

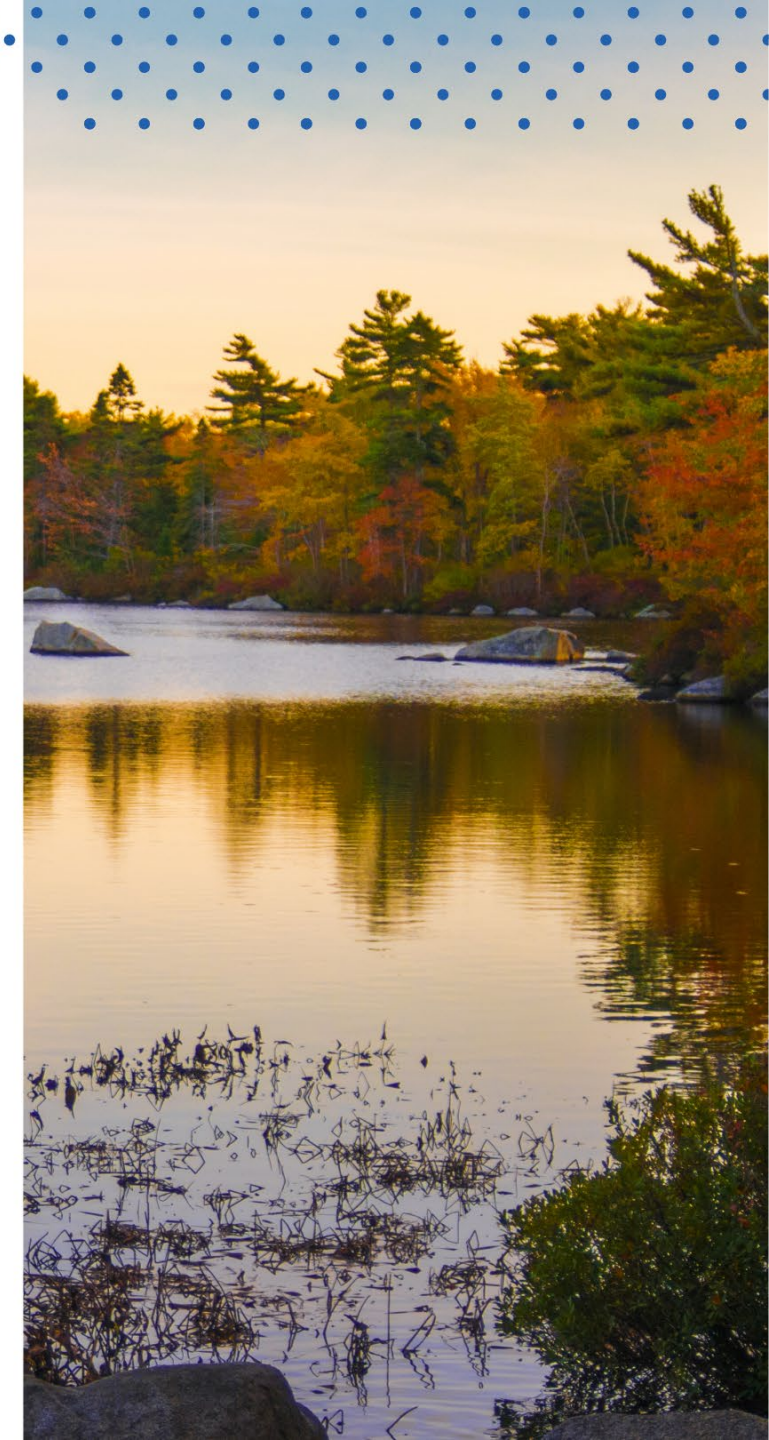


One Water, One Data

Utility wide adoption of consolidated water quality management and analytic applications

November 7-9, 2022

Adam McKnight, Halifax Water
Elaine Kelly, Klir



Who is Halifax Water?

Halifax Water is the municipal water, wastewater, and stormwater utility serving the residents of the Halifax region.

Sampling Requirements:

Drinking Water

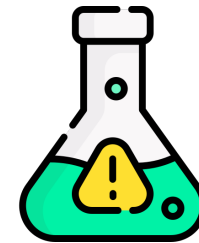
- Regulatory: 65 sampling locations
- Distribution Operations: 107 routine sampling locations
- Treatment Operations: 6-10 routine sampling location

Wastewater

- Regulatory: 20 sampling locations
- Treatment Operations: 6-10 routine sampling locations



Serves Over
109,000 Customers



18 Wastewater
Systems



9 Drinking
Water Systems



The Goal? Ensure Complete Compliance

Requirements

- ☑ Dashboard reporting for complete compliance visibility
- ☑ Enhanced data analytics to spot trends sooner
- ☑ Different working groups can collaborate on data entry, analysis & share information
- ☑ Enable data sharing with external labs
- ☑ Automated data management & reporting
- ☑ Capacity to store historical data for auditing



Data Accessibility & Quality

Format

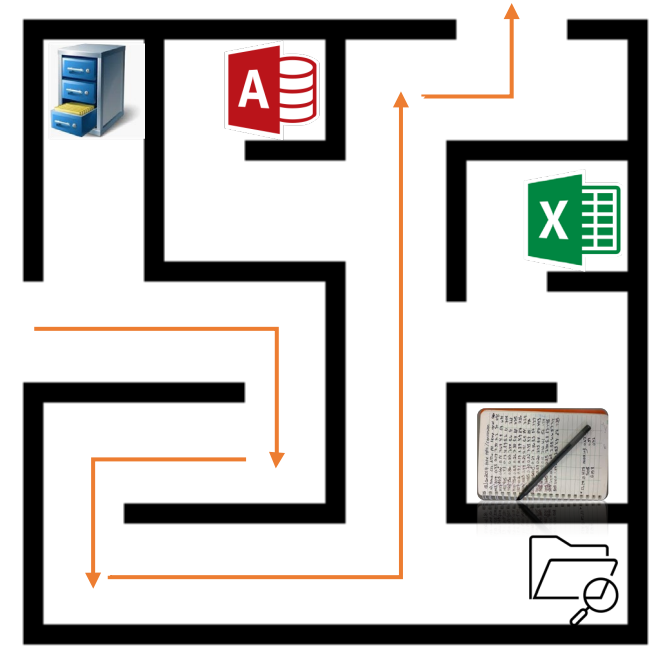
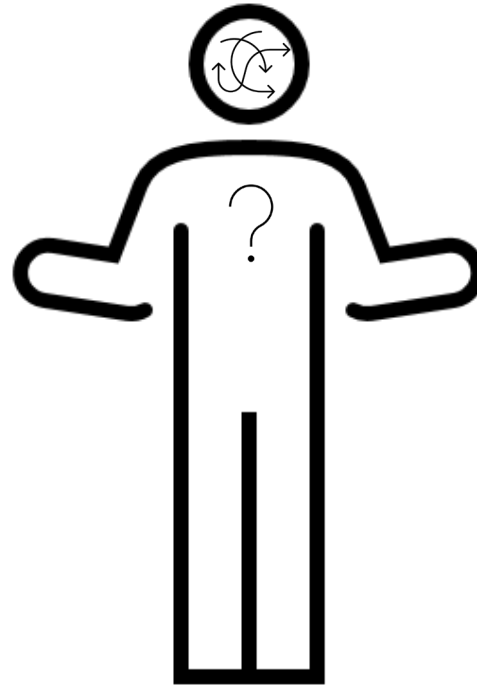
- Is the data in a format that facilitates analysis?

Access






- Can key stakeholders access the data?

Reliable

- Is the dataset authoritative
- Is the data routinely updated as required?



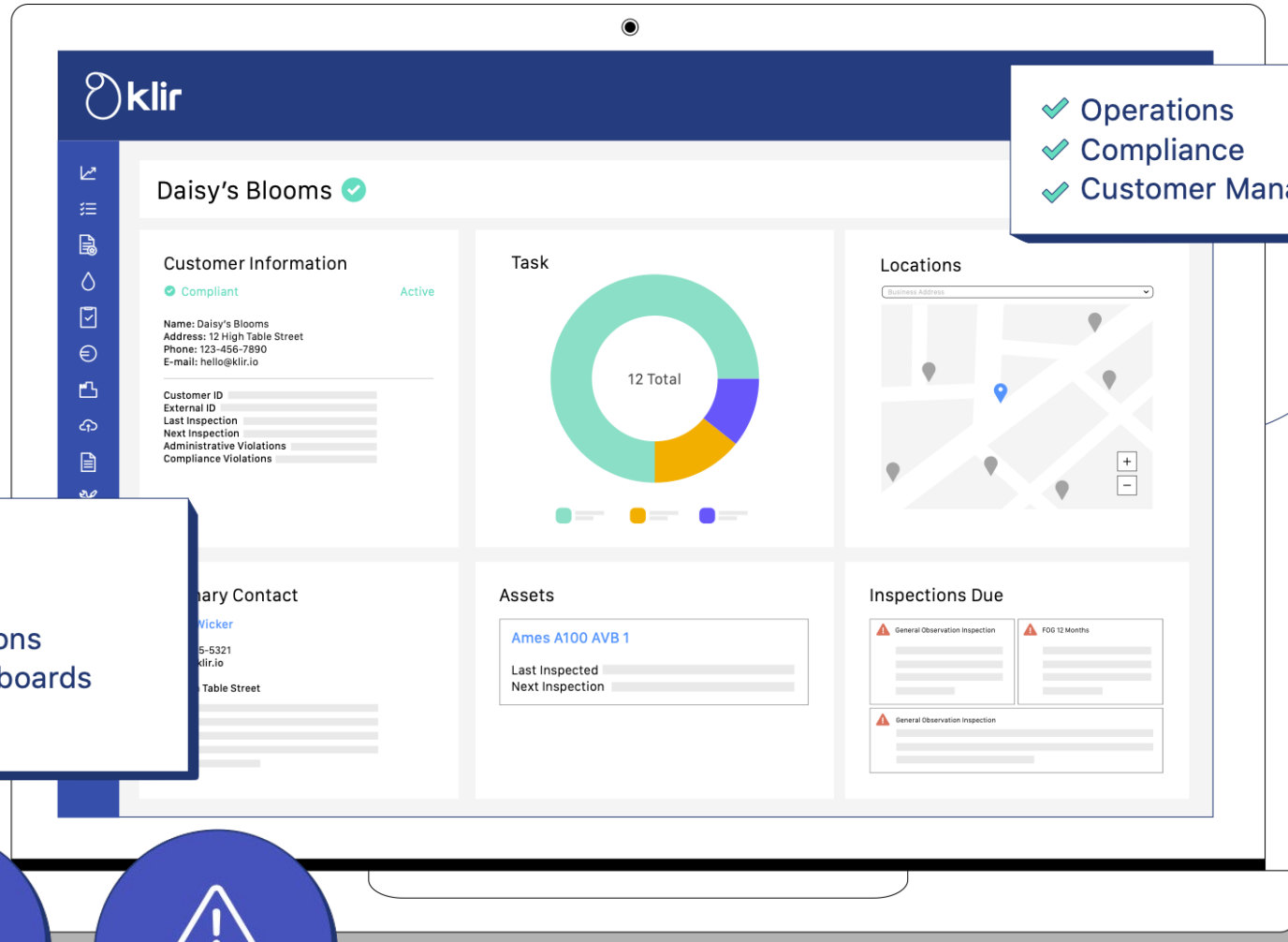
Name

-  TributaryDataMaster - AM.xlsx
-  TributaryDataMaster - AMK.xlsx
-  TributaryDataMaster - BG.xlsx
-  TributaryDataMaster - WK&MH.xlsx
-  TributaryDataMaster.xlsx



What is Klir?

One Water, One Data
Simplifying compliance with a single platform for all teams.



- ✓ Operations
- ✓ Compliance
- ✓ Customer Management

- Management Tools**
- ✓ Task Management
 - ✓ Customer Inspections
 - ✓ Performance Dashboards
 - ✓ One-Click Reports

Permit Management

Sampling Management

NPDES

Instant Alerts



Klir Sampling and Permitting

- Complete Compliance At A Glance
- A Single Source of Truth for All Permitting Info
- Manage All Plants in One Place

The dashboard shows the following permit counts:

- In Progress: 23
- Pending: 24
- Active: 47
- Expiring Soon: 2
- Expired Permits: 12

Permit Name	Project ID	Status	Expiry Date	Department/Division	Permit Type	Regulatory Agency	Responsible Contact	Tags	Tasks Open
Test Permit Load 8.13 ID: ORDER NO. RS-2007-0048		Pending		Operations	New Permit 1		admin admin		1
Test Permit Load 8.8 ID: ORDER NO. RS-2007-0048		Pending		Operations	New Permit 1		Peter test		1
Test Permit Load 8.3 ID: ORDER NO. RS-2007-0048		Active		Operations	New Permit 1		Peter test		0
Test Permit Load 8.1 ID: ORDER WQ 2014-0194- DWQ GENERAL ORDER NO. CAG140001		Active		Maintenance	Encroachment Permit		Peter test		1

Summary Cards:

- Overdue Sample Tasks: 551
- Due Today Sample Tasks: 1
- Sample Tasks Due This Week: 15
- Sample Tasks Due Next 30 Days: 42

Compliance Criteria:

- Total: 977
- Failed: 50
- Passed: 927

Bar Chart (2021):

Month	Failed	Passed
Jan	0	0
Feb	0	0
Mar	2	2
Apr	0	0
May	10	25
Jun	0	0
Jul	0	0
Aug	0	0
Sep	2	2
Oct	0	0
Nov	0	0
Dec	0	0

Permit #29
Status: Active

Monitoring Plan Details:
Date range: 06/Jan/2022 - 06/Apr/2022
Facilities: 0
Type: Operational
Parameters: 0
Legislation:
Department: Operations

Water System Details:
Name: Klir PWS 2
Type: Community
Owner Type: Local Government
Primary Source: Groundwater
Secondary Source:
Population Served: 100000

Infrastructure | **Sample Tasks** | Results | File Attachments

Search All | All Dates | All Status | All Departments | All Divisions

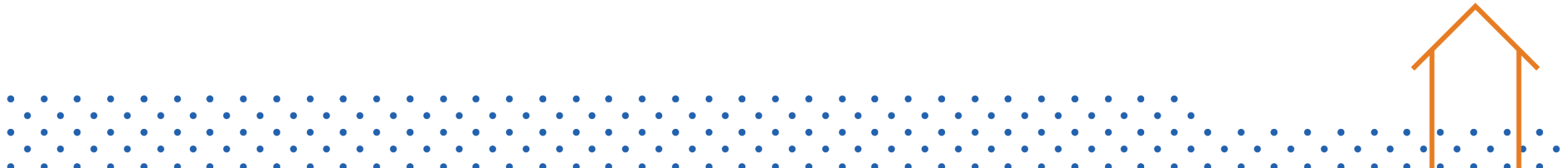
All Users (Task Owner / Assi... | All Facilities | All Parameters | All Tags | Clear Filters

+ New Task | Collapse to details view

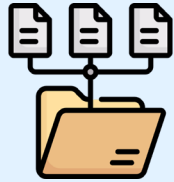


Halifax Water's Transition to Klir

The screenshot shows the Klir Administration interface for user management. It includes a table of users with columns for Actions, Username, Surname, Roles, Organization Units, E-mail Address, Active status, Last Login Time, and Creation Time. An 'Edit User' modal is open for 'Tim Tanner', showing fields for Name, Surname, E-mail Address, Title, Mobile Number, Phone Number, and Username. To the right, a data table is visible with columns for Raw Water parameters (Rate, Turbidity, Color, etc.) and Filter Check After 2-Hours data.



Lessons Learned



Unintended Benefits

- Task Organization
- Improved Auditing



Change Management

- Consistent Communications
- Within Project Team as well as within Stakeholder Groups



Enhanced Collaboration

- Collaboration between business units
- Halifax Water-Klir relationship



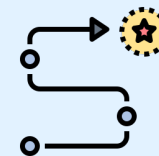
Resources

- Administration following "Go-Live"
- Implications to other business units



Quality Data

- Takes time
- Collaboration between Halifax Water and Klir



Implementation

- Phased implementation



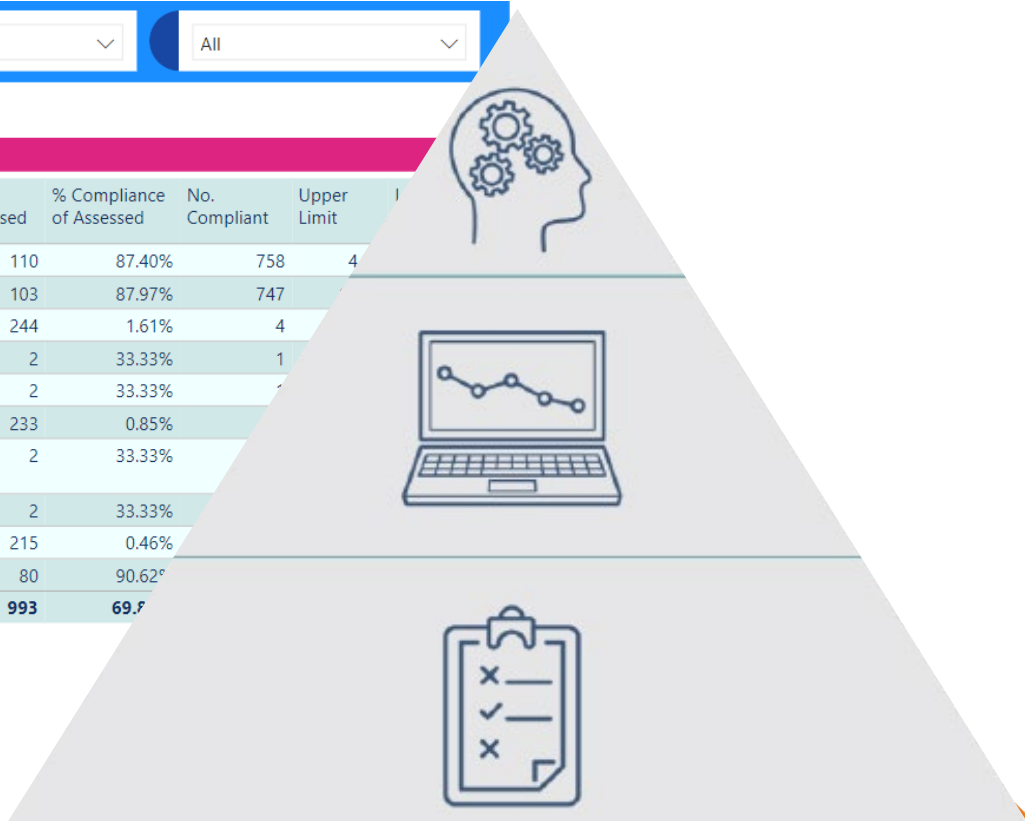
Creating Knowledge from Data

klir **i** Distribution Compliance 2022 All All

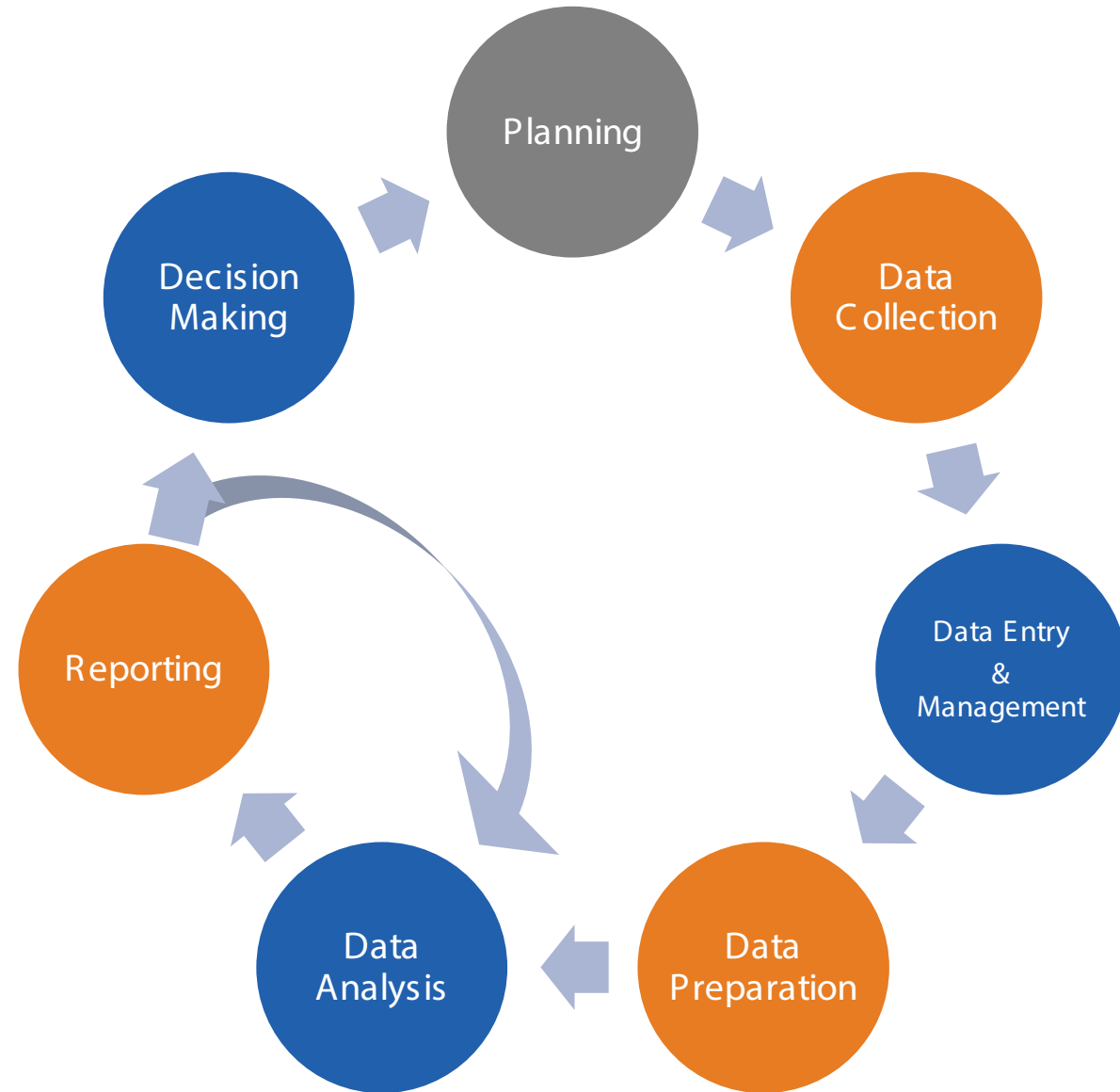
Facility Name x Parameter x
Middle Musquodoboit...



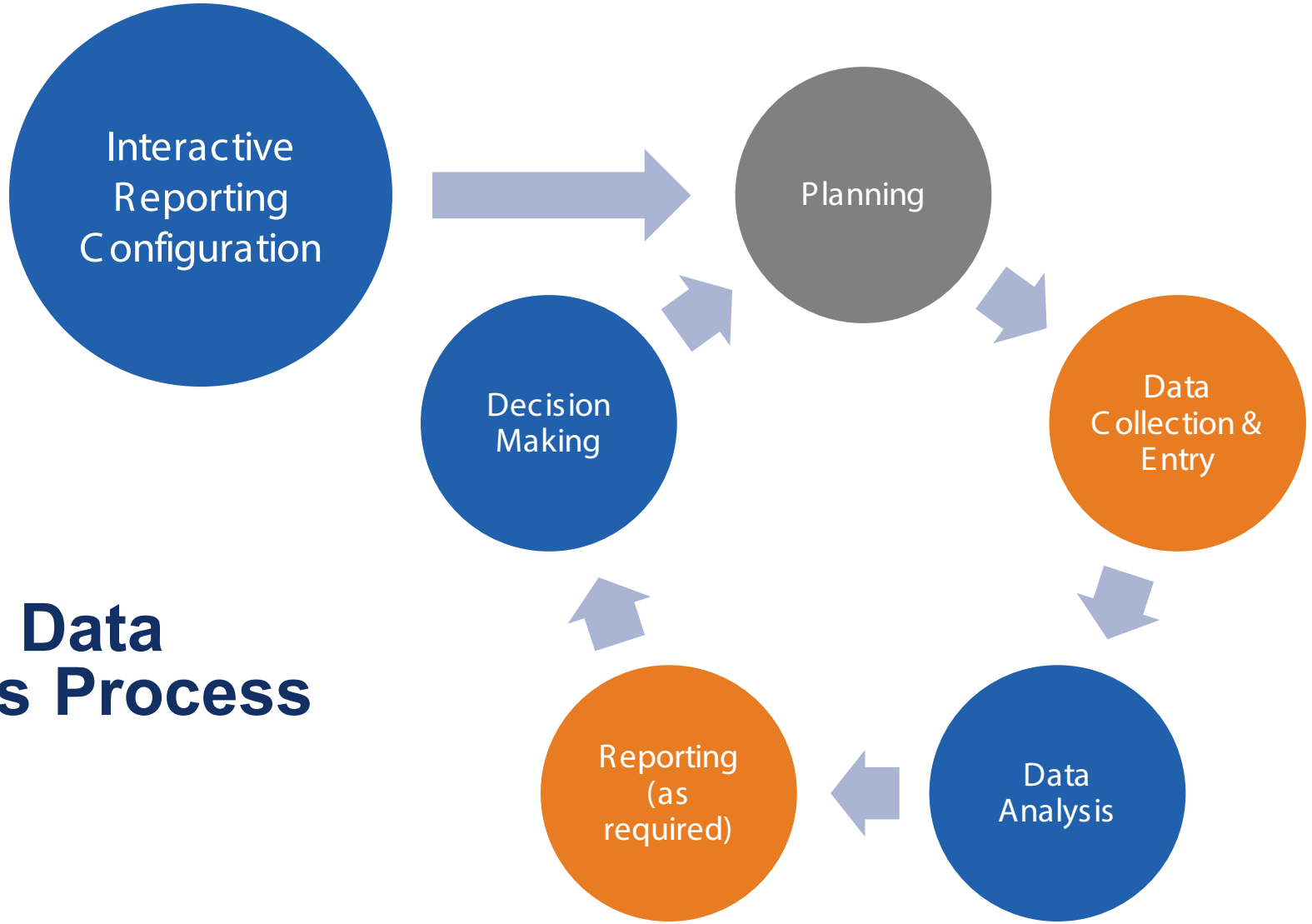
Parameter	No. results	Not Assessed	% Compliance of Assessed	No. Compliant	Upper Limit
Chlorine (free)	873	110	87.40%	758	4
pH	856	103	87.97%	747	
Total Aluminum (Al)	248	244	1.61%	4	
Total Barium (Ba)	3	2	33.33%	1	
Total Copper (Cu)	3	2	33.33%		
Total Manganese (Mn)	235	233	0.85%		
Total Sodium (Na)	3	2	33.33%		
Total Strontium (Sr)	3	2	33.33%		
Total Zinc (Zn)	216	215	0.46%		
Turbidity	853	80	90.62%		
Total	3293	993	69.7%		



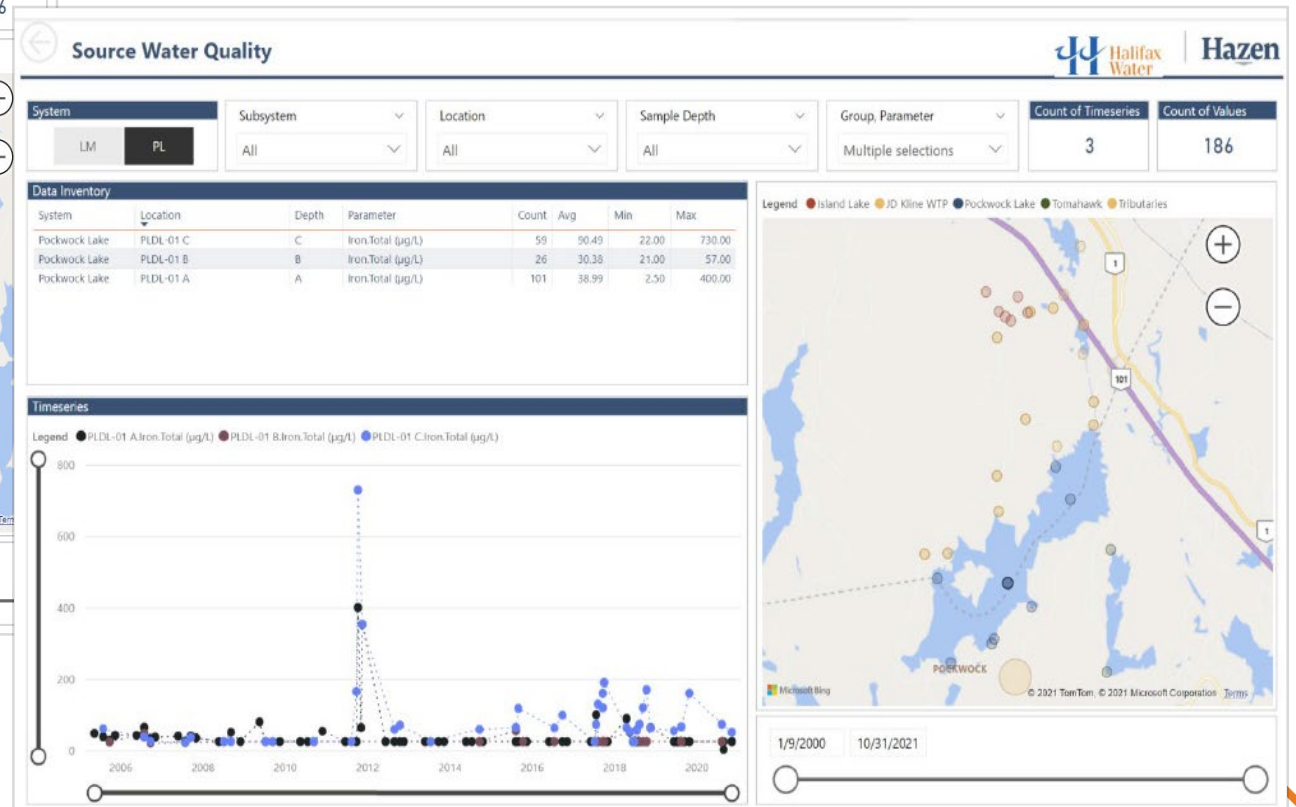
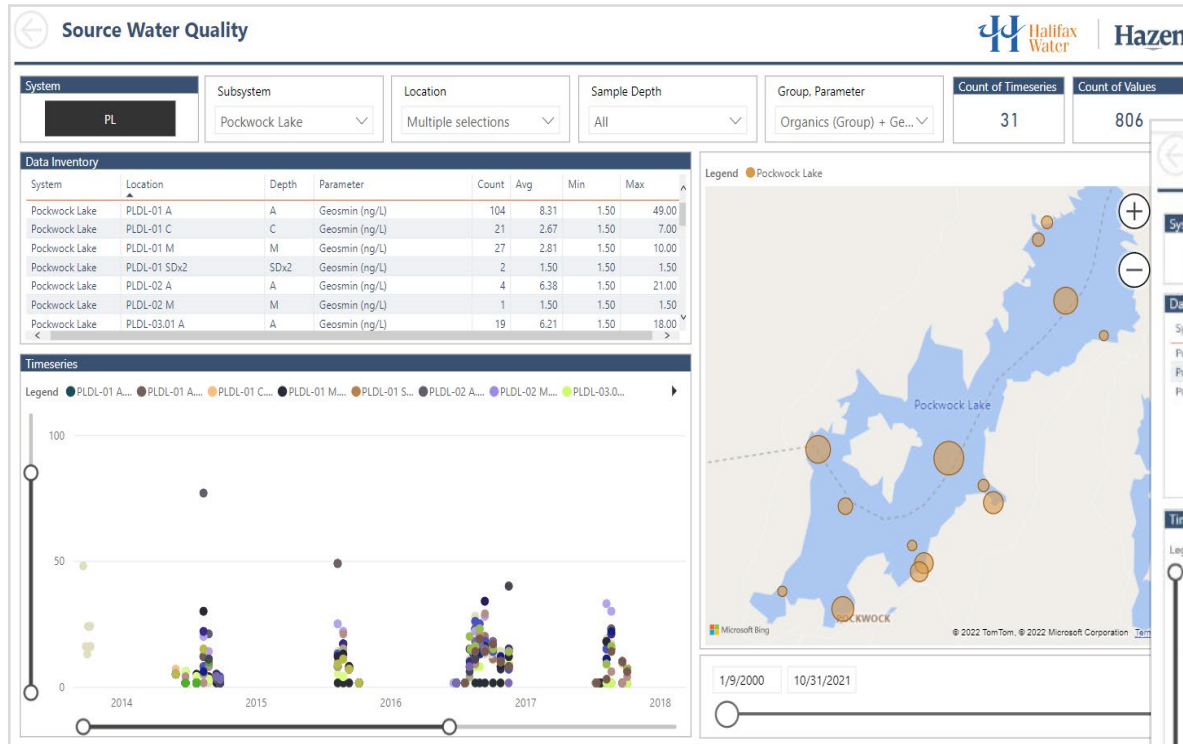
Traditional Data Analysis Process



Current Data Analysis Process



Creating Knowledge from Data



Interactive Analytics

klir Source Pockwock Lake

Parameter: Geosmin

Date Range: 8/14/2008 - 4/2/2022

Result Value Range: 0.00 - 79,300.00

Results Over Time

Average	Median
13.22	10.00
Maximum	Minimum
138.00	3.00
Std. Dev	
12.94	

klir Distribution Compliance 2022

Facility Name: Bannery Lake Distribut... Parameter: Chlorine

% of Compliant over ... 99.48%

- Collin's Park Distribution 100.00%
- Five Island Lake Distrib... 100.00%
- Middle Musquodoboit... 100.00%
- Silver Sands Distribution 100.00%
- Lake Major Distribution 99.56%
- Pockwock Lake Distrib... 99.45%
- Bannery Lake Distrib... 98.88%
- Total Copper (Cu) 100.00%
- Total Manganese (Mn) 100.00%
- Total Sodium (Na) 100.00%
- Total Strontium (Sr) 100.00%
- Total Zinc (Zn) 100.00%
- Turbidity 100.00%
- pH 96.15%

klir My Dashboard

My Open Tasks

Total 45

- On Schedule: 33
- Overdue: 12

My Assigned Tasks

Recently Updated Tasks

Task Name	Status	Assignee	Due Date
Perchlorate Monitoring	New	James Lee	12/May/2022
Effluent Monitoring	New	Janice Webber	03/May/2022
RTCR Monitoring		Sam Seebacher	28/April/2022
Permitting		Megan Poblacion	21/April/2022
Perchlorate Monitoring		Megan Poblacion	16/April/2022
Perchlorate Monitoring		Sam Seebacher	12/April/2022
Effluent Monitoring		Jisoo Lee	08/April/2022
RTCR Monitoring		Stephanie Patel	18/April/2022
Permitting		George Johansson	24/March/2022

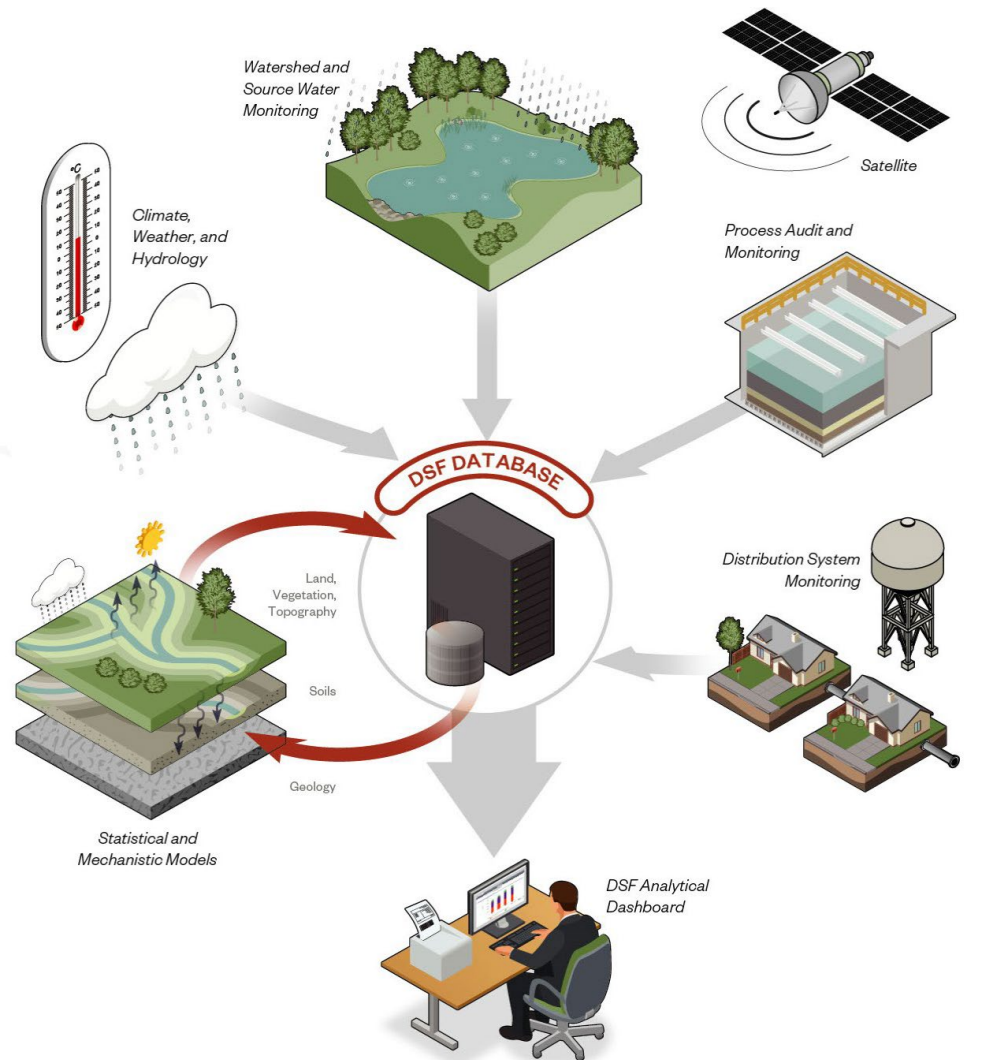
	853	80	90.62%	773	5.00
Turbidity					
Total	3293	993	69.85%	2289	100.68

My Notifications

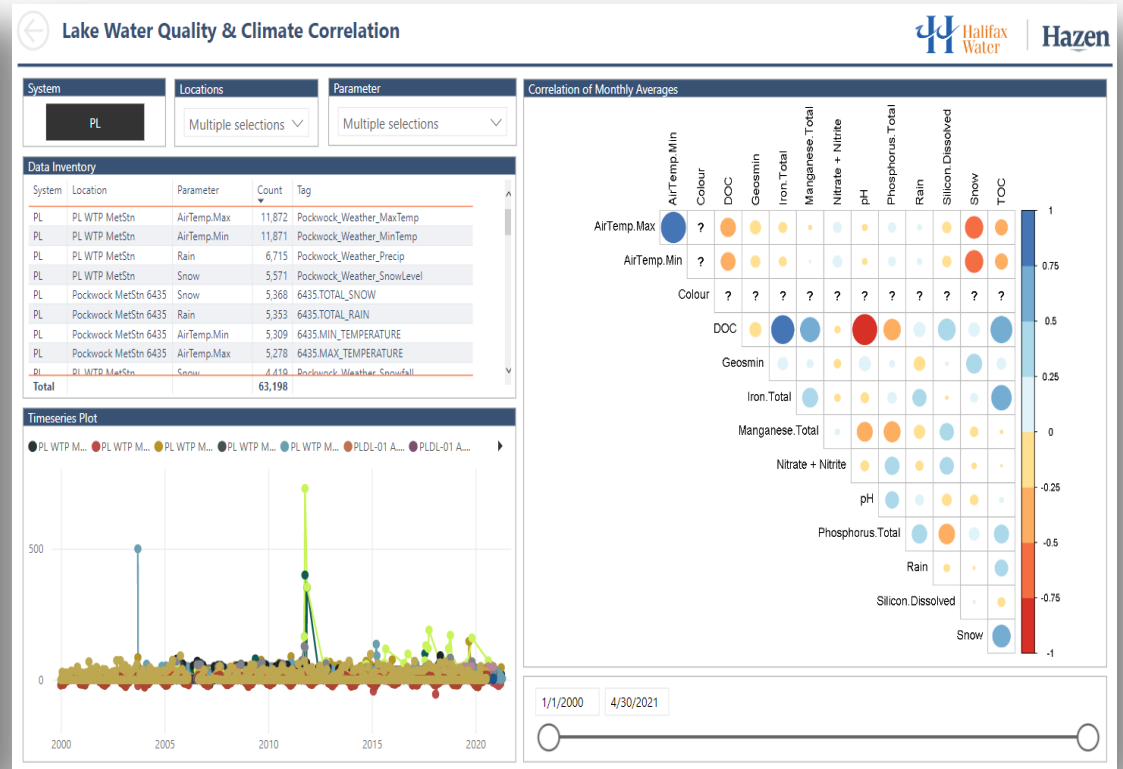
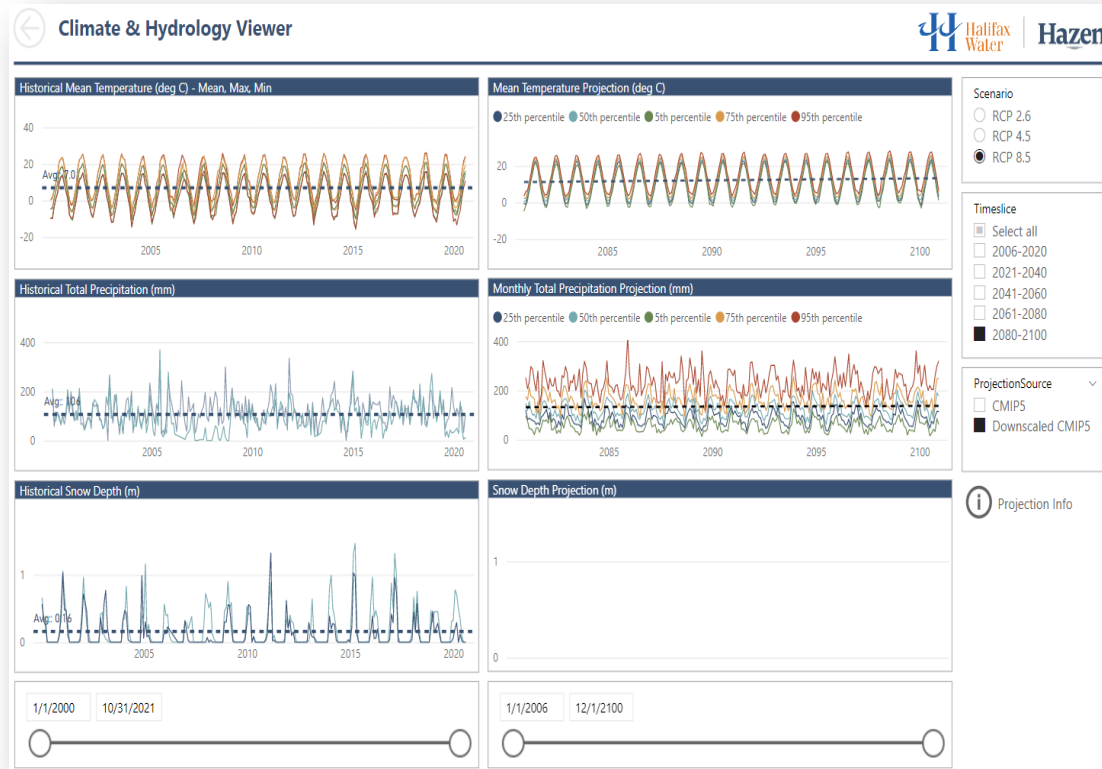
Notification	Creation Time
Multi-Task Closed (x5): Raw Water - ID 73054	2 Days Ago
Permit Created - ID 92984	2 Days Ago
Permit Created - ID 39349	4 Days Ago
Task Created - ID 93858	5 Days Ago
Task Created - ID 34212	5 Days Ago
Task Created - ID 12932	6 Days Ago
Multi-Task Created (x2) - ID 20199	16 Days Ago
Owner Changed: CE Test - ID 21002	1 Month Ago
Assignee Changed - ID 22910	1 Month Ago



Integrated Data Analytics



Integrated Data Analytics



Adam McKnight

Data Analyst – Water Quality Programs, Halifax Water

AdamM@halifaxwater.ca

Elaine Kelly

Co-founder and CRO, Klir

Elaine.Kelly@klir.com

