River near Main Street Basic Aquatic Si...**

This dataset contains raw data for all of the variables measured for the iUTAH GAMUT Network aquatic site on the Logan River at the Main Street Highway 89/91 bridge...  
[CSV](#)

**iUTAH GAMUT Network Raw Data at Logan River near Mendon Road Advanced Aquatic...**

This dataset contains raw data for all of the variables measured for the iUTAH GAMUT Network aquatic site on the Logan River at Mendon Road/600 South (LR\_Mendon\_AA). Each file...  
[CSV](#)

# Data Publication: Process



## Publication:

- Assigns a citation and a url
- Data and metadata are discoverable
- Datasets are archived and curated

# Data Publication: Data Collection Plans

- **ALL** data creation efforts with **ANY** funding from iUTAH (salary, travel, sampling, equipment, etc.) **MUST** submit a brief plan to the Data Policy Committee **PRIOR** to funding.
- Plan should include:
  1. Identification of types of data to be collected/created
  2. Brief description of methods, data formats, and data products
  3. Timeline for data generation and expected publication
  4. Identification of who will have access to preliminary data during collection
  5. Identification of limits to access
  6. Information on collaborators/co-authors of data products or publications

# Data Publication: Data Collection Plans

- Template should be used:  
[http://iutahepcor.org/data\\_modeling/data\\_management\\_Policy.shtml](http://iutahepcor.org/data_modeling/data_management_Policy.shtml)
  - Submit to [amber.jones@usu.edu](mailto:amber.jones@usu.edu)

# Data Publication: Repository System

<http://repository.iutahhepscor.org>

- Web-based system for iUTAH researchers to submit and publish data and models.
- System supports **curation** of datasets.
- **Integrates** the submission and presentation of data and metadata.
- Supports **discovery and access** of datasets to a wide audience.
- Supports **storage and archival**.
- Datasets are private until **approved** by a moderator.

The screenshot shows a web-based dataset submission form titled 'Create Dataset'. The header includes the iUTAH logo, the text 'Modeling and Data Federation', and 'innovative Urban Transitions and Aridregion Hydro-sustainability'. The top navigation bar has links for Home, Development, Data, About, and user information (Amber Jones). Below the header, the URL is http://repository.iutahhepscor.org/datasets/create-dataset. The main form area is divided into several sections:

- What are datasets?**: A brief description of what datasets are and how they are used.
- Create dataset**: The primary action button.
- Add data**: A link to add more data to the dataset.
- Additional data**: A link to add additional data.
- NOTE**: A note stating that the dataset will be private until approved by a system administrator.
- Title**: Field for dataset title (e.g., Red Butte Creek GAMUT Water Temperature Data).
- URL**: Field for dataset URL (e.g., iutah-ckan-stage.usrr.usu.edu/dataset/<dataset>).
- Description**: Field for dataset description (e.g., A short description (or abstract) for the dataset). It includes a note about using Markdown formatting.
- Keywords**: Field for dataset keywords (e.g., water quality, temperature, Red Butte Creek, time series).
- Organization**: Field for dataset organization (e.g., iutah).
- Visibility**: Field for dataset visibility (e.g., Private). It includes a note about why the dataset is private.
- Language**: Field for dataset language (e.g., en, es, fr).
- Access Information**: Field for dataset access information (e.g., limited to iUTAH participants, limited to IRB researchers). It includes a note about using Markdown formatting.
- Type**: Field for dataset type (e.g., collection).
- Optional Metadata**: Section for optional metadata fields:
  - Purpose**: Field for dataset purpose (e.g., Educational, Research, Regulatory).
  - Required Software**: Field for required software (e.g., ArcGIS, R, specific model application).
  - Research Focus Area**: Field for research focus area.
- Spatial Metadata**: Section for spatial metadata fields:
  - Spatial Coverage**: Field for spatial coverage (e.g., Salt Lake County).
  - iUtah Study Area**: Field for study area (e.g., Salt Lake County).

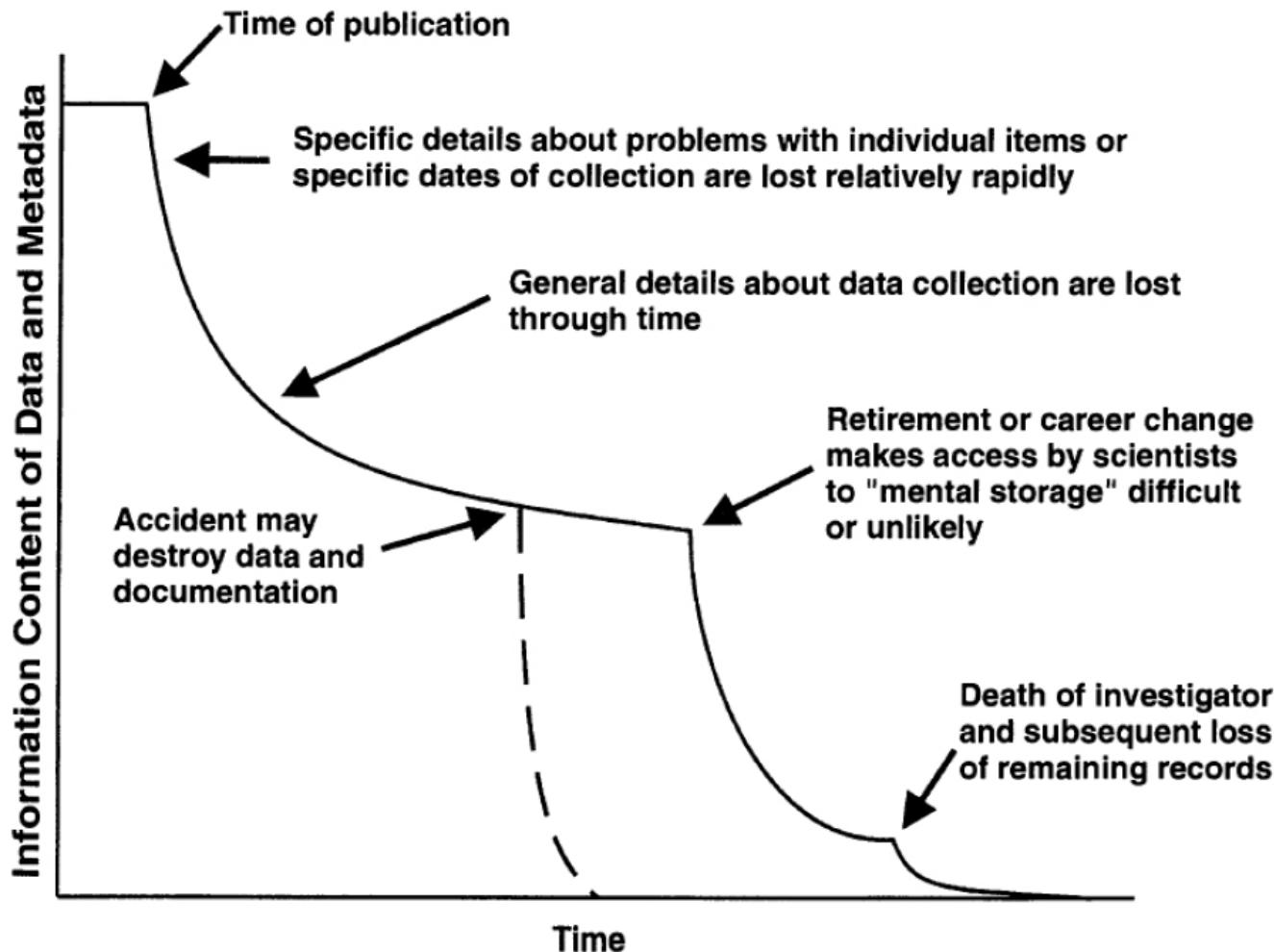
# Data Publication: Repository System

<http://repository.iutahhepscor.org>

- Organized into **datasets**. Each dataset consists of multiple resources.
- Supports submission of **metadata-only** record.
- **General level metadata**. More specific metadata may be submitted as a resource.
- Metadata records submitted to **provide insight** into what work iUTAH participants are conducting.

The screenshot shows the 'Create Dataset' page of the iUTAH Modeling and Data Federation website. The page has a header with the iUTAH logo and the text 'Modeling and Data Federation' and 'innovative Urban Transitions and Aridregion Hydro-sustainability'. The navigation bar includes Home, Development, Data, About, and user information for Amber Jones. The main content area has a green header bar with three tabs: 'What are datasets?' (selected), 'Create dataset' (highlighted in green), 'Add data', and 'Additional data'. A note states: 'NOTE: Your dataset will be private until approved by a system administrator. However, you can see your newly submitted datasets in your Dashboard.' The 'Create dataset' section contains fields for Title (e.g., Red Butte Creek GAMUT Water Temperature Data), URL (iutah-ckan-stage.usrr.usu.edu/dataset/<dataset>), Description (e.g., A short description (or abstract) for the dataset), and Keywords (e.g., water quality, temperature, Red Butte Creek, time series). It also includes fields for Organization (iutah), Visibility (Private), Language (e.g., en, es, fr), Access Information (e.g., limited to iUTAH participants, limited to IRB researchers), Type (collection), and optional fields for Purpose (e.g., Educational, Research, Regulatory), Required Software (e.g., ArcGIS, R, specific model application), and Research Focus Area. The bottom section is titled 'Spatial Metadata' with fields for Spatial Coverage (e.g., Salt Lake County) and IUTah Study Area.

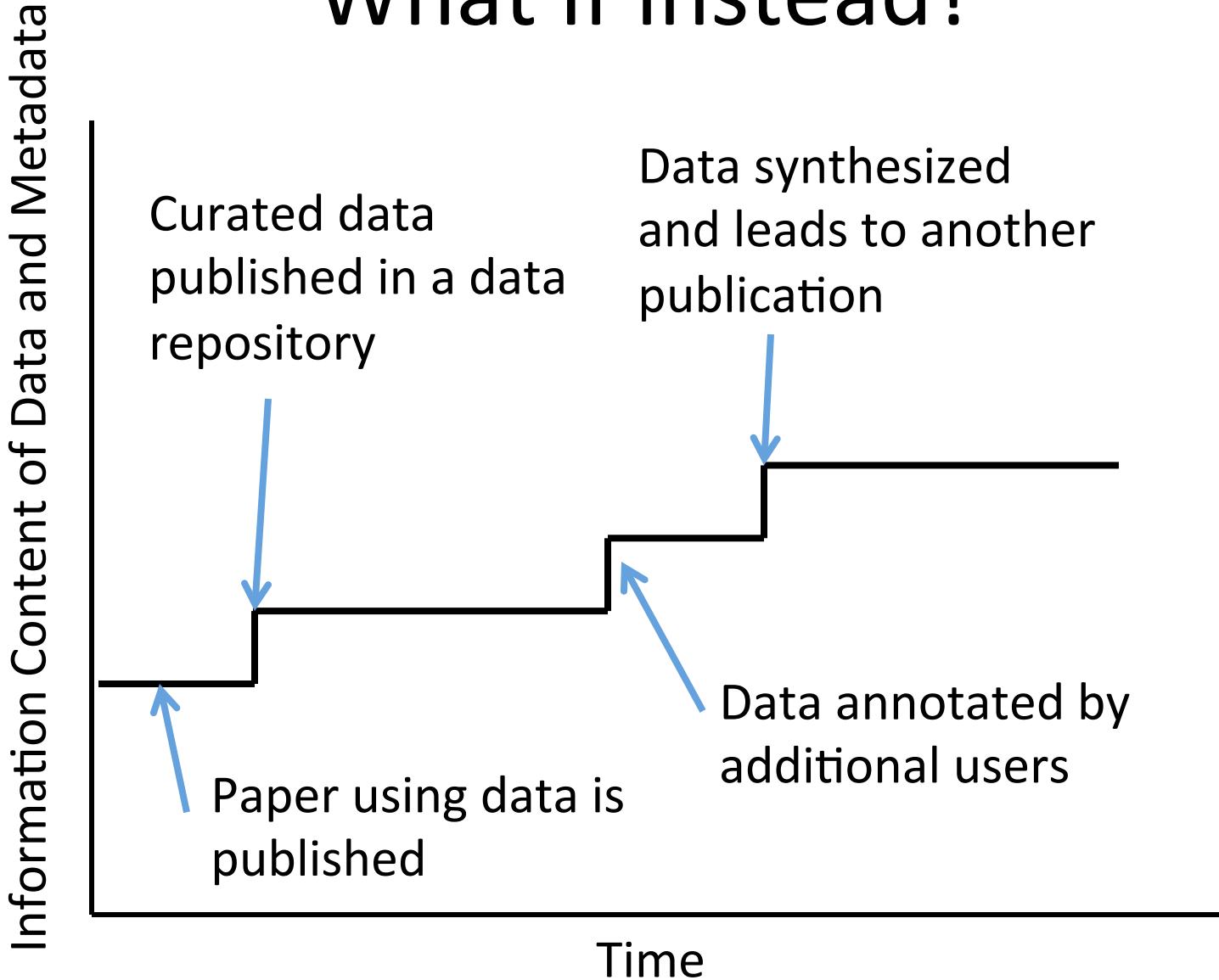
# Information Entropy



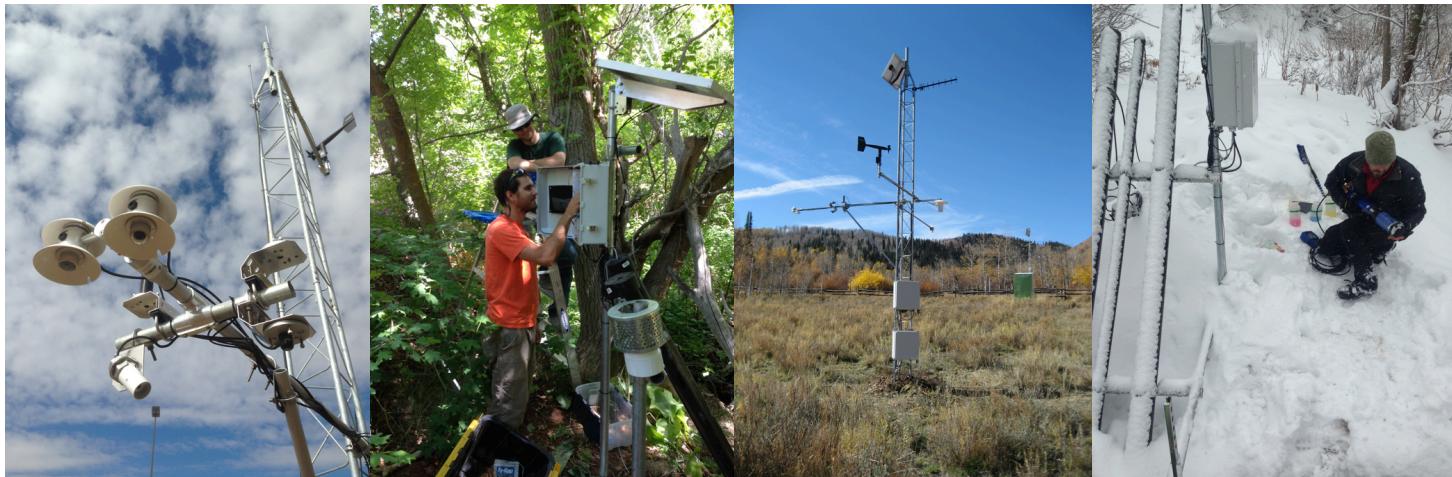
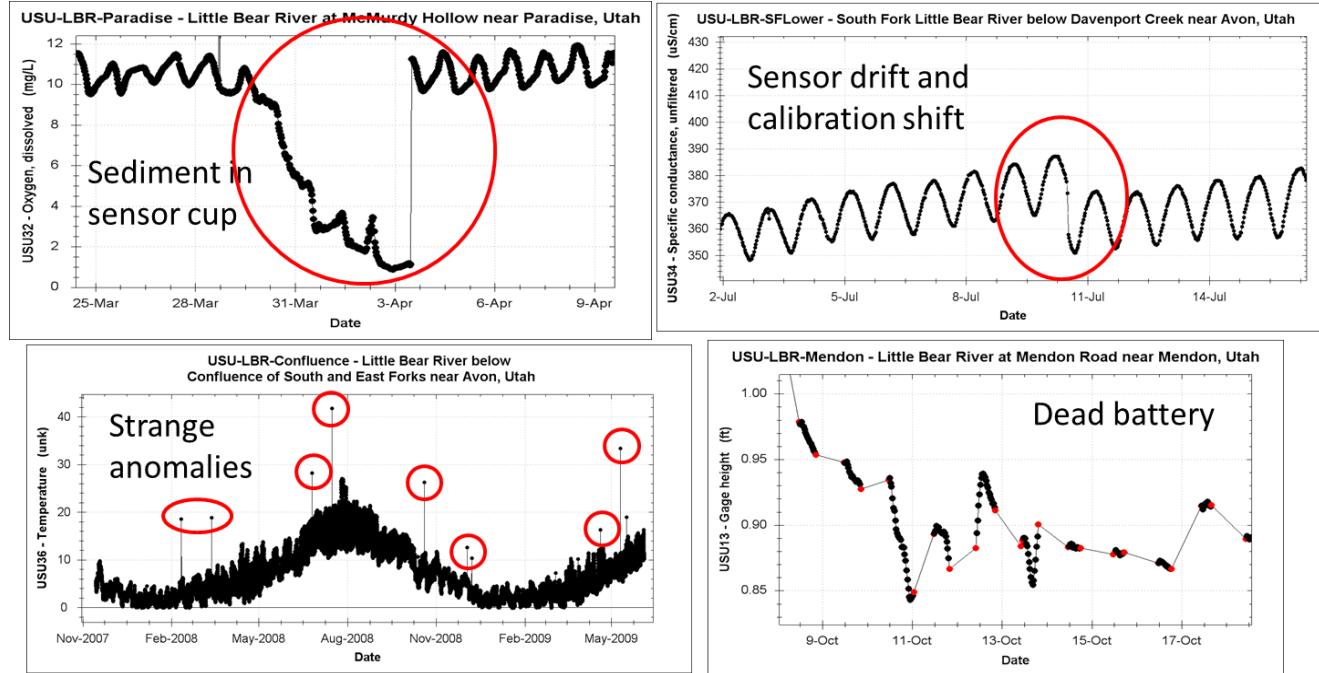
Example of the normal degradation in information content associated with data and metadata over time ("information entropy").

Michener, W.K. (2006). Meta-information concepts for ecological data management, Ecological Informatics, 1(1), 3-7, <http://dx.doi.org/10.1016/j.ecoinf.2005.08.004>.

# What if instead?



# QA/QC Support

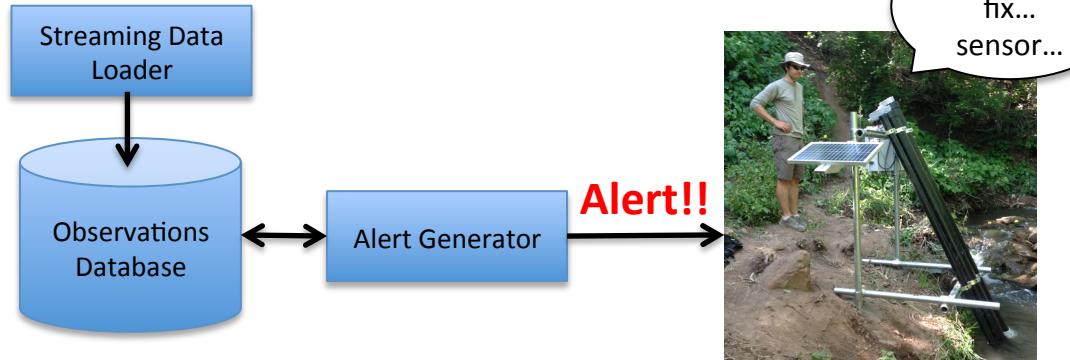


# QA/QC Support: Automated Alerts

Technicians receive email alerts daily

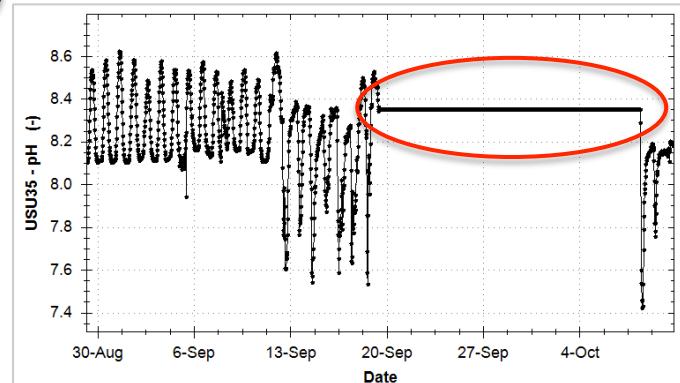
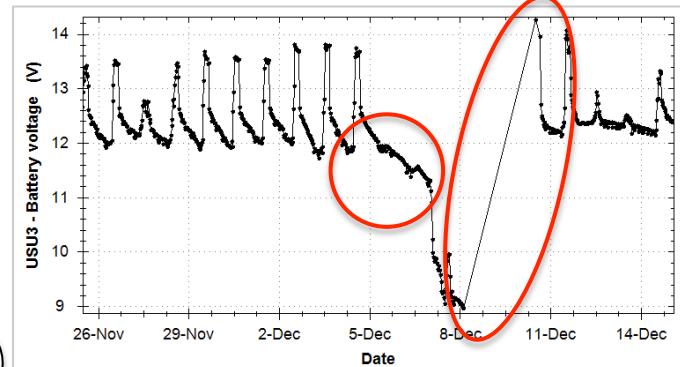
1. Power: battery voltage < 12 volts
2. Persistence: value of a variable is unchanging
3. Updates: data are not being reported
4. NaNs: sensor is reporting “NaN” values

Additional alerts can be implemented as needed  
(e.g., variable-specific range checks, internal consistency, spatial consistency).

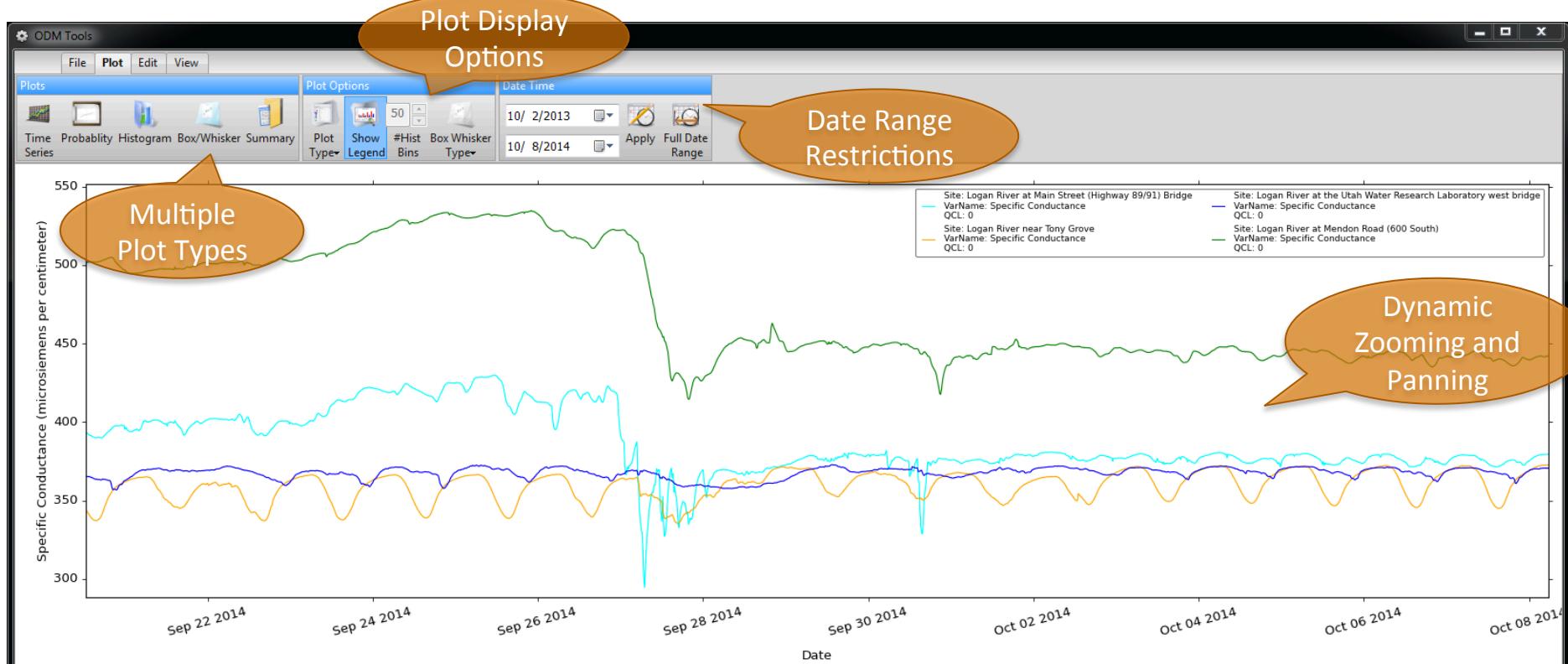


IUTAH Data Alerts < <a href="mailto:data.alerts@usu.edu">data.alerts@usu.edu</a> >						
to chris.cox, amber.jones ▾						
SiteID	SiteCode	VariableID	VariableCode	DataValue	Start	End
3	LR_MainStree	61	ODO_Sat	84.90	2014-02-17 21:18	2014-02-18 01:15
4	LR_TWDEF_C	9	Precip_Tot	9.74	2014-02-17 16:00	2014-02-18 00:45
4	LR_TWDEF_C	13	SWMin_NR01_Avg	-4.88	2014-02-17 16:00	2014-02-18 00:30
4	LR_TWDEF_C	14	SWOut_NR01_Avg	.00	2014-02-17 16:30	2014-02-18 04:00
4	LR_TWDEF_C	24	PARIn_Avg	.00	2014-02-17 18:45	2014-02-18 04:00
4	LR_TWDEF_C	26	PAROut_Avg	.00	2014-02-17 18:45	2014-02-18 04:00
4	LR_TWDEF_C	41	SoilCond_20cm_Avg	.00	2014-02-17 06:15	2014-02-18 04:00
4	LR_TWDEF_C	45	SoilCond_50cm_Avg	.00	2014-02-17 06:15	2014-02-18 04:00
4	LR_TWDEF_C	48	SoilTemp_100cm_Avg	-2.06	2014-02-17 09:15	2014-02-17 13:15
4	LR_TWDEF_C	49	SoilCond_100cm_Avg	.00	2014-02-17 06:15	2014-02-18 04:00
4	LR_TWDEF_C	91	Precip_HrDiff	.00	2014-02-17 19:00	2014-02-18 01:00
5	LR_GC_C	5	BP_Avg	86.00	2014-02-17 21:45	2014-02-18 01:45
5	LR_GC_C	9	Precip_Tot	-9999.00	2014-02-17 06:15	2014-02-18 04:45
5	LR_GC_C	45	SoilCond_50cm_Avg	.00	2014-02-17 06:15	2014-02-18 04:45
5	LR_GC_C	91	Precip_HrDiff	.00	2014-02-17 06:15	2014-02-18 04:45

(15 rows affected)



# QA/QC Support: Desktop Software



Series Selection Filters

Time Series Selection

Series: mssql://Amber@UTAHdbs.uwrl.usu.edu/UTAH\_Logan\_OD

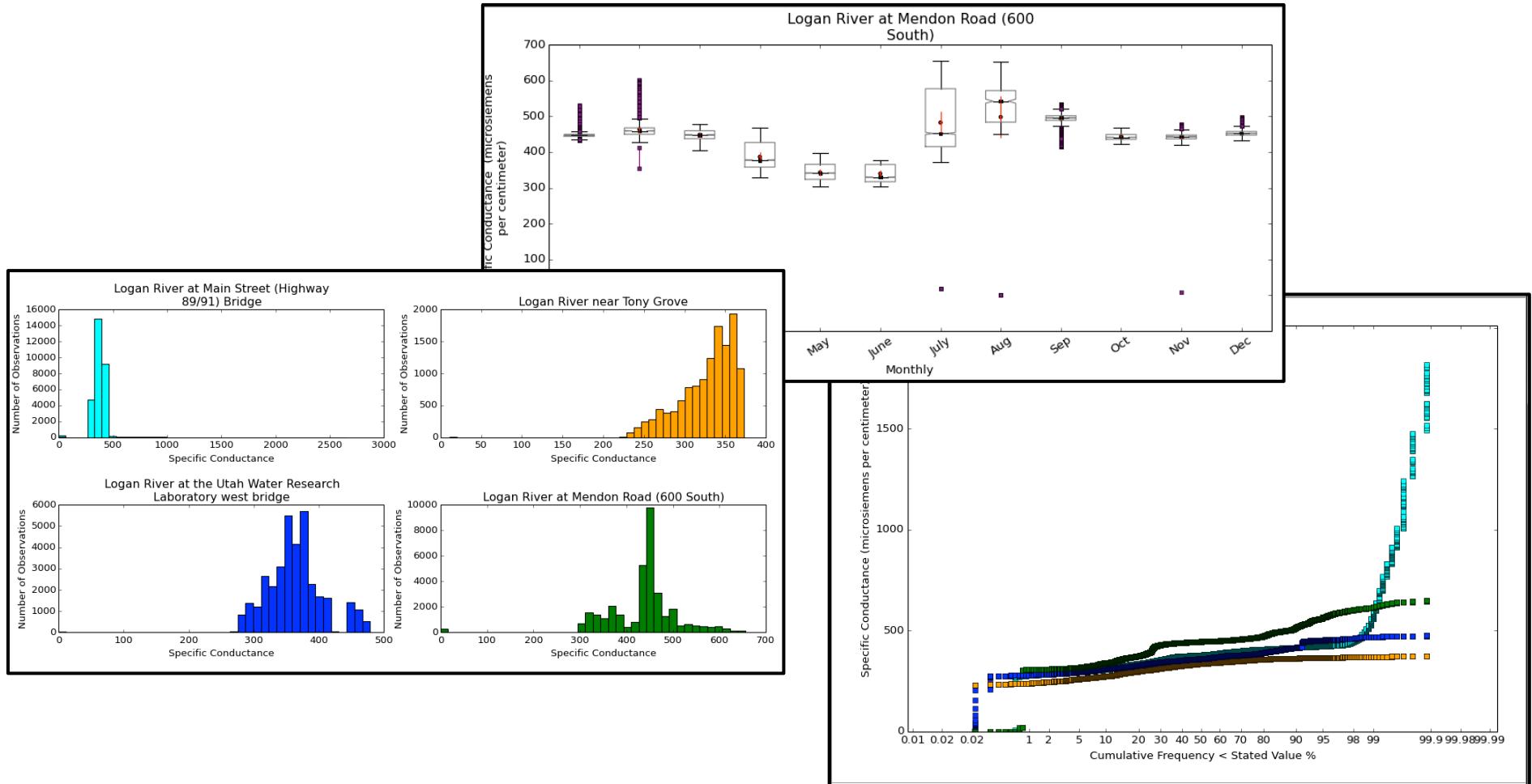
All Simple Filter Advanced Filter

Site: LR\_WaterLab\_AA-Logan River at the Utah Water Research Laboratory west bridge

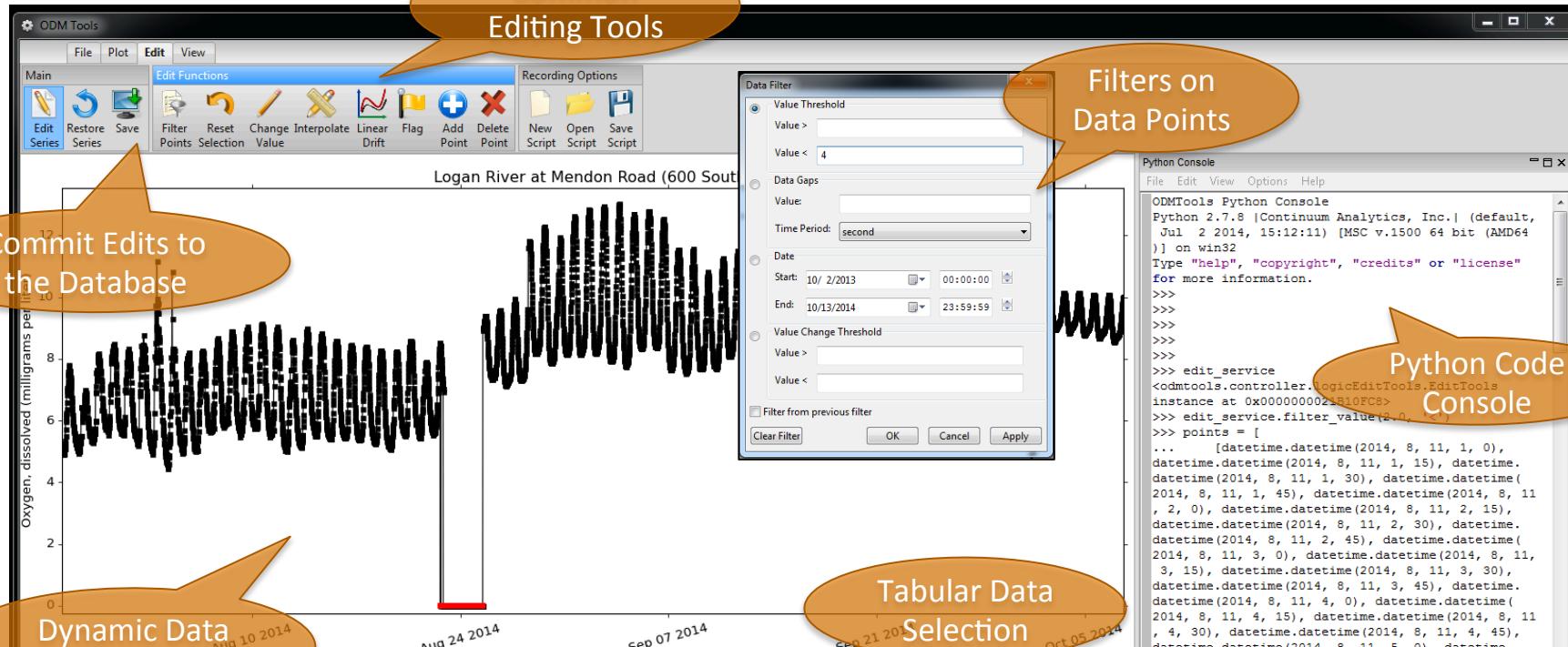
Variable: SpCond-Specific Conductance

SeriesID	SiteID	SiteCode	SiteName	VariableID	VariableCode	VariableName	Speciation	VariableUnitsID	VariableUnitsName	SampleMedium	ValueType
5	1	LR_WaterLab_AA	Logan River at the Utah Water Research Laboratory west bridge	58	SpCond	Specific Conductance	Not Applicable	192	microsiemens per centimeter	Surface Water	Field Observation
31	2	LR_Mendon_AA	Logan River at Mendon Road (600 South)	58	SpCond	Specific Conductance	Not Applicable	192	microsiemens per centimeter	Surface Water	Field Observation
57	3	LR_MainStreet_BA	Logan River at Main Street (Highway 89/91) Bridge	58	SpCond	Specific Conductance	Not Applicable	192	microsiemens per centimeter	Surface Water	Field Observation
362	9	LR_TG_BA	Logan River near Tony Grove	58	SpCond	Specific Conductance	Not Applicable	192	microsiemens per centimeter	Surface Water	Field Observation

# QA/QC Support: Desktop Software



# QA/QC Support: Desktop Software

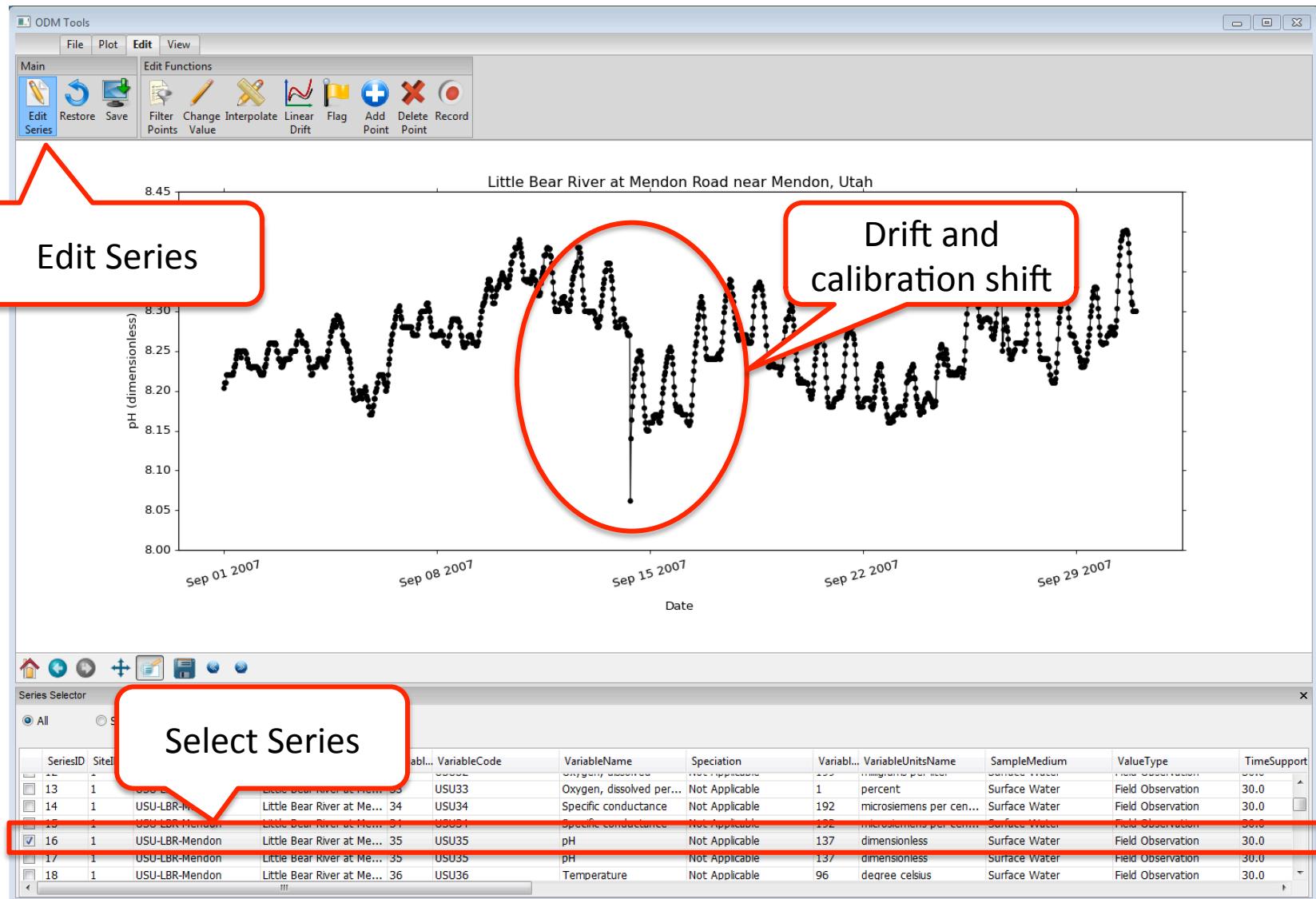


Python Script Editor

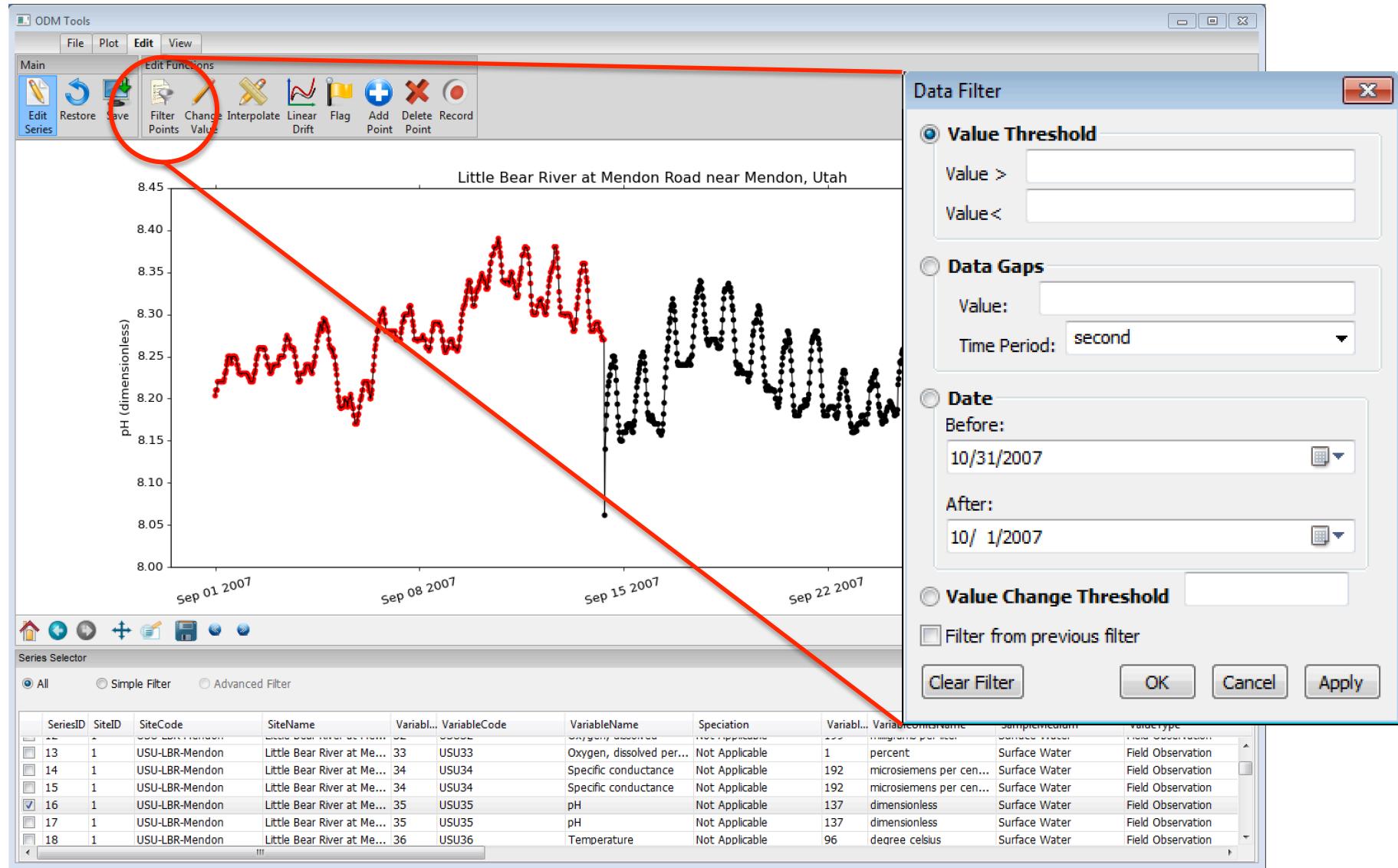
```
4 #series_service = SeriesService(connection_string='mssql+pyodbc://Amber@iUTAHdbs.uwrl.usu.edu/iUTAH_Logon_OD')
5 edit_service.filter_value(2.0, '<')
6 edit_service.reset_filter()
7 #Perform linear drift correction based on calibration 8/13/14
8 points = [
9     edit_service.select_points([], points)
10    edit_service.drift_correction(0.075)
11    #Interpolate anomalous points
12    points = [
13        edit_service.select_points([], points)
14        edit_service.interpolate()
15        #Flag period of sensor malfunction
16        edit_service.filter_value(2.0, '<')
17    ]
18 ]
```

Series: mssql://Amber@iUTAHdbs.uwrl.usu.edu/iUTAH\_Logon\_OD Editing a new file

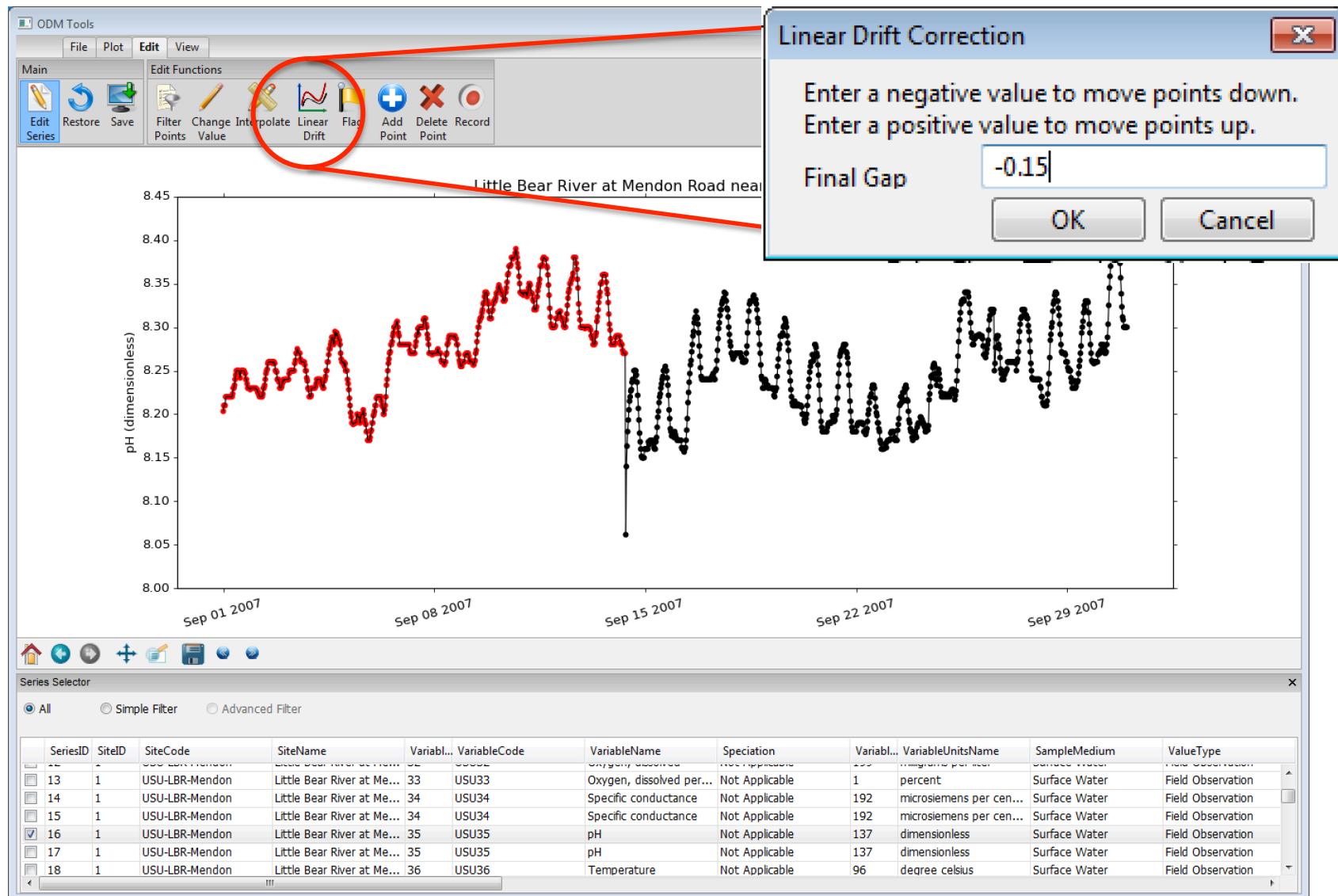
# Step 1: Select a Time Series for Editing



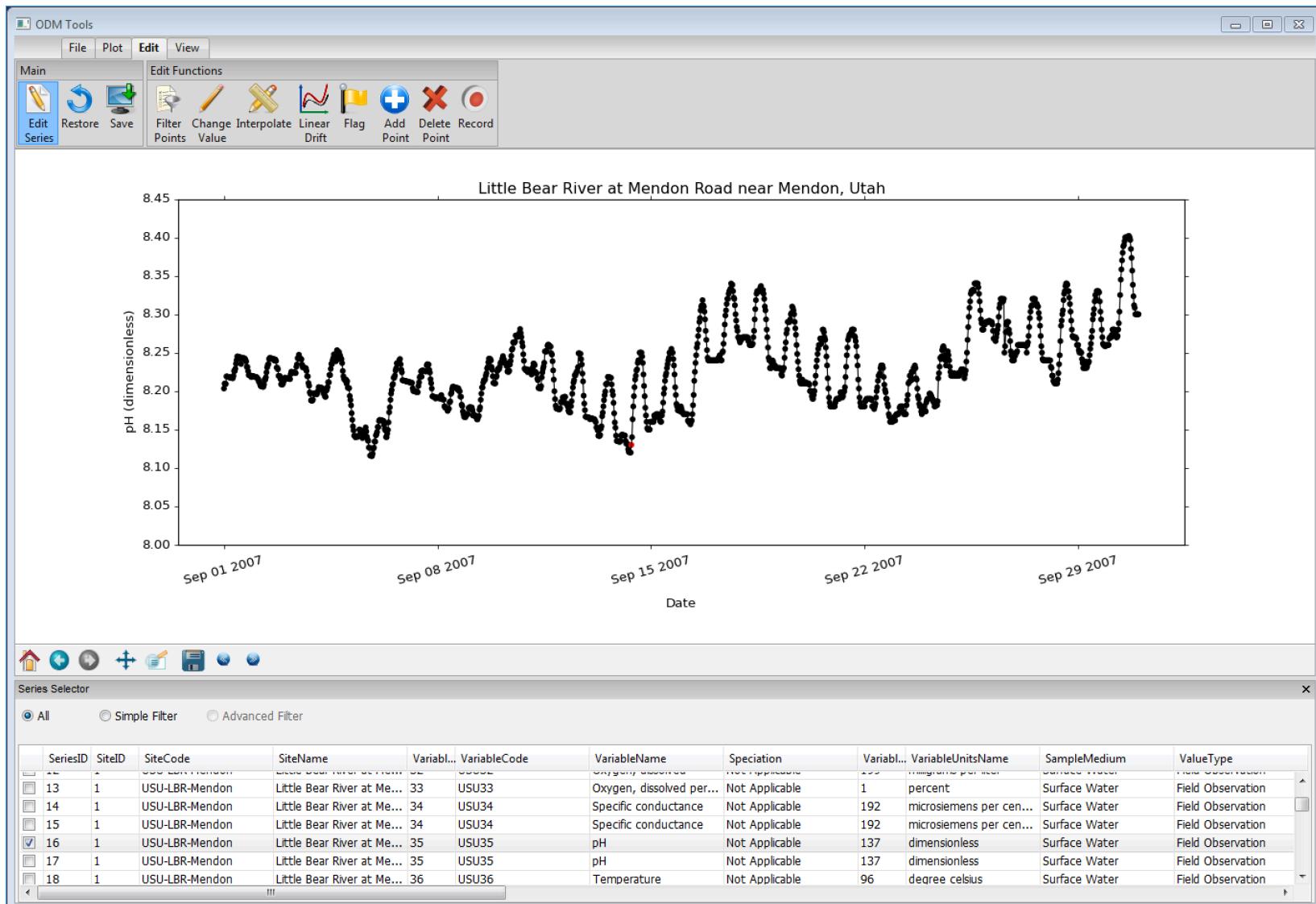
# Step 2: Select Data to Edit



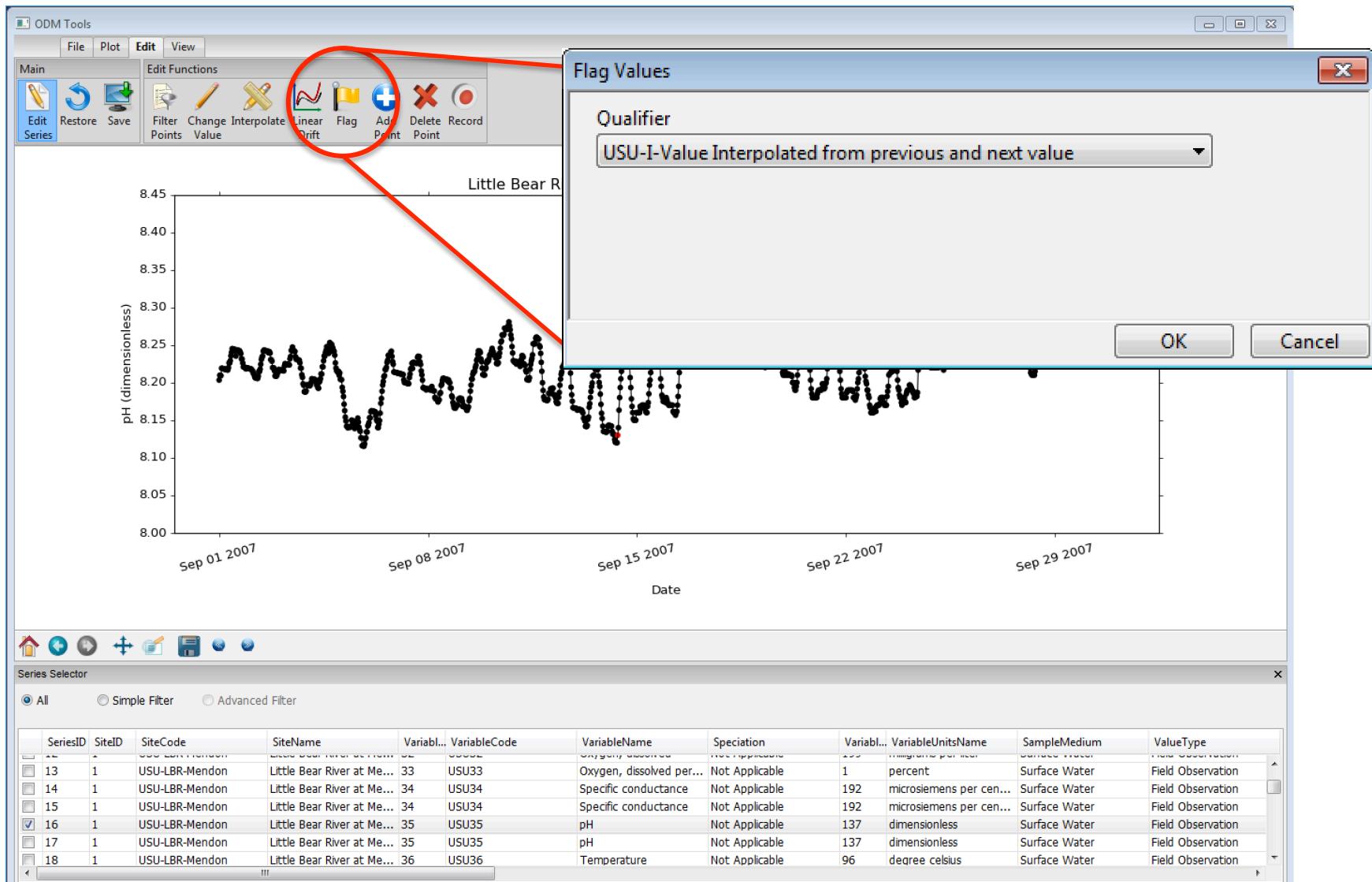
# Step 3: Linear Drift Correction



# Step 4: Interpolate



# Step 5: Flag



# Step 6: Save Modified Data Series

Save... Save... Save... Save... Save... Save... **Summary**

How would you like to save this data series?

Save as a new data series  
 Save as an existing data series

Automatically generate a new code  
 Select an existing Name  
Description  
Water temperature measured  
Turbidity measured  
Water level measured  
Battery voltage measured  
Air temperature measured  
Relative humidity measured  
Precipitation measured

Select an existing Variable  
 Use Current Variable  
 Select an existing Variable  
Code Name  
-9999 Unknown  
0 Raw  
1 Quality  
2 Deriv.  
3 Inter.  
4 Known  
 Create Quality Code:  
Definition:  
Explanation:

Create New Variable  
 Create New Variable  
Description:  
Source  
Organization: Utah State University Utah Water Research Laboratory  
Description: Continuous water quality monitoring by Utah State University  
Citation: Continuous water quality monitoring by Jeff Horshurah, David Ste

< Back Finish Cancel

# Recording Edits

The screenshot illustrates the ODM Tools software interface, specifically the 'Edit' tab, showing a time-series plot of pH levels and a corresponding Python code editor.

**Main Window:** Displays a scatter plot titled "Little Bear River at Mendon Road near Mendon, Utah". The Y-axis is labeled "pH (dimensionless)" ranging from 8.00 to 8.45. The X-axis is labeled "Date" with ticks for Aug 30 2007, Sep 06 2007, Sep 13 2007, Sep 20 2007, and Sep 27 2007. A red circle highlights the "Record" button in the toolbar.

**Code Editor:** Shows a Python script titled "Editing a new file". The code performs various edits on a series with ID 16:

```
from odmservices import EditService
from odmservices import SeriesService
edit_service = EditService(series_id=16, connection_string='mssql+pyodbc://')
series_service = SeriesService(connection_string='mssql+pyodbc://sa:nlcd34GI')
## To run commands from the python console uncomment and run the following command
#edit_service = Tools
edit_service.select_points([datetime.datetime(2007, 9, 1, 0, 0), datetime.datetime(2007, 9, 14, 8, 30)])
edit_service.draft_correction(-0.15)
edit_service.select_points([datetime.datetime(2007, 9, 14, 8, 30)])
edit_service.interpolate()
```

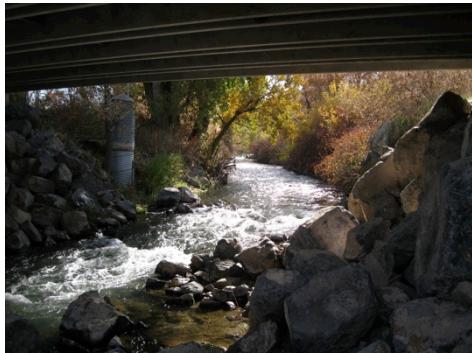
A red callout box points to the code editor with the text: "Automatically generated Python code with each editing step".

**Series Selector:** A table listing series details. The "Simple Filter" tab is selected, showing rows for series 14 through 22. Row 16 is checked.

SeriesID	SiteID	SiteCode	SiteName	Variable	VariableCode	VariableName	Speciation
14	1	USU-LBR-Mendon	Little Bear River at Me...	34	USU34	Specific conductance	Not Applicable
15	1	USU-LBR-Mendon	Little Bear River at Me...	34	USU34	Specific conductance	Not Applicable
<input checked="" type="checkbox"/>	16	USU-LBR-Mendon	Little Bear River at Me...	35	USU35	pH	Not Applicable
17	1	USU-LBR-Mendon	Little Bear River at Me...	35	USU35	pH	Not Applicable
18	1	USU-LBR-Mendon	Little Bear River at Me...	36	USU36	Temperature	Not Applicable
19	1	USU-LBR-Mendon	Little Bear River at Me...	36	USU36	Temperature	Not Applicable
20	1	USU-LBR-Mendon	Little Bear River at Me...	37	USU37	Turbidity	Not Applicable
21	1	USU-LBR-Mendon	Little Bear River at Me...	39	USU39	Phosphorus, total	P
22	1	USU-LBR-Mendon	Little Bear River at Me...	39	USU39	Chlorophyll-a	P

# Future Steps and Input

- Samples data:
  - Synoptic effort: soon to be imported into GAMUT databases
  - Biweekly effort: will be regularly imported into GAMUT databases
- New sites coming online:
  - Several recent Provo River sites
  - Red Butte Creek storm drain
  - Additional storm drain sites on the way
- How to display/distinguish storm drain sites online?
- Register web services with CUAHSI Water Data Center?
- Quality Control of GAMUT data:
  - technicians working on
  - Publication: what granularity?



iUTAH



# Questions?

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