



Photo credit: John Hannon, Reclamation

Data Management

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Data Management Documentation

- Document Link:
 - [Data Management Plan](#)
- Technical Memorandum Status:
 - Final Draft
 - Enhancements since Mid-Term Peer Review:
 - Minor modifications based on MTC feedback
 - Minor modifications based on Panel Comments



Purpose of Data Management System (DMS)

- **Goal:** Provide higher quality data for modelers to confidently and effectively:
 - Assess data
 - Develop models
 - Apply models
- **Intended Outcome:**
 - Produce more reliable data management to support decision making

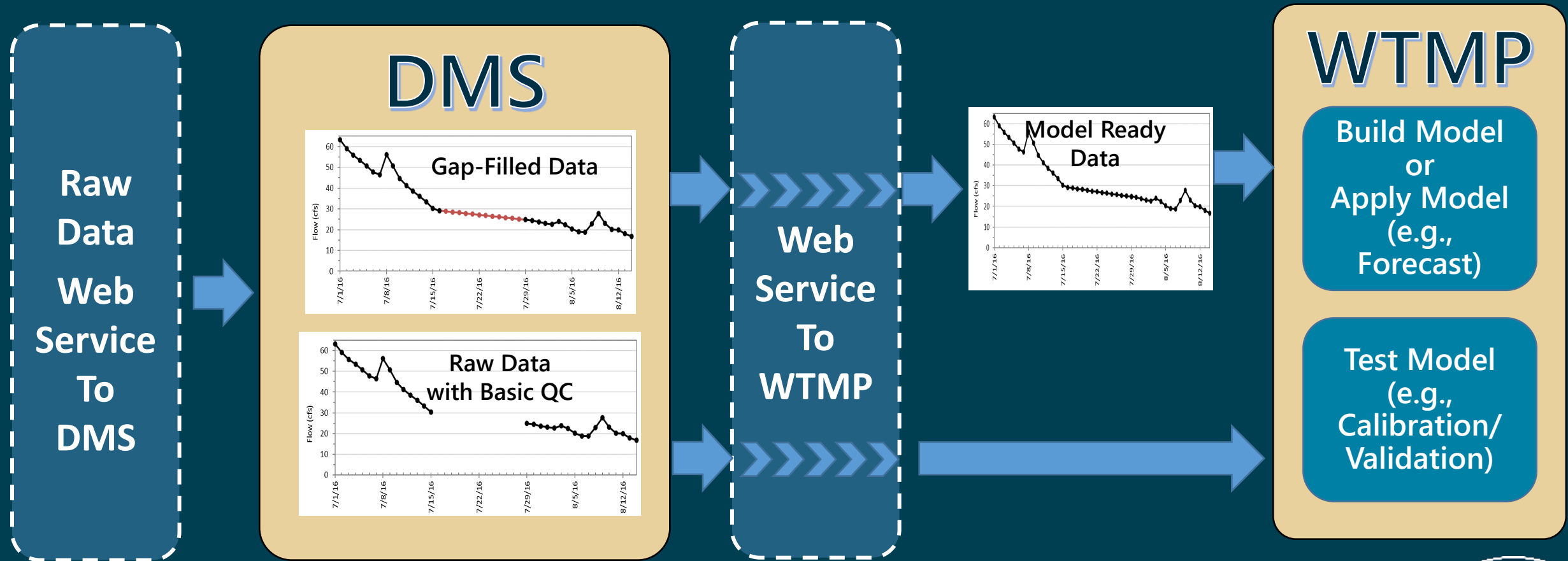


Reclamation's Perspective: Data Management Solutions

- Design:
 - Leverage database technology to efficiently store, modify, and extract data
- Implementation:
 - Dedicate experienced staff to Data Management
 - Generate "Model Ready" data near to real-time rather than after the fact



DMS - Provide Model Ready Data and Calibration/Validation Data



DMS Benefits

- **Functions of a DMS with database structure**
 - Store and organize data (rules-based organization)
 - Streamline data collection for efficiencies with small staffing
 - Visualize data for quality checks
 - Create and track metadata
 - Adaptable design for anticipated future modifications
- **WTMP Features**
 - Quality Codes – metadata
 - Model Ready Data – common formats and no missing data
 - Web Access – automated data communication



DMS – Streamline Data Collection Shown in the Dashboard

- Most time series data collected in near real time from on-line sources.
- Data is imported with native quality codes if they exist.
- Thresholds can be applied to filter out 'bad' data.

The dashboard interface includes a navigation menu on the left with options: Dashboard, Data Library, Help Link, Info Pages, and Sitehawk. The main content area is titled "DashBoard" and features a "Save Dashboard As Homepage" button. It displays several time-series charts for "200 - Raw Sac.-Keswick Res." with tabs for "Chart", "Alarms", and "Thresholds". The charts include:

- Keswick Dam - KES Hrly Res. Inflow (cfs)
- Keswick Dam - KES Hrly Res. Outflow (cfs)
- Keswick Dam - KES Hrly Pwr Flw (cfs)
- Keswick Dam - KES Hrly Stor. (Acre-ft)
- Keswick Dam - KES Hrly Spill Flw (cfs)
- Keswick Dam - KES Hrly Res. Elev. (ft)
- Keswick Dam - KWK Hrly WTemp. (Deg F)

Each chart has a "Value out of QA Range" indicator. A secondary window shows "200 - Raw Sac.-Keswick Res.: Unacknowledged Alarms" with the following table:

Name	Alarm Type	Color	Alm Lvl	Date	Value	Min Lvl	Max Lvl	Inside	Chart	Ack
Whiskeytown L-Keswick Res. tun - SPC Hrly Res. Inflow	Value out of QA Range	011	-311	2023-08-28 05:00:00.000	-99999	-1	50000	No		
Whiskeytown L-Keswick Res. tun - SPC Hrly Res. Outflow	Value out of QA Range	011	-311	2023-08-28 05:00:00.000	-99999	-1	50000	No		
Keswick Dam - KES Hrly Res. Inflow	Value out of QA Range	011	-311	2023-08-28 05:00:00.000	-99999	-1	80000	No		
Keswick Dam - KES Hrly Res. Outflow	Value out of QA Range	011	-311	2023-08-28 05:00:00.000	-99999	-1	80000	No		
Keswick Dam - KES Hrly Spill Flw	Value out of QA Range	011	-311	2023-08-28 05:00:00.000	-99999	-1	50000	No		
Keswick Dam - KES Hrly Pwr Flw	Value out of QA Range	011	-311	2023-08-28 05:00:00.000	-99999	-1	50000	No		
Keswick Dam - KES Hrly Stor.	Value out of QA Range	011	-311	2023-08-28 05:00:00.000	-99999	-1	50000	No		
Whiskeytown L-Keswick Res. tun - SPC Hrly Res. Inflow	Value out of QA Range	011	-311	2023-08-28 15:00:00.000	-5	-1	50000	No		
Whiskeytown L-Keswick Res. tun - SPC Hrly Res. Inflow	Value out of QA Range	011	-311	2023-08-23 09:00:00.000	-6	-1	50000	No		
Whiskeytown L-Keswick Res. tun - SPC Hrly Res. Inflow	Value out of QA Range	011	-311	2023-08-23 08:00:00.000	-3	-1	50000	No		
Whiskeytown L-Keswick Res. tun - SPC Hrly Res. Inflow	Value out of QA Range	011	-311	2023-08-23 07:00:00.000	-8	-1	50000	No		
Whiskeytown L-Keswick Res. tun - SPC Hrly Res. Inflow	Value out of QA Range	011	-311	2023-08-23 06:00:00.000	-3	-1	50000	No		

DMS - Store and Process Data in the Data Library (Part I)

- Time series organized by "Project" that equates to Model Domain.
- Includes all projects, metadata, visualization (charts and graphs), and processing tools (gap handling).
- Applying Quality Codes in the QA screen

...circling back

The screenshot displays the 'Data Library' interface. At the top, there are tabs for 'By Project' (selected) and 'By Type'. Below this is the 'Data Series Selector' table, which lists various projects and their IDs. A red box highlights the 'Project Name' and 'Project Number' columns. To the right is the 'Metadata' section, which shows a table of metadata keys and values for the selected series. A red box highlights the 'Metadata' tab. Below the metadata is the 'Work Space' section, which includes a 'Hide' button and a search field. A red box highlights the 'Work Space' section. Below the workspace is a table of series data. A red box highlights the 'Toolbox' section, which contains tabs for 'Details', 'Annotations', and 'Gap Handling'. The 'Details' tab is active, showing fields for 'Type ID', 'SMT Value', 'Measurement Name', and 'Units'. A red box highlights the 'Toolbox' section. The 'Statistics' section shows various statistical values for the selected series.

Project Name	Project Number
1002 Lake Berryessa	1002
Anderson Survey	90
CDEC Stations	1569
Demo Project	25
Los Angeles (5002)	5002
MR Am.-Folsom Lake	250
MR Am.-Lower American R.	252
MR Am.-Natoma Lake	251
MR Sac.-Clear Cr. to Sac R.	235
MR Sac.-Keswick Res.	234
MR Sac.-Lewiston Res.	232
MR Sac.-Shasta Lake	230
MR Sac.-Trinity Lake	231

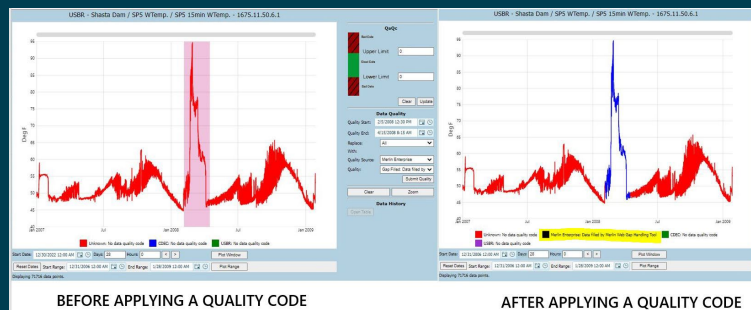
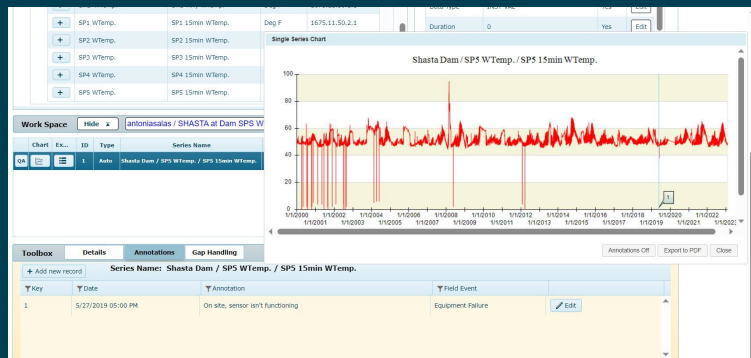
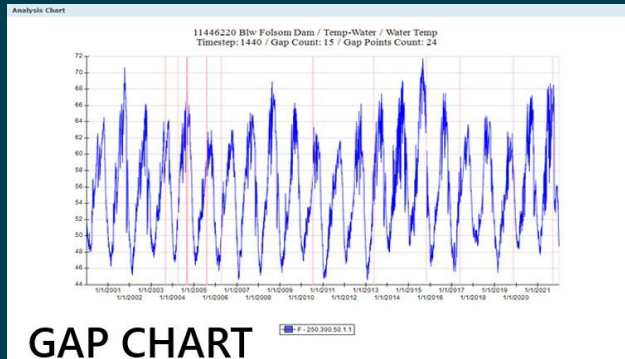
Key	Value	Active	Edit
Button Name	WTEMP	Yes	Edit
Canary Sig Parameter	none	Yes	Edit
Last ScreenGrabr Extract	767	Yes	Edit
Long Name	Temperature	Yes	Edit

Chart	Ex...	ID	Type	Series Name	Units	Series ID	Hide QaFail	Multi Chart	Start Date	End Date	Toolbox	Edit	Calc	Delete
QA		1	Auto	Shasta Dam / SP2 WTemp. / SP2 15min WTemp.	Deg F	1675.11.50.3.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	12/31/1999 09:45	1/27/2023 08:00				

Type ID:	1675.11.50.3.1
SMT Value:	1
Measurement Name:	SP2 15min WTemp.
Units:	Deg F

Statistics
Maximum Value: 74.8
Mean Value: 52.9521
Median Value: 51.7
Minimum Value: 41.4
Mode Value: 49.7
Standard Deviation: 4.19768
Time Step: 15

DMS - Store and Process Data in the Data Library (II)



BEFORE APPLYING A QUALITY CODE

AFTER APPLYING A QUALITY CODE

Data Library

By Project By Type

Save Data Library As Homepage

Data Series Selector

Project Name	Project Number
1002 Lake Berryessa	1002
Anderson Survey	90
CDEC Stations	1569
Demo Project	25
Los Angeles (5002)	5002
MR Am.-Folsom Lake	250
MR Am.-Lower American R.	252
MR Am.-Natoma Lake	251
MR Sac.-Clear Cr. to Sac R.	235
MR Sac.-Keswick Res.	234
MR Sac.-Lewiston Res.	232
MR Sac.-Shasta Lake	230
MR Sac.-Trinity Lake	231

Metadata

Key	Value	Active	Edit
Button Name	WTEMP	Yes	Edit
Canary Sig Parameter	none	Yes	Edit
Last ScreenGrabr Extract	767	Yes	Edit
Long Name	Temperature	Yes	Edit
Max. Data Gap			

Work Space

Hide Save Load Chart All Multi-Axis: Export All Clear

Chart	Ex...	ID	Type	Series Name	Units	Series ID	Hide QaFail	Multi Chart	Start Date	End Date	Toolbox	Edit	Calc	Delete
QA		1	Auto	Shasta Dam / SP2 WTemp. / SP2 15min WTemp.	Deg F	1675.11.50.3.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	12/31/1999 09:45	1/27/2023 08:00				

Toolbox

Details Annotations Gap Handling

Type ID: 1675.11.50.3.1
 SMT Value: 1
 Measurement Name:
 Units:

Save

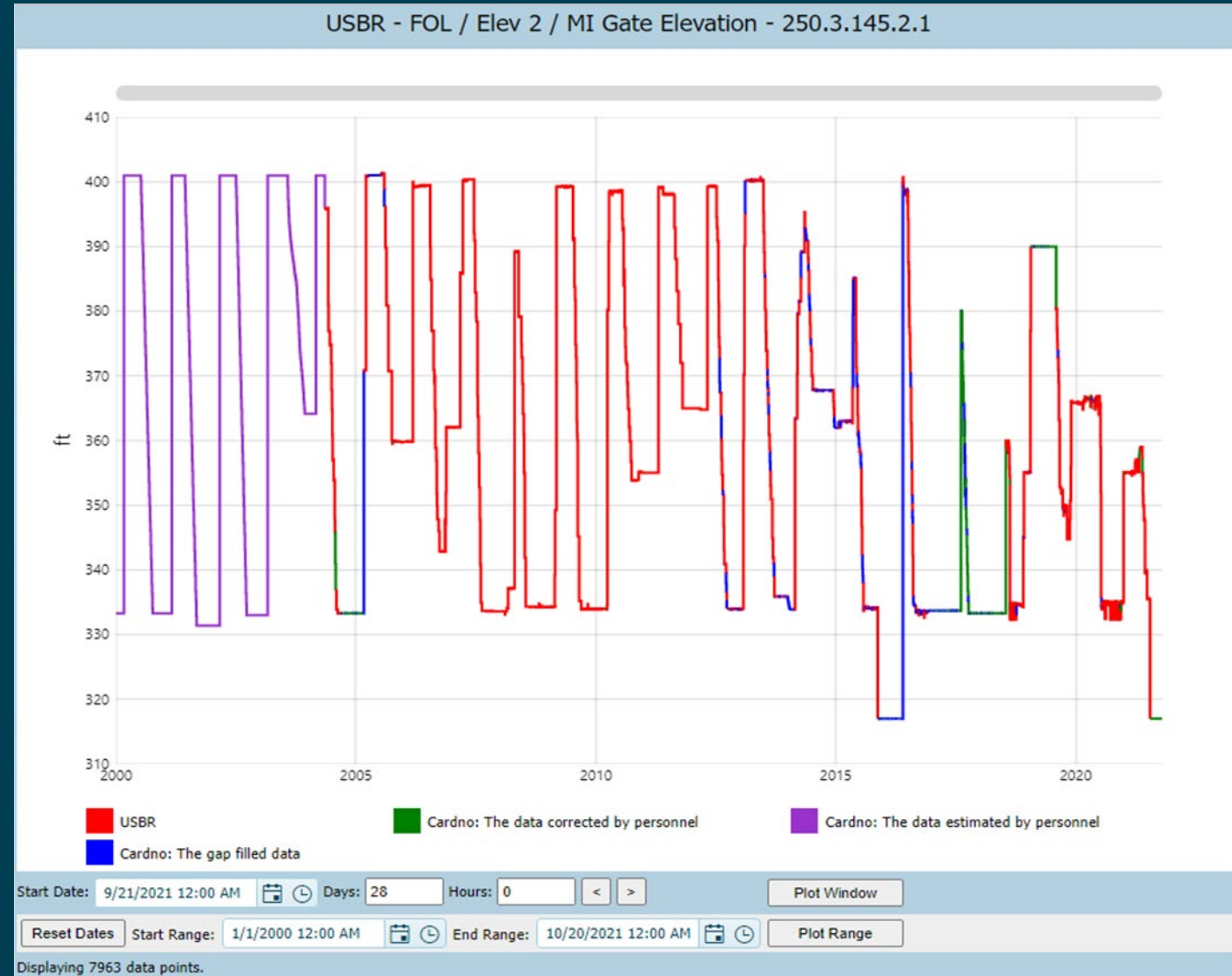
Statistics

Maximum Value: 74.8
 Mean Value: 52.9521
 Median Value: 51.7
 Minimum Value: 41.4
 Mode Value: 49.7
 Standard Deviation: 4.19768
 Time Step: 15

Last Updated: 1/27/2023 2:05:04 AM Update Statistics

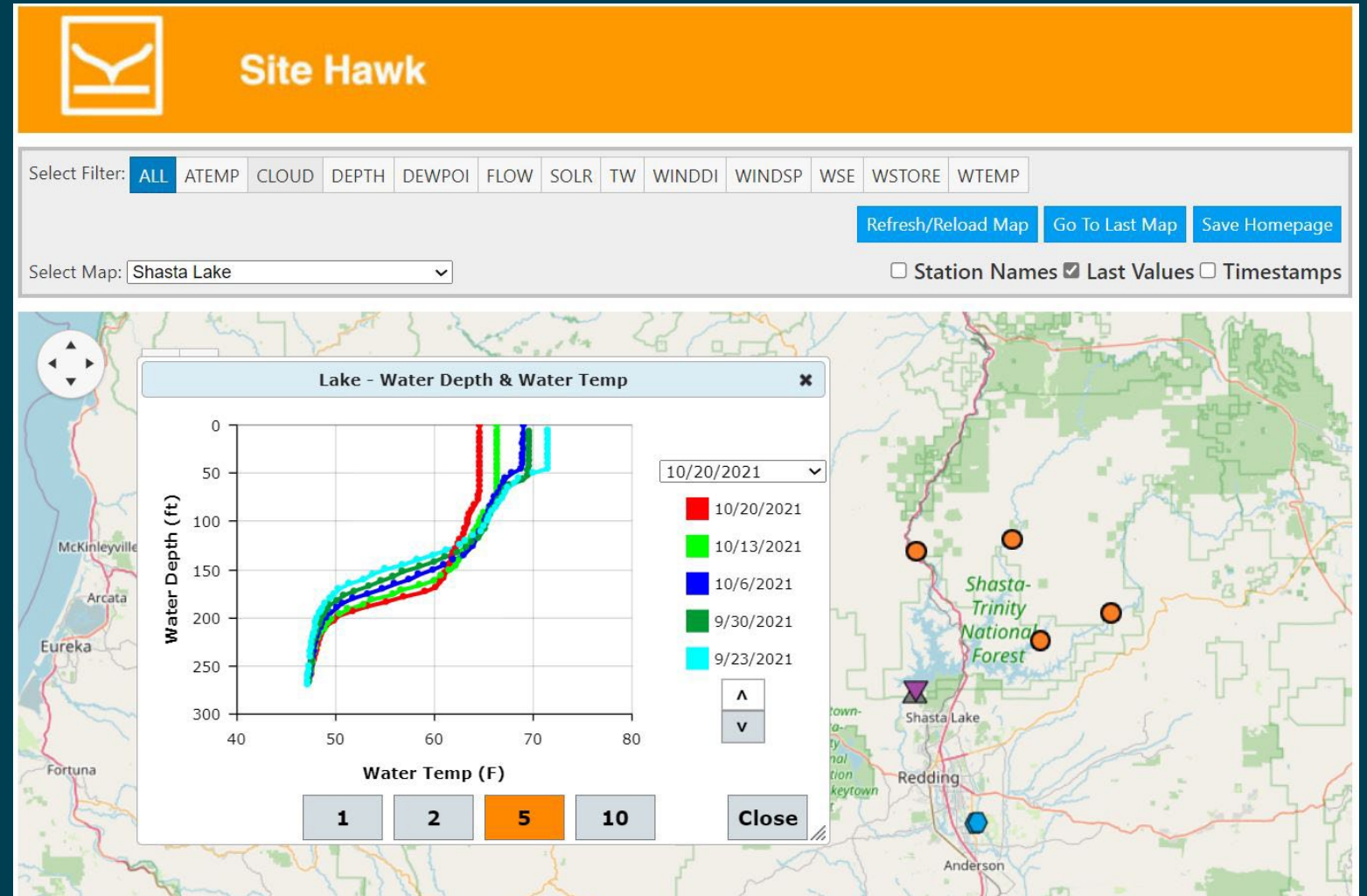
DMS - Create and Track Quality Codes

- Quality codes assigned to data set allow tracking of data history
- Allows development of "Model Ready Data"
- Model Ready Data
 - Complete boundary conditions (no gaps) for use in the WTMP models



DMS - SITEHAWK

- Displays all gauges and data loggers on a map
- Upon hovering over each project (denoted by a shape; square, triangle, etc.) it will display all parameters at that station



Data Management Development Summary

- Accomplishments:
 - WTMP DMS has matured from a repository of the Calibration/Validation data set to a functioning Quality Assurance/Quality Control tool capable of treating raw data and preparing it for “model ready” application.
- Assessment:
 - Features and preliminary testing support real-time implementation

