



5/18/2022

The Partner Ecosphere of Connected Water

How the City of Salem used Aveva Data Hub and partnerships to improve operations

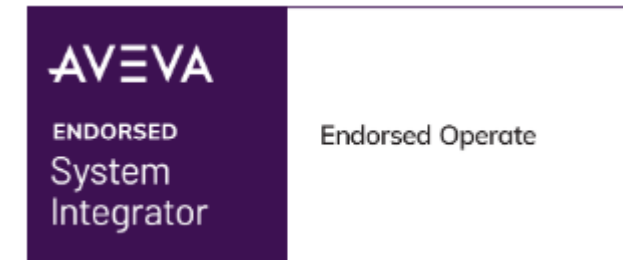
Presented by: Brandon Lake and Jessica Ewy

AVEVA



- Operating globally from Bellevue, WA USA. Established in 1979
- Full-service engineering, systems integration, and technology services.
- AVEVA Endorsed Systems Integrator (AVEVA PI systems) since 2006

- Oil and Gas
- Power Generation
- Water/Wastewater
- Manufacturing
- Data Centers
- Critical Facilities
- Transportation



The City of Salem



Introduction

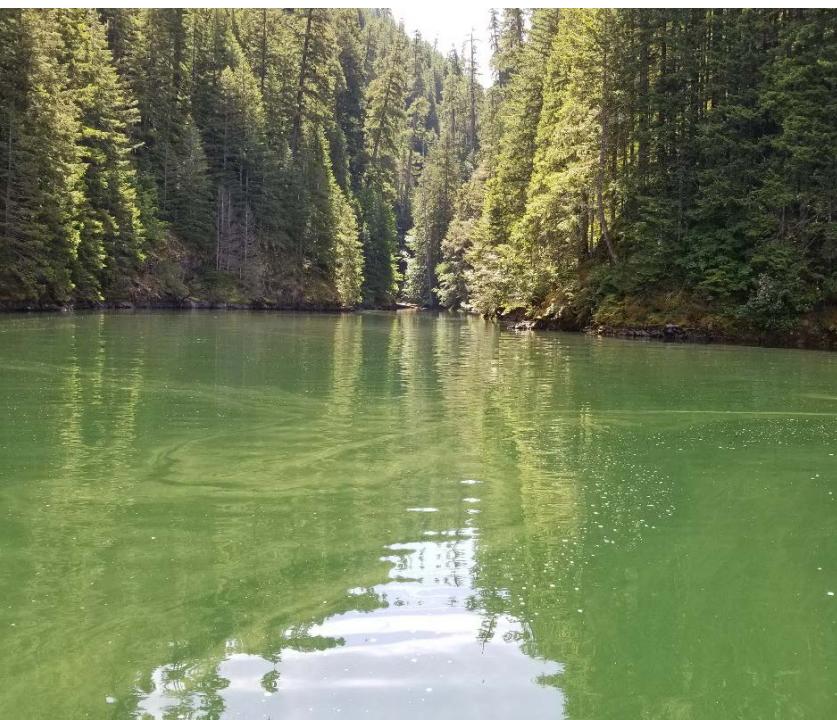
City of Salem Background



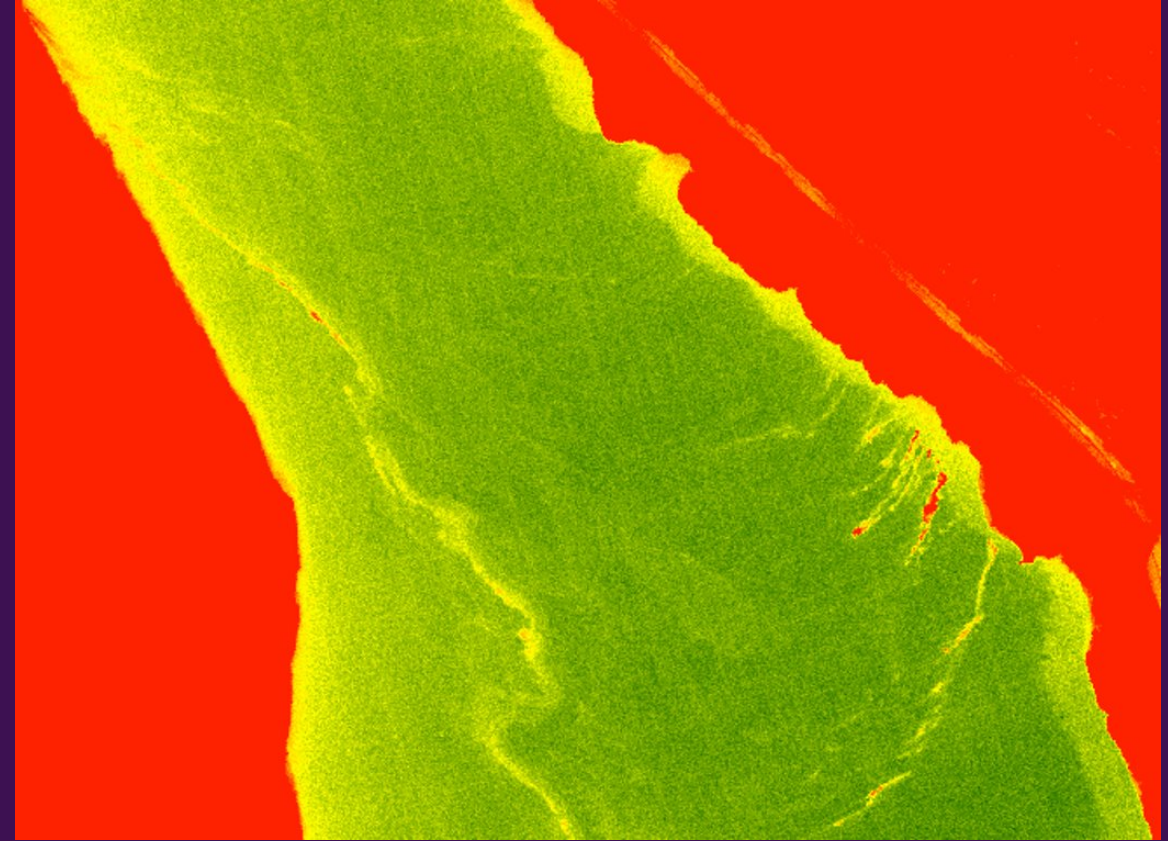
Detroit Lake

Normal Summer Day





Sometimes you can't
see algae blooms



Leading Water Quality Innovation



Challenge

Providing state-of-the-art real-time visibility into bacteria levels and reservoir monitoring and analytics

Solution

The PI System acts as a foundation for the data

Integrating numerous new data sources

Modeling algorithms from TPL are integrated

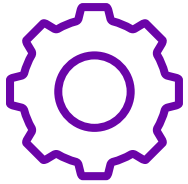
HAB events and cycles are seen earlier

Benefits

Avoid drinking water quality surprises

Predict and proactively manage future HAB events

Partners



Challenge

Providing state-of-the-art real-time visibility and calculated reports around bacteria levels and reservoir monitoring to management as fast as possible

Limit and Measure wastewater levels



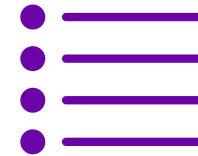
Solution

Utilize trusted partners

The PI System acts as a foundation for the data

Integrate new data sources

Share Data with key contributors using Aveva Data Hub

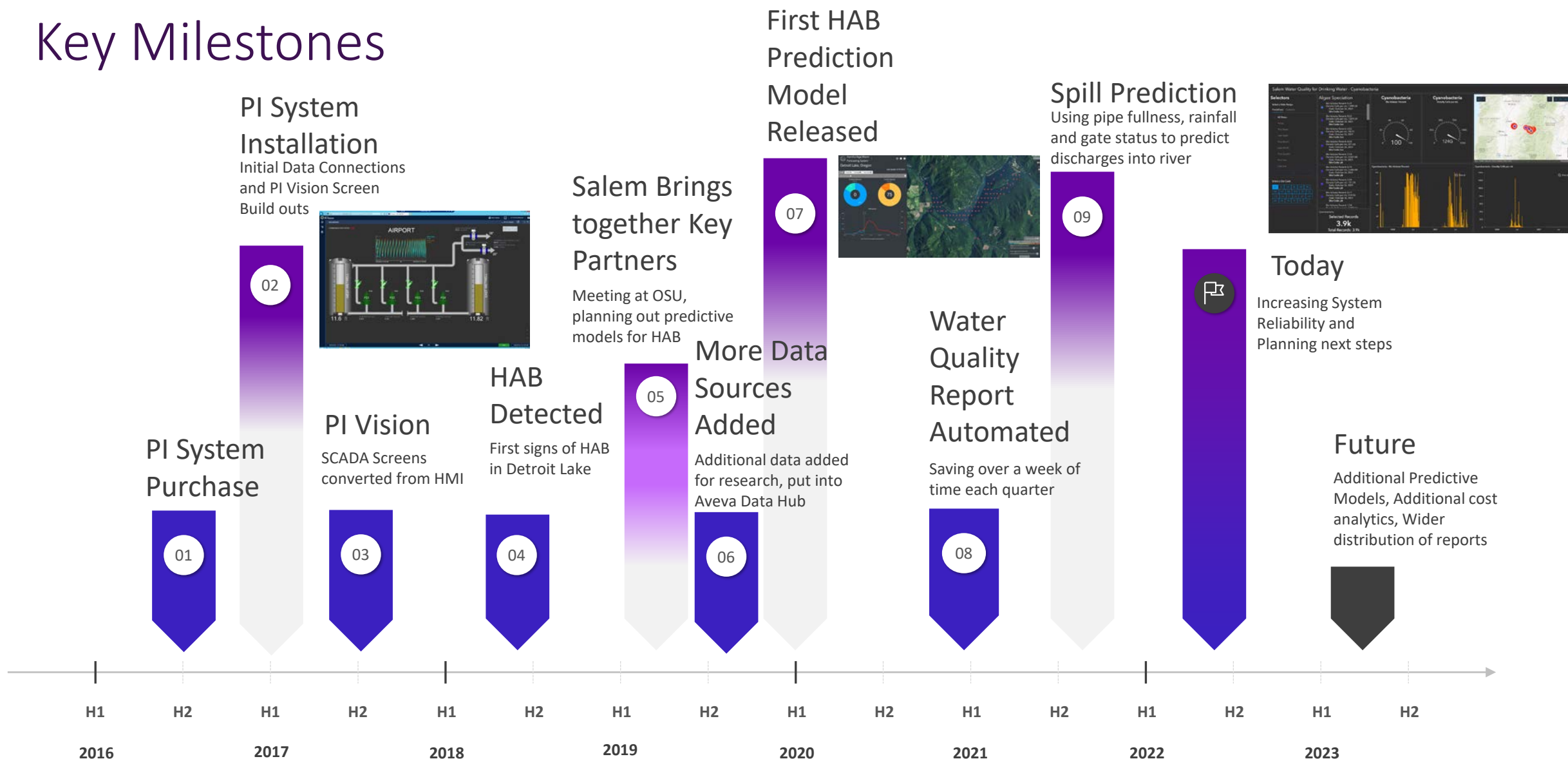


Benefits

Avoid drinking water quality surprises

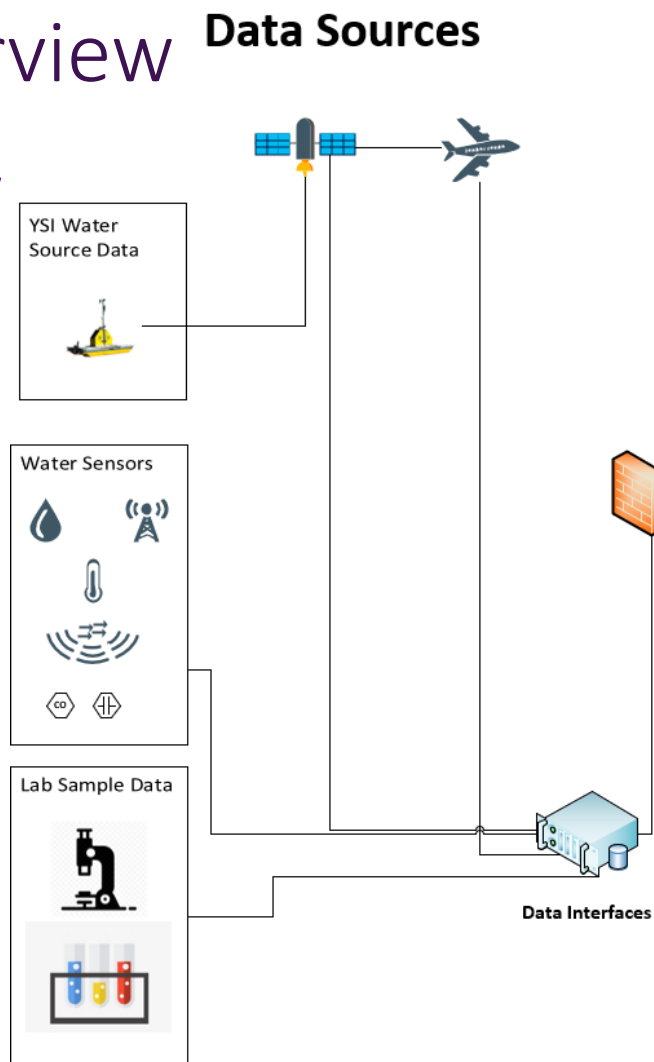
Predict and proactively manage future HAB events since they are seen earlier

Key Milestones



System Overview

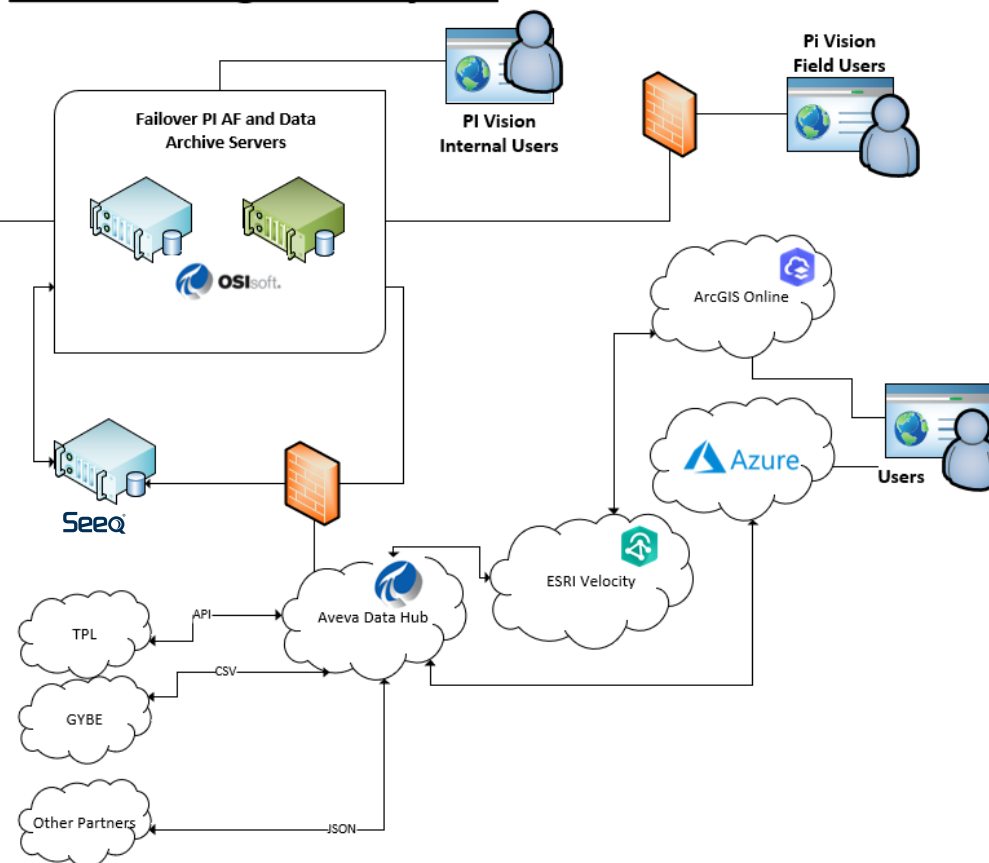
PI System Overview



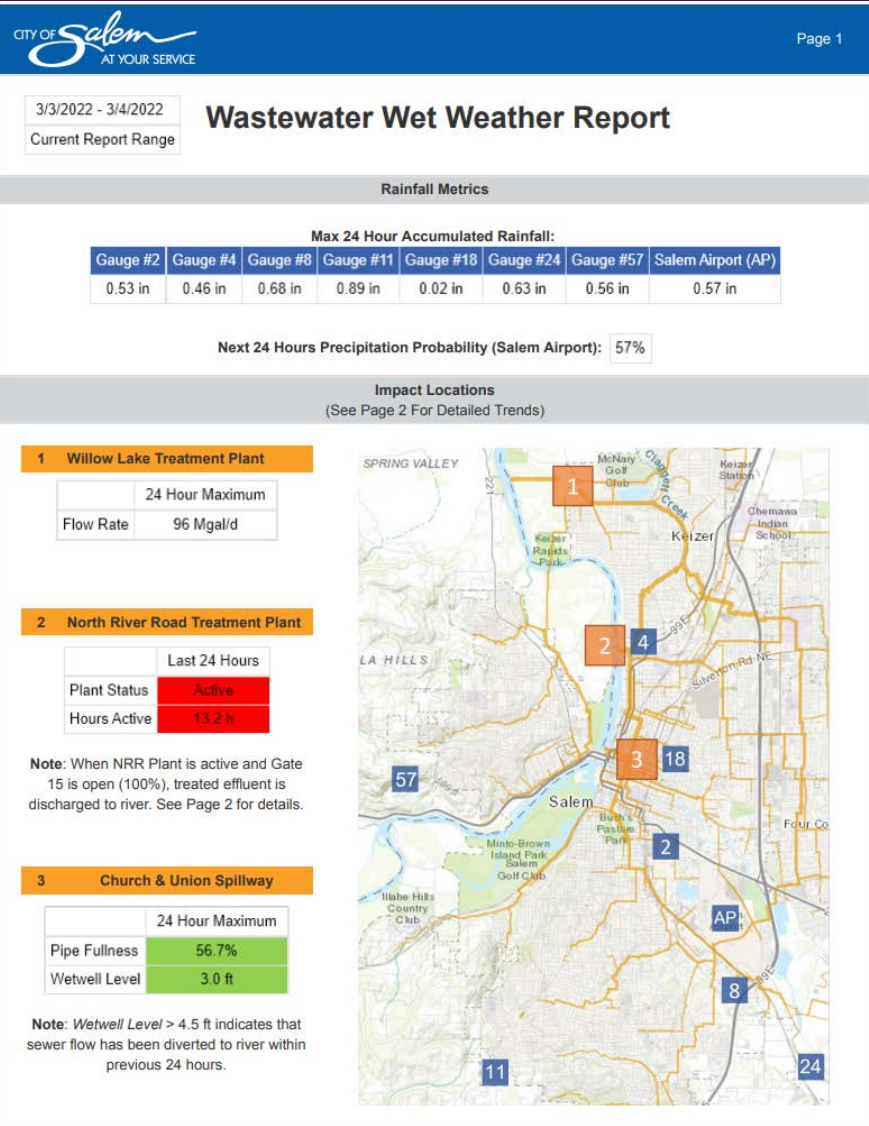
City of Salem PI System

Data Consumers

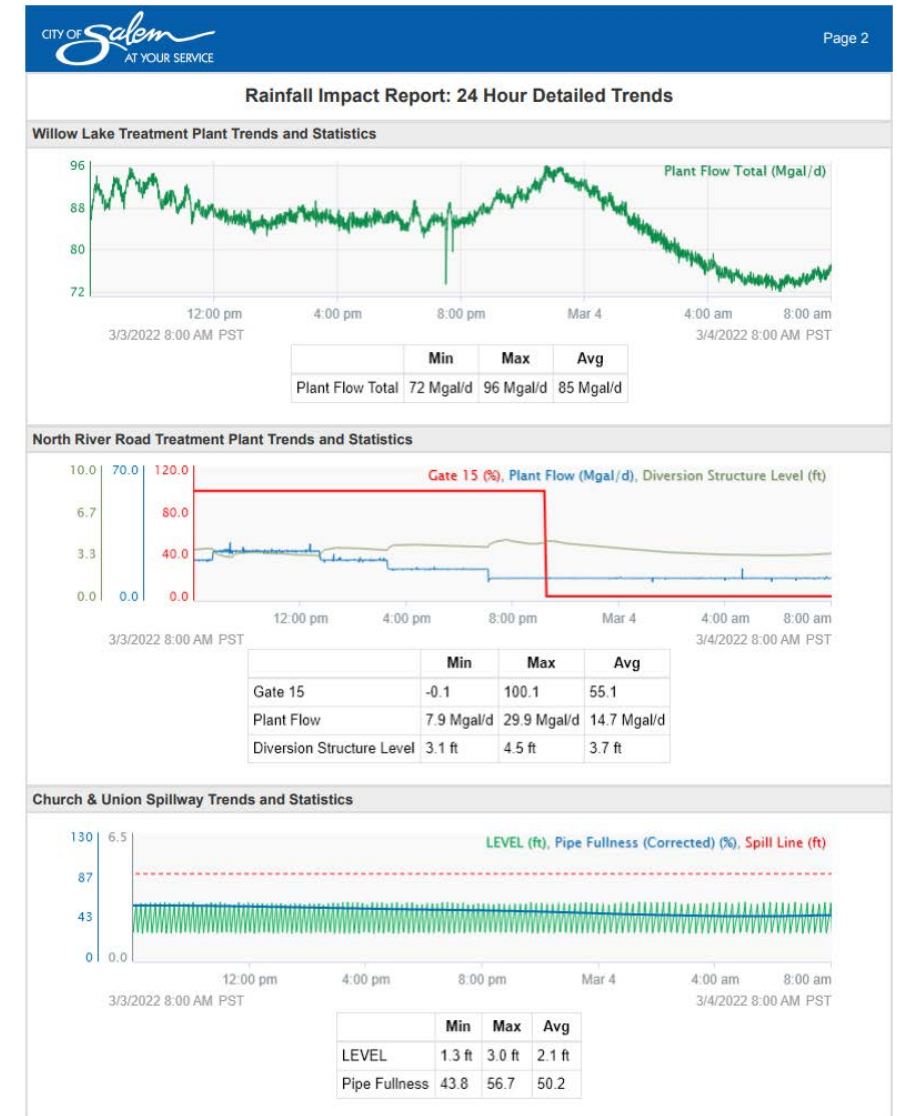
Data Storage/Analytics



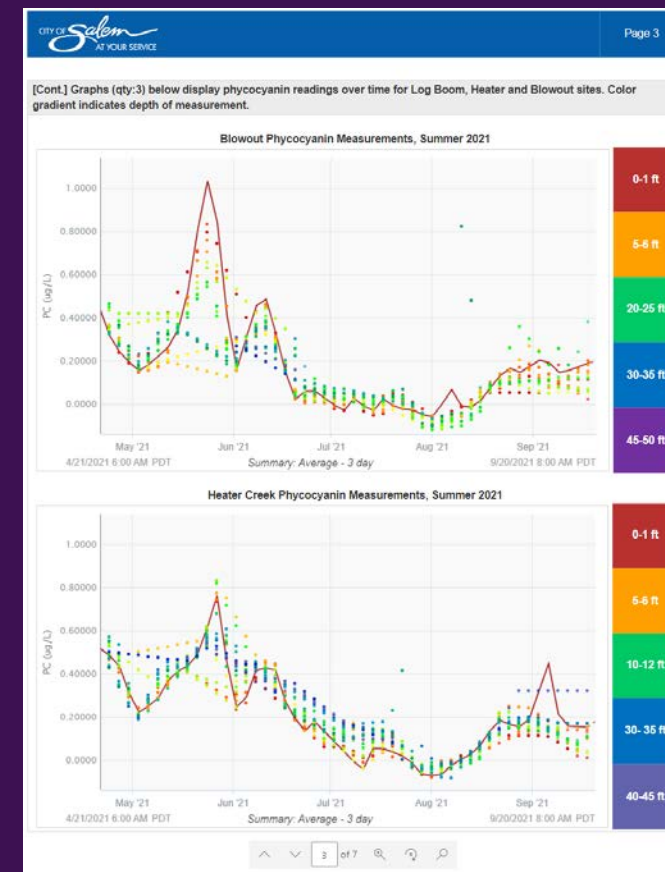
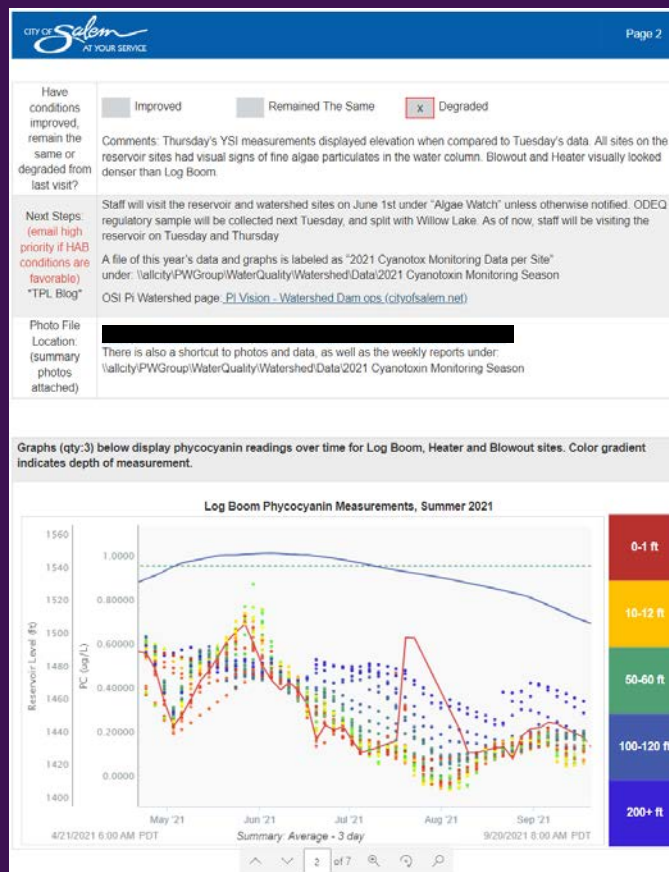
Additional Actionable Insights



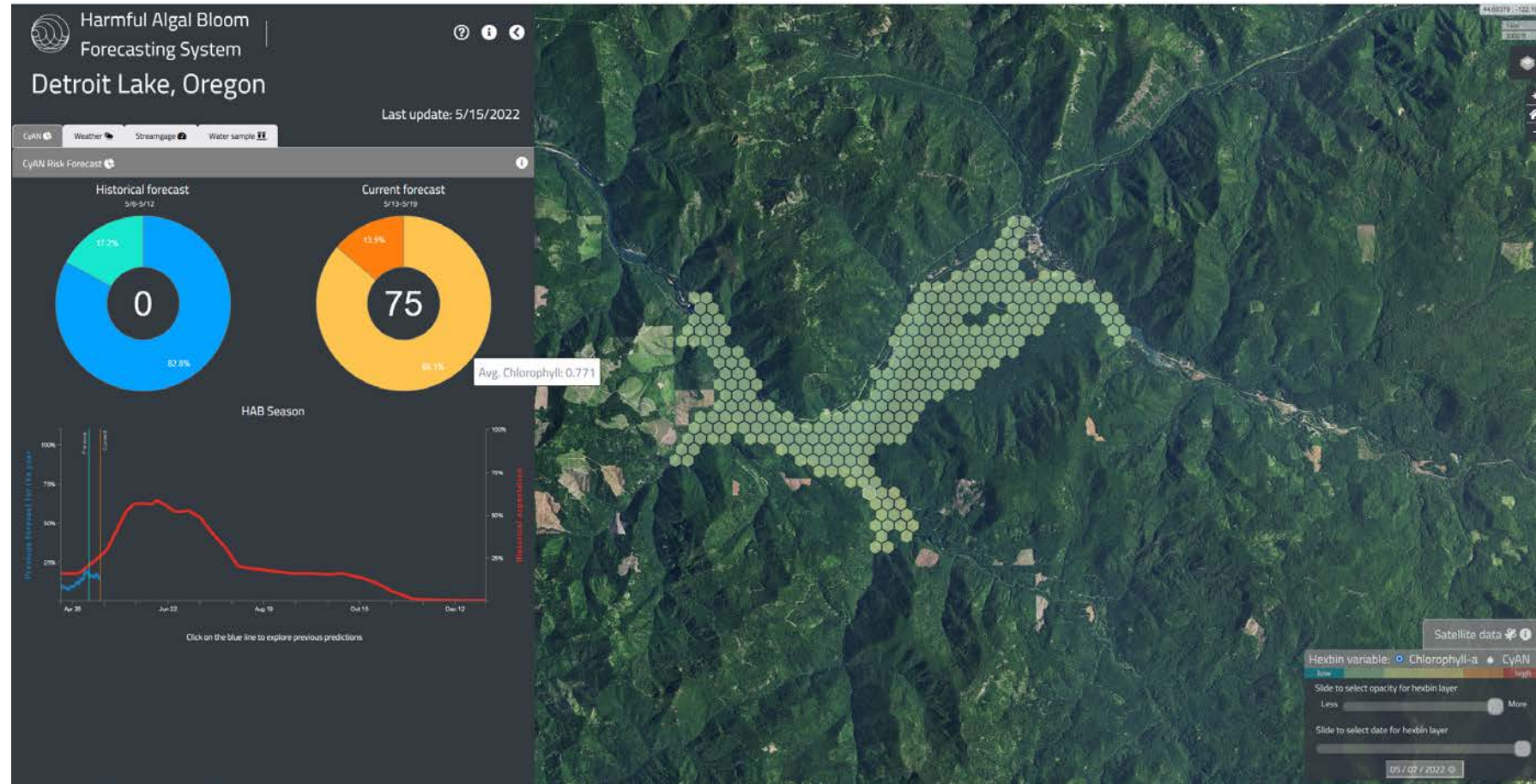
Manage
wastewater
treatment
operations
during rainfall



Reduced Level of Effort



Predictive Model Visualization

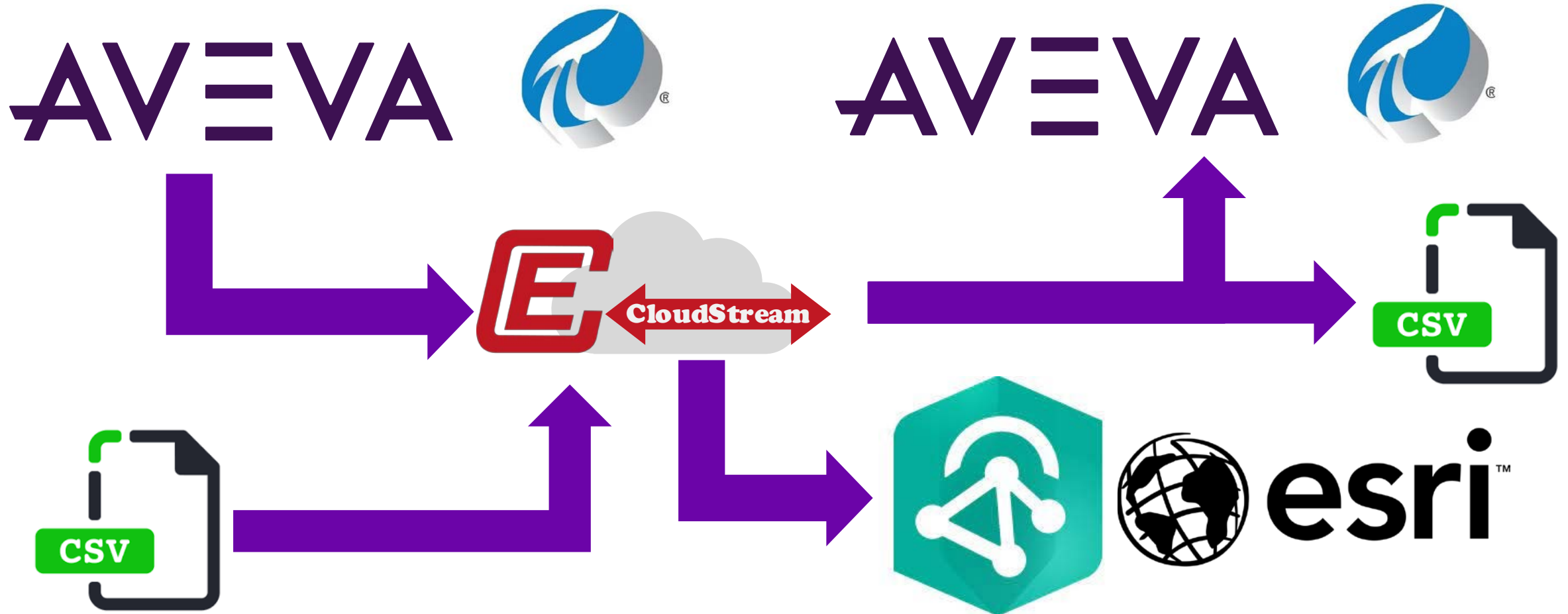


Multiple Systems in Salem, Siloed

- ESRI
 - Planning Department
 - Street Sweeping
 - Police
 - IT
 - Planning
 - Transportation
- OSISoft PI System
 - Wastewater Treatment
 - Water Quality
 - Field Operations
- Drivers:
 - Reduced reliance on internal IT
 - Single Pane of glass for a long term data sharing roadmap
 - Quicker ways to aggregate, analyze and bring value to the data that exists

Solution Architecture

Simple Connection from PI and Aveva Data Hub to ESRI



Requirements

- Data in Aveva Data Hub
- ESRI's Velocity will build out a corresponding table based on that data
- 1) Have data in Aveva Data Hub
 - Ensure that SDS type has a latitude and longitude
- 2) Validate out of order data requirements
- 3) Get a client key for Aveva Data Hub
- 4) Get a client key (endpoint) for Velocity

```
[
  {
    "dateTime": "2020-06-01T16:20:00Z",
    "Site_Code": "mi",
    "Tagname": "bacillariophyta",
    "Depth": 0,
    "Division": "bacillariophyta",
    "Tally_Total": 60.5,
    "Area_Counted_Total": 171.28600000000006,
    "Density_cells_per_mL": 1239.57,
    "Total_BV_um3_per_mL": 1228071.67,
    "Biovolume_percent": 98.79,
    "Latitude": "44.791056",
    "Longitude": "-122.749972",
    "fDOM": -0.5,
    "DO_percent": 89.3,
    "DO_mgperl": 7.43,
    "SPC": 4.5,
    "pH": 6.19,
    "NTU": 18.38,
    "BGA_PC_RFU": 0.52,
    "BGA_PC_ugperl": 0.55,
    "Chl": 0.03,
    "Chl_ugperl": 0.22,
    "Altitude": 203.1
  }
]
```

Data Feed

Aveva Data Hub and ESRI Velocity

Home

Data Management

Data Collection

Visualization

Analytics

Security

Developer Tools

Support

SALEM_WQ_OCS_FEED

1

Saved

Stop

Details

Analysis

Logs

Find tools

Feeds

Sources

Data Enrichment

Find Locations

Manage Data

Summarize Data

Use Proximity

Output

OCS WQ Final

0 e/s

Filter Cyanotoxins

Filter Eurofins

Filter Nutrients

Filter HandheldYSI

Cyanotoxins - Remove extra cols

Eurofins - Remove extra cols

Nutrients - Remove extra cols

HandheldYSI - Remove extra cols

CyanoToxin Feature Layer ArcGIS Online

Eurofins Feature Layer ArcGIS Online

nutrients_feature_layer_BL

Nutrients Feature Layer ArcGIS Online

HandheldYSI_feature_layer_BL

Handheld YSI ArcGIS Online

ation v3 (Algae Speciation v3)

+ Add Event

Biovolume_percent_Group

4.41;56.09;6.56;24.88

0.19;0.1

1.81

3.63;1.65

0.28;0.02

0.28

0.02

0.38

0.51;13.87;6.85;38.73

1.29;0.47

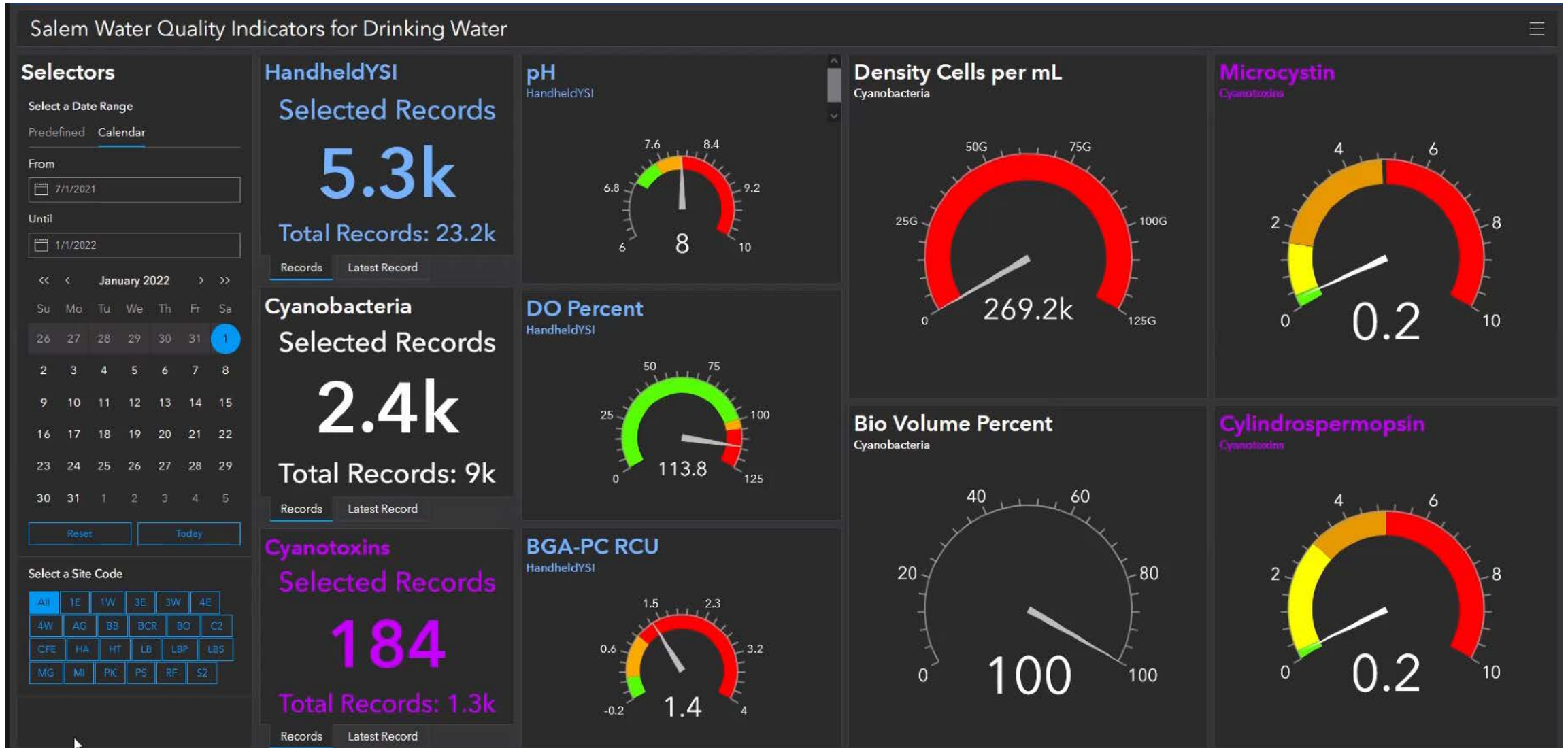
6.23

1.38;12.29;9.97

0.4;1.7;0.02

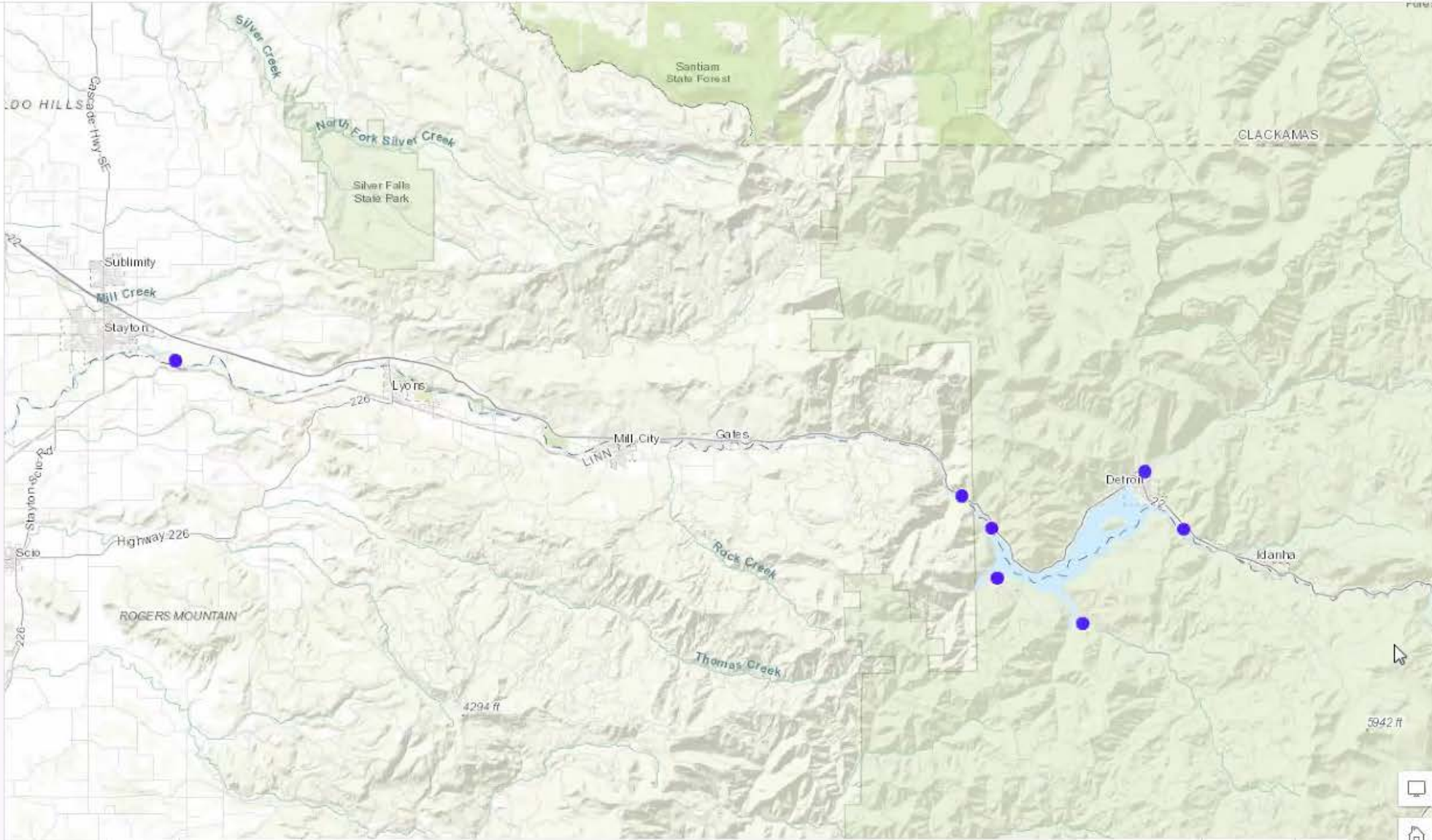
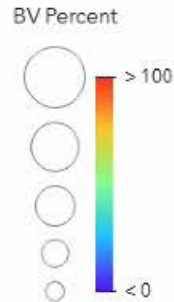
0.4

1.7



Legend

Algae Speciation - Cyanobacteria



Salem Water Quality for Drinking Water - Cyanobacteria

Selectors

Select a Date Range

Predefined Calendar

All Dates

Today

This Week

Last Week

This Month

Last Month

This Quarter

This Year

Last Year

Select a Site Code

All	1E	1W	3E	3W	4E
4W	AG	BB	BCR	BO	C2
C2E	HA	HT	LB	LBP	LBS
MG	MI	PK	PS	RF	S2

Algae Speciation

Bio Volume Percent: 5.29
Density Cells per mL: 1,999.20
Date: October 26, 2021
Site Code: bcr

Bio Volume Percent: 0.22
Density Cells per mL: 1,079.39
Date: October 26, 2021
Site Code: bcr

Bio Volume Percent: 4.52
Density Cells per mL: 98.13
Date: October 26, 2021
Site Code: bcr

Bio Volume Percent: 0.54
Density Cells per mL: 821.68
Date: October 26, 2021
Site Code: bcr

Bio Volume Percent: 2.34
Density Cells per mL: 4,557.40
Date: October 26, 2021
Site Code: pk

Bio Volume Percent: 0.14
Density Cells per mL: 3,486.08
Date: October 26, 2021
Site Code: pk

Bio Volume Percent: 2.04
Density Cells per mL: 151.38
Date: October 26, 2021
Site Code: pk

Bio Volume Percent: 0.17
Density Cells per mL: 919.94
Date: October 26, 2021
Site Code: pk

Bio Volume Percent: 1.24
Density Cells per mL: 3,201.54

Cyanobacteria

Selected Records

3.9k

Total Records: 3.9k

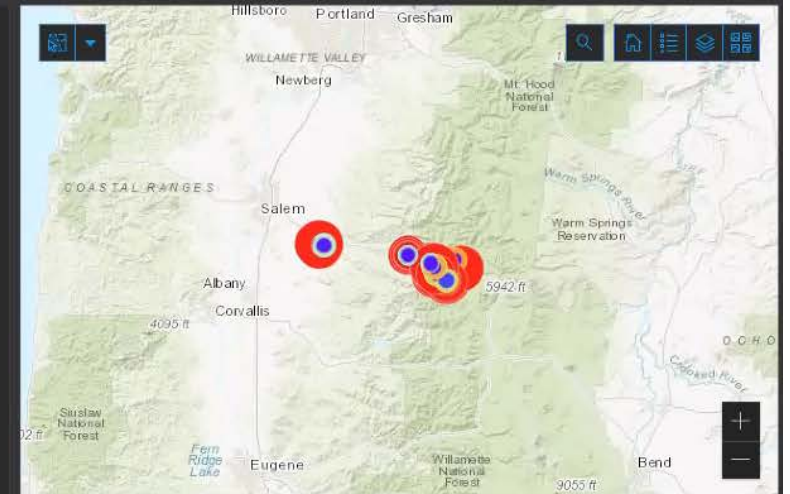
Cyanobacteria

Bio Volume Percent



Cyanobacteria

Density Cells per mL



Esri, HERE, Garmin, FAO, USGS, EPA, NPS

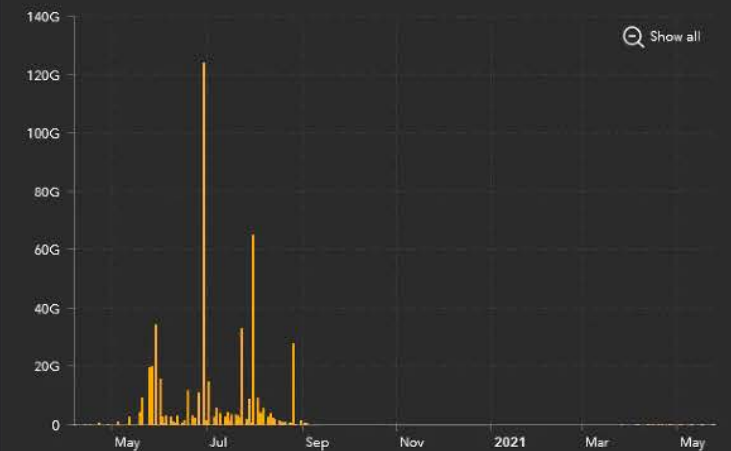
Powered by Esri

Cyanobacteria - Bio Volume Percent



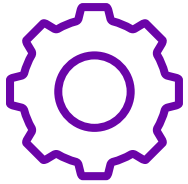
Show all

Cyanobacteria - Density Cells per mL



Show all

Partners



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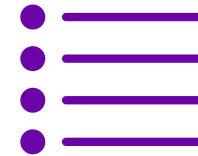
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“Casne Engineering successfully integrated all of the systems we needed to address our HAB challenge. The PI System, field sensors, and a predictive model”

Devin Doring



Brandon Lake

Technical Program Manager

- Casne Engineering
- Brandon.Lake@casne.com



Jessica Ewy

Technical Program Manager

- Casne Engineering
- Jessica.Ewy@casne.com

Engineering Excellence through Teamwork, Anchored in Trust, Integrity and Commitment.

Questions?

Please wait for the microphone

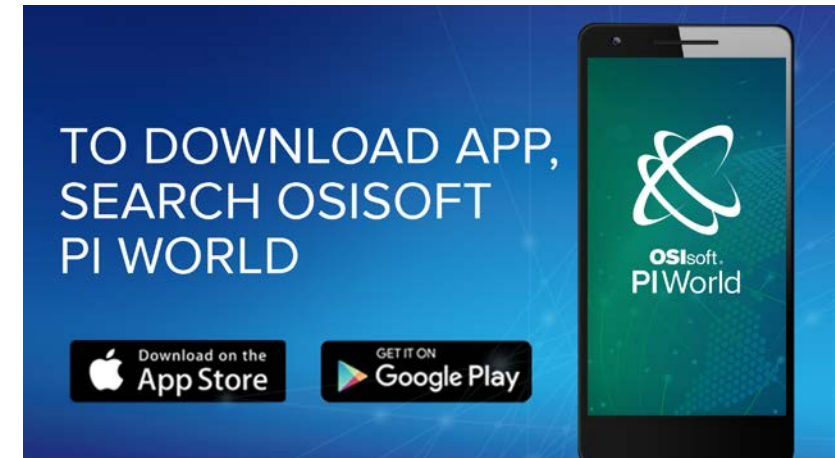
- State your name and company



Please remember to...

Complete the survey!


- Navigate to this session in the mobile agenda for the survey




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AVEVA is a global leader in industrial software, driving digital transformation and sustainability. By connecting the power of information and artificial intelligence with human insight, AVEVA enables teams to use their data to unlock new value. We call this Performance Intelligence. AVEVA's comprehensive portfolio enables more than 20,000 industrial enterprises to engineer smarter, operate better and drive sustainable efficiency. AVEVA supports customers through a trusted ecosystem that includes 5,500 partners and 5,700 certified developers around the world. The company is headquartered in Cambridge, UK, with over 6,500 employees and 90 offices in over 40 countries.

Learn more at www.aveva.com