Community Flow Monitoring Network

Vancouver Island

SPRING 2024 Network Meeting

April 24, 2024

10:00 AM - 12:00 PM

Via Zoom

Project funding and support provided by:

PACIFIC SALMON FOUNDATION

BRITISH COLUMBIA Ministry of Environment and Climate Change Strategy

BRITISH COLUMBIA Community Gaming Grants

HABITAT CONSERVATION TRUST FOUNDATION

The McLean Foundation

REGIONAL DISTRICT OF NANAIMO

Meeting Agenda

1) Introduction

2) 2024 Update

-What's new

-What's next

3) Discussion – Flow Data to Action

5-10 minute break (~ 11:00)

4) Jon Jeffery – Aquarius Web Portal tutorial and how to use rating tables

Where are we?

Community Flow Monitoring Network

Vancouver Island

BRITISH COLUMBIA CONSERVATION FOUNDATION

Legend

- Current stations
- Proposed stations – 2024
- Interest in future involvement

2024 Update

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- Data publication progress
- Station upgrades
- New Resources

2024 Update

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- **Data publication progress**
  - Some data sets are now publicly available on Aquarius
  - Continuous discharge data review in progress
  - More info coming up in Jon’s presentation

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2024 Update

Station Upgrades

New Loggers

New housing set ups ->

2024 Update

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New Resources

- Calendar / Field Schedule
  - Available on website & Google Drive

Vancouver Island
Community Flow Monitoring Network

Annual Field Work Schedule
(General)

Winter	Spring	Summer	Fall
January – early March: • Winter *high* flow measurement – FT2* stage + discharge • Logger downloads	**Late March – June:** • Spring *moderate* flow measurement – FT2 stage + discharge • Station maintenance	**Late June/July:** • *Low* flow measurement – FT2 or bucketfill stage + discharge • Station maintenance	**September/October:** • Fall *moderate* flow measurement - FT stage + discharge • Level Survey

2024 Update

Community Flow Monitoring Network

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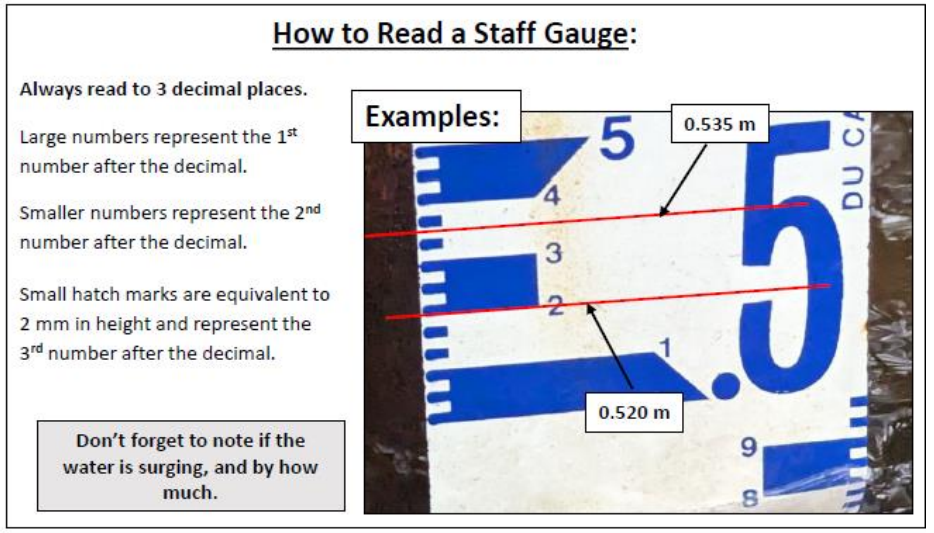
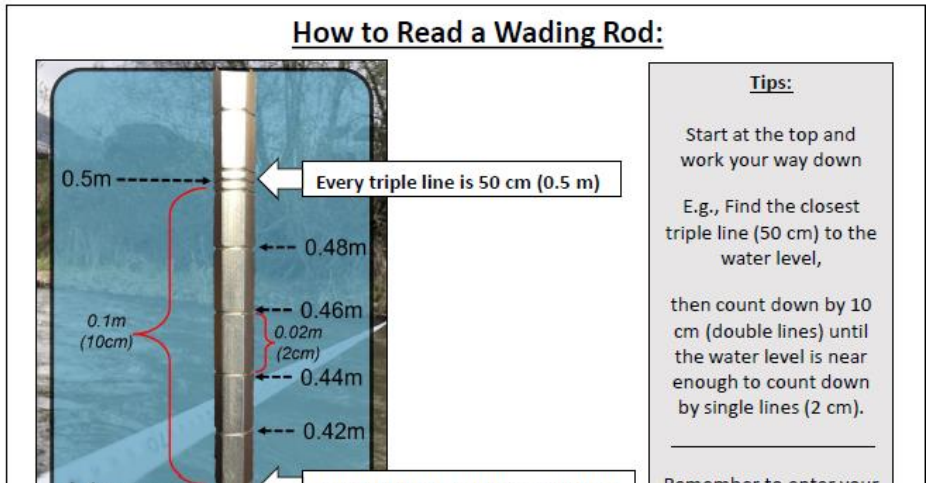
New Resources

- One-page Field Guide
  - Available on website & Google Drive





2024 Updates

Community Flow Monitoring Network

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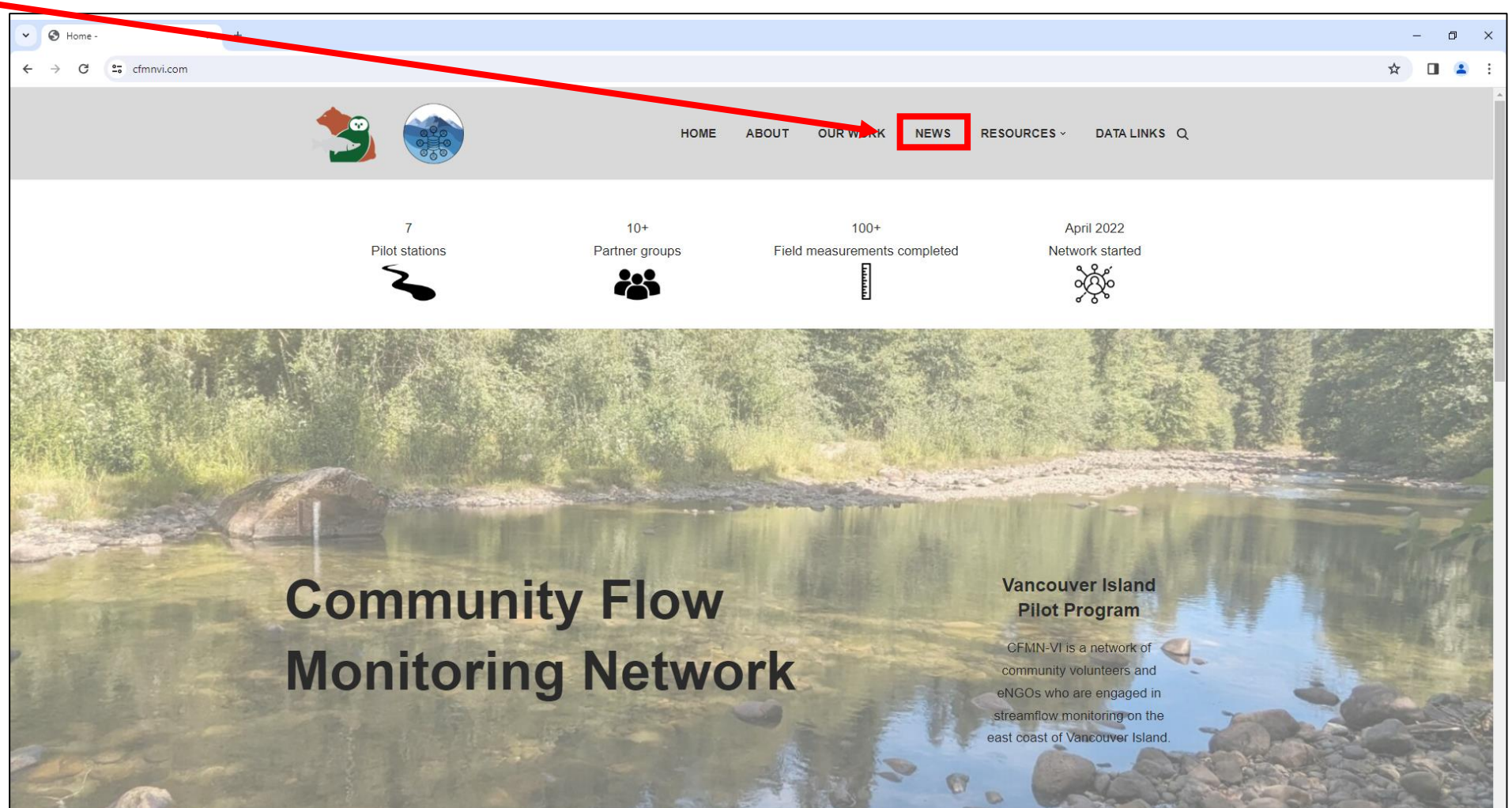
cfmnvi.com



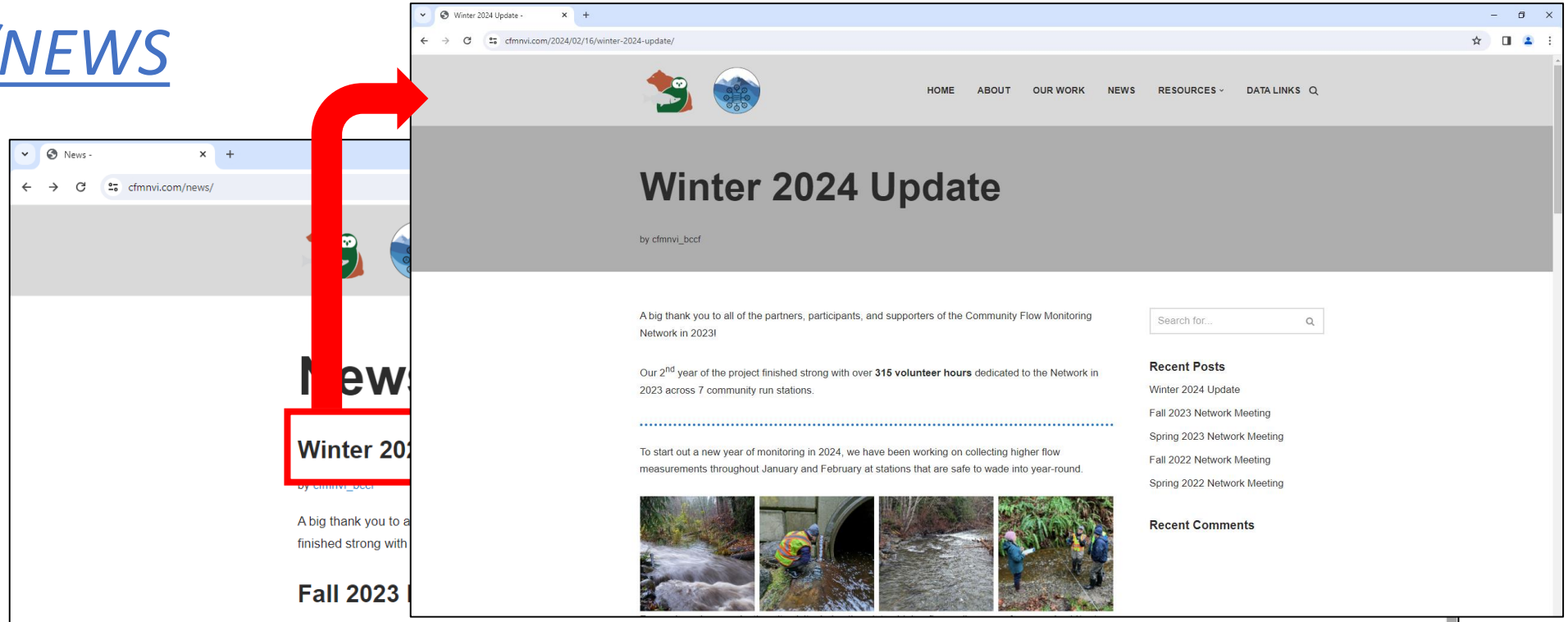
2024 Updates

Community Flow Monitoring Network

Vancouver Island

BRITISH COLUMBIA CONSERVATION FOUNDATION

cfmnvi.com/NEWS



2024 – What's Next?

Community Flow Monitoring Network

Vancouver Island

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2024 – What's Next?

Community Flow Monitoring Network

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Spring Level Surveys

2024 – What's Next?

Community Flow Monitoring Network

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Spring Level Surveys

Flow Tracker

2024 – What's Next?

Community Flow Monitoring Network

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BRITISH COLUMBIA CONSERVATION FOUNDATION

Spring Level Surveys

Flow Tracker

Flow Regatta

2024 – What's Next?

Community Flow Monitoring Network

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Flow Regatta

July 2024 - Date TBD

Outdoors, in-person

Lunch, and snacks provided

2024 – What's Next?

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Flow Regatta – July 2024

Equipment demonstrations, skills testing

Flow -> habitat & watershed health

Guest speakers/presenters

2024 – What's Next?

Community Flow Monitoring Network

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Flow Regatta

Location?? - TBD

Survey

- Where – i.e., how far are you willing to drive?
- When – Weekday, weekend?

2024 – What's Next?

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Station Summaries Report – 2024 Update

Vancouver Island
Community Flow Monitoring Network
Pilot Project

STATION SUMMARIES

2023-24


Discussion: Data to Action

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- What kinds of projects do you have planned for your stream in 2024?
- What are you most interested in learning about your stream in relation to flow?
- Have your goals for flow monitoring changed since you started?

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5 Minute Break

Project funding and support provided by:

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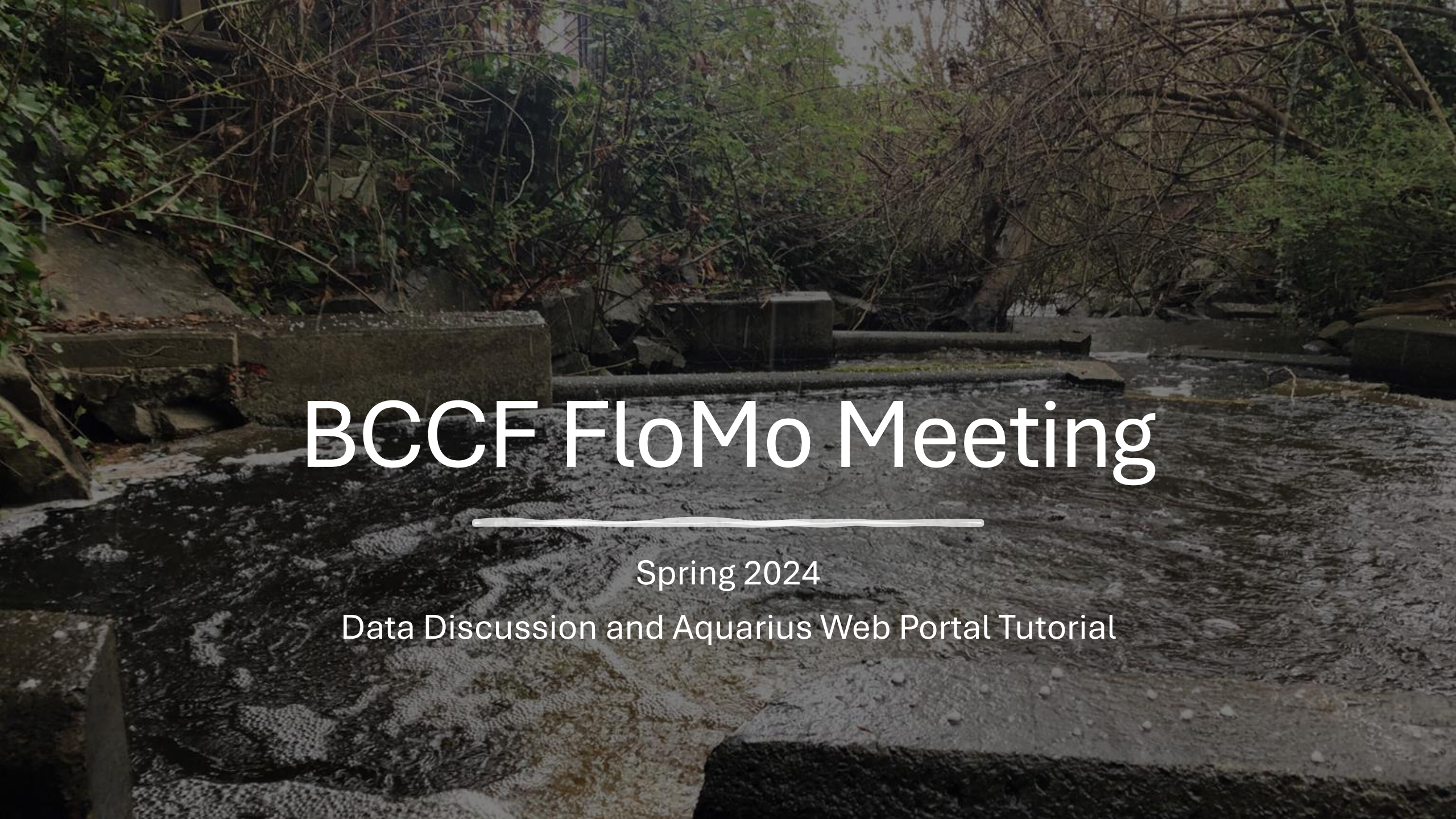


BCCF FloMo Meeting

Spring 2024

Data Discussion and Aquarius Web Portal Tutorial

Cooking with Hydrometrics

- Hydrometrics consists of **data collection** and **data review**

- Data Collection = getting the ingredients
- Data Review = cooking the ingredients

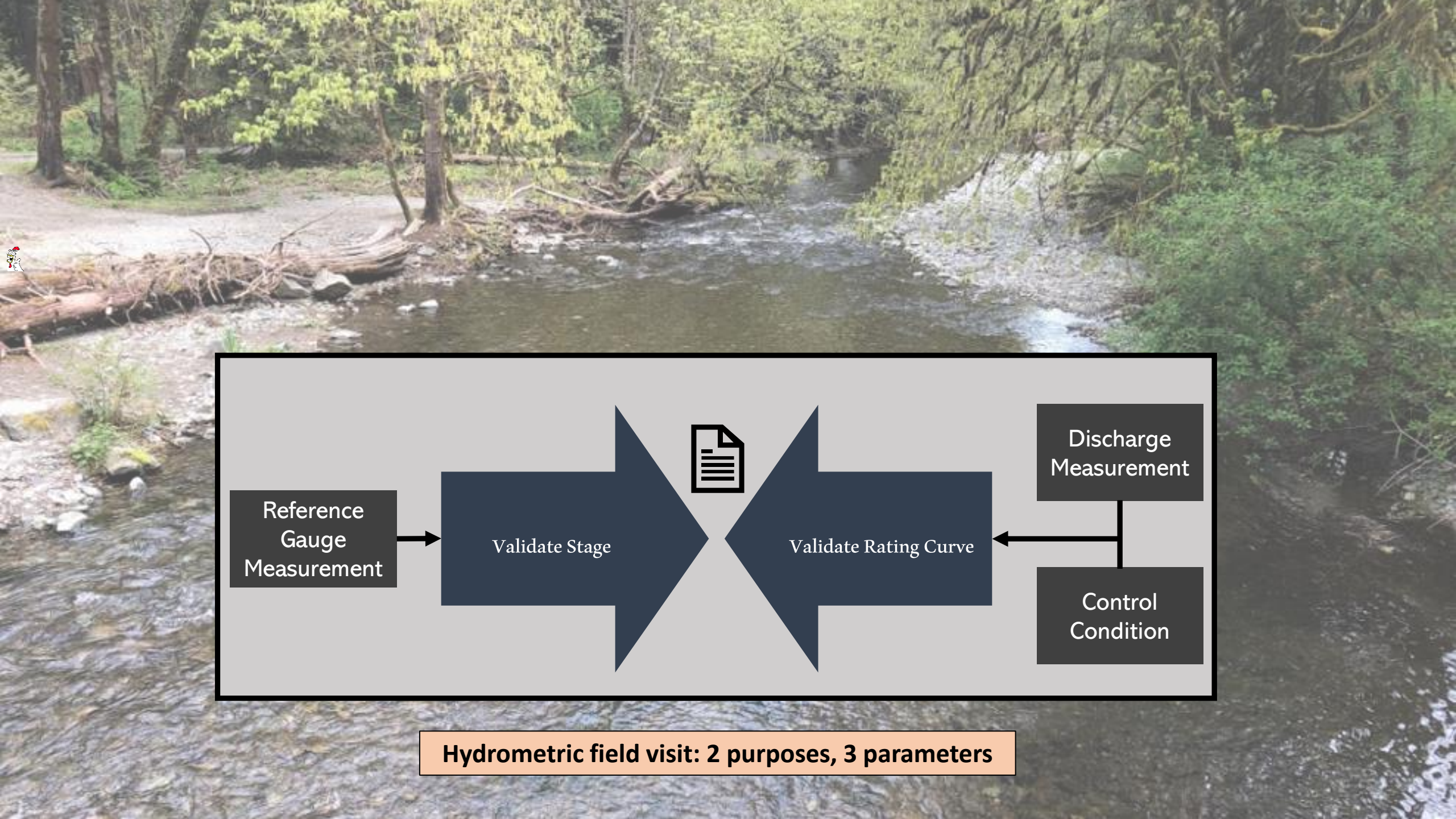
Hydrometric Chicken à la RISC

Ingredients:

- 1 cup – stage data
- 6-8 tbsp – field notes
- 1-2 tsp – benchmark level tie
- Meta-data to taste

Instructions:

- Bake according RISC standards



Hydrometric field visit: 2 purposes, 3 parameters

Data à la PHP: Instructions

1	Organize/Upload: Field Visits, Documentation and Raw Data	☐
2	Review of Benchmark Stability	☐
3	Stage: Review, Correction, Grading	☐
4	Review/Development of Rating Curve	☐
5	Application of Shifts (if applicable)	☐
6	Discharge: Review, Correction, Grading	☐
7	Final Reports Publication	☐

1. Data Upload

Field Visits
Volunteers

- Upload
- Attach
- grade

Benchmark Stability

- Review
- Assess GC

2. Stage

Upload
- Upload raw stage to .logger

BCCF

Correct
- Fill gaps >2h if possible
- Pre-process GC (if applicable)
- Apply estimated and validated SRC drifts
- Trim data

Grade
- Use RISC as guideline
- Include any notes/qualifiers for data approver
- Adjust approval to In Review

3. Rating Model

Assess	Develop	Finalize
• Confirm Q quality • Confirm cMGH • Control observations	• PZF • Channel conditions • Hypotheses	• Rating development template • grading

4. Discharge

Assess
- Assess measured discharge vs. rated discharge, adjust curve if necessary or consider shift scenario

Shift
- Apply shifts – time based or stage based – over perceived periods of stability

Grade
- Use RISC as guideline
- Include any notes/qualifiers for data approver
- Adjust approval to In Review

5. Documents

- BM Stability Report
- Station Description
- Computation Checklist
- Rating Development Template
- Station Analysis

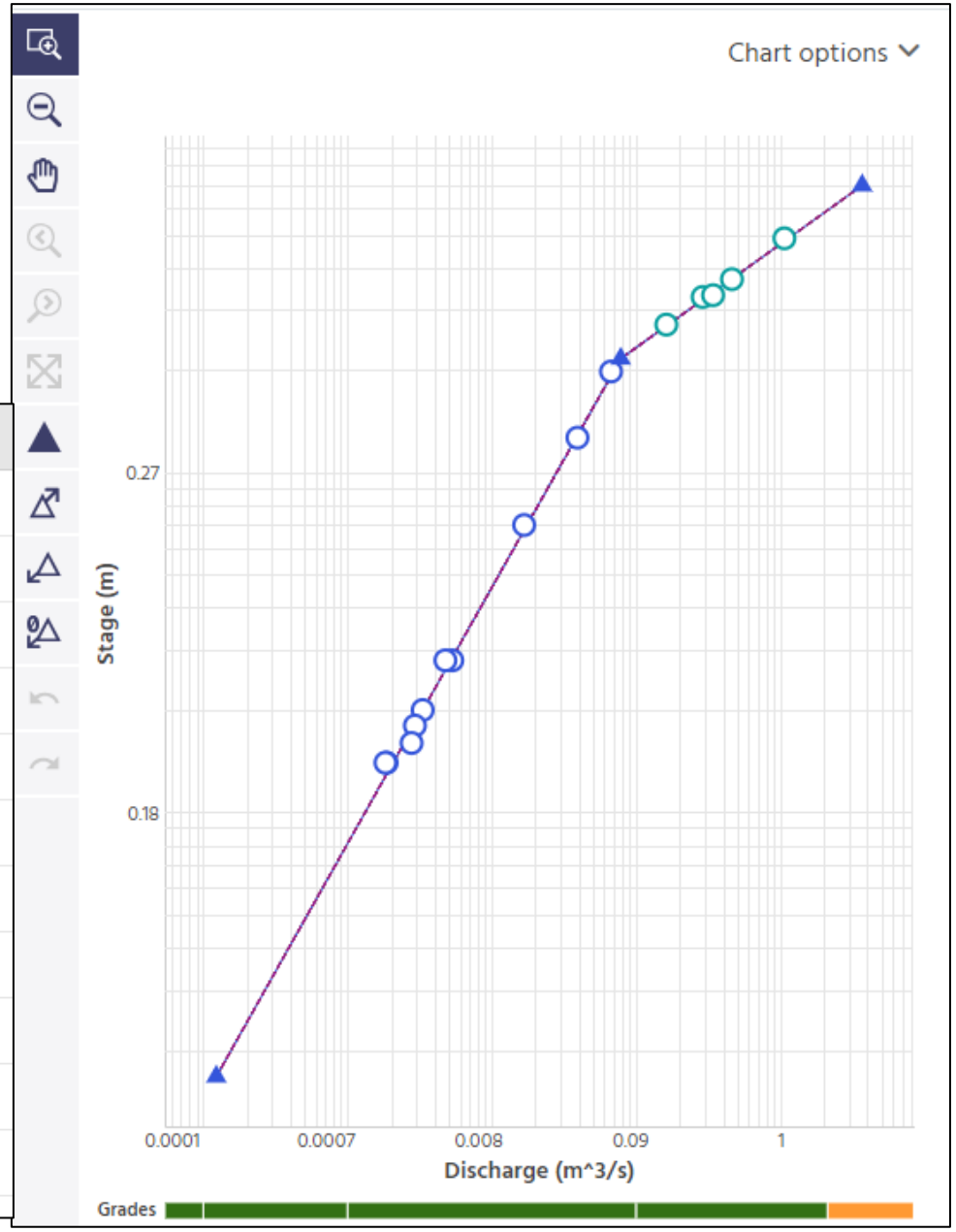
Data Update

Site	Status	Timeline
Grandon Creek	Historical (2012-2022)	Finalized and approved – grade unknown
	2023	Finalized and approved – **grade C ☺**
Beach Creek	Historical (2020-2022)	Started - In Review – rating curve needs development
	2023	Started - In Review
Cook Creek	Historical (2018-2022)	Started - In Review – prelim rating curve
	2023	Started - In Review
Tsolum Creek	Historical (2012-2022)	Started - In Review
	2023	Started - In Review
Departure Creek	Historical	N/A
	2023	Rating curve needs development
Wilfred Creek	Historical (2018-2022)	Not yet started – rating curve needs development
	2023	Not yet started
Morrison Creek	Historical	N/A
	2023	Rating curve needs development

Data Quality – Great work!

- Grandon Creek – stable control

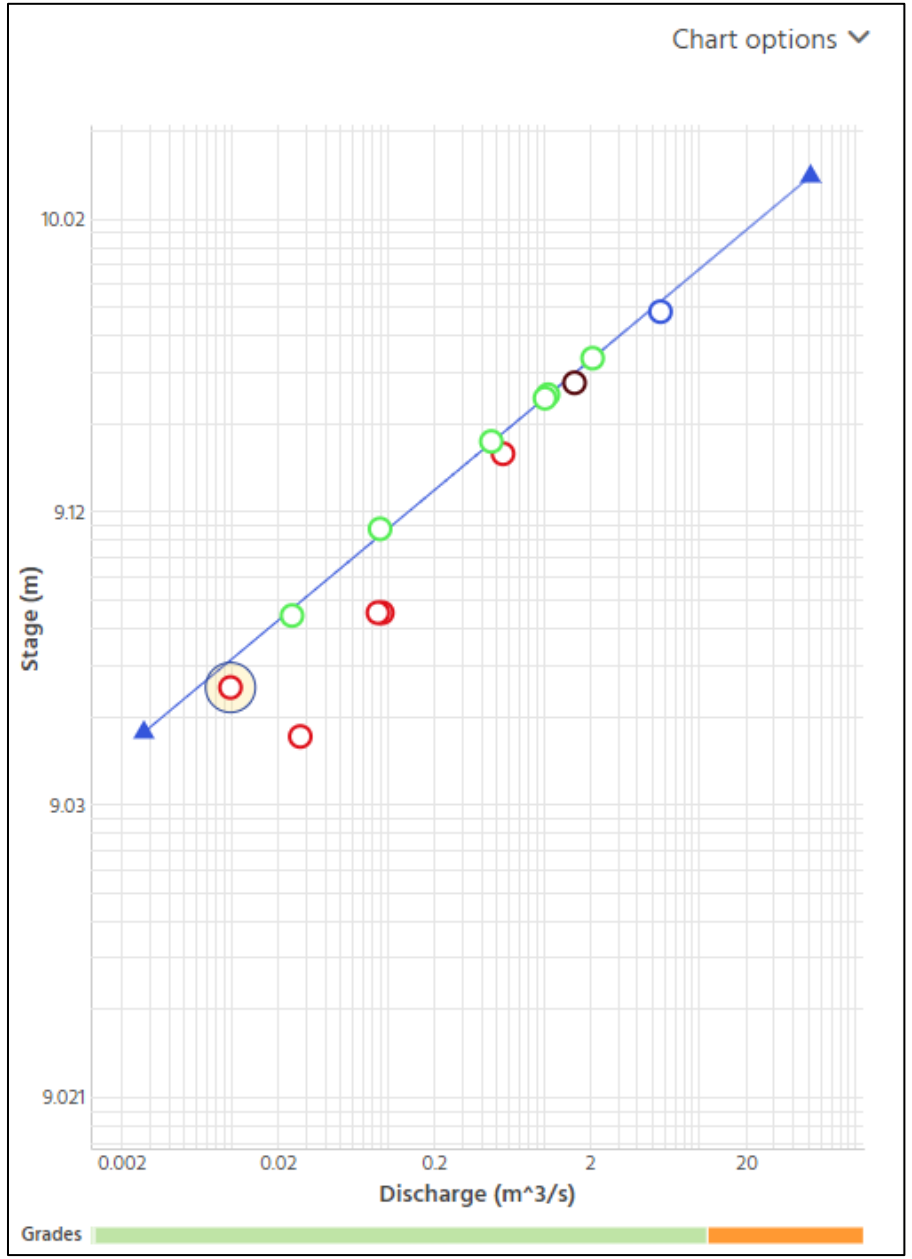
Use	Chart view	Timestamp ↓	Stage m	Discharge m^3/s	Shift m	R Error %	Method	Grade
☑	○	2024-01-26 11:16:54	0.5020	0.341	0.0063	6.35	Mid-section	51 - Excellent
☑	○	2023-10-13 11:30:00	0.1980	0.00476	-0.0018	-8.23	Volumetric	25 - Best Practice
☑	○	2023-08-14 14:07:05	0.1840	0.00183	-0.0012	-11.49	Mid-section	25 - Best Practice
☑	○	2023-08-14 13:18:22	0.1840	0.00186	-0.0010	-9.78	Volumetric	25 - Best Practice
☑	○	2023-07-26 12:57:30	0.1860	0.00277	0.0015	12.41	Volumetric	25 - Best Practice
☑	○	2023-05-26 13:02:30	0.1980	0.00531	0.0005	2.43	Volumetric	31 - Good
☑	○	2023-04-19 13:51:15	0.2965	0.0391	0.0019	1.97	Mid-section	31 - Good
☑	○	2023-03-03 15:42:40	0.4420	0.162	-0.0024	-2.85	Mid-section	51 - Excellent
☑	○	2023-02-12 15:15:00	0.3680	0.0668	-0.0058	-3.87	Mid-section	31 - Good
☑	○	2022-11-04 13:00:00	0.2400	0.0167	-0.0024	-4.48	Volumetric	25 - Best Practice
☑	○	2022-09-19 16:00:00	0.1880	0.00292	0.0002	1.43	Volumetric	25 - Best Practice



Data Quality – Great work!

- Cook Creek – changing control

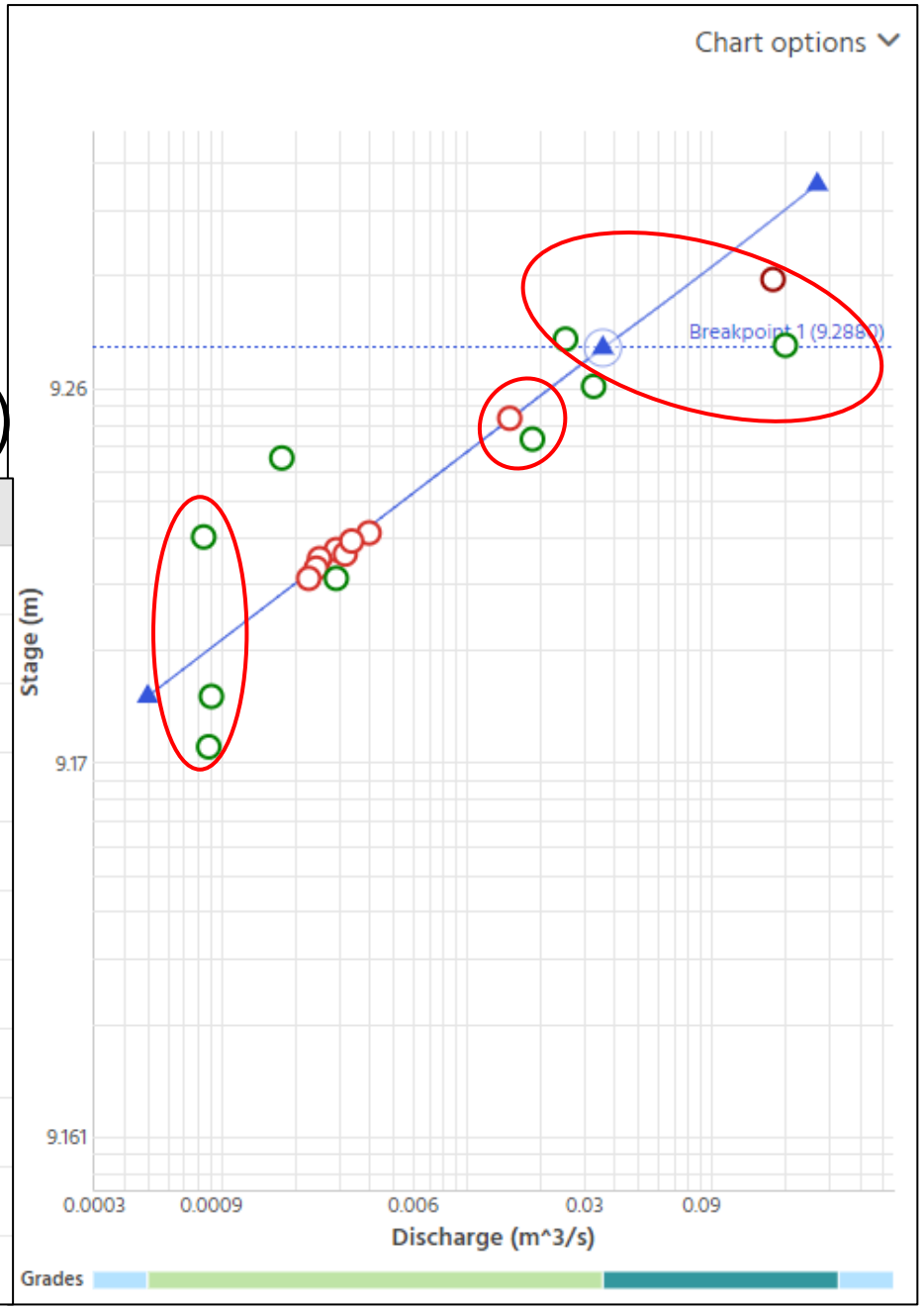
Use	Chart view	Timestamp ↓	Stage m	Discharge m^3/s	Shift m	R Error %	Method	Grade
☑	○	2023-12-19 11:06:02	9.3530	2.09	0.0001	0.09	Mid-section	31 - Good
☑	○	2023-10-04 10:40:45	9.1070	0.0908	-0.0044	-10.92	Mid-section	41 - Very Good
☑	○	2023-07-25 10:50:09	9.0640	0.0248	0.0024	12.66	Mid-section	25 - Best Practice
☑	○	2023-05-08 13:23:18	9.1930	0.469	-0.0015	-1.99	Mid-section	31 - Good
☑	○	2023-04-18 12:45:03	9.2630	1.03	0.0007	0.66	Mid-section	41 - Very Good
☑	○	2023-02-06 12:00:00	9.2700	1.08	-0.0014	-1.26	Mid-section	51 - Excellent
☑	○	2022-10-05 10:30:00	9.0450	0.01	0.0060	62.04	Mid-section	21 - Estimated
☑	○	2022-08-18 10:15:00	9.0370	0.028	0.0320		Mid-section	31 - Good
☑	○	2022-07-19 10:45:00	9.0650	0.088	0.0365	280.20	Mid-section	41 - Very Good
☑	○	2022-07-19 10:11:17	9.0650	0.0938	0.0389	305.43	Mid-section	51 - Excellent
☑	○	2022-04-13 13:00:00	9.1770	0.557	0.0281	44.85	Mid-section	41 - Very Good



Data Quality – Great work!

- Beach Creek – unstable control (vegetation)

Use	Chart view	Timestamp ↓	Stage m	Discharge m^3/s	Shift m	R Error %	Method	Grade
☑	○	2024-01-26 14:12:08	9.3550	0.178	0.0873	107.76	Mid-section	31 - Good
☑	○	2023-11-27 13:08:53	9.2950	0.0254	-0.0276	-37.07	Mid-section	31 - Good
☑	○	2023-10-13 14:11:31	9.2250	0.00176	-0.0368	-81.09	Mid-section	21 - Estimated
☑	○	2023-09-16 11:27:30	9.2000	0.000846	-0.0205	-76.09	Volumetric	
☐	○	2023-08-14 10:47:53	0.1740	0.000909	9.0062		Mid-section	25 - Best Practice
☐	○	2023-07-05 11:31:00	0.1700	0.000887	9.0100		Volumetric	25 - Best Practice
☑	○	2023-05-16 15:00:00	9.1910	0.00294	0.0055	38.16	Volumetric	25 - Best Practice
☑	○	2023-04-19 11:17:50	9.2330	0.0186	0.0188	58.09	Mid-section	41 - Very Good
☑	○	2023-03-03 13:22:30	9.2900	0.20	0.1696	437.59	Estimated	21 - Estimated
☑	○	2023-02-12 16:05:00	9.2610	0.033	0.0216	47.12	Mid-section	25 - Best Practice
☑	○	2022-11-12 10:32:30	9.1990	0.0034	0.0002	0.98	Volumetric	25 - Best Practice



Use								
☑								
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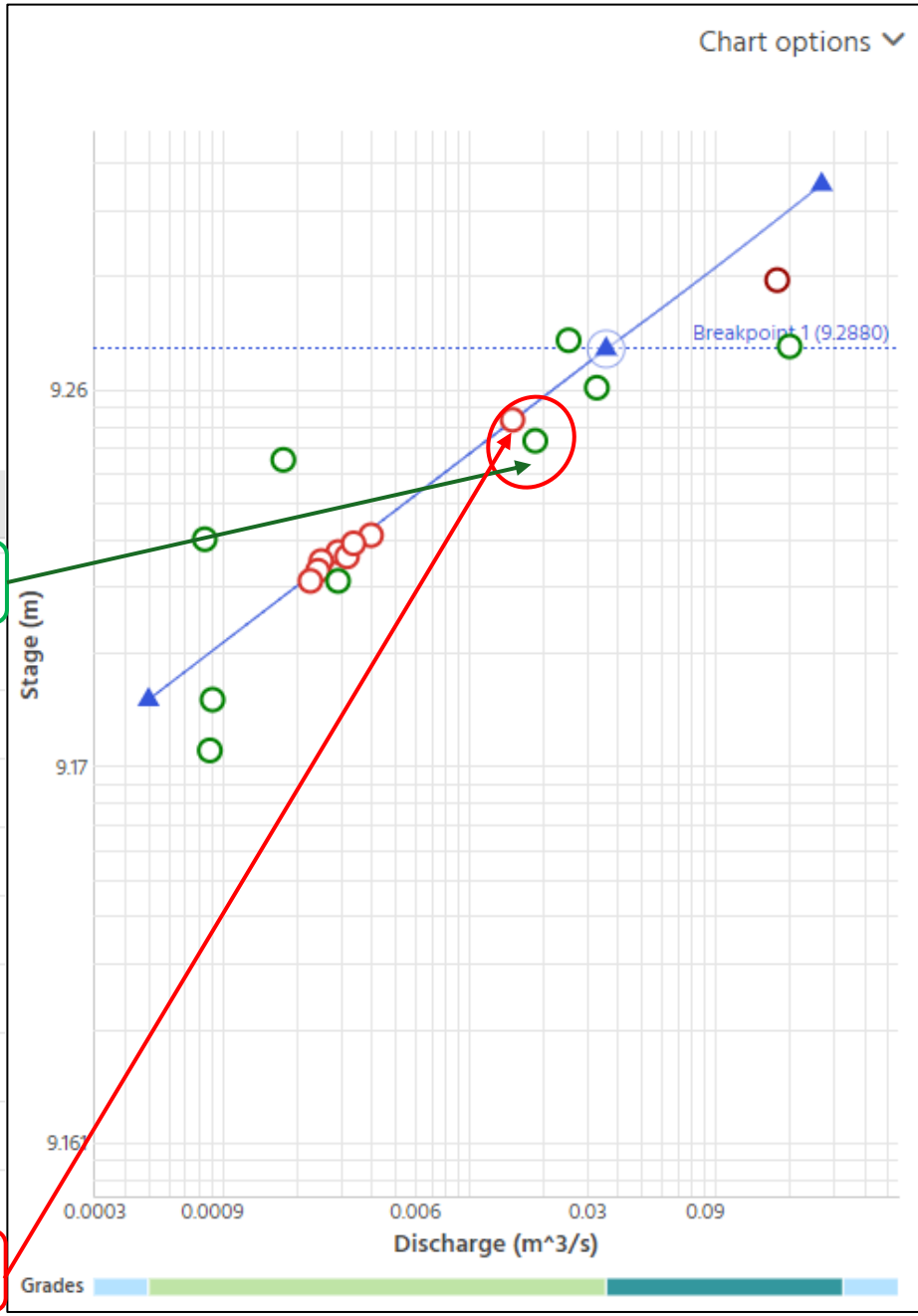
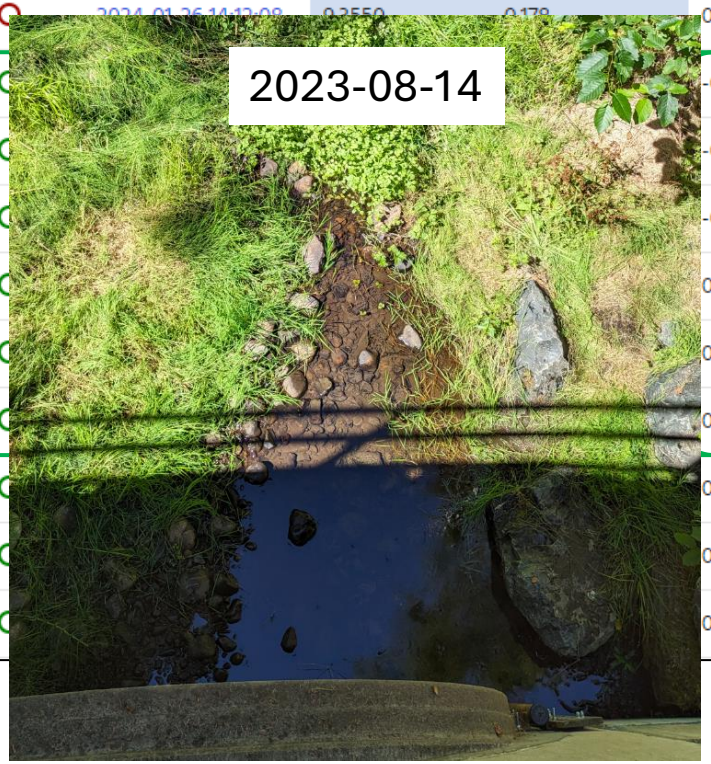
☑		2022-09-20 14:00:00	9.1910	0.00227	0.0010	6.64	Volumetric	25 - Best Practice
☑	○	2022-08-29 10:26:30	9.1930	0.00244	0.0002	1.07	Volumetric	25 - Best Practice
☑	○	2022-08-17 11:10:00	9.1950	0.00251	-0.0013	-7.33	Volumetric	25 - Best Practice
☑	○	2022-08-03 10:24:00	9.1970	0.00294	-0.0005	-2.79	Volumetric	25 - Best Practice
☑	○	2022-07-18 12:30:00					Mid-section	25 - Best Practice
☑	○	2022-05-22 15:00:00	9.2430	0.015	-0.0005	-1.13	Mid-section	25 - Best Practice

2022-05-22: Photo Missing ☹

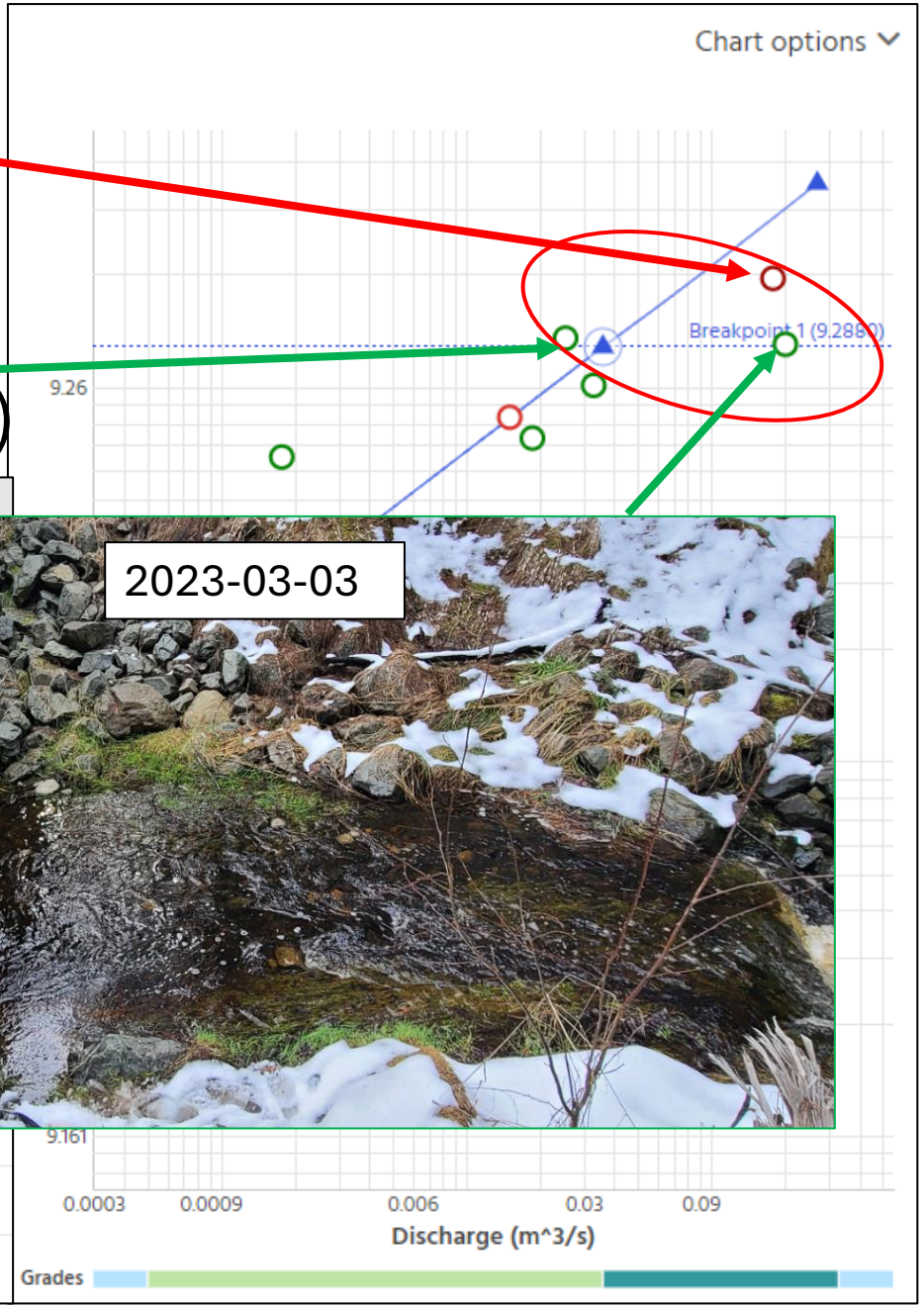


Data !

- Beac etation)



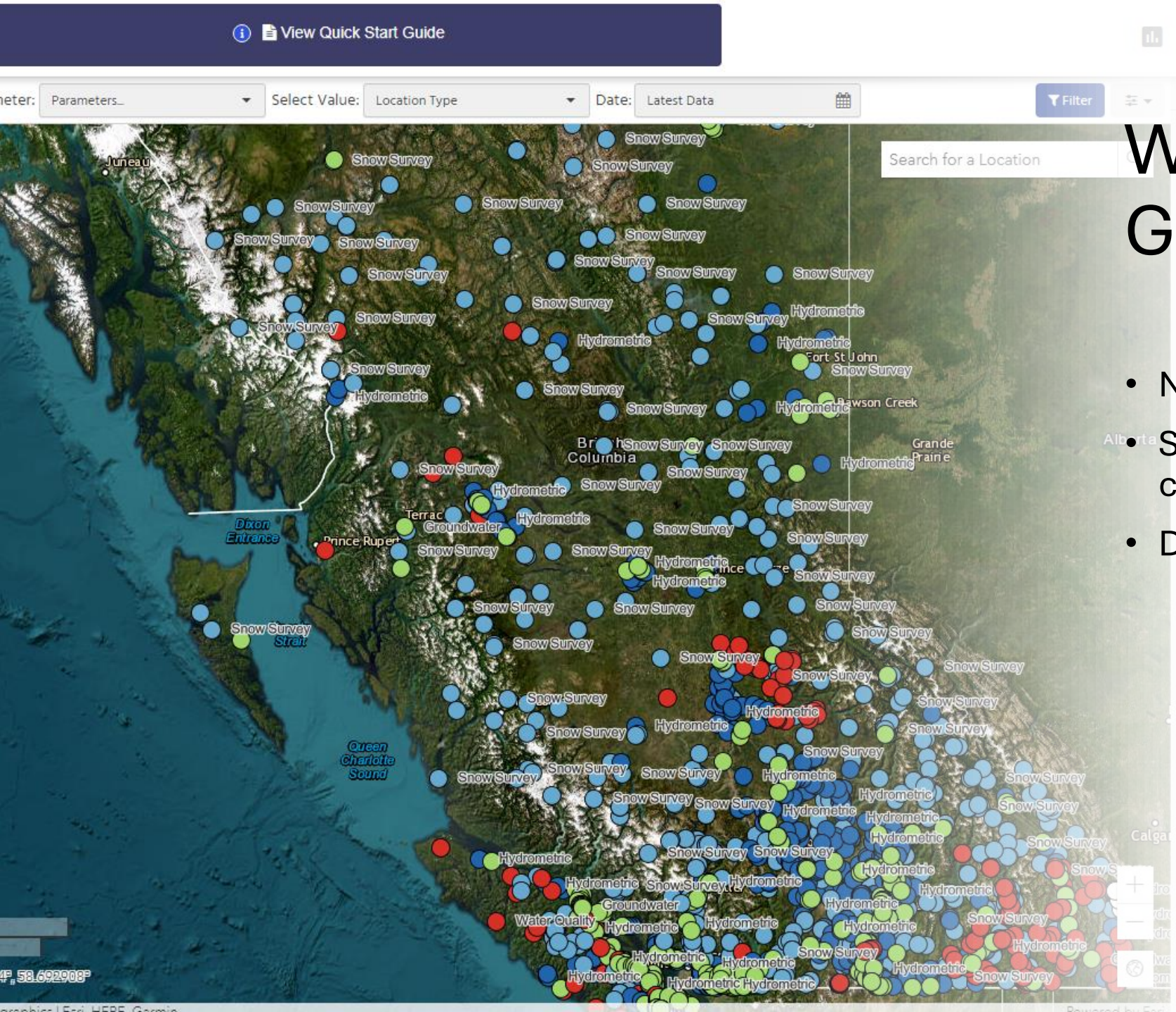
Use	Chart view	Timestamp ↓						
☑					0.0873	10776		
☑					-0.0276	-3		
☑					-0.0368	-8		
☑					-0.0205	-7		
☑					0.0052			
☑					0.0090			
☑					0.0055	38		
☑					0.0188	58		
☑					0.1696	43		
☑					0.0216	47		



☑	○	2023-04-19 11:17:50	9.2330	0.0186	0.0188	58.09	Mid-section
☑	○	2023-03-03 13:22:30	9.2900	0.20	0.1696	437.59	Estimated
☑	○	2023-02-12 16:05:00	9.2610	0.033	0.0216	47.12	Mid-section
☑	○	2022-11-12 10:32:30	9.1990	0.0034	0.0002	0.98	Volumetric

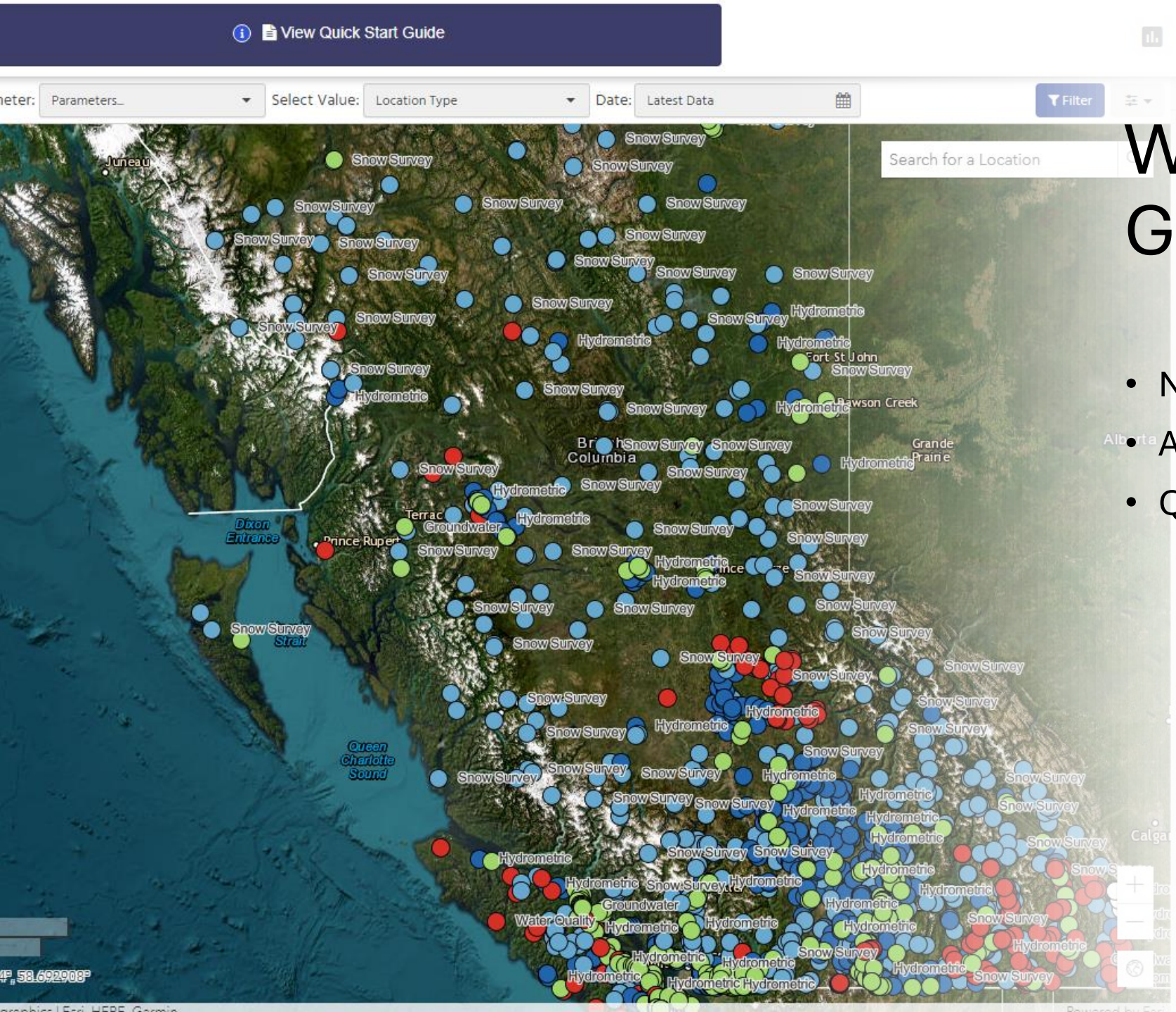
Knowing your sites

- Control observations
  - Photos are really helpful!
- Check the rating curve
  - Is the rating curve prediction the same as our discharge measurement?
  - Aim for <25% difference (actual discharge vs. rated discharge)
  - Aim for <0.010m difference (actual stage vs. rated stage)



Web Portal Tour – Grandon Creek

- Navigation of Web Portal
- Streamflow statistics and charts!
- Data Reports
  - Station Analysis
  - Rating Development doc
  - Rating Table

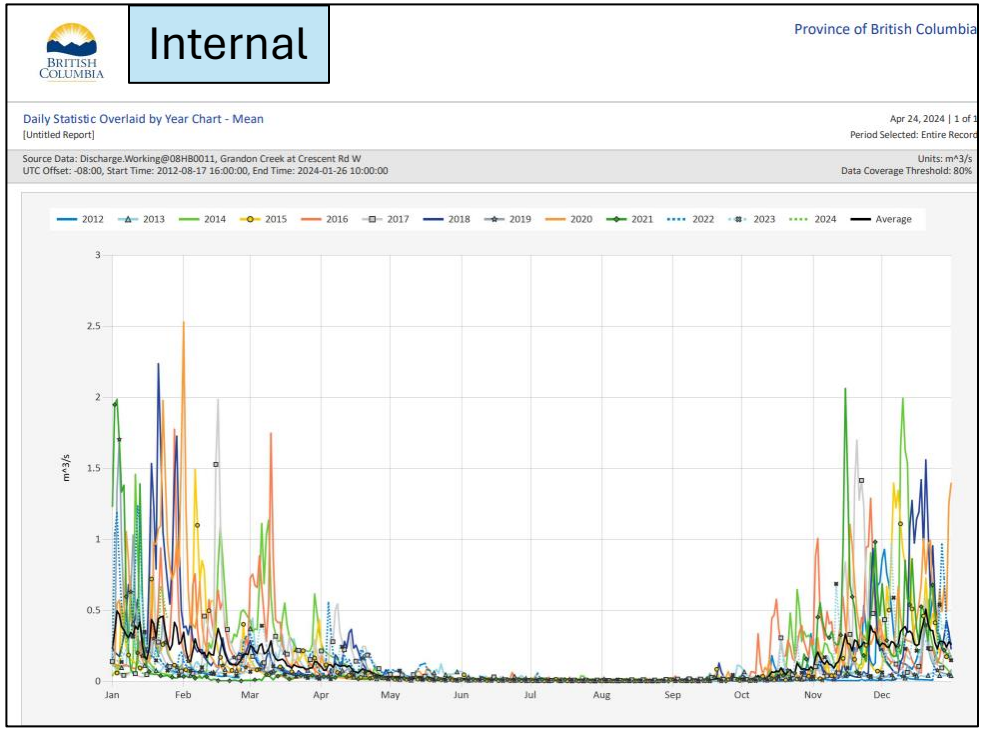


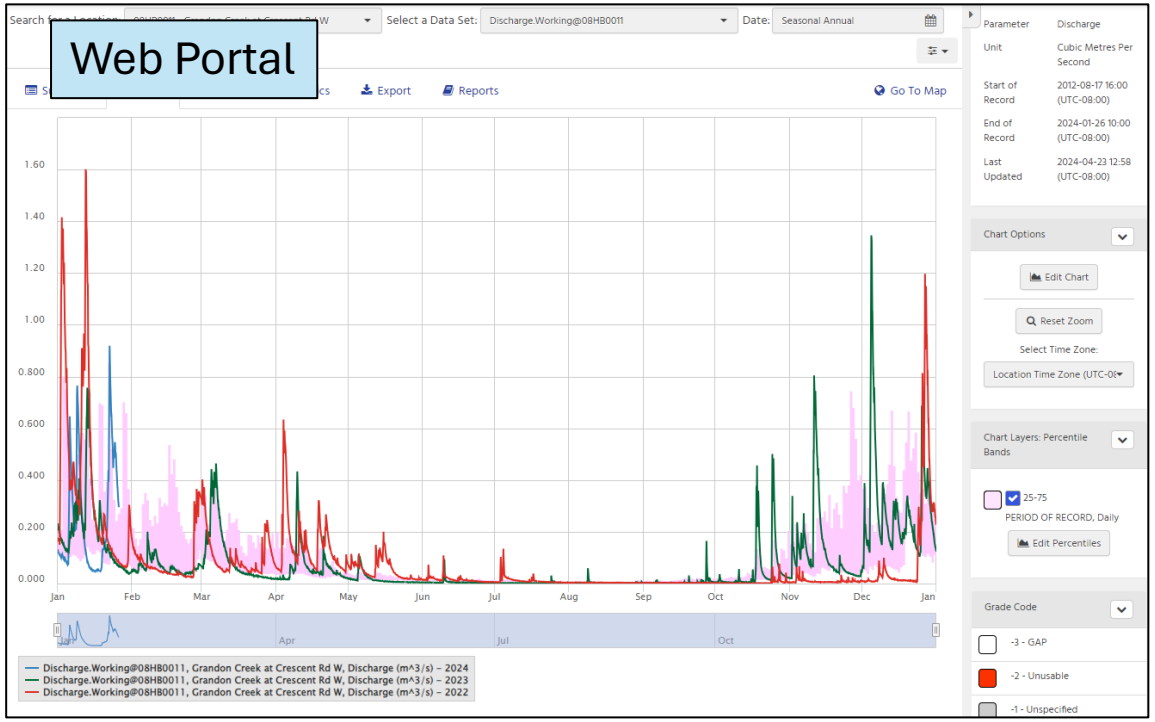
Web Portal Tour – Grandon Creek

- Navigation of Web Portal
- Aqrt.nrs.gov.bc.ca
- Quick start guide available

Web Portal Tour – Grandon Creek

- Streamflow statistics and charts!
- Internal reports being investigated (no firm timeline)
- Web Portal charts and displays available to public





Web Portal Tour – Grandon Creek

- Data Reports
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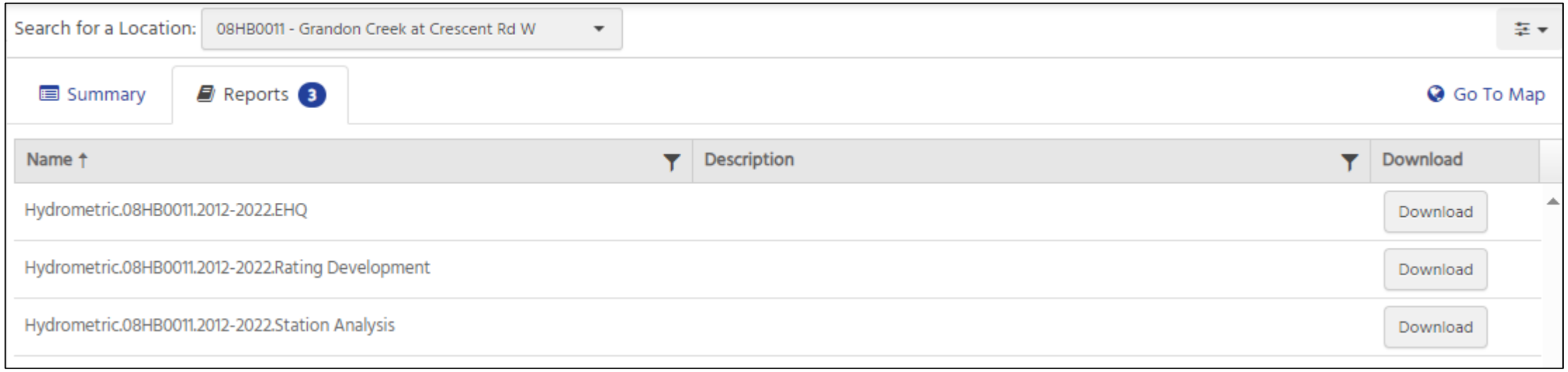

Rating Table – How to Use

```
# Location: 08HB0011    Grandon Creek at Crescent Rd W
# Date processed: 2024-01-30 10:46:30 UTC-08:00 by Jonathan.Jeffery@gov.bc.ca
# Rating: Log Method-1.00
# Created: 2022-08-12 17:57:34 UTC-08:00
# Created by: TRODGERS
# Updated: 2024-01-30 10:34:19 UTC-08:00
# Updated by: Jonathan.Jeffery@gov.bc.ca
```

Offsets and Breakpoints

Offset1: 0.1700

Expanded Rating Table: 1.00

Stage (m)	Discharge (m^3/s)										Difference in Discharge per 0.01 m
	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	
0.17			0.000156	0.000267	0.000392	0.000527	0.000671	0.000823	0.000983	0.00115	
0.18	0.00132	0.0015	0.00168	0.00187	0.00207	0.00226	0.00247	0.00267	0.00288	0.0031	0.00199
0.19	0.00332	0.00354	0.00376	0.00399	0.00422	0.00446	0.0047	0.00494	0.00518	0.00543	0.00236
0.20	0.00568	0.00593	0.00619	0.00645	0.00671	0.00697	0.00724	0.0075	0.00777	0.00805	0.00264
0.21	0.00832	0.0086	0.00888	0.00916	0.00944	0.00973	0.01	0.0103	0.0106	0.0109	0.00287
0.22	0.0112	0.0115	0.0118	0.0121	0.0124	0.0127	0.013	0.0133	0.0136	0.0139	0.00306
0.23	0.0143	0.0146	0.0149	0.0152	0.0155	0.0159	0.0162	0.0165	0.0168	0.0172	0.00324
0.24	0.0175	0.0178	0.0182	0.0185	0.0188	0.0192	0.0195	0.0198	0.0202	0.0205	0.00339
0.25	0.0209	0.0212	0.0216	0.0219	0.0223	0.0226	0.023	0.0233	0.0237	0.0241	0.00353
0.26	0.0244	0.0248	0.0251	0.0255	0.0259	0.0262	0.0266	0.027	0.0273	0.0277	0.00366
0.27	0.0281	0.0285	0.0288	0.0292	0.0296	0.03	0.0303	0.0307	0.0311	0.0315	0.00379
0.28	0.0319	0.0323	0.0326	0.033	0.0334	0.0338	0.0342	0.0346	0.035	0.0354	0.0039
0.29	0.0358	0.0362	0.0366	0.037	0.0374	0.0378	0.0382	0.0386	0.039	0.0394	0.00401
0.30	0.0398	0.0402	0.0406	0.041	0.0414	0.0418	0.0422	0.0426	0.0431	0.0435	0.00411
0.31	0.0439	0.0443	0.0447	0.0451	0.0456	0.046	0.0464	0.0468	0.0473	0.0477	0.00421
0.32	0.0481	0.0485	0.049	0.0494	0.0498	0.0502	0.0507	0.0511	0.0515	0.052	0.0043
0.33	0.0524	0.0528	0.0533	0.0537	0.0541	0.0546	0.055	0.0555	0.0559	0.0564	0.00439
0.34	0.0568	0.0572	0.0577	0.0581	0.0586	0.059	0.0595	0.0599	0.0604	0.0608	0.00448
0.35	0.0613	0.0617	0.0622	0.0626	0.0631	0.0635	0.064	0.0645	0.0649	0.0654	0.00456
0.36	0.0658	0.0663	0.0668	0.0672	0.0677	0.0681	0.0686	0.0691	0.0695	0.07	0.00464
0.37	0.0705	0.0709	0.0714	0.0719	0.0723	0.0728	0.0733	0.0738	0.0742	0.0747	0.00471
0.38	0.0752	0.0757	0.0761	0.0766	0.0771	0.0776	0.078*	0.0792	0.0804	0.0817	0.00771
0.39	0.0829	0.0841	0.0854	0.0867	0.0879	0.0892	0.0906	0.0919	0.0932	0.0946	0.013
0.40	0.0959	0.0973	0.0987	0.10	0.102	0.103	0.104	0.106	0.107	0.109	0.0144

Site Visit in Summer:
Staff Gauge = 0.295m
Measured Discharge = 0.015 m^3/s

1. What is my expected stage at this discharge? (shift)
2. What is my expected discharge at this stage? (% diff)
3. What is the shift or percent difference?

(ie. How off am I from the curve? Should I re-do my measurement or take a really good control photo?)

Rating Table – How to Use

```
# Location: 08HB0011    Grandon Creek at Crescent Rd W
# Date processed: 2024-01-30 10:46:30 UTC-08:00 by Jonathan.Jeffery@gov.bc.ca
# Rating: Log Method-1.00
# Created: 2022-08-12 17:57:34 UTC-08:00
# Created by: TRODGERS
# Updated: 2024-01-30 10:34:19 UTC-08:00
# Updated by: Jonathan.Jeffery@gov.bc.ca
```

Offsets and Breakpoints

Offset1: 0.1700

Expanded Rating Table: 1.00

Stage (m)	Discharge (m^3/s)										Difference in Discharge per 0.01 m
	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	
0.17			0.000156	0.000267	0.000392	0.000527	0.000671	0.000823	0.000983	0.00115	
0.18	0.00132	0.0015	0.00168	0.00187	0.00207	0.00226	0.00247	0.00267	0.00288	0.0031	0.00199
0.19	0.00332	0.00354	0.00376	0.00399	0.00422	0.00446	0.0047	0.00494	0.00518	0.00543	0.00236
0.20	0.00568	0.00593	0.00619	0.00645	0.00671	0.00697	0.00724	0.0075	0.00777	0.00805	0.00264
0.21	0.00832	0.0086	0.00888	0.00916	0.00944	0.00973	0.01	0.0103	0.0106	0.0109	0.00287
0.22	0.0112	0.0115	0.0118	0.0121	0.0124	0.0127	0.013	0.0133	0.0136	0.0139	0.00306
0.23	0.0143	0.0146	0.0149	0.0152	0.0155	0.0159	0.0162	0.0165	0.0168	0.0172	0.00324
0.24	0.0175	0.0178	0.0182	0.0185	0.0188	0.0192	0.0195	0.0198	0.0202	0.0205	0.00339
0.25	0.0209	0.0212	0.0216	0.0219	0.0223	0.0226	0.023	0.0233	0.0237	0.0241	0.00353
0.26	0.0244	0.0248	0.0251	0.0255	0.0259	0.0262	0.0266	0.027	0.0273	0.0277	0.00366
0.27	0.0281	0.0285	0.0288	0.0292	0.0296	0.03	0.0303	0.0307	0.0311	0.0315	0.00379
0.28	0.0319	0.0323	0.0326	0.033	0.0334	0.0338	0.0342	0.0346	0.035	0.0354	0.0039
0.29	0.0358	0.0362	0.0366	0.037	0.0374	0.0378	0.0382	0.0386	0.039	0.0394	0.00401
0.30	0.0398	0.0402	0.0406	0.041	0.0414	0.0418	0.0422	0.0426	0.0431	0.0435	0.00411
0.31	0.0439	0.0443	0.0447	0.0451	0.0456	0.046	0.0464	0.0468	0.0473	0.0477	0.00421
0.32	0.0481	0.0485	0.049	0.0494	0.0498	0.0502	0.0507	0.0511	0.0515	0.052	0.0043
0.33	0.0524	0.0528	0.0533	0.0537	0.0541	0.0546	0.055	0.0555	0.0559	0.0564	0.00439
0.34	0.0568	0.0572	0.0577	0.0581	0.0586	0.059	0.0595	0.0599	0.0604	0.0608	0.00448
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0.40	0.0959	0.0973	0.0987	0.10	0.102	0.103	0.104	0.106	0.107	0.109	0.0144

Site Visit in Summer:
Staff Gauge = 0.295m
Measured Discharge = 0.015 m^3/s

What is my expected stage at this discharge? (shift)

1. Find your measured discharge in the rating table
2. Determine the expected stage at this discharge (rated stage)
3. Calculate the difference between the observed stage and the rated stage

Shift = 0.295m – 0.232m
= -0.063m

Rating Table – How to Use

```
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0.19	0.00332	0.00354	0.00376	0.00399	0.00422	0.00446	0.0047	0.00494	0.00518	0.00543	0.00236
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0.21	0.00832	0.0086	0.00888	0.00916	0.00944	0.00973	0.01	0.0103	0.0106	0.0109	0.00287
0.22	0.0112	0.0115	0.0118	0.0121	0.0124	0.0127	0.013	0.0133	0.0136	0.0139	0.00306
0.23	0.0143	0.0146	0.0149	0.0152	0.0155	0.0159	0.0162	0.0165	0.0168	0.0172	0.00324
0.24	0.0175	0.0178	0.0182	0.0185	0.0188	0.0192	0.0195	0.0198	0.0202	0.0205	0.00339
0.25	0.0209	0.0212	0.0216	0.0219	0.0223	0.0226	0.023	0.0233	0.0237	0.0241	0.00353
0.26	0.0244	0.0248	0.0251	0.0255	0.0259	0.0262	0.0266	0.027	0.0273	0.0277	0.00366
0.27	0.0281	0.0285	0.0288	0.0292	0.0296	0.03	0.0303	0.0307	0.0311	0.0315	0.00379
0.28	0.0319	0.0323	0.0326	0.033	0.0334	0.0338	0.0342	0.0346	0.035	0.0354	0.0039
0.29	0.0358	0.0362	0.0366	0.037	0.0374	0.0378	0.0382	0.0386	0.039	0.0394	0.00401
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0.31	0.0439	0.0443	0.0447	0.0451	0.0456	0.046	0.0464	0.0468	0.0473	0.0477	0.00421
0.32	0.0481	0.0485	0.049	0.0494	0.0498	0.0502	0.0507	0.0511	0.0515	0.052	0.0043
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0.34	0.0568	0.0572	0.0577	0.0581	0.0586	0.059	0.0595	0.0599	0.0604	0.0608	0.00448
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0.37	0.0705	0.0709	0.0714	0.0719	0.0723	0.0728	0.0733	0.0738	0.0742	0.0747	0.00471
0.38	0.0752	0.0757	0.0761	0.0766	0.0771	0.0776	0.078*	0.0792	0.0804	0.0817	0.00771
0.39	0.0829	0.0841	0.0854	0.0867	0.0879	0.0892	0.0906	0.0919	0.0932	0.0946	0.013
0.40	0.0959	0.0973	0.0987	0.10	0.102	0.103	0.104	0.106	0.107	0.109	0.0144

Site Visit in Summer:

Staff Gauge = 0.295m

Measured Discharge = 0.015 m^3/s

What is my expected discharge at this stage?

1. Find the discharge in the table based on measured stage
2. Calculate percent difference between rated and measured discharge

$$\% \text{ diff} = \frac{0.015 m3/s - 0.038 m3/s}{0.038 m3/s} * 100\%$$

$$= -60.5\%$$


Questions?