South McDougal Flats MVC-SMF-24 Project

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Alberta Health Services
Public Health

Mountain View
COUNTY

Executive Summary:

As part of MVC-SMF Area Structure Plan review in early 2024 residents raised concerns about groundwater quality. To better understand the groundwater quality in the area, AHS partnered with MVC for this project. Owners in the SMF area were mailed letters on August 30, 2024, to inform of the project and encourage their participation.

As part of the project, the county hosted two free Working Well Workshops at the Sundre Royal Canadian Legion open to all residents of Mountain View County. The workshops provide owners the information and tools needed to protect and care for their water wells and drinking water supply. In total 59 individuals attended these two workshops.

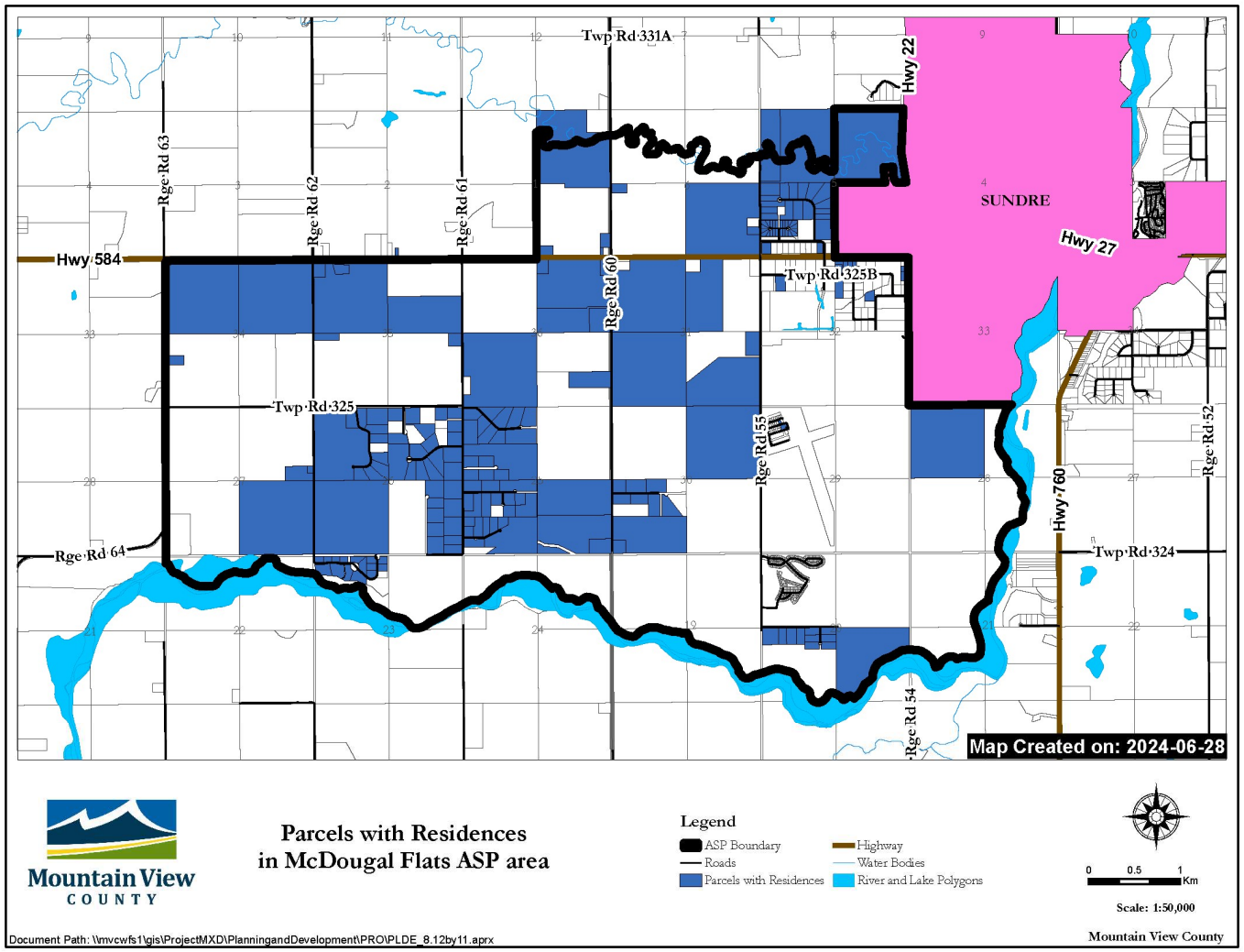
Owners were also encouraged to submit chemical and bacteriological samples for free through AHS-EPH to establish a more comprehensive current baseline for local water quality. AHS-EPH also undertook a historical review of samples chemical samples submitted between Jan 2021-Sept 2024 to ensure anyone that has previously submitted within the past 3 years would have their tests included in the data as ACFT only allows sampling every 3 years.

- 39 bacteriological samples and 41 chemical samples were submitted by owners within the SMF area from October 1-November 15, 2024.
- 34 historical chemical samples were identified and included in the pooled analysis of 75 chemical samples.

Overall Finding: The SMF Area groundwater sampled appears to have lower levels of parameters of concern when compared to the historical local watershed and provincial water quality. In 2027, owners will be again encouraged to submit samples to assess if there has been any changes in local water quality.

For additional information please contact Pamela.Kutuadu@ahs.ca

MAP OF THE SOUTH MCDOUGAL FLATS AREA- MOUNTAIN VIEW COUNTY



Data Notes:

- Alberta Environmental Public Health Information Network (AEPHIN) data is pooled from 2001 to 2019, data from 2020-2024 anticipated to be uploaded in 2025 and will be included in the part 2 of the project in 2027 analysis. Copper: AEPHIN did not report AO exceedances, only MAC. Caution as there are low # of samples.
- Manganese: in 2019 MAC added and AO lowered per the CDWQG.
- AHS recommends for those with Lead and Copper exceedances to do a flushed retest as there could be metals from plumbing fixtures if taken from stagnant sources, such as lead and copper.

Canadian Drinking Water Quality Guidelines (CDWQG):

- MAC= Maximum Acceptable Concentration
- AO= Aesthetic Objective

Data Sources:

1) Samples submitted with the project code label "MVC-SMF-24" between Oct 1-Nov 15, 2024 to:

- Alberta Precision Labs (APL):
  Bacteriological samples
- Alberta Center For Toxicology (ACFT)
  Chemical samples

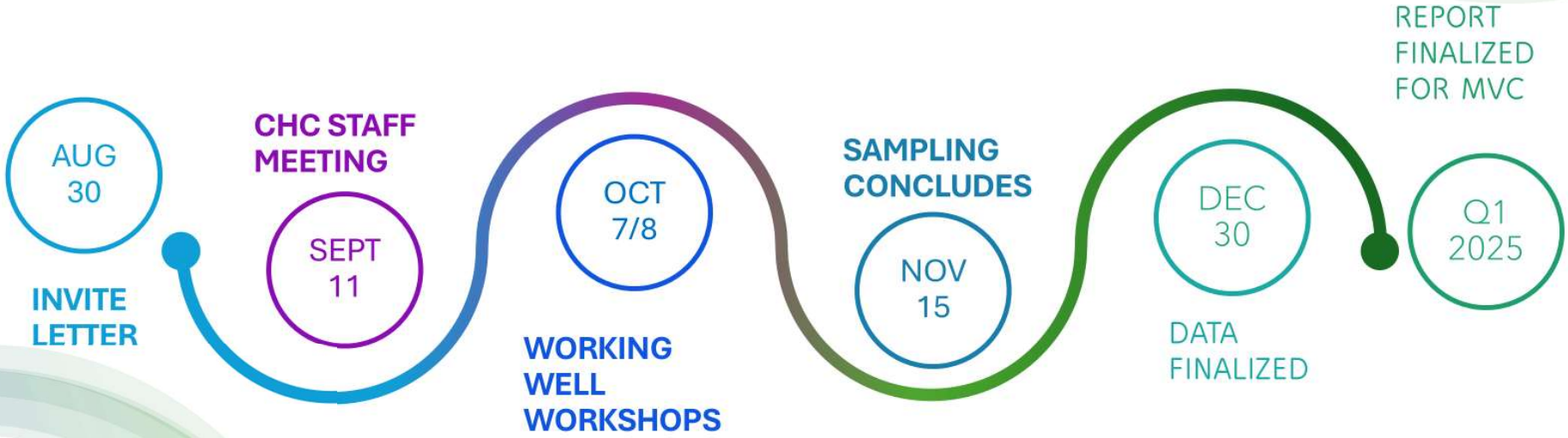
2) Historical ACFT samples

- Archived records for samples submitted from Jan 2021-Sept 2024 with Legal Land Description (LLD) within the SMF area. No records were found for samples within SMF from 2021.
- The MVC-SMF-24 project concluded prior to the new AO for iron being introduced by Health Canada. The analysis was based on the AO of 0.3mg/L

Report Notes

- Community participatory research limitation- the scope of these results is restricted to the wells voluntarily sampled by homeowners.
  - Of the 273 residences that received the invite letter to participate, 75 samples were included in the project data, came from 67 unique wells. The samples ranged from Jan 2022- Nov 2024, representing 24.5% of the wells in the SMF area.

Project timeline



CHC= Community Health Center

Report Notes

- Aug 30, 2024- MVC mailed out letters to participate in the project to all residents of SMF
- Sept 11, 2024- AHS met with the Sundre CHC staff to inform of the scope of the project and ensure samples submitted within the project area of SMF had the project label attached to the requisitions
- Oct 7/8, 2024- working well workshops were held at the Sundre Royal Canadian Legion, open to all residents of the MVC, not just those within SMF.
- Samples were accepted from Oct 1-Nov 15.
- ACFT provided a summary of all samples processed under the MVC-SMF-24 project code, review of historical ACFT samples were summarized and all APL samples submitted under MVC-SMF-24 were extracted from the AHS database.

Working Well Workshops

October 7, 2024 @ Sundre Legion

PROJECT SAMPLE SUBMITTED?	✓ ATTENDED	NOT IN ATTENDANCE	PRESENTER	HOST	GRAND TOTAL
Bacteriological only	1				1
both	6	1			7
Chemical only	4	1			5
No Project Sample	25	5			30
presenter			5		5
host				2	2
couple	6	4			10
Grand Total	**42**	**11**	**5**	**2**	**60**

- Of those registered, after accounting for couples, there were an estimated 36 households in attendance on Oct 7.
- 4 households submitted only chemical samples
  - 1 only submitted a bacteriological
  - 6 submitted both chemical and bacteriological.

Working Well Workshop

October 8, 2024 @ Sundre Legion

PROJECT SAMPLE SUBMITTED?	✓ ATTENDED	NOT IN ATTENDANCE	PRESENTER	HOST	GRAND TOTAL
Both	3				3
No Project Sample	13	4			17
couple	1	2			3
Host		1		2	3
Presenter		1	5		6
Grand Total	**17**	**8**	**5**	**2**	**32**

- Of those registered, after accounting for couples, there were an estimated 15 households in attendance on Oct 8
- Of that: 3 households submitted both chemical and bacteriological samples from within the project area.

Sample Results Processed

- Bacteriological: 39 samples
- Chemical: 75 samples total
  - Historical: 34
  - MVC-SMF-24: 41

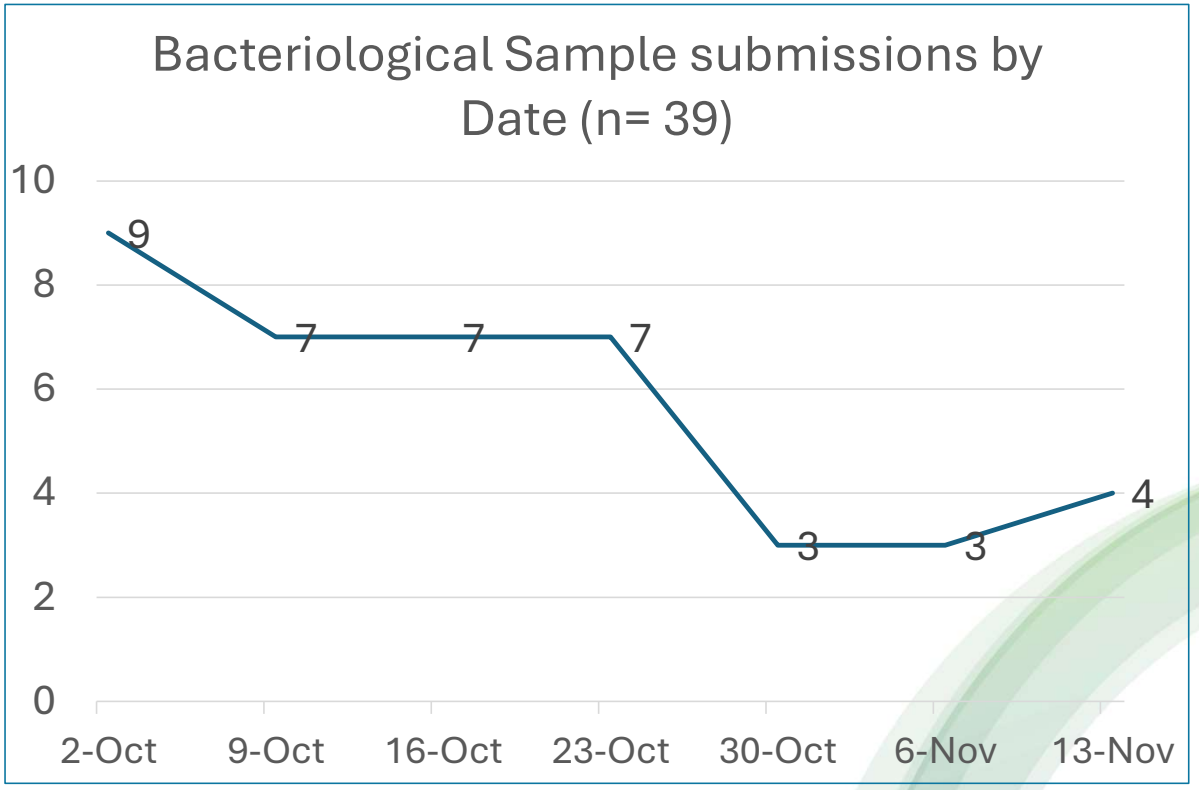
Report Notes

- Majority of samples were submitted to the Sundre Community Health Centre; some were also sent to the Olds, Red Deer and Calgary CHCs.

Bacteriological Sampling

ALBERTA PRECISION LABORATORIES

From October 1- Nov 15, 39 samples within the SMF area were submitted.



Report Notes

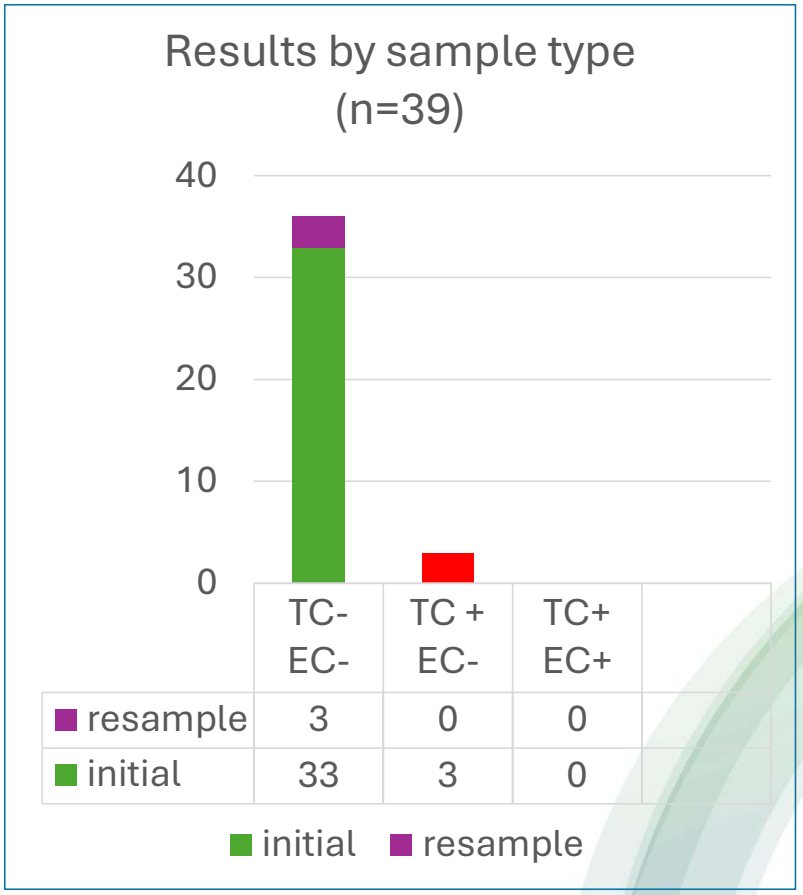
- The weekly project submissions started strong in the first month and tapered off by half in November. A total of 39 sample results were included in the analysis and later mapped.

Bacteriological Sampling

ALBERTA PRECISION LABORATORIES

- All 3 initial samples that showed presence of TC had satisfactory resamples (absent/absent), No samples showed the presence of *E.coli*.

TC= Total Coliforms
EC= *E.coli*



Report Notes

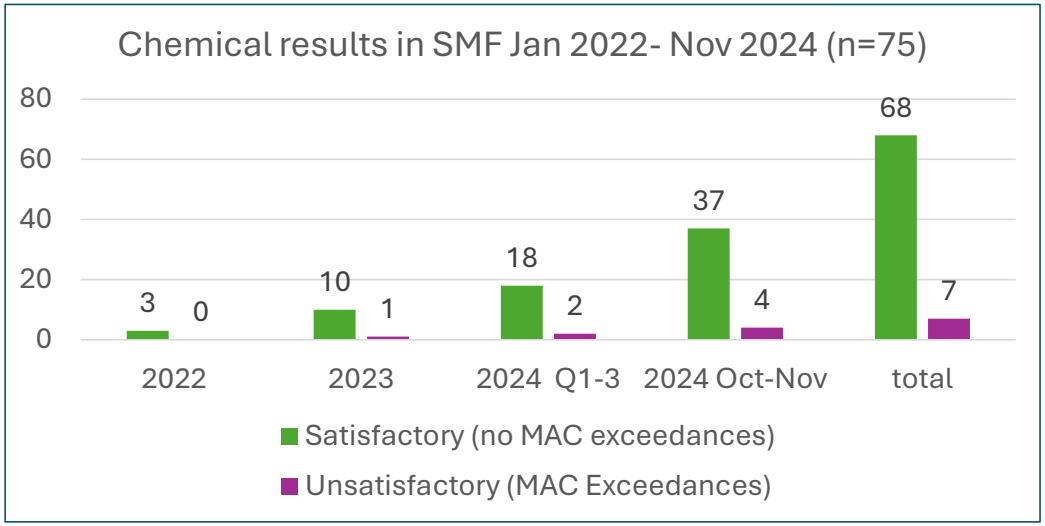
- Includes only samples submitted between Oct 1- Nov 15, 2024. Routine samples are tested using qualitative methods (presence/absence), resamples are tested using quantitative methods (numeration of the bacterial counts present).
- Coliforms are non-pathogenic bacteria found in the soil, plants, sewage and manure, but they should not be present in groundwater. They are used as an indicator of microbial contamination. As they are ubiquitous in the environment, the source of coliforms in unsatisfactory samples is often due to how the sample was collected. Submitters were advised to resample paying close attention to how they collect the sample. All resamples came back satisfactory, showing no coliforms present.
- For more information about bacteriological results: Understanding your drinking water bacteria test results
- E.coli are pathogenic bacteria found in the intestines of people and animals. Source is often sewage or manure contamination. No samples in showed the presence of E.coli.

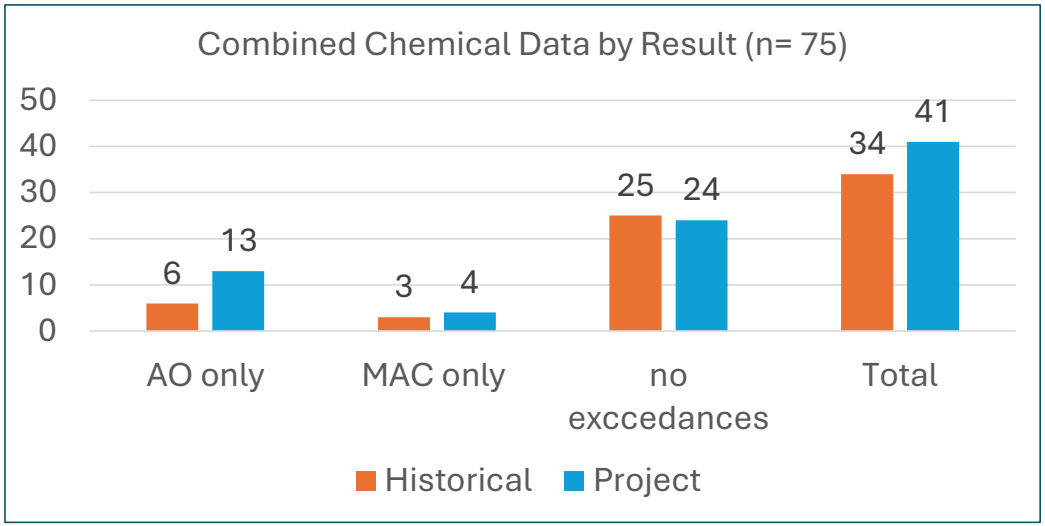
Chemical Samples

In total from Oct 1-Nov 15:
- 4/41 samples during the project window with MAC exceedances, 2 each for Fluoride and lead.

All other exceedances were from the historical sample data (Jan 2022-Sept 2024).

No data reported from historical records on levels of Sulfate found samples above the AO (500 mg/L)





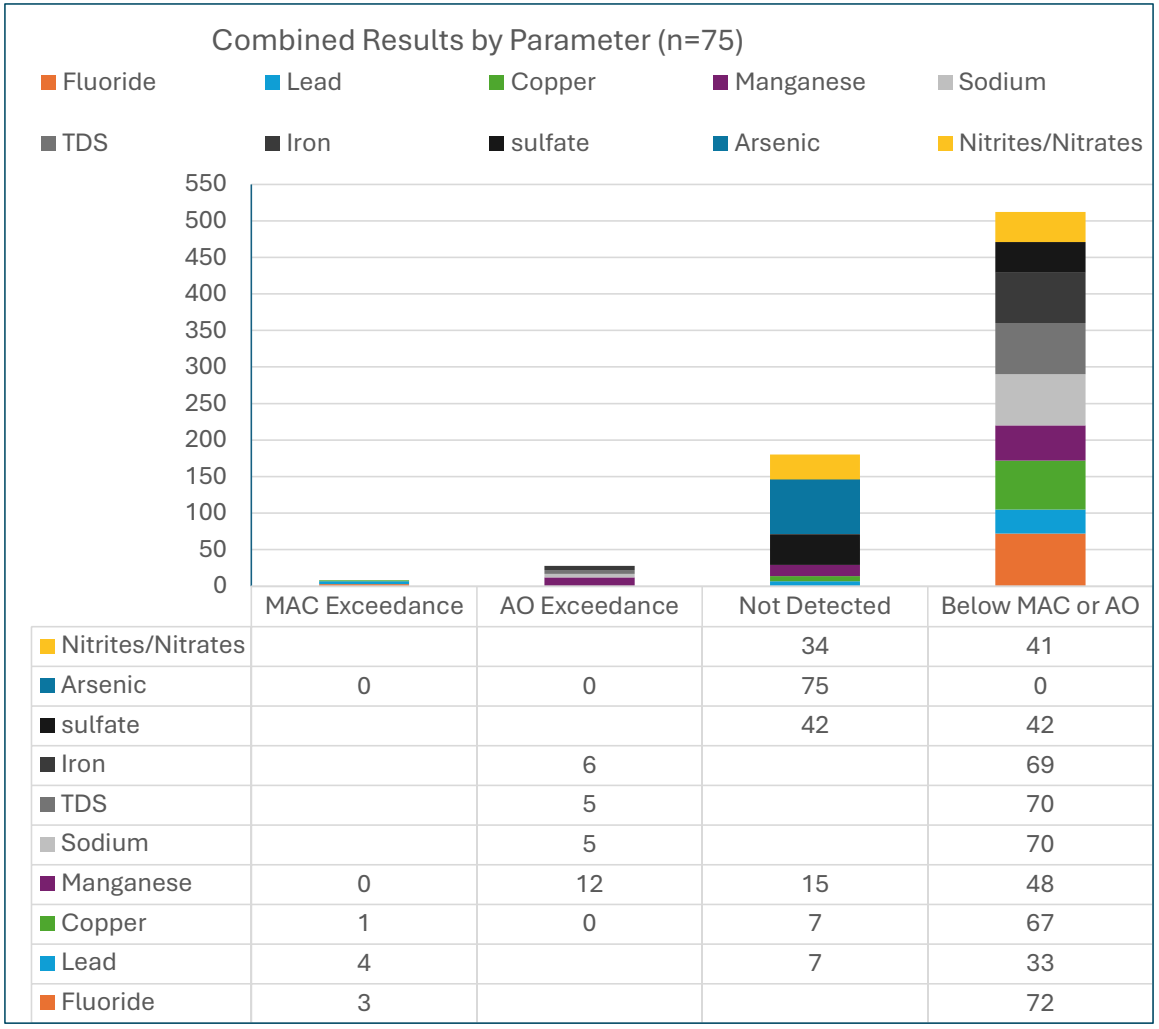
Report Notes

- Canadian Drinking Water Quality Guidelines (CDWQG):
  - MAC= Maximum Acceptable Concentration
  - AO= Aesthetic Objective
- Samples with an AO exceedance are still deemed safe for human consumption as there is no health effect for the general population associated with the parameter. Parameters with an AO are associated with maintenance issues, like with iron, or taste such as sodium. MAC= has a health effect associated, the value is based on the most vulnerable population, ie. Fluoride MAC 1.5 mg/L, but for adults there is no negative health effect up to 2.4 mg/L.
- The majority of samples from both the historical and project code data had no exceedances. Sometimes there was a MAC exceedance along with an AO exceedance, but sometimes there was only a MAC or only an AO exceedance.
- For the historical samples, 3 samples with a MAC exceedances were found. 4 project code samples had a MAC exceedance.

Chemical Samples

Parameters that were “Not Detected” in the samples:

- Aluminum
- Antimony
- Barium
- Boron
- Cadmium
- Chromium
- Mercury
- Selenium
- Uranium
- Nitrates
- Nitrites



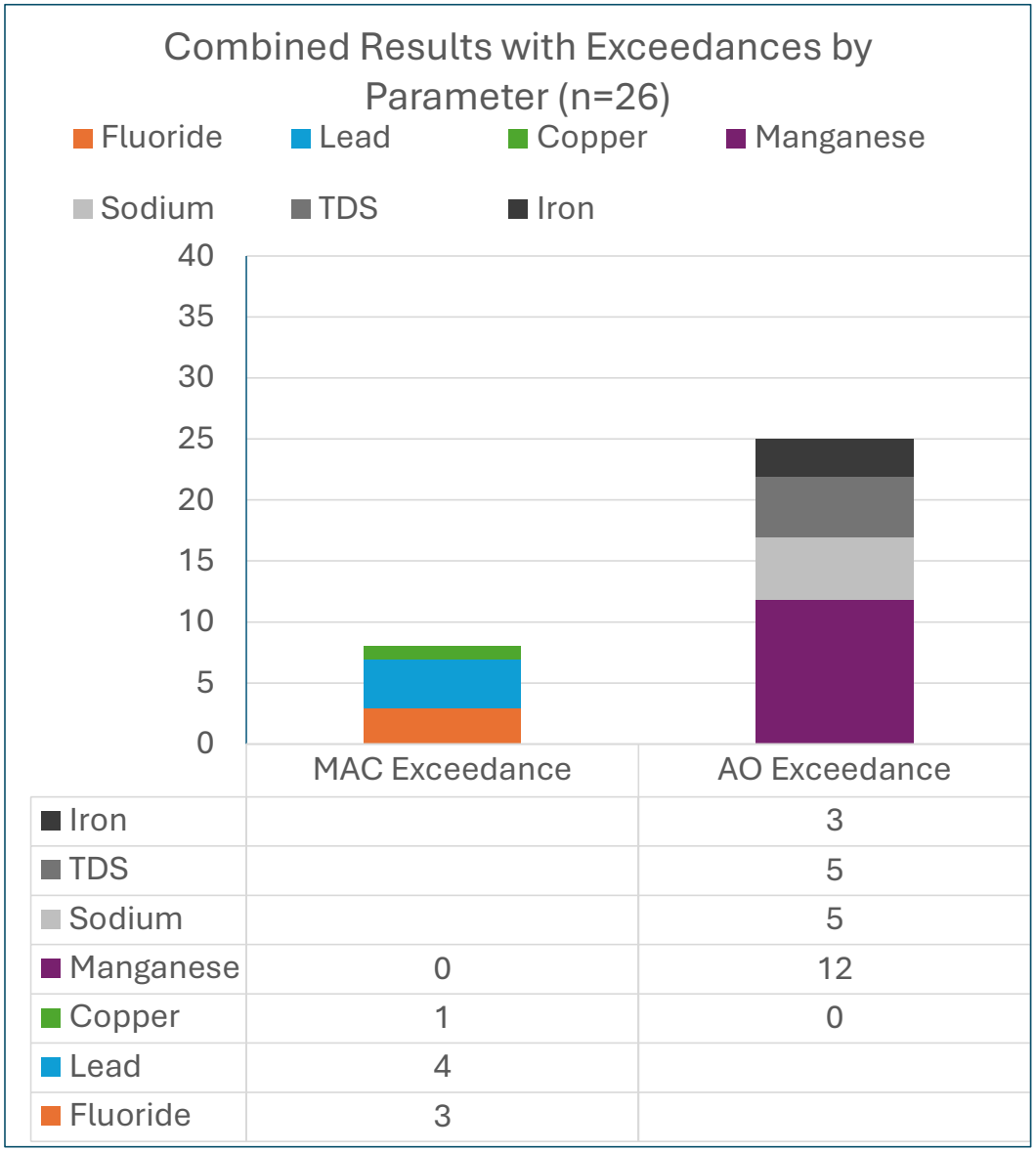
	MAC Exceedance	AO Exceedance	Not Detected	Below MAC or AO
Nitrites/Nitrates			34	41
Arsenic	0	0	75	0
sulfate			42	42
Iron		6		69
TDS		5		70
Sodium		5		70
Manganese	0	12	15	48
Copper	1	0	7	67
Lead	4		7	33
Fluoride	3			72

Report Notes

- Of the routine trace metals parameters tested, most were reported as "Not detected" and as such are not included in the chart, or the mapping. The majority of samples from both the historical and project code data had no exceedances.
- The parameters presented in the chart, sometimes there was a MAC exceedance along with an AO exceedance, but sometimes there was only a MAC or only an AO exceedance.
- Canadian Drinking Water Quality Guidelines (CDWQG):
  - MAC= Maximum Acceptable Concentration
  - AO= Aesthetic Objective

- 26/75 samples reported some type of exceedance.

  This chart shows the types of exceedances found.



	MAC Exceedance	AO Exceedance
Iron		3
TDS		5
Sodium		5
Manganese	0	12
Copper	1	0
Lead	4	
Fluoride	3	

Report Notes

- To focus in on the information from the previous slide, this chart shows the combined historical and project code data combined and the number of samples that reported each of these parameters above either the AO or the MAC. N=26 samples with exceedances.
- Note that Copper and Manganese have both a MAC and AO. No MAC exceedances for Manganese were found, but 12 AO exceedances were reported.

  - 1 MAC exceedance for Copper was found, and no AO exceedances.
- Canadian Drinking Water Quality Guidelines (CDWQG):
  - MAC= Maximum Acceptable Concentration
  - AO= Aesthetic Objective

Chemical Results summary by Exceedance

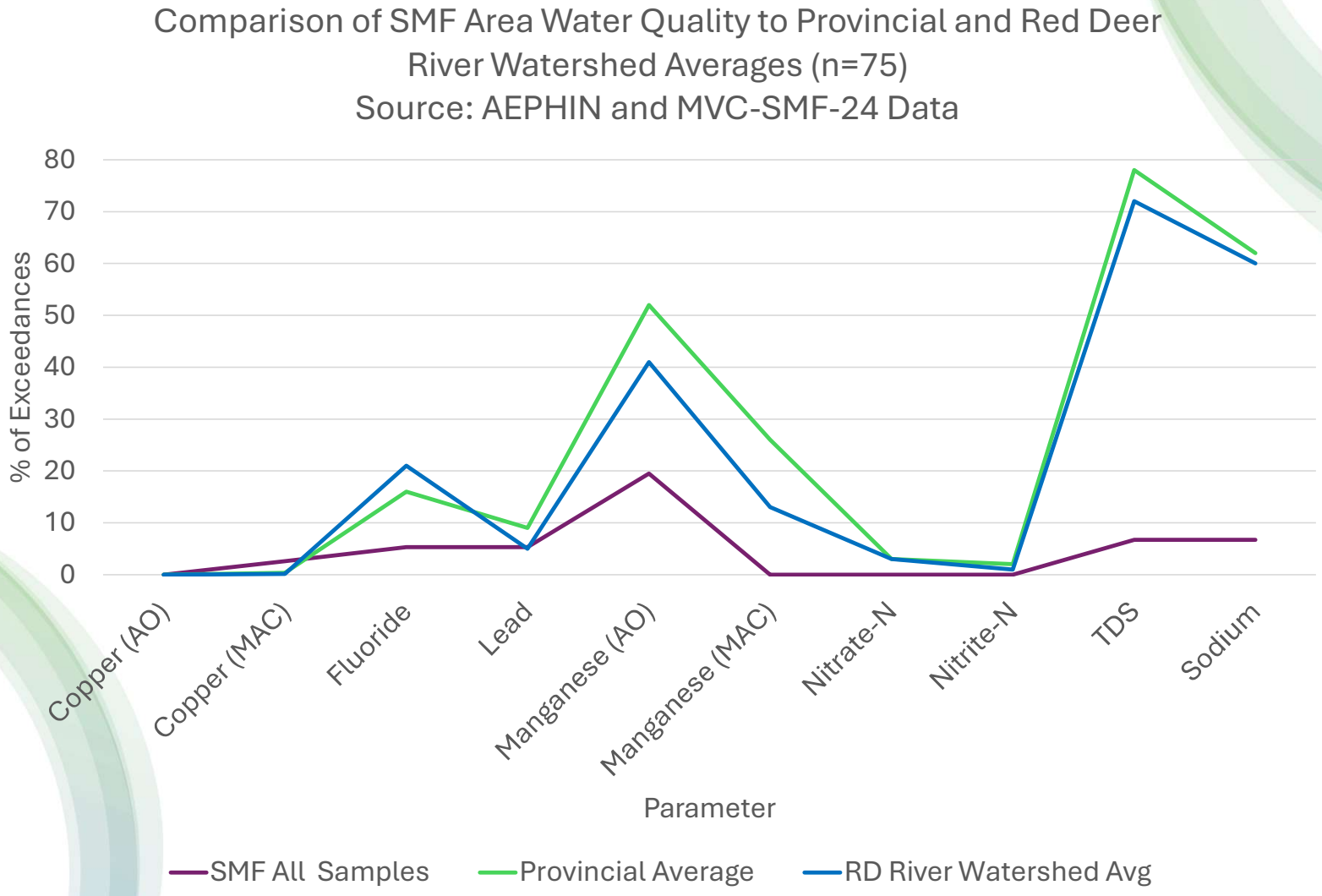
Parameter Result	MVC-SMF-24	SMF Area historical	Grand Total
MAC Exceeded	**4**	**3**	**7**
Lead & Copper		**1**	**1**
Fluoride only	**2**	**1**	**3**
Lead only	**2**	**1**	**3**
Satisfactory "PASS"	**37**	**31**	**68**
No Exceedances	24	25	49
AO Exceeded	13	6	19
Iron only	2		2
Manganese only	4	4	8
Manganese & Iron	4		4
Sodium & TDS	3	2	5
Grand Total	**41**	**34**	**75**

In some instances, there were multiple exceedances in the same sample.
(ex. Lead & Copper)

In other instances, there was only 1 exceedance.
(ex. Fluoride only)

Report Notes

- Of the 75 chemical samples, 26 samples reported some type of exceedance (7 MAC + 19 AO= 26)
- This table shows how many samples had multiple exceedances, and which had single exceedances and which parameters they were for.


Comparison of SMF Area Water Quality to Provincial and Red Deer River Watershed Averages (n=75)
Source: AEPHIN and MVC-SMF-24 Data
% of Exceedances
80
70
60
50
40
30
20
10
0
Copper (AO)
Copper (MAC)
Fluoride
Lead
Manganese (AO)
Manganese (MAC)
Nitrate-N
Nitrite-N
TDS
Sodium
Parameter
SMF All Samples
Provincial Average
RD River Watershed Avg

Report Notes

- Summary of key parameters when compared to the provincial averages (in green) and local watershed averages (in blue).
- Note: unless otherwise noted are for MAC exceedances only.
- The SMF All Samples (in purple) includes all 75samples (34 from the historical and 41 from the project code MVC-SMF-24 data).
- Note the project sample size is very small in comparison to the Watershed and Provincial data pool.
- The % of samples with exceedances in the SMF area is below average for all parameters except for Lead, while below provincial averages it was equal to the watershed average. As noted previously, Lead exceedances can be due to plumbing fixtures or stagnant sources. Recommend a flush retest for these.
- Canadian Drinking Water Quality Guidelines (CDWQG):
    - MAC= Maximum Acceptable Concentration
    - AO= Aesthetic Objective

Chemical Exceedances summary (n=75)

Data Source MVC-SMF-24 Project Historical Nov 2021-Sept 2024	**# Samples with MAC exceedance "pass"= AO exceedance or no Exceedances**	Fluoride (mg/L) MAC 1.5	Arsenic (mg/L) MAC 0.01	Lead (mg/L) MAC 0.005	Copper (mg/L) MAC 2.0 (AO 1.0)	Nitrate (N) (mg/L) MAC 10	Nitrite (N) (mg/L) MAC 1	Manganese (mg/L) MAC 0.12 (AO 0.02)	Sodium (mg/L) AO 200	TDS (Calc) (mg/L) AO 500	Sulfate (mg/L) AO 500	Iron (mg/L) AO 0.3
Historical Summary (n=34)	3 MAC Ex. 31pass	1MAC	0 MAC	2 MAC	1 MAC	No MAC	No MAC	0 MAC, 4 AO	3 AO	3AO	*not captured*	*not captured*
MVC-SMF-24 Summary (n-41)	4 MAC Ex. 37 pass	2 MAC	0 MAC	2 MAC	0 MAC 0 AO	0 MAC	0 MAC	0 MAC, 8 AO	2 AO	2 AO	0 AO	6 AO
TOTAL SUMMARY-Combined (n=75)	7 Samples with MAC 68 pass	3 MAC	0 MAC	4 MAC	1 MAC 0 AO	0 MAC	0 MAC	0 MAC 12 AO	5 AO	5 AO	0 AO	7 AO

Report Notes

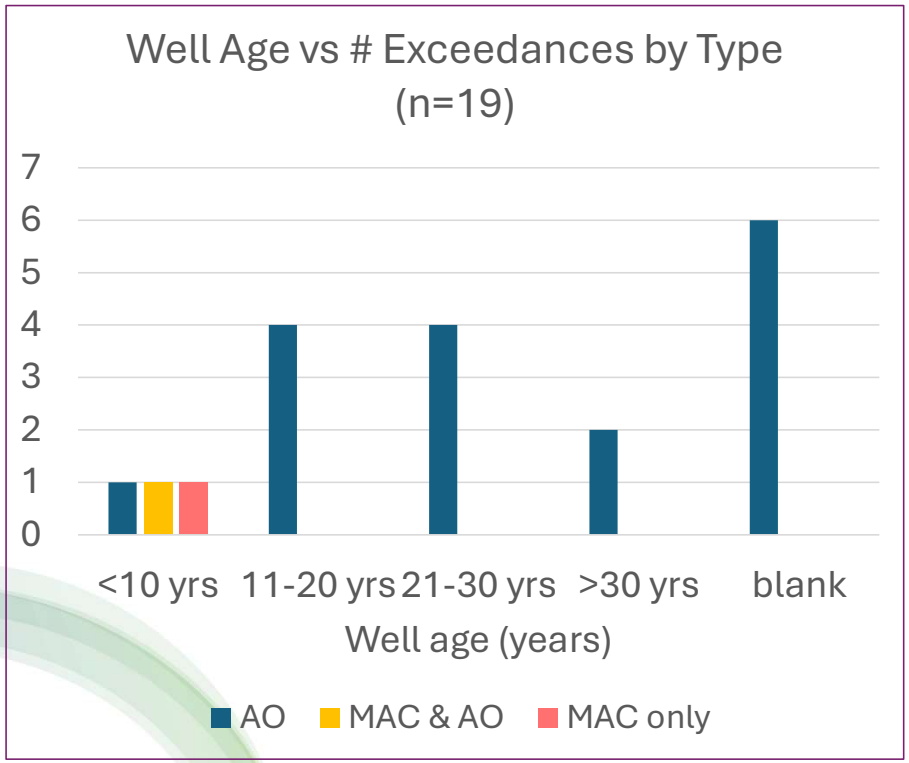
- This chart summarizes all MAC and AO exceedances for the parameters by the date range that were then compared to the provincial and watershed averages and also mapped.
- This chart breakdowns if the exceedance was from the historical samples or the project code (MVC-SMF-24) samples.
- Historical samples includes those submitted Jan 2022- September 2024, there were no samples submitted in the SMF area in 2021. MVC-SMF-24 samples includes those submitted Oct 1-Nov 15, 2024.
- Canadian Drinking Water Quality Guidelines (CDWQG):
  - MAC= Maximum Acceptable Concentration
  - AO= Aesthetic Objective

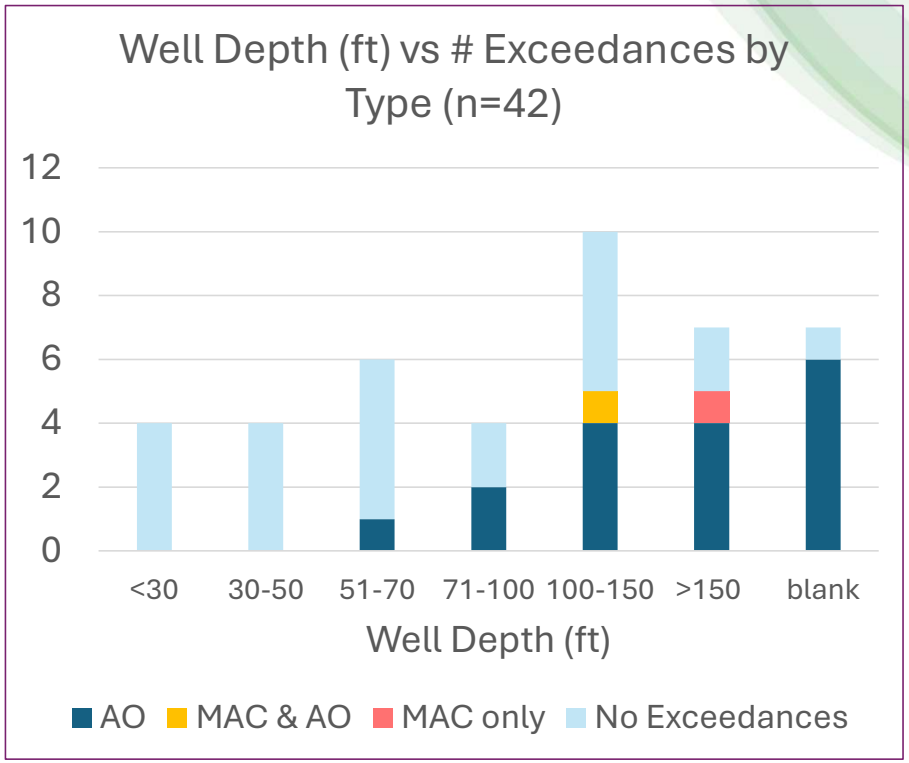
Parameter	Sodium	TDS	Sulphate	Arsenic	Copper	Fluoride	Lead	Manganese	Nitrate (Nitrate-Nitrogen)	Nitrite (Nitrite-Nitrogen)
AO/MAC	AO 200	AO 500	AO 500	MAC 0.01	AO 1.0 MAC 2.0	MAC 1.5	MAC 0.005	AO 0.02 MAC 0.12	See note	See note
# total Exceedances (historical and current) n=75	5/75 = 6.7%	5/75 = 6.7%	0	0	1/75 MAC = 1.3%	4/75= 5.3%	4/75= 5.3%	0/75 MAC 12/75 AO= 16%	0	0
% of Project Samples (n=41)	3/41= 7.3%	3/41= 7.3%	0	Not detected	0	2/41= 4.9%	2/41= 4.9%	8/41= 19.5% AO MAC- 0%	0	0
% Historical SMF Area (2022-2024) samples (n=34)	2/34= 5.9%	2/34= 5.9%	Not captured	Not detected	MAC 1/34= 2.9%	2/34= 5.9%	2/34= 5.9%	0 % > MAC 4/34=11.8% >AO	0	0
Provincial Average AEPHIN 2001-2019	62% >AO Median 250	78% > AO Median 726	9% > AO Median 71.8	14% >MAC Median 0.0005	0.36 % MAC Median 0.005	16% Median 0.3	9% Median 0.0005	26% >MAC Median 0.022 52%> AO	3% >MAC Median 0.115	2% >MAC Median 0.015
Red Deer River Watershed (2001-2019) Median (mg/L)	60% > AO Median 233	72% >AO Median 643	10% > AO Median 63	1% > MAC Median 0.0005	0.15% Median	21% >MAC Median 0.4	5% >MAC Median 0.0004	13% > MAC Median 0.011 41%> AO	3%> MAC Median 0.115	1% >MAC Median 0.015
notes					Historical AO exceedances not reported, only MAC exceedances		Potential confounder- lead containing fixtures. Flush test retest recommended. ** all 3 were outside of SMF area.	In 2019 the MAC was lowered to 0.02 and a MAC of 0.12 est.	(nitrate-Nitrogen **MAC 10**) Nitrate, MAC 45	(Nitrite-nitrogen, **MAC 1.0**) Nitrite, MAC 3.0
Comparison	Below avg	Below avg	Below avg	Below avg	Below avg	Below avg	At or Below avg	Below avg	Below avg	Below Avg

Report Notes

- Summary table of key parameters that were then mapped. In total there were 75 samples (34 historical and 41 MVC-SMF-24 data). MAC= Maximum Acceptable Concentration, AO= Aesthetic Objective.
- Includes comparison to the provincial and local watershed historical averages (based on AEPHIN data up to 2019, note that trace metals not routinely reported prior to 2019). The median (average) reported value is shown in units of mg/L.
- We compared the project and historical data with the AEPHIN data for provincial averages as well as a more specific comparison to the local watershed. The SMF area wells tested in this project report lower levels than both the provincial and local watershed averages.
- A limitation of this is that AEPHIN doesn't include the sample data from 2019-2024, which is when trace metals became part of routine testing. In the next AEPHIN update, which we anticipate sometime this year, there will be opportunity to re-assess, as well when we conduct the resampling in 2027, as agreed upon for a 3 year follow up.
- Proposed follow up for those with Lead and copper exceedances is to recommend a flushed retest as there could be metals from plumbing fixtures if taken from stagnant or infrequently used taps/lines.

Relationship to Well Age and Depth

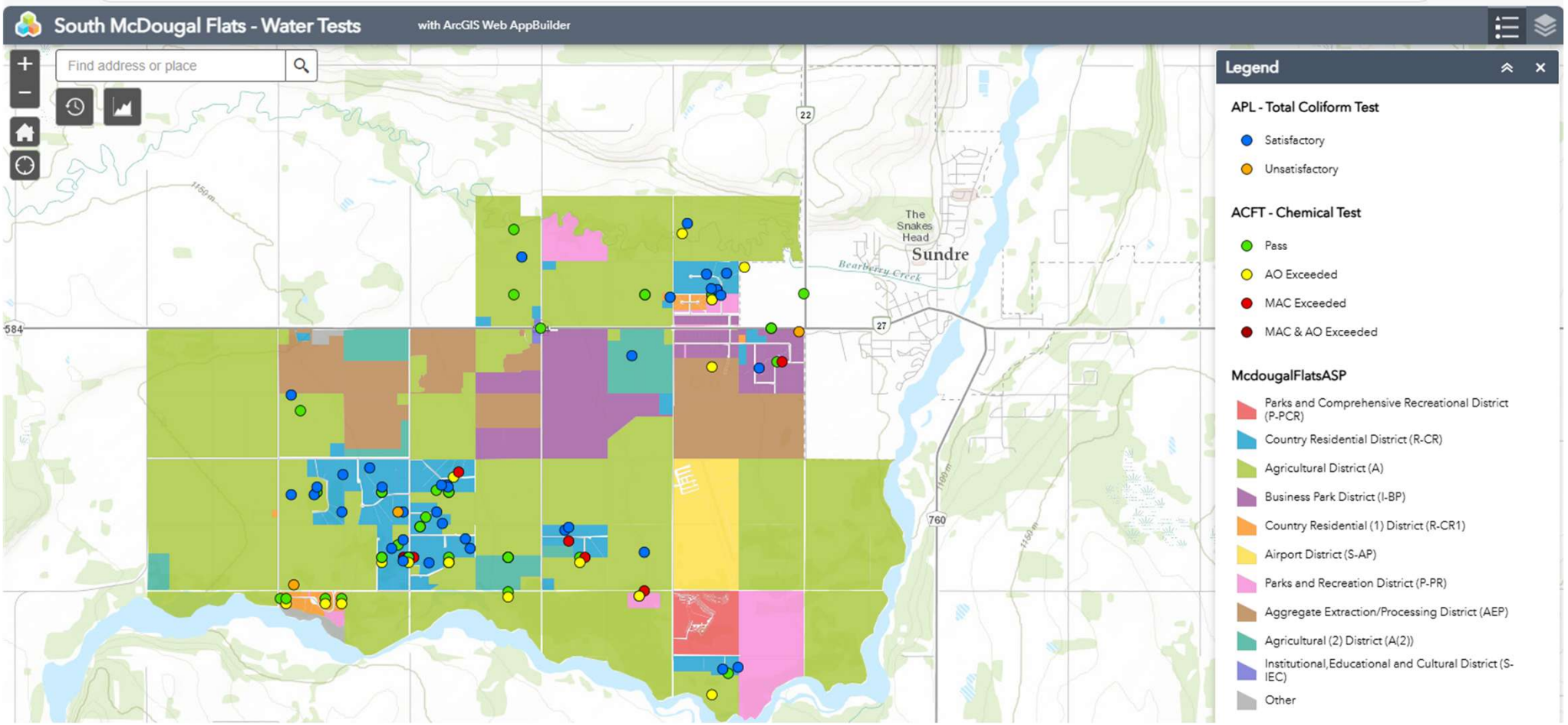




Report Notes

- There was not sufficient reliable capture of well depth or age provided on the requisitions by submitters to be able to map or make any associations between age or depth of wells when analyzing the data.
- For the MVC-SMF-24 samples taken between Oct –Nov 2024, typically we think of shallower and older wells as being more vulnerable. We also do expect higher mineral counts in wells that are deeper. This was reflected in the data, with deeper wells being associated with the identified MAC exceedances. However well depth and age were not consistently captured for us to make any statistically significant associations.

https://arcg.is/1eXfGq



Report Notes

- Time lapse feature shows up on the bottom by year-quarter. Heat map indicates the # of samples in a particular area.
- Charts feature visualizes the breakdown of the results in each category.
- Table feature displays all 39 bacteriological (APL) and 75 chemical (ACFT) results
- Bacteriological and chemical data are separated
- APL Samples are for the Bacteriological results: TC present/TC absent
- ACFT samples are for the Chemical results:
  - satisfactory result = those with no MAC exceedances or AO exceedances, but note that sources with AO only exceedances are deemed POTABLE or fit for human consumption
  - MAC exceedance
  - AO only exceedance
  - AO & MAC exceedance (this is for the 1 Copper exceedance, which exceeds both the MAC and AO)

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Thank you