



Elk River  
Watershed  
—  
Qukin  
ʔamakʔis

Collaborative  
Monitoring  
Program

# The State of Current Knowledge of Elk Valley Water

*Telling Stories with Data*

**Evgeni Matveev**

Education and Outreach Coordinator, Elk River Alliance

*April 3<sup>rd</sup>, 2024*

# The Collaborative



Elk River  
Watershed  
—  
Qukin  
ʔamakʔis

## Collaborative Monitoring Program



Ministry of  
Environment and  
Climate Change Strategy



*Yaqit Pa'knuqti'it*

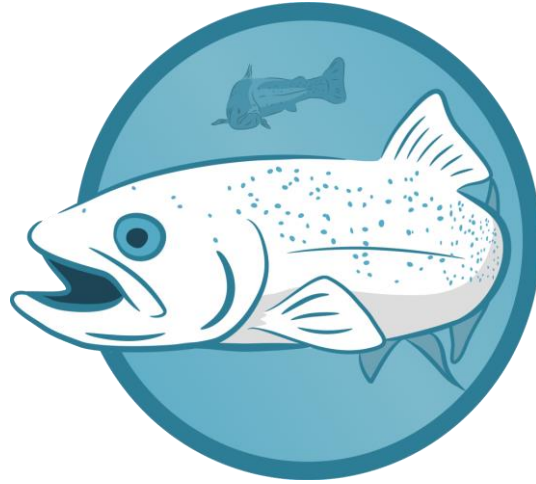
**Teck**



# The Collaborative: Key Themes



Climate Change  
Driven Flooding  
and Drought



Fish Habitat



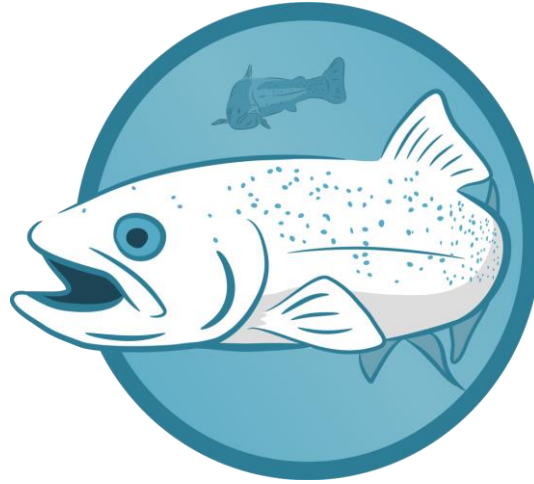
Ktunaxa Land and  
Water Uses



# The Collaborative: Key Themes



Climate Change  
Driven Flooding  
and Drought



Fish Habitat



Ktunaxa Land and  
Water Uses



# Adaptive Monitoring Framework

7 Adjust Practices

1 Engage with Communities & Interests

2 Frame the Question

3 Design Monitoring Program

- Indicator values at current state of activities?
- Sampling frequency and sampling location?
- Indicators of stress and effect? (pick benchmarks)
- Spatial and temporal scope?

4 Implement Monitoring Program

Recruit Implementation Partners

↓

Partners collect data & information in field

↓

Partners analyze & upload data or information to online hubs

6 Communicate Findings

5 Evaluate Findings

Are we seeing changes from baseline?

Do these changes matter?



To design an effective monitoring program, we need to know what data is already available and what inferences we can draw from it



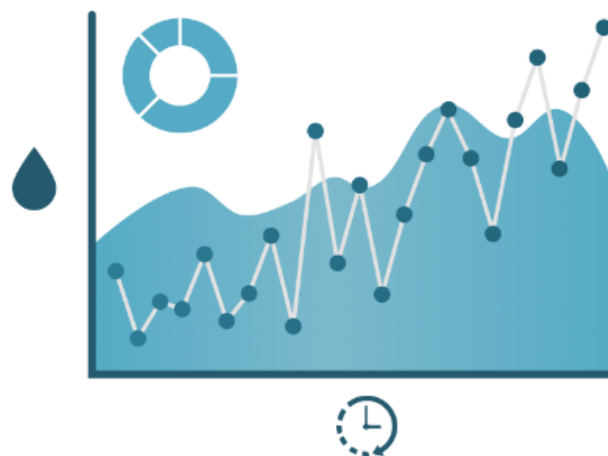
## What can we learn from existing data?

### Data Consolidation



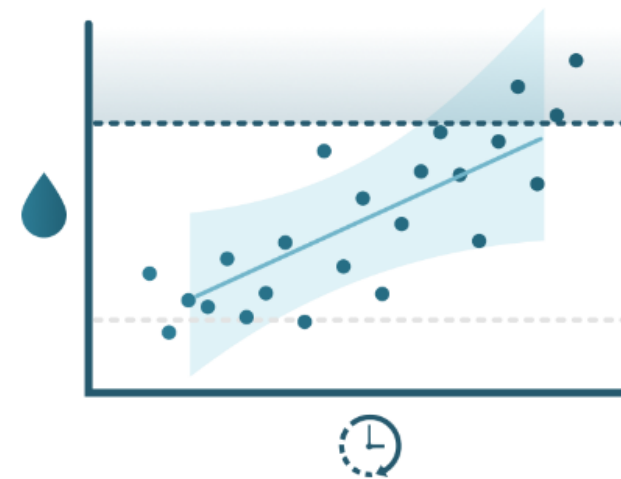
Collect data from different sources

### Data Visualisation and Hypothesis Building



Explore trends related to key themes

### Evaluation

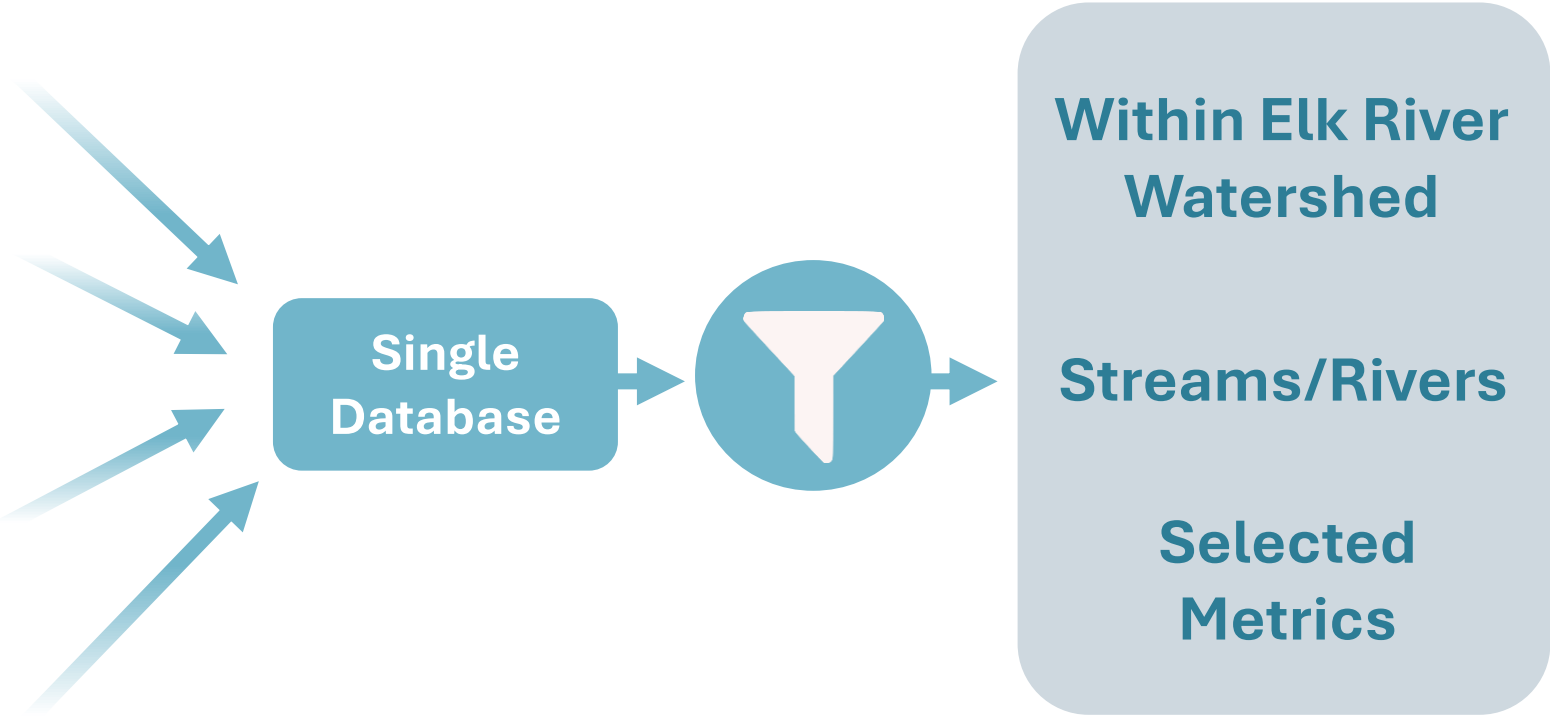
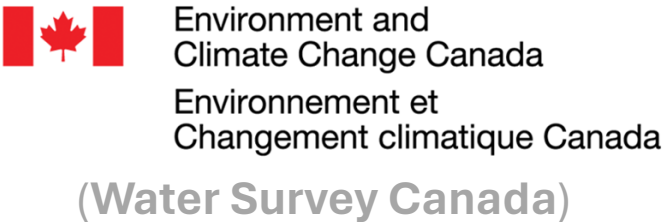
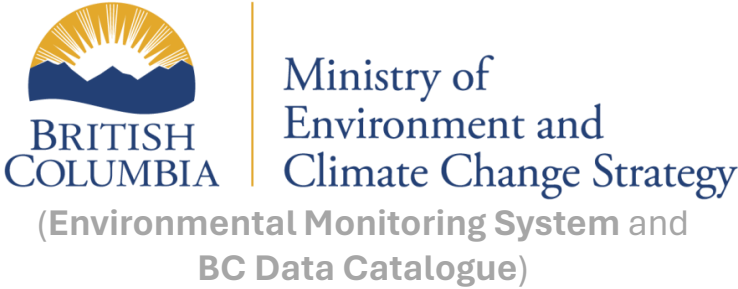


Statistically test hypotheses

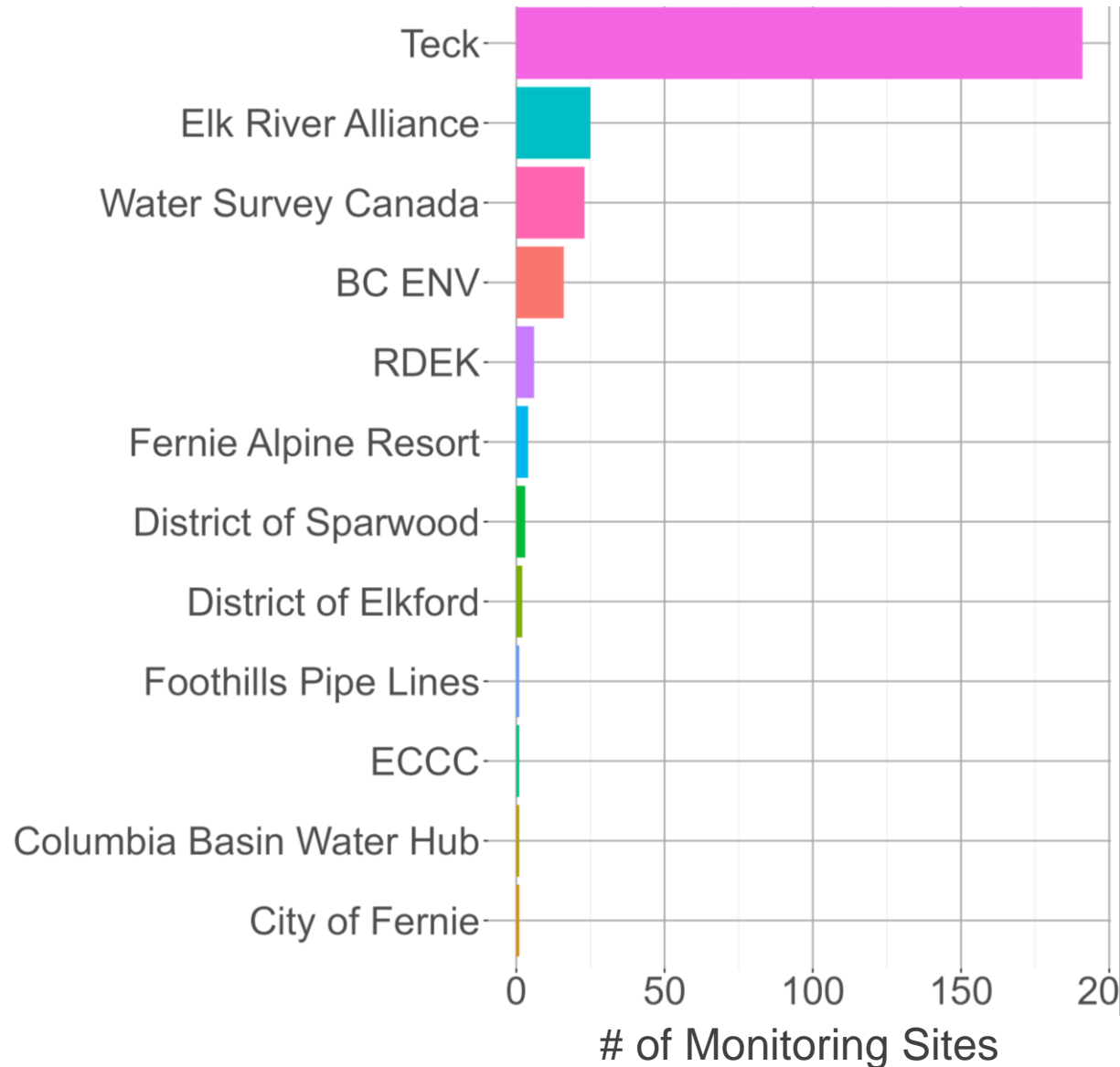
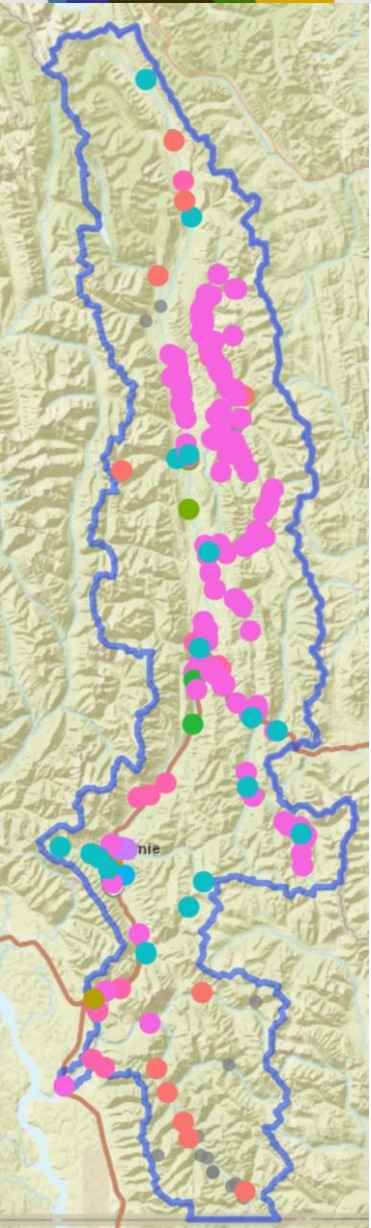


# Publicly accessible data

## 5 public data repositories:



# Who monitors Elk Valley water?



**369 SITES**

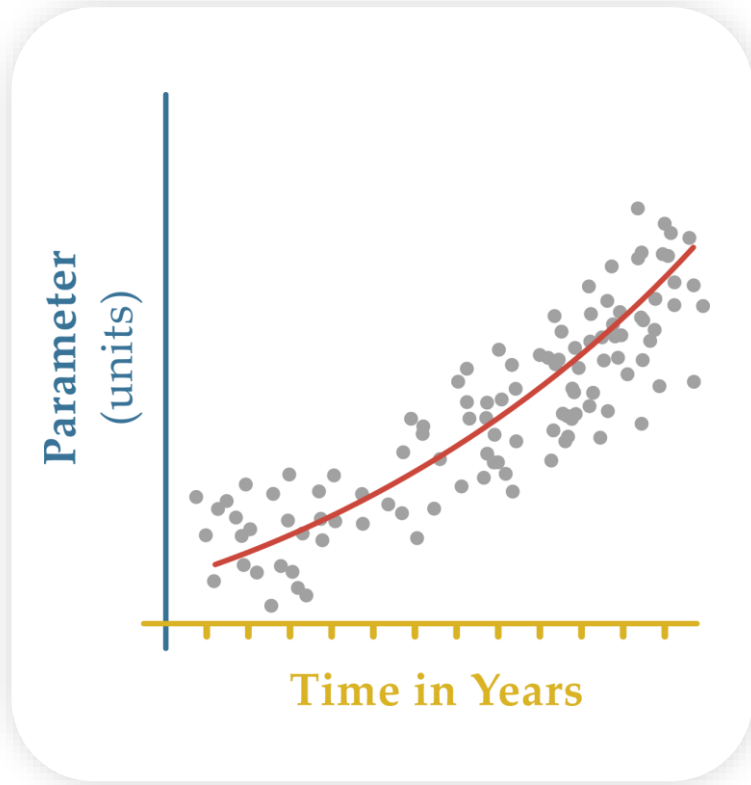
**59 PARAMETERS**



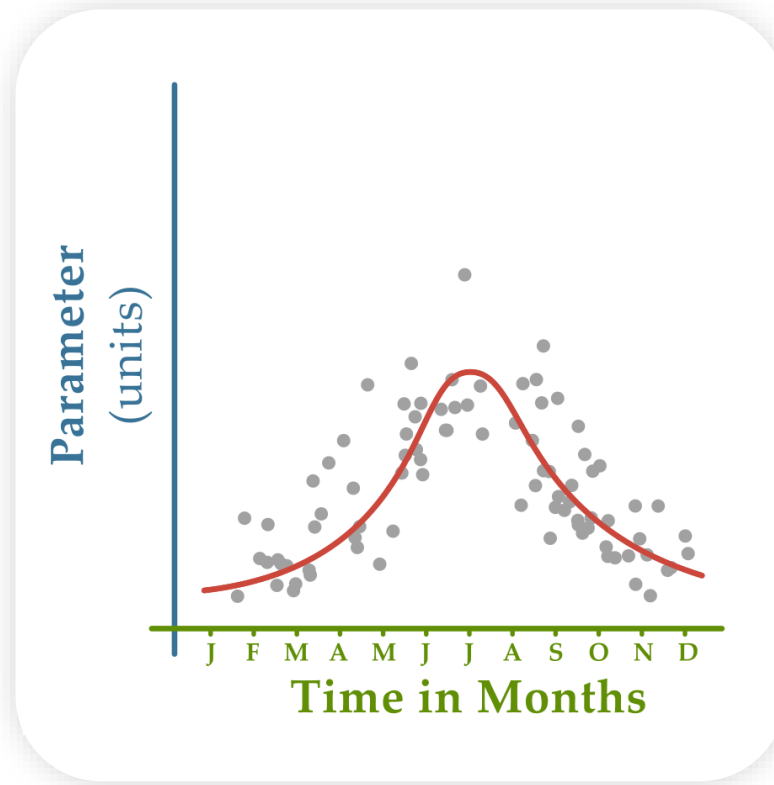


# Stories with Data: Visualizing Variation

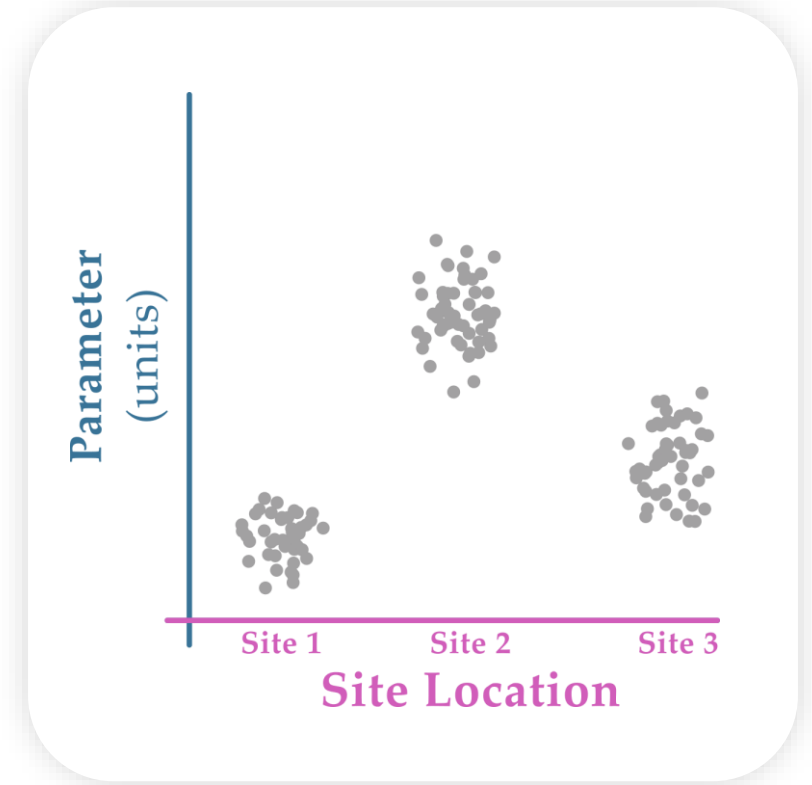
## Long-term Variation



## Seasonal Variation



## Spatial Variation

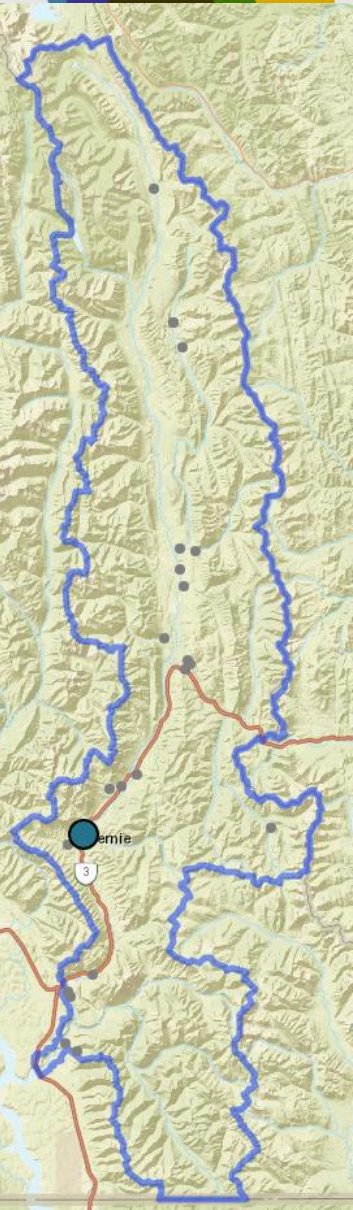
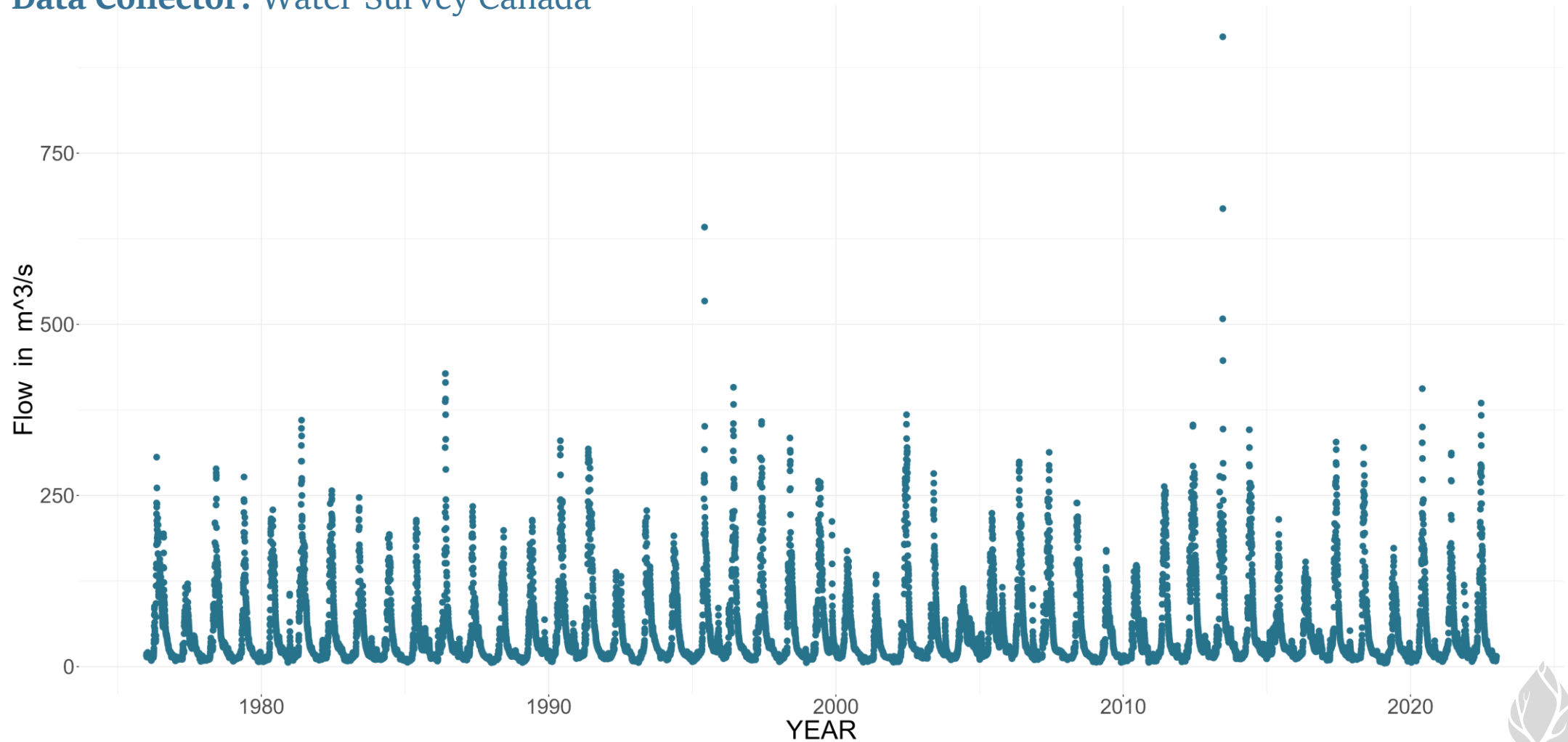


# Stories with Data: Flow

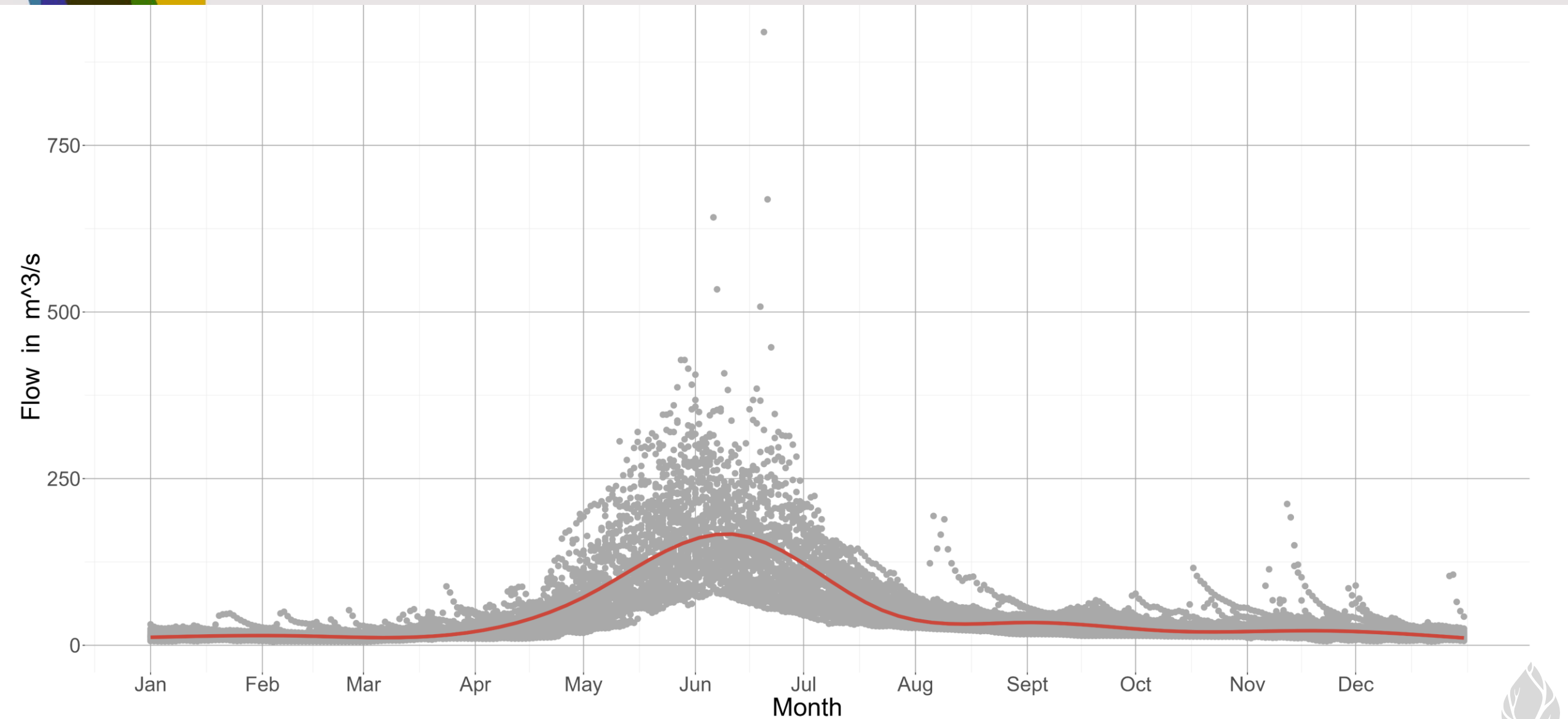
**Site ID:** o8NK002

**Location:** Elk River at Fernie

**Data Collector:** Water Survey Canada



# Stories with Data: **Flow**



# Stories with Data: Flow



Flow in  $m^3/s$

750

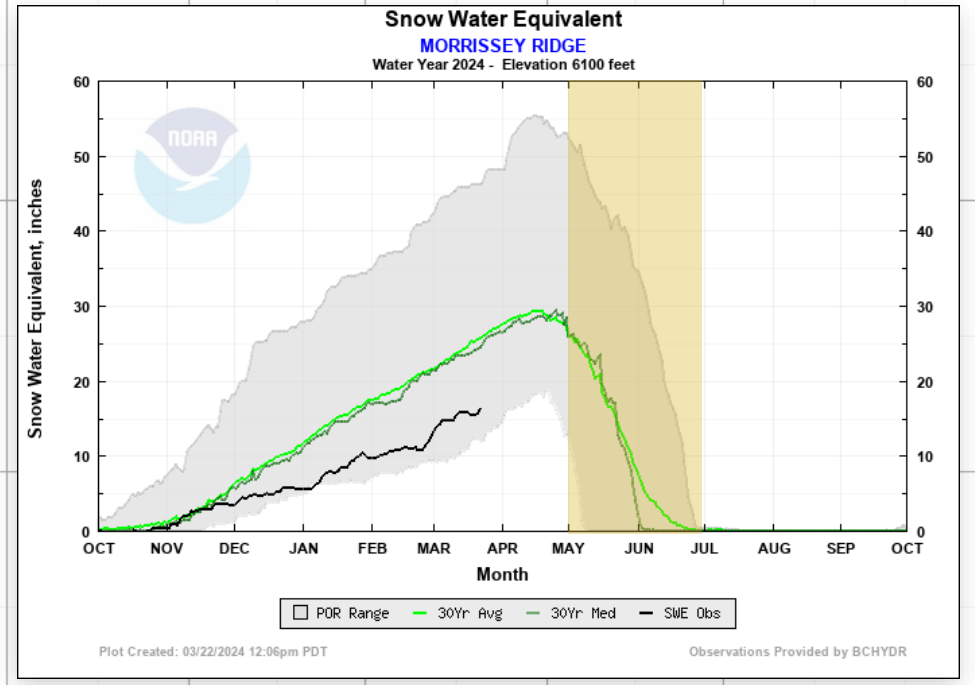
500

250

0

Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec

Month



# Stories with Data: Flow



Flow in  $m^3/s$

750

500

250

0

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

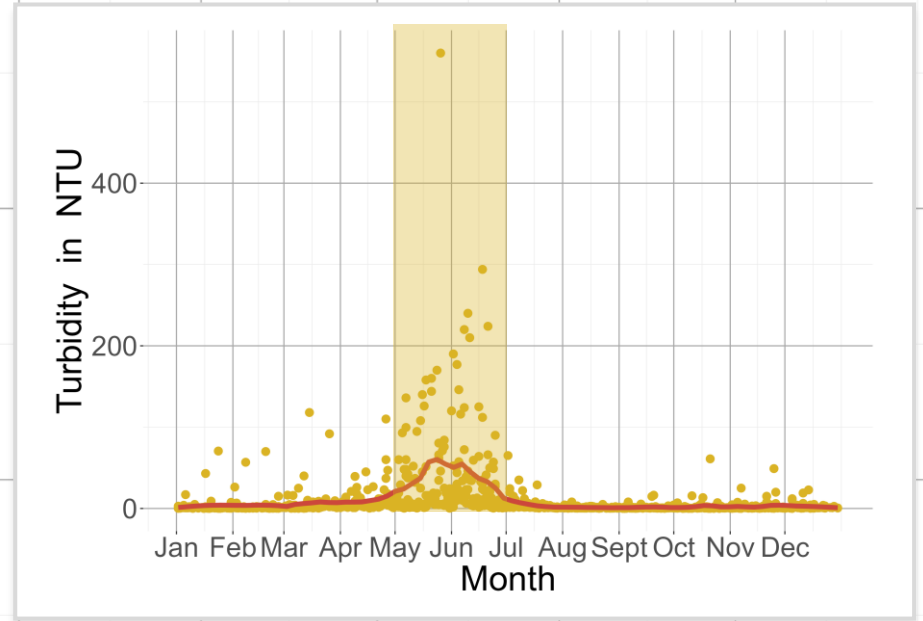
Sept

Oct

Nov

Dec

Month



Turbidity in NTU

400

200

0

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sept

Oct

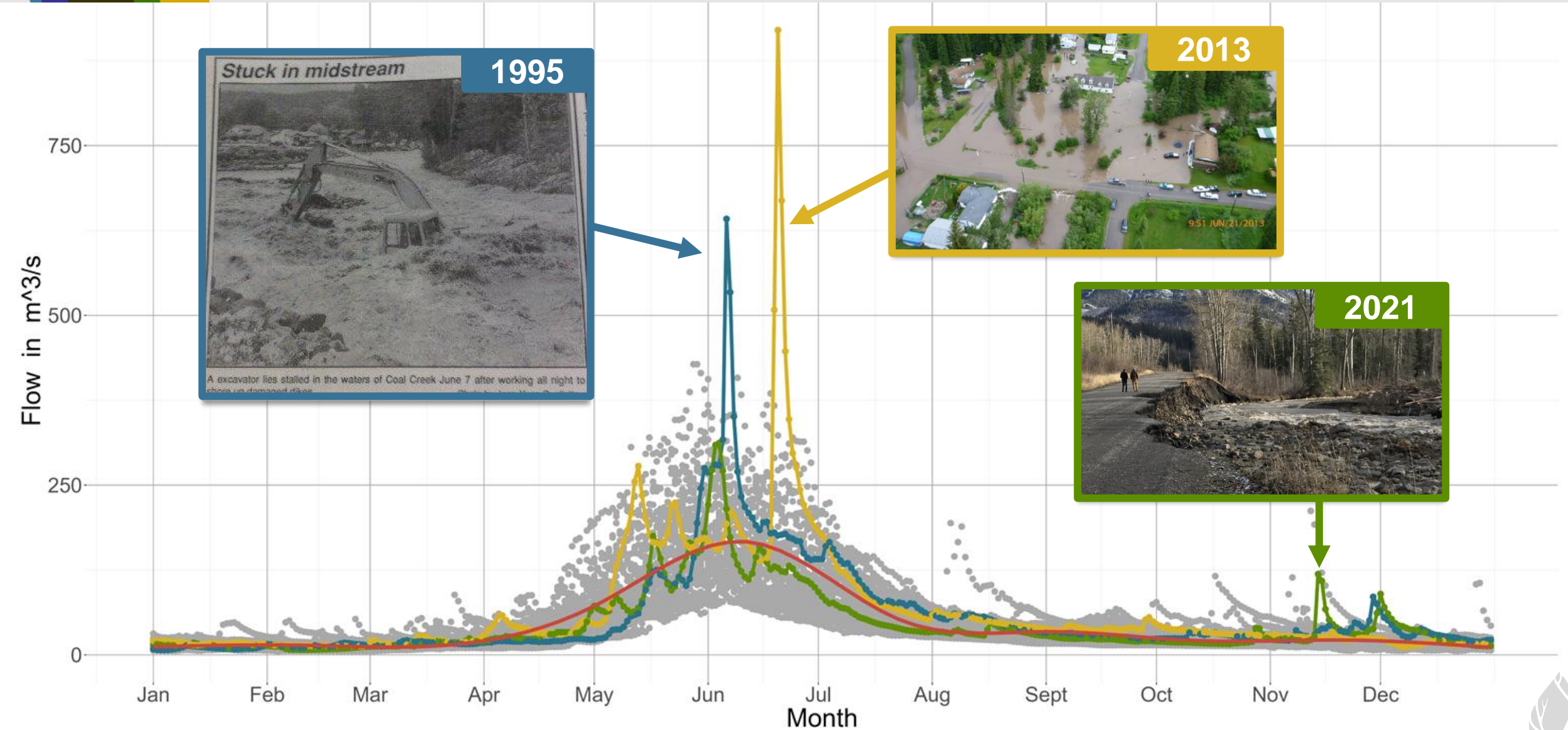
Nov

Dec

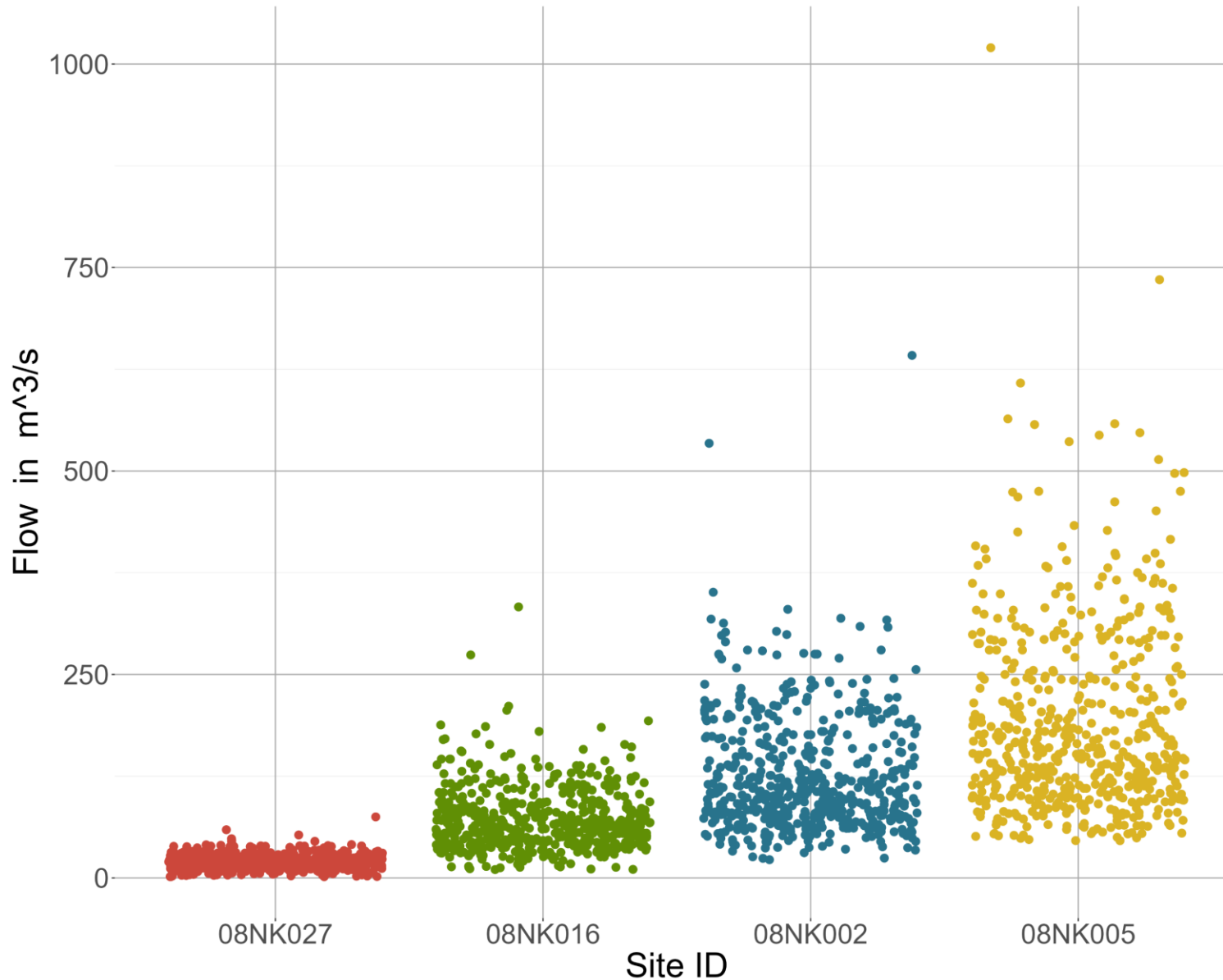
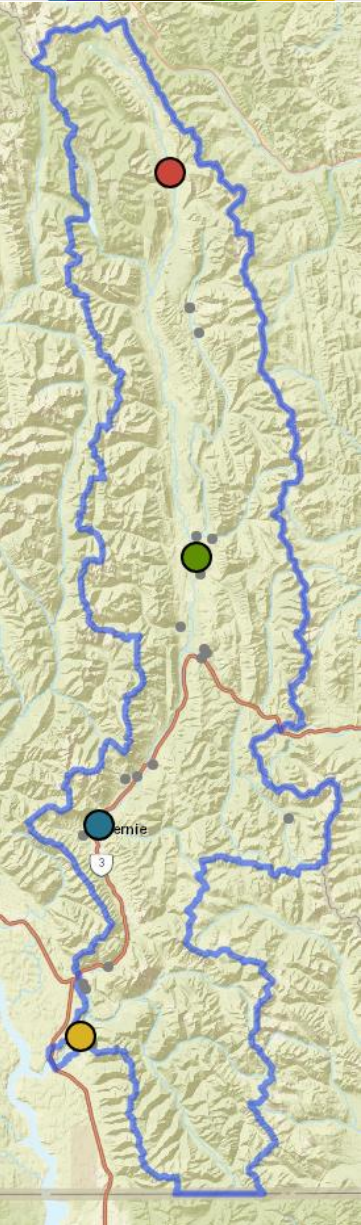
Month



# Stories with Data: Flow



# Stories with Data: Flow



May, June, July  
1990-1995

Data Collector: Water  
Survey Canada



Site ID: 08NK027  
Site Name: Elk River Below  
Weary Creek



Site ID: 08NK016  
Site Name: Elk River  
Near Natal



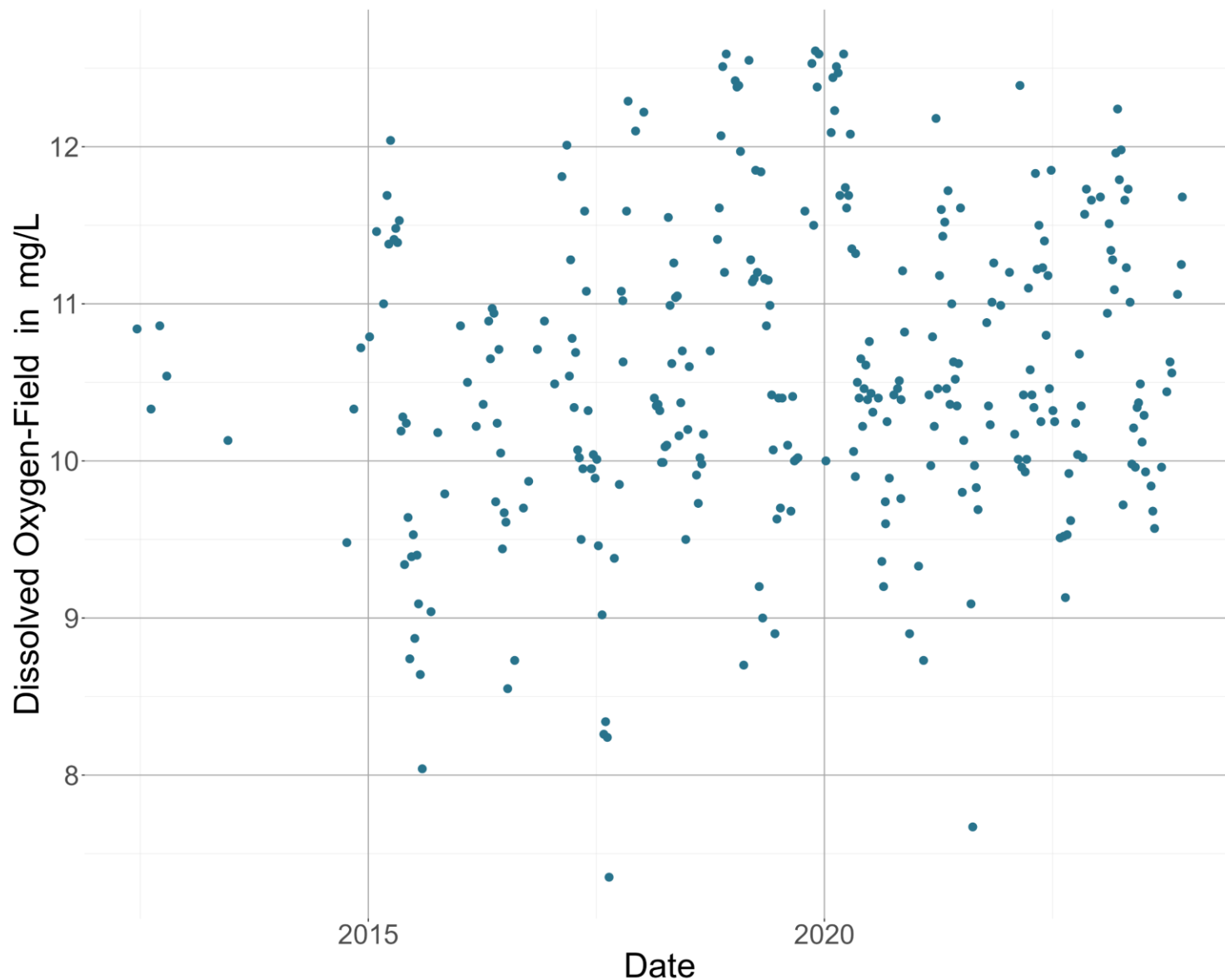
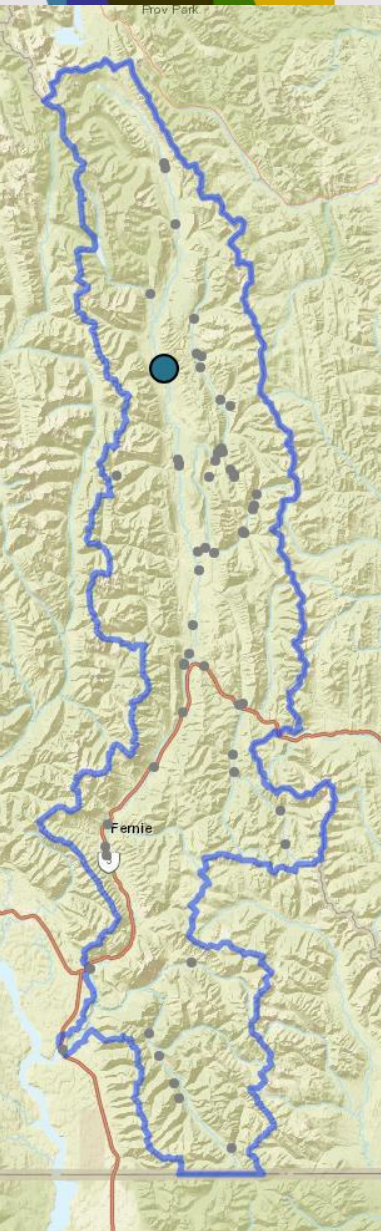
Site ID: 08NK002  
Site Name: Elk River  
at Fernie



Site ID: 08NK005  
Site Name: Elk River at  
Phillips Bridge



# Stories with Data: Dissolved Oxygen

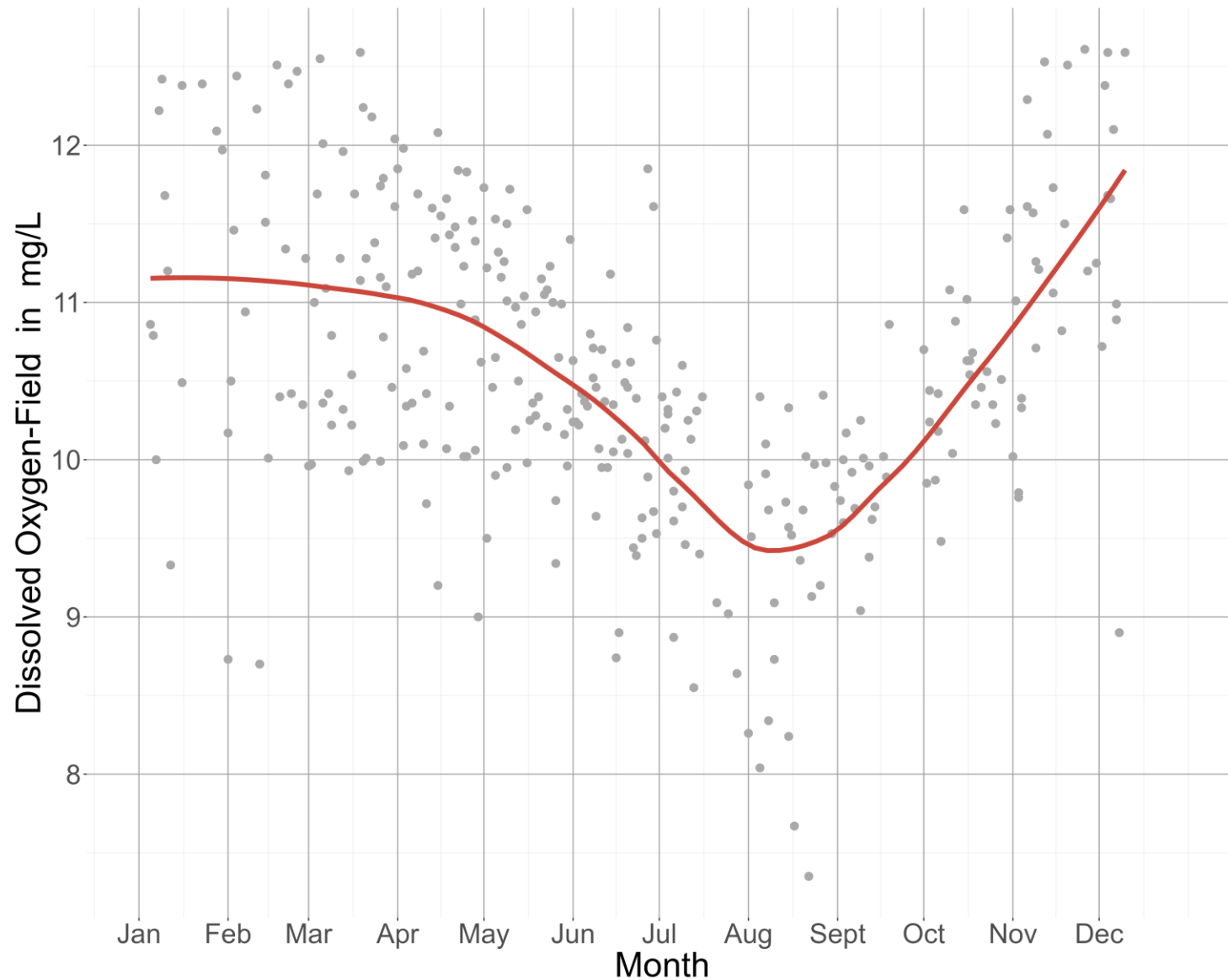
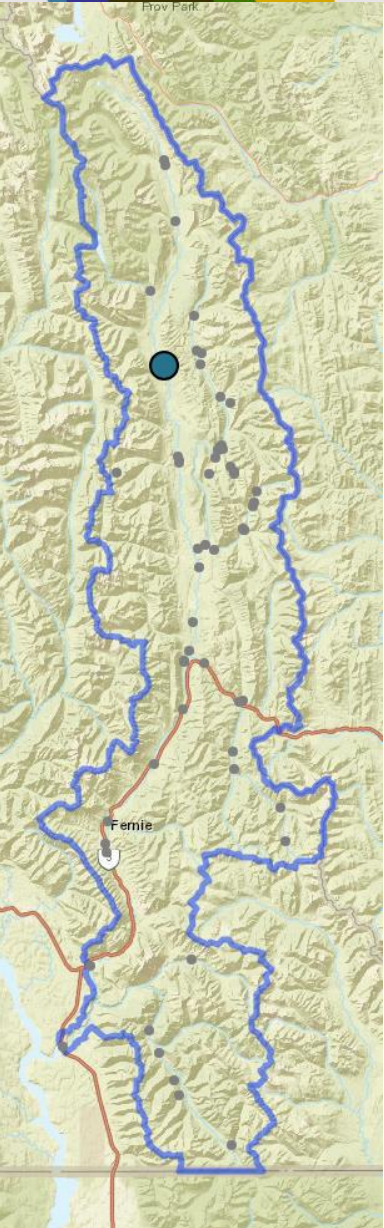


**Site ID:** 0200389  
**Site Name:** Elk River  
Above Greenhills  
Mining Operation  
**Data Collector:** Teck





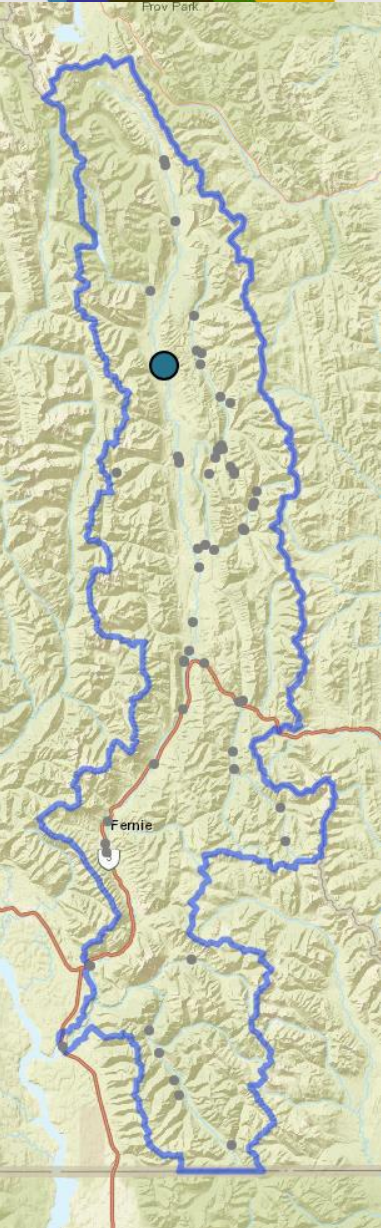
# Stories with Data: Dissolved Oxygen



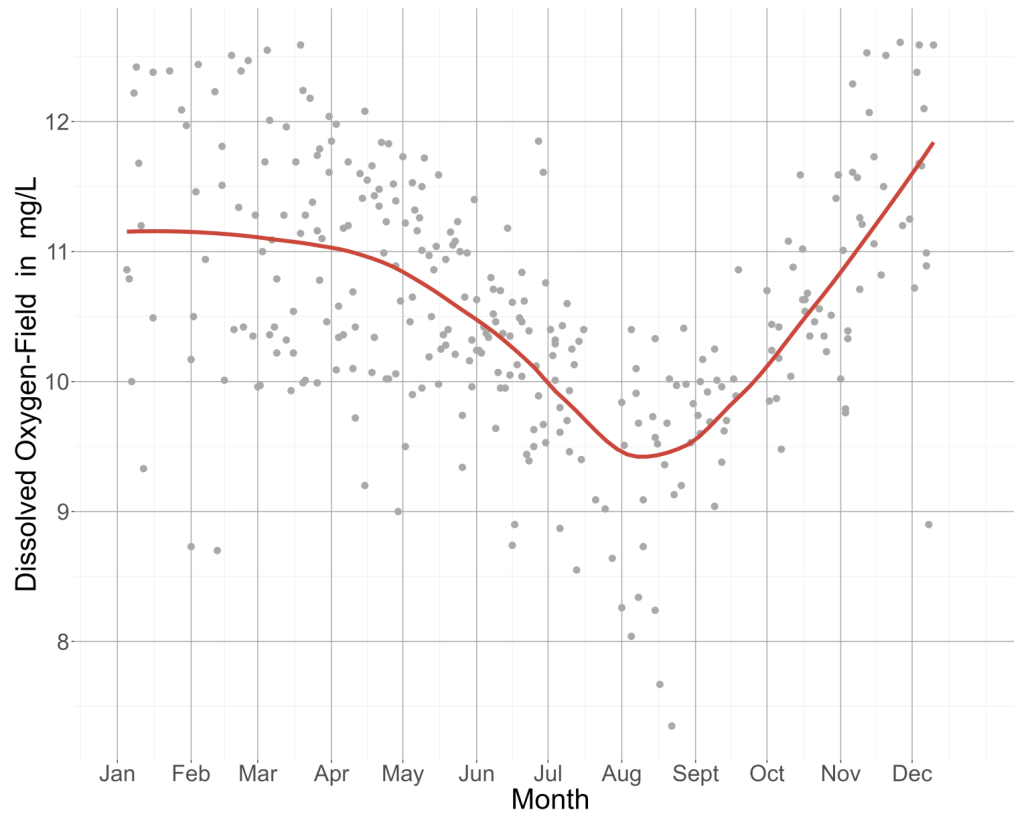
**Site ID:** 0200389  
**Site Name:** Elk River  
Above Greenhills  
Mining Operation  
**Data Collector:** Teck



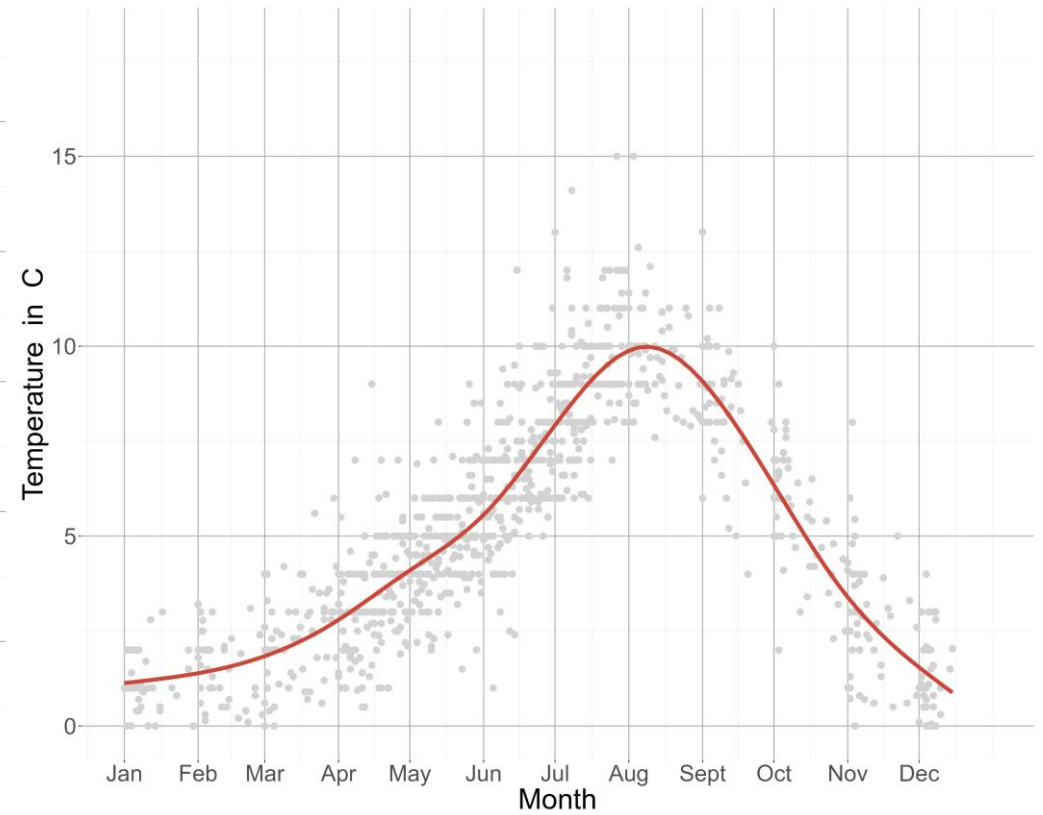
# Stories with Data: Dissolved Oxygen



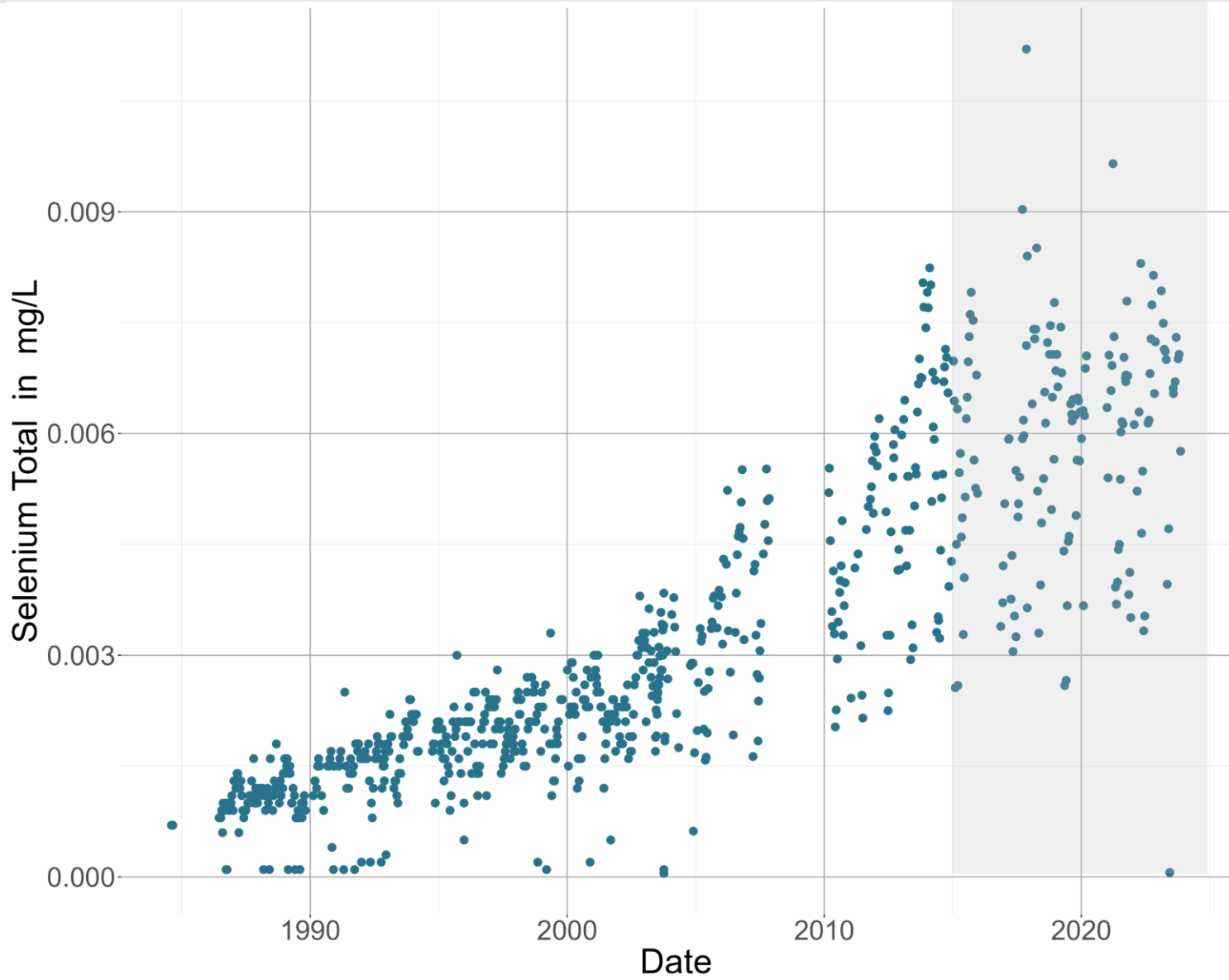
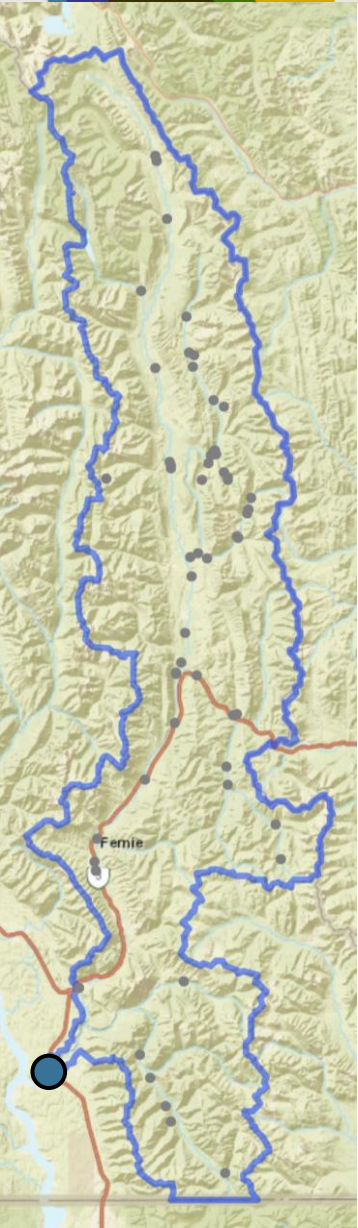
**Dissolved Oxygen**




**Water Temperature**



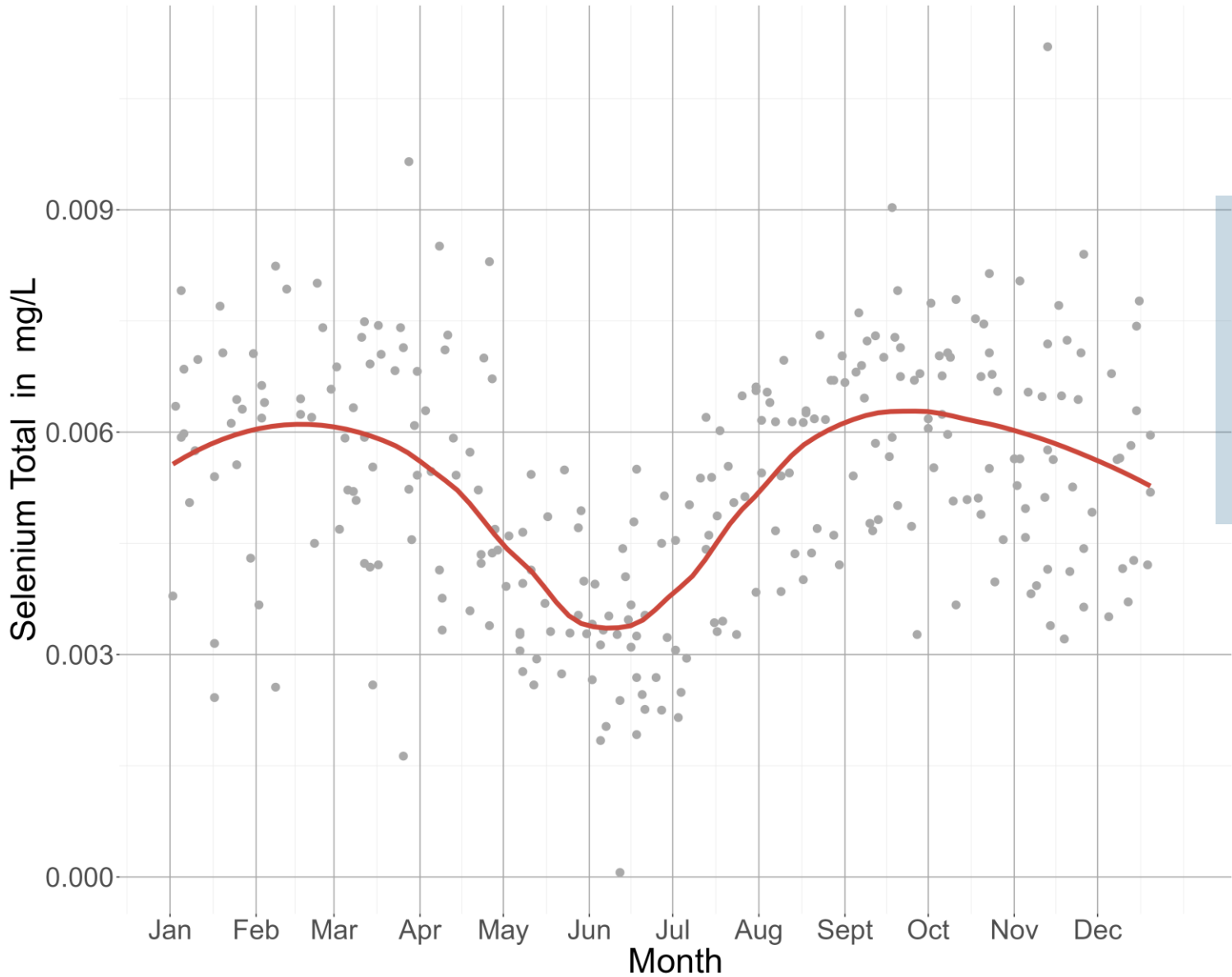
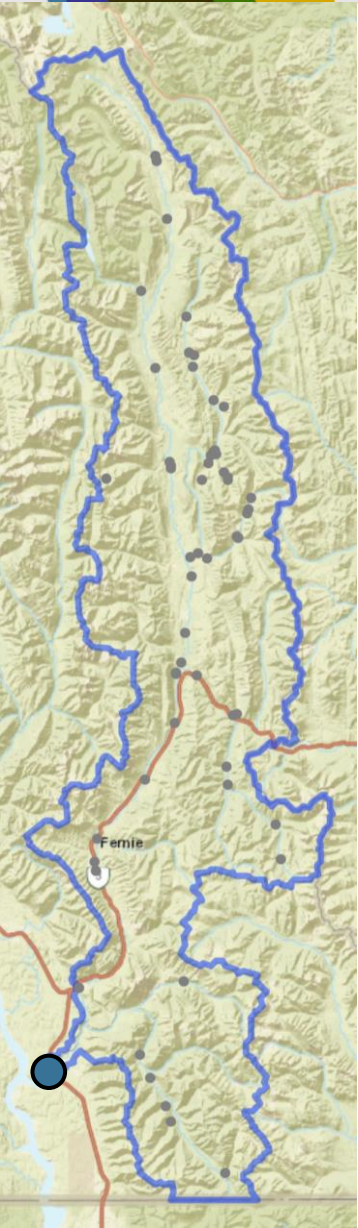
# Stories with Data: Selenium




 **Site ID:** 0200016  
**Site Name:** Elk River Above Highway 93  
**Data Collector:** Environment and Climate Change Canada



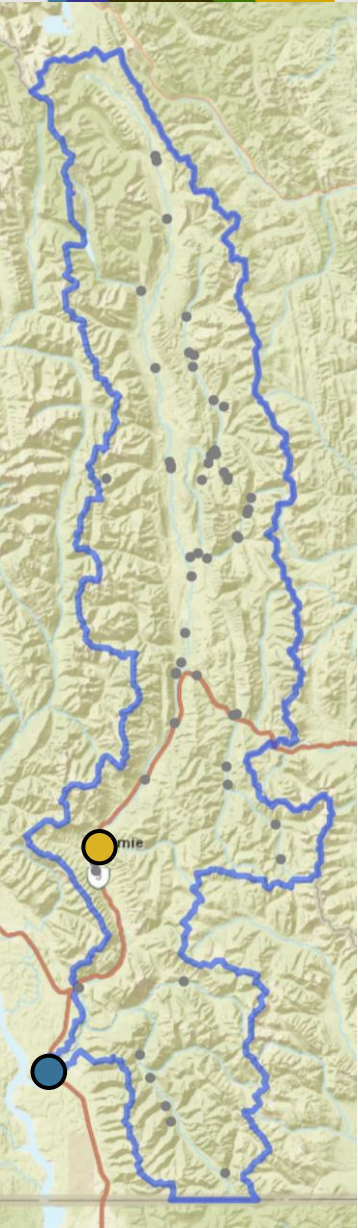
# Stories with Data: Selenium



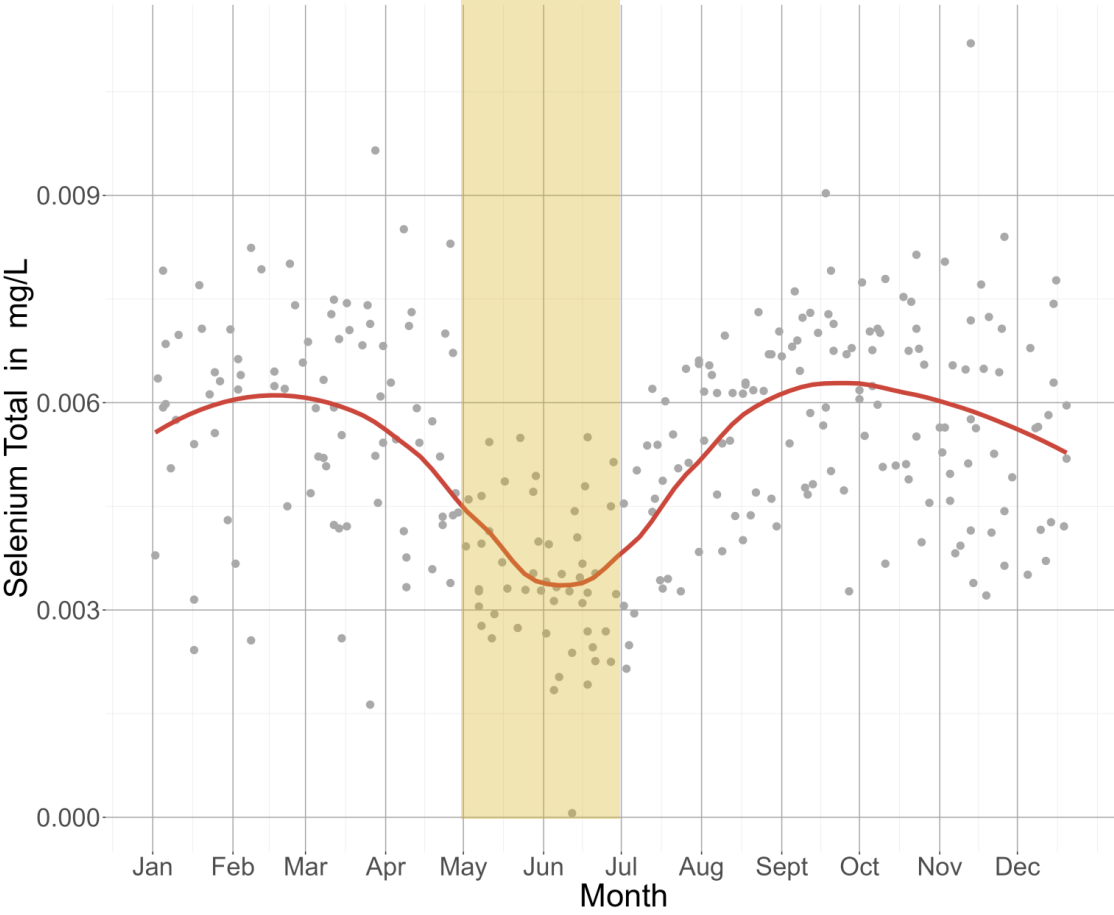
 **Site ID:** 0200016  
**Site Name:** Elk River Above Highway 93  
**Data Collector:** Environment and Climate Change Canada



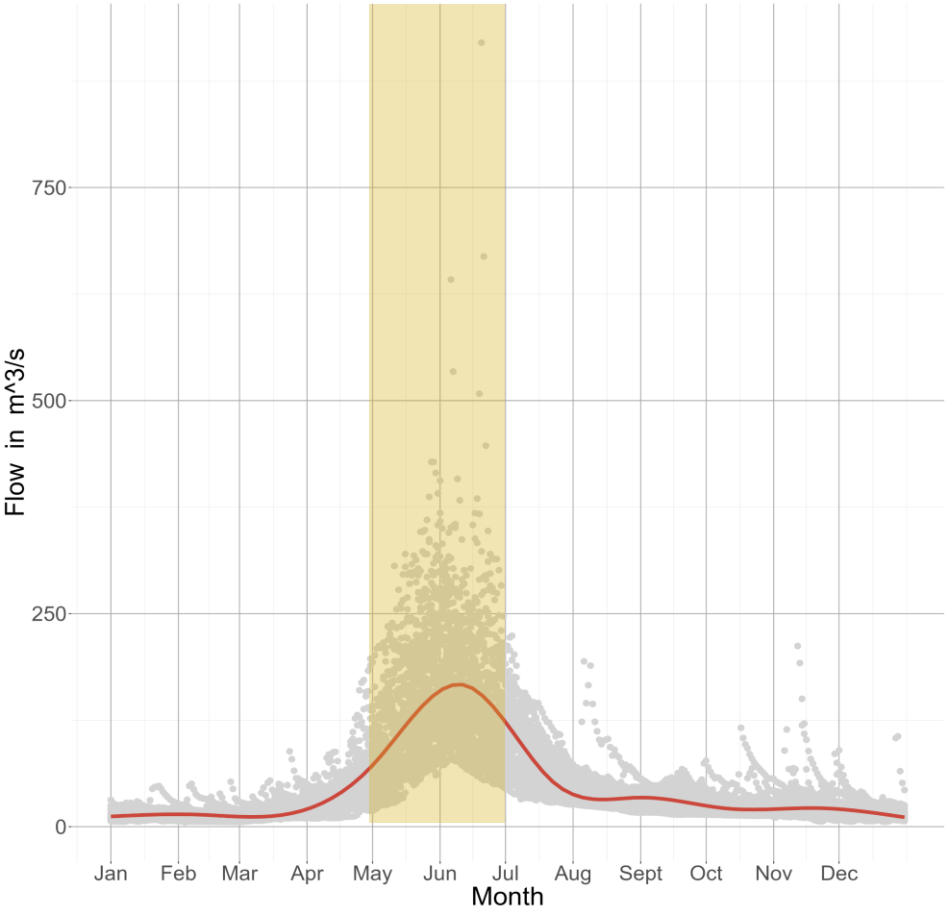
# Stories with Data: Selenium



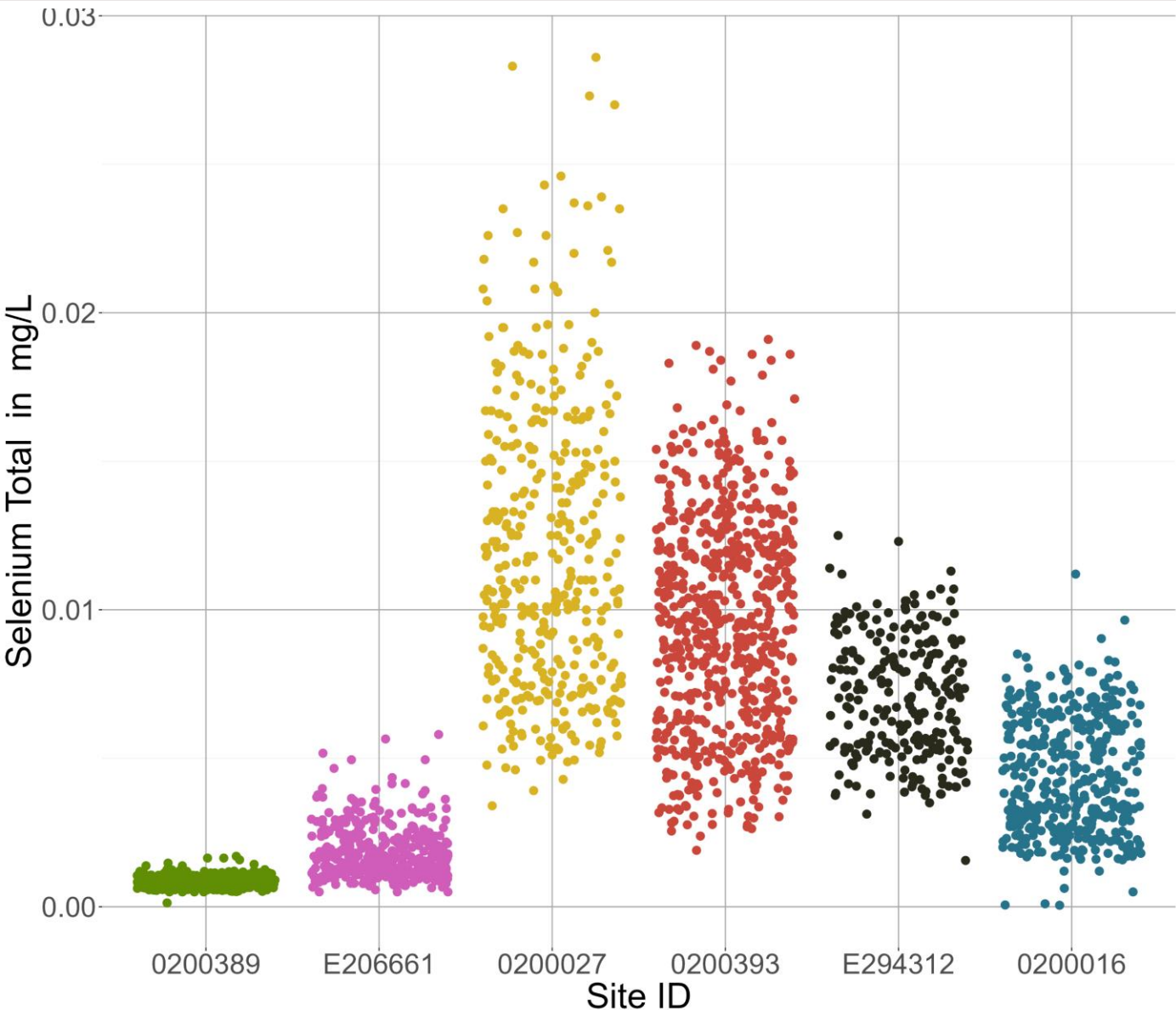
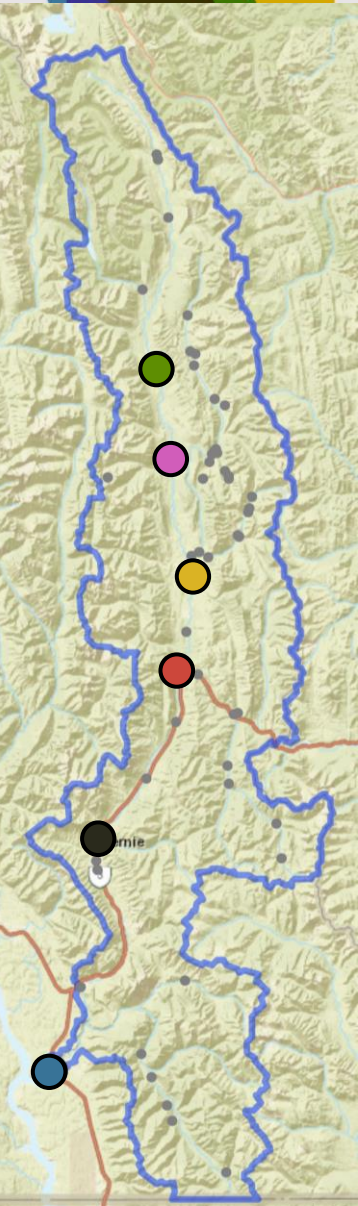
## Selenium Concentration



## Flow



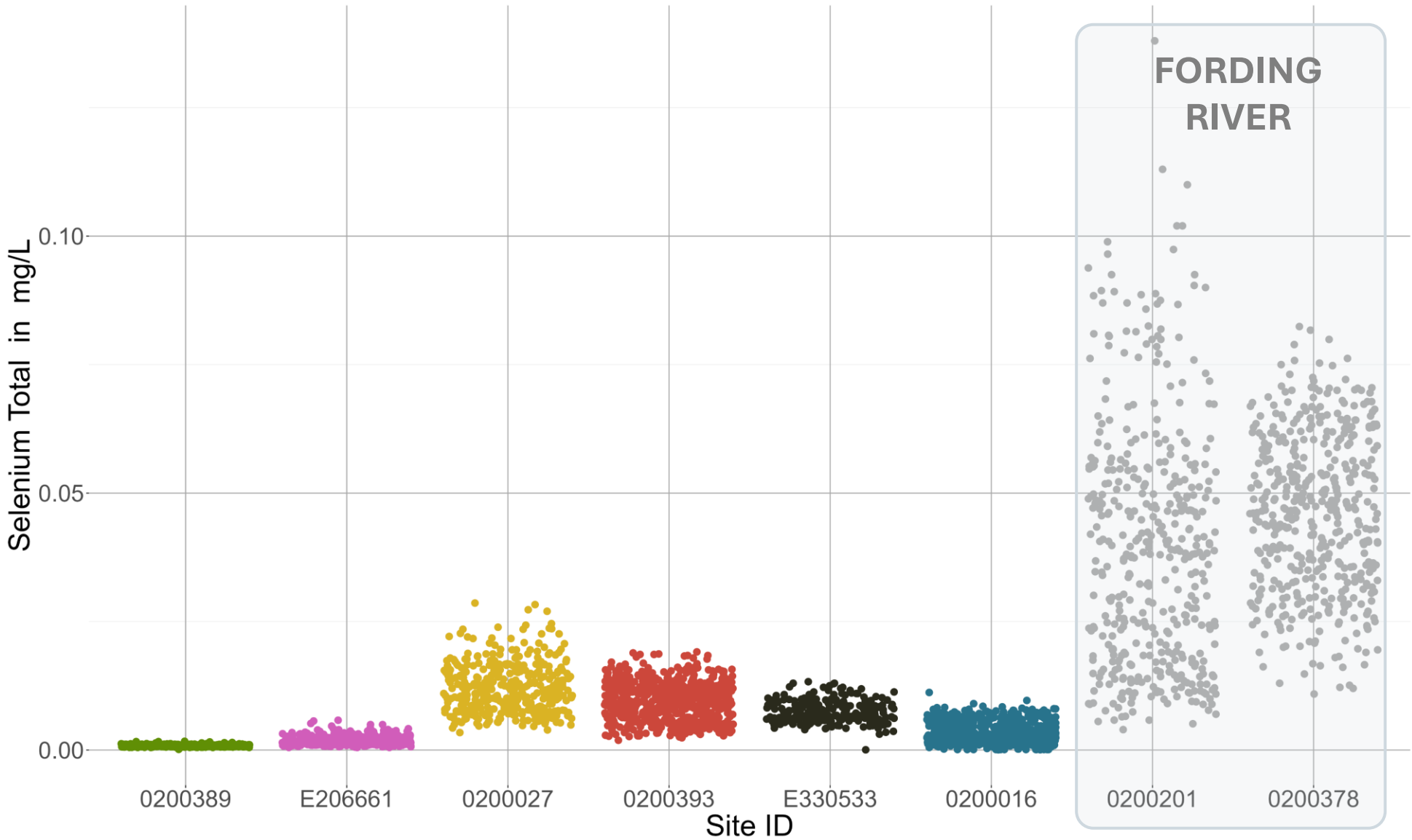
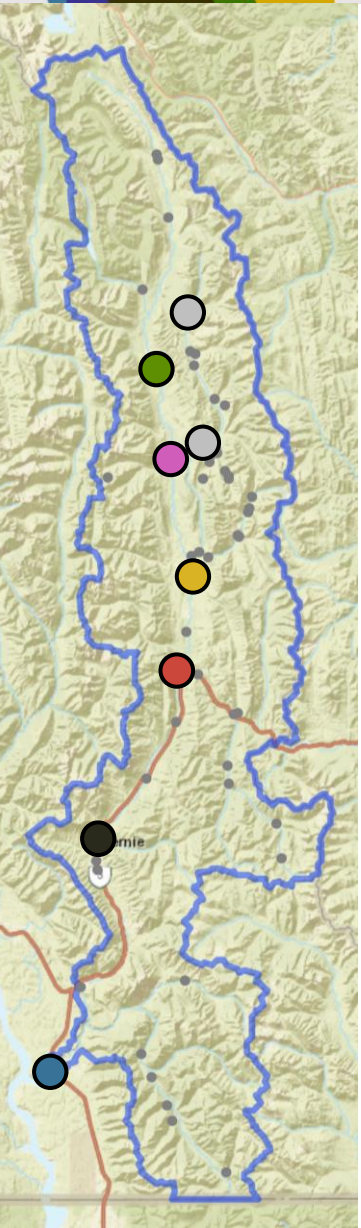
# Stories with Data: Selenium



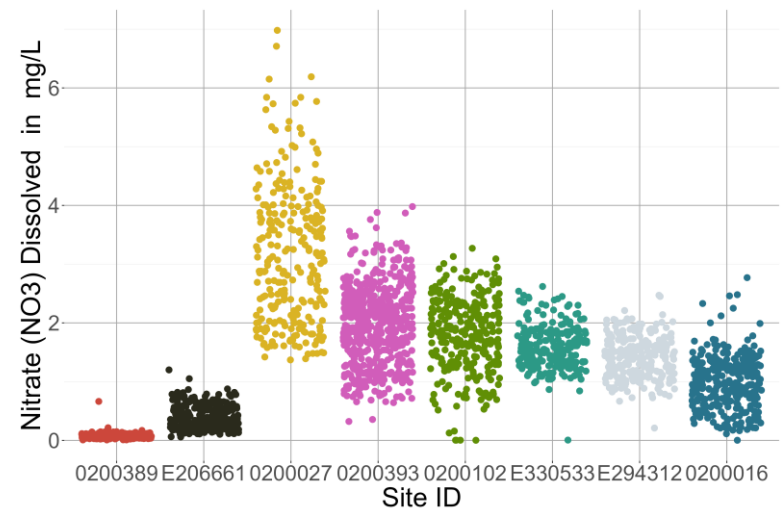
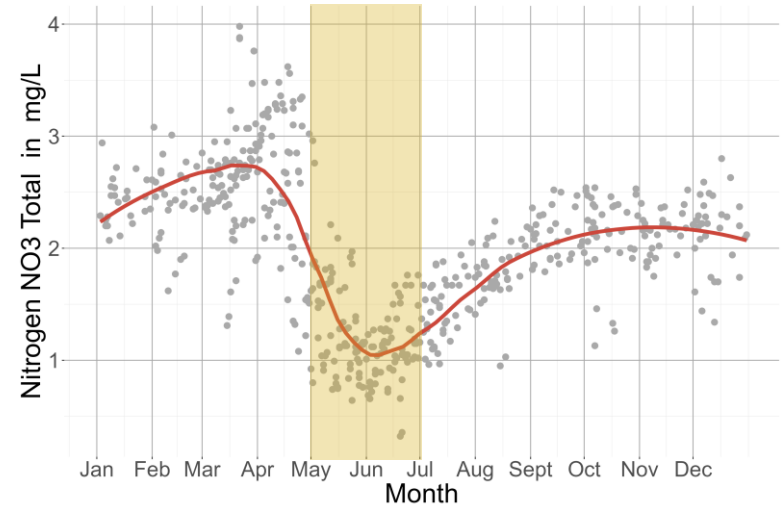
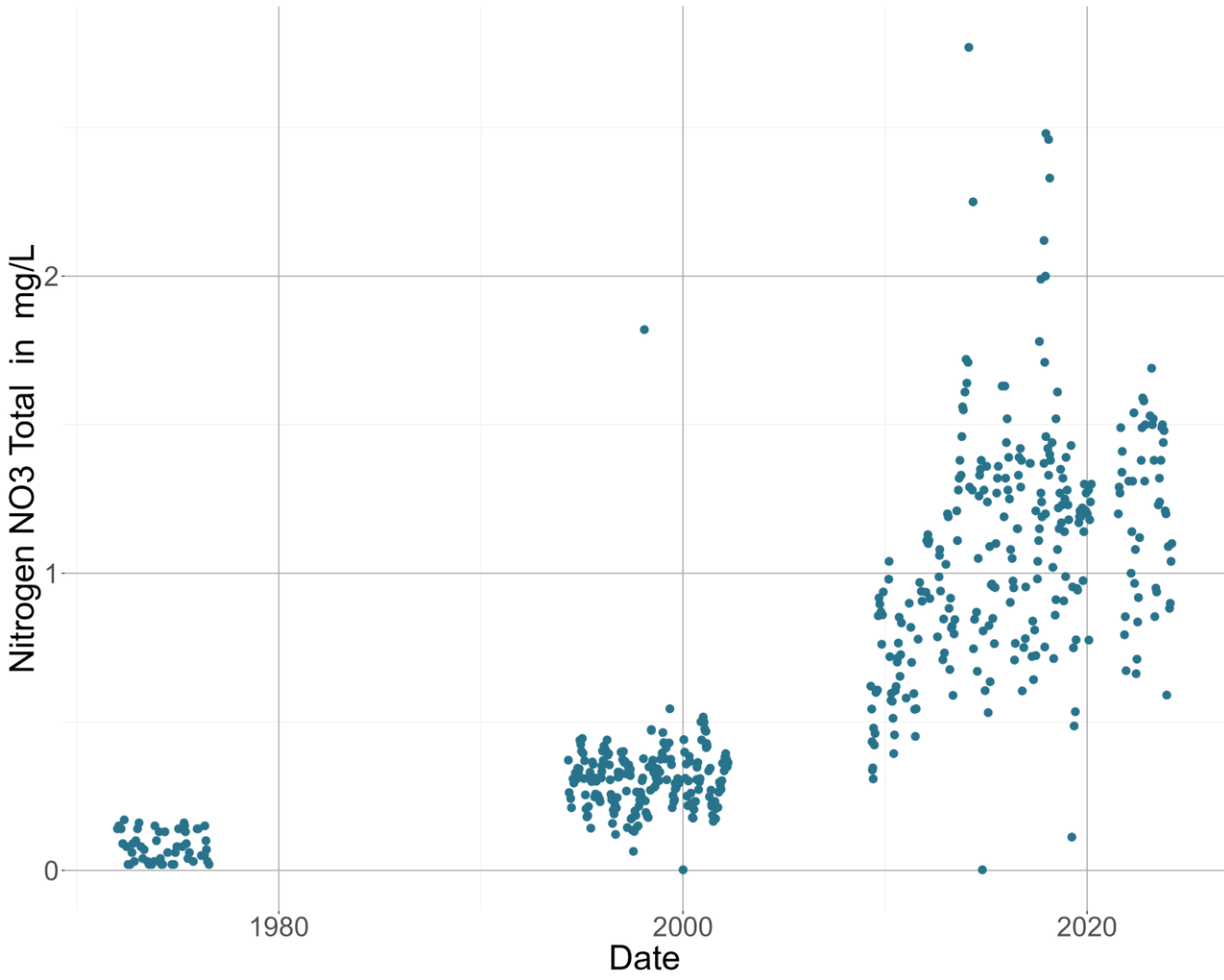
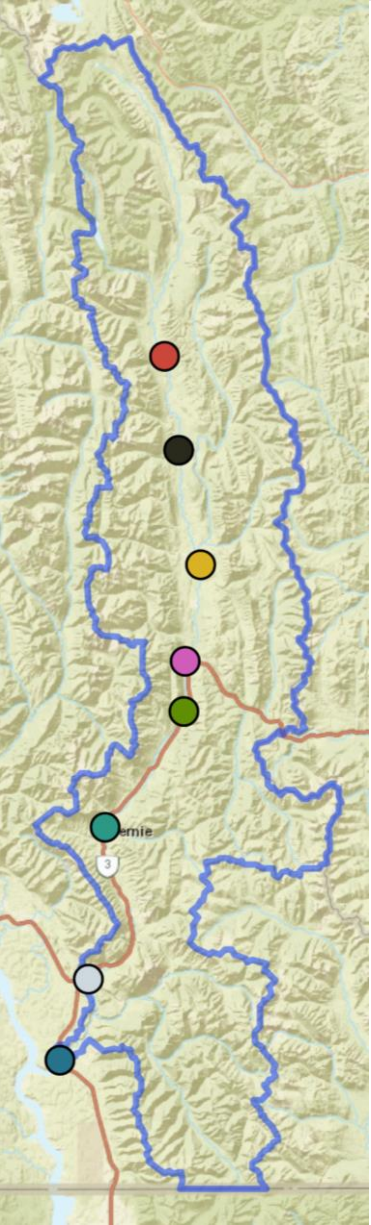
- Site ID:** 0200389  
**Site Name:** Elk River above Greenhills  
**Minig Operation**  
**Data Owner:** Teck
- Site ID:** E206661  
**Site Name:** Elk River above Boivin Creek  
**Data Owner:** Teck
- Site ID:** 0200027  
**Site Name:** Elk River above Grave Creek at Abandoned Suspension Bridge  
**Data Owner:** Teck
- Site ID:** 0200393  
**Site Name:** Elk River below Michel Creek at CPR Roadhouse  
**Data Owner:** Teck
- Site ID:** E294312  
**Site Name:** Elk River at Elko Reservoir  
**Data Owner:** Teck
- Site ID:** 0200016  
**Site Name:** Elk River Above Highway 93  
**Data Owner:** Environment and Climate Change Canada



# Stories with Data: Selenium



# Stories with Data: Nitrates





# Next Steps: Data Visualisation App

http://127.0.0.1:7496 Open in Browser Republish

Select Parameter: Alkalinity Total

Select Catchment: Elk River


Minimum number of samples: 1 to 300

Map Type:  Satellite  Map

Show 20 entries

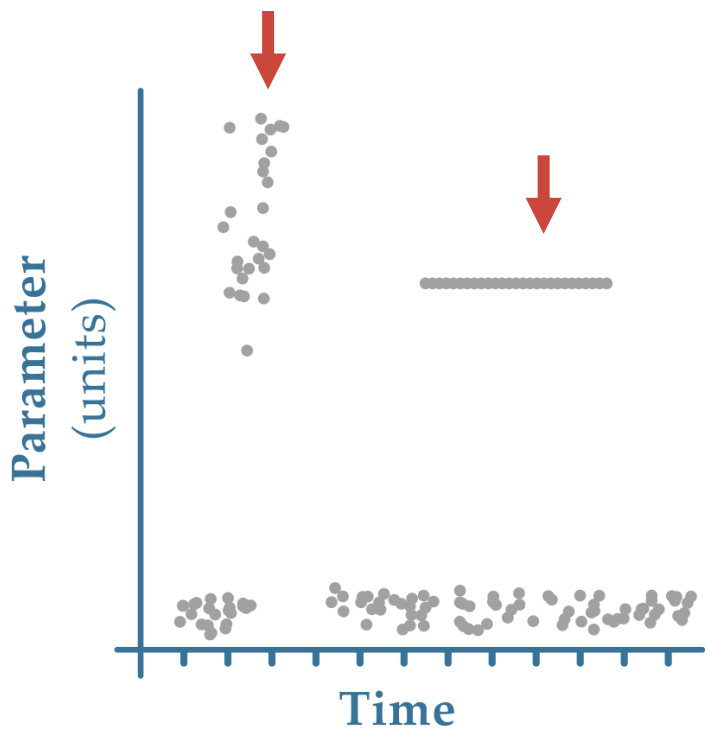
Search:

SITE_ID	MONITORING_LOCATION	DATA_OWNER	DATA_REPOSITORY	GNIS_NAME
10762	E287436 WOLF CREEK @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
10972	E287437 BRANCH F @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11297	E326780 UNNAMED CREEK, WEST SIDE ELK R. (RG_UCWER)	Teck	Environmental Monitoring System	Elk River
11342	E287434 WILLOW CREEK NORTH @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11424	E287433 WADE CREEK @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11628	E287435 WILLOW CREEK SOUTH @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11675	E287432 COUGAR CREEK @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11761	0200388 ELK VALLEY COAL G/H (PE6248) MICKELSON CR U/S ELK R.	Teck	Environmental Monitoring System	Elk River
12086	0200389 ELK RIVER ABOVE GREENHILLS MINING OPERATION	Teck	Environmental Monitoring System	Elk River

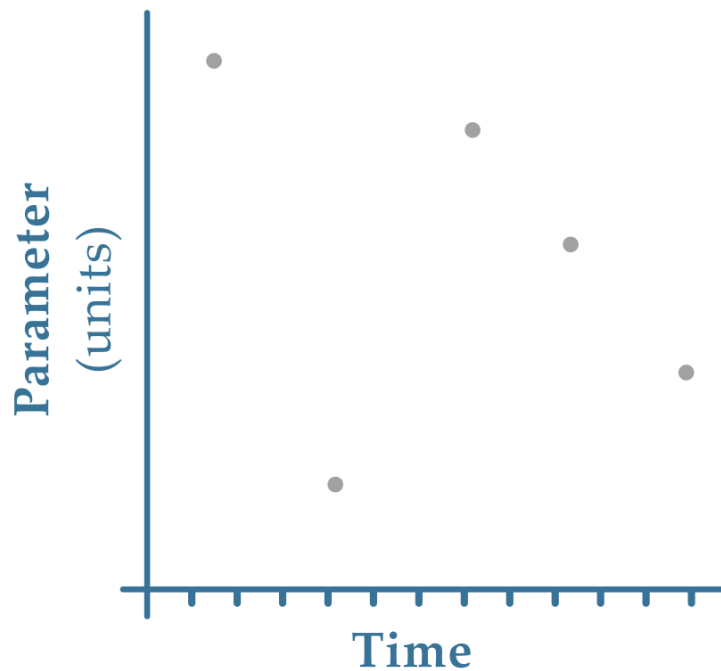


# Next Steps: limitations of existing data

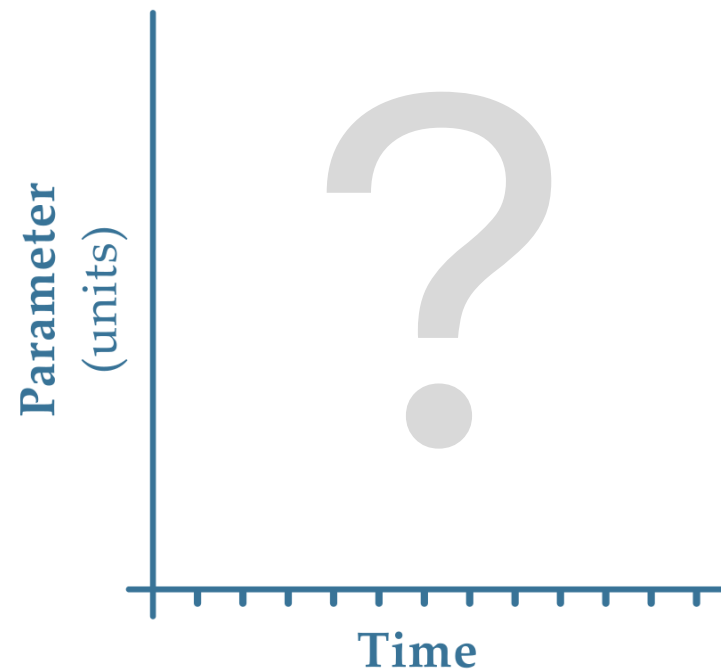
Incorrect Data Entry



Insufficient Data to make inferences

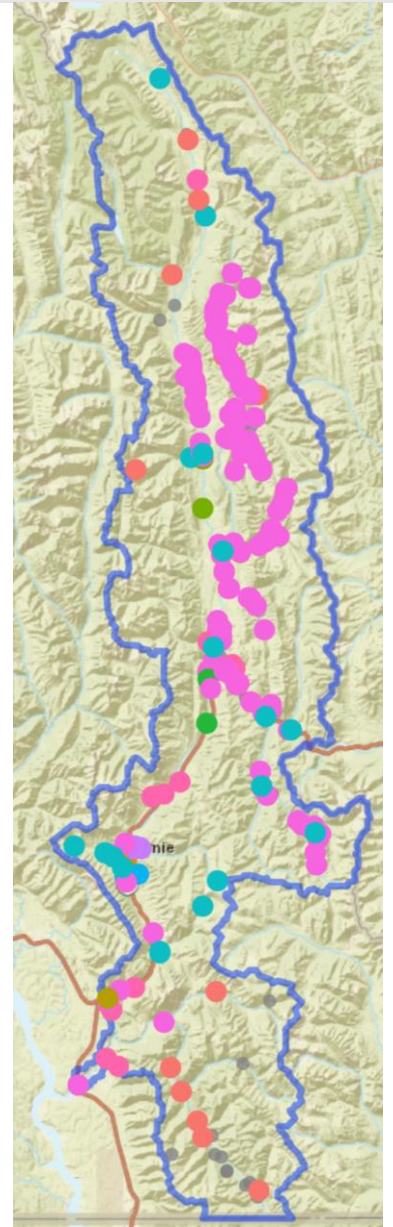


No data from some impacted areas



# Take Home Messages

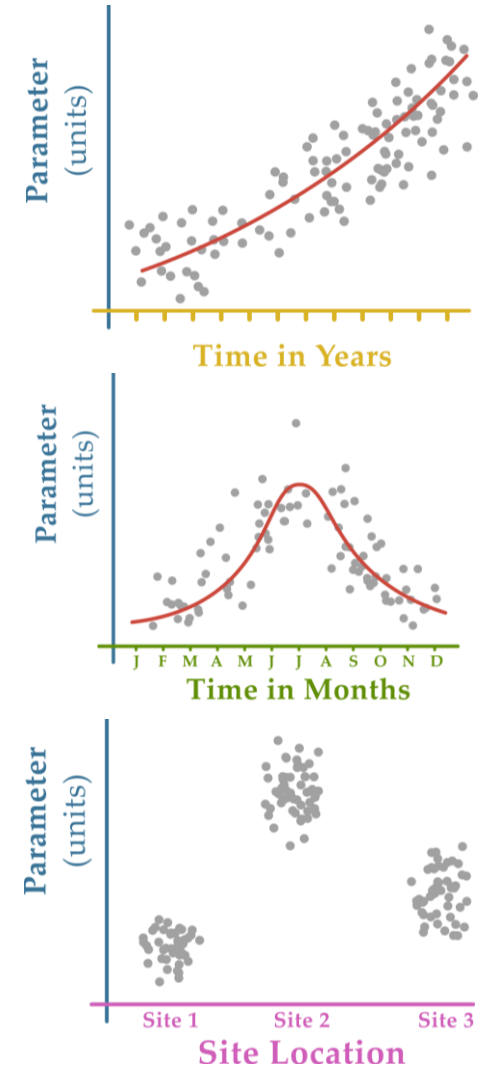
Many organisations collect data on the watershed



# Take Home Messages

Many organisations collect data on the watershed

**Different ways of looking at data can tell different stories**

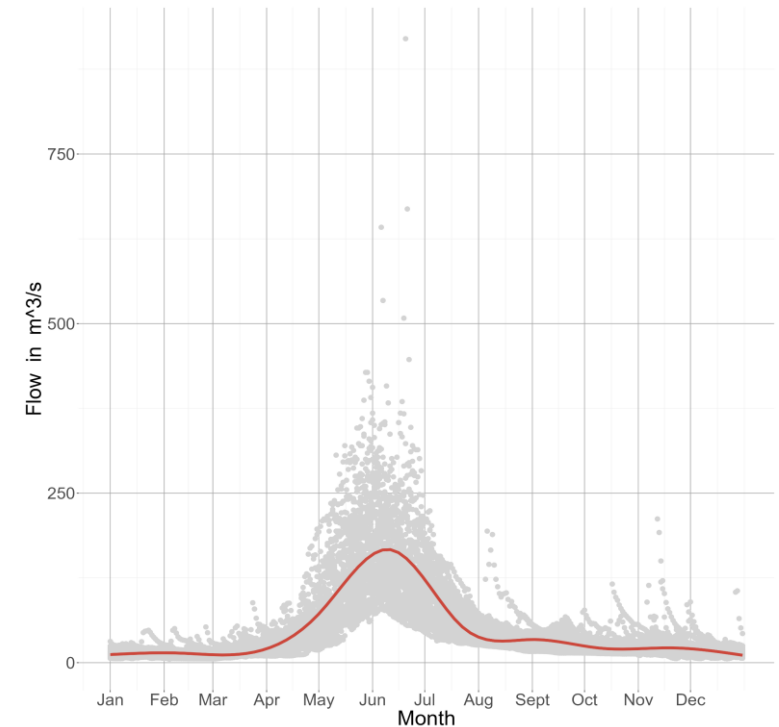


# Take Home Messages

Many organisations collect data on the watershed

Different ways of looking at data can tell different stories

**Data can tell important stories about natural processes such as seasonal flow patterns**



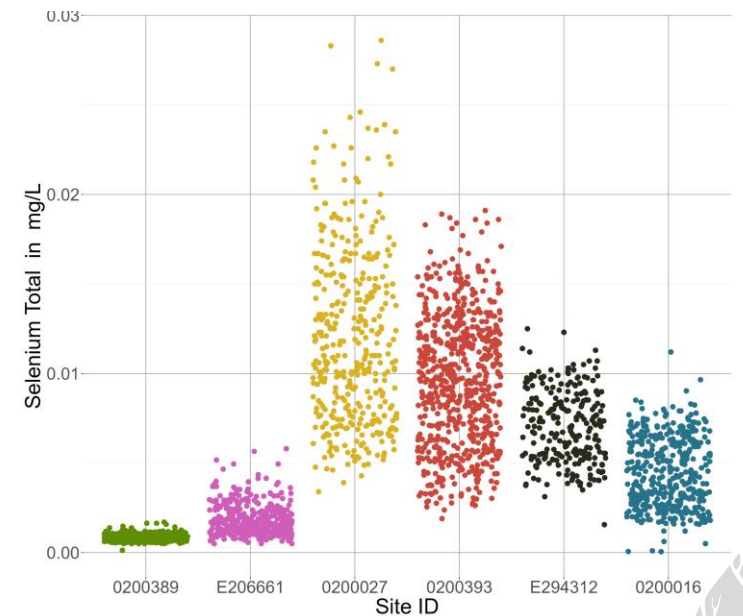
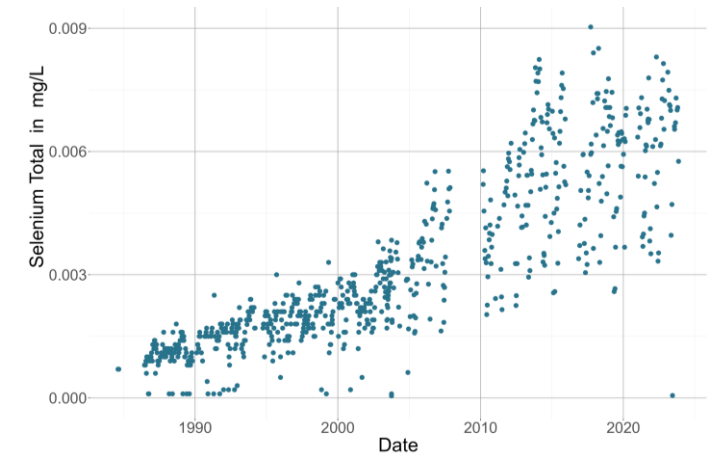
# Take Home Messages

Many organisations collect data on the watershed

Different ways of looking at data can tell different stories

Data can tell important stories about natural processes such as seasonal flow patterns

**Data can also tell important stories about human impacts**



# Take Home Messages

Many organisations collect data on the watershed

Different ways of looking at data can tell different stories

Data can tell important stories about natural processes such as seasonal flow patterns

Data can also tell important stories about human impacts which are superimposed on natural patterns

**By understanding the limitations of existing data, we can adjust our monitoring practices to answer some important questions**

