



Elk River
Watershed
—
Qukin
ʔamakʔis

Collaborative
Monitoring
Program

Using data to tell stories

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April 3rd, 2024



Land acknowledgement

The Elk River Watershed Collaborative Monitoring Program is grateful to work on qukin ʔamakʔis, the Land of the Raven, which are the traditional land and waters of the Yaqit ʔa·knuqʔi ʔit First Nation, a band of the Ktuanxa Nation.

The Elk River Watershed

Elk Lakes

Elkford

Sparwood

Fernie

Lake Koocanusa



The Elk River Watershed

Elk Lakes

Elkford

Sparwood

Fernie

Lake Koocanusa



Understanding Human Impact

FORESTRY



COAL MINING DEVELOPMENT



Understanding Human Impact

FORESTRY

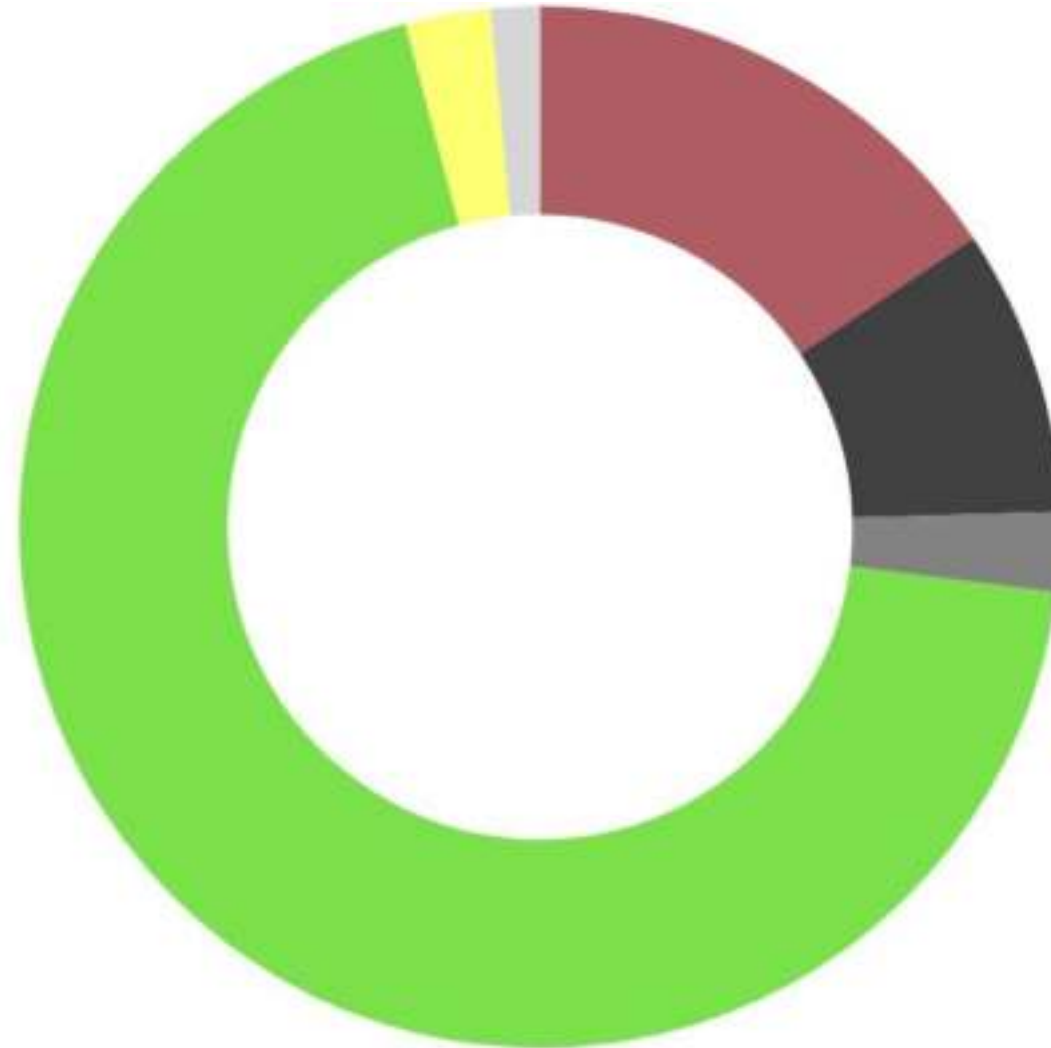
COAL MINING DEVELOPMENT



- POWERLINES
- MUNICIPALITIES & LOCAL ROADS
- RAILROADS
- AGRICULTURE AND CLEARED AREAS
- HIGHWAYS



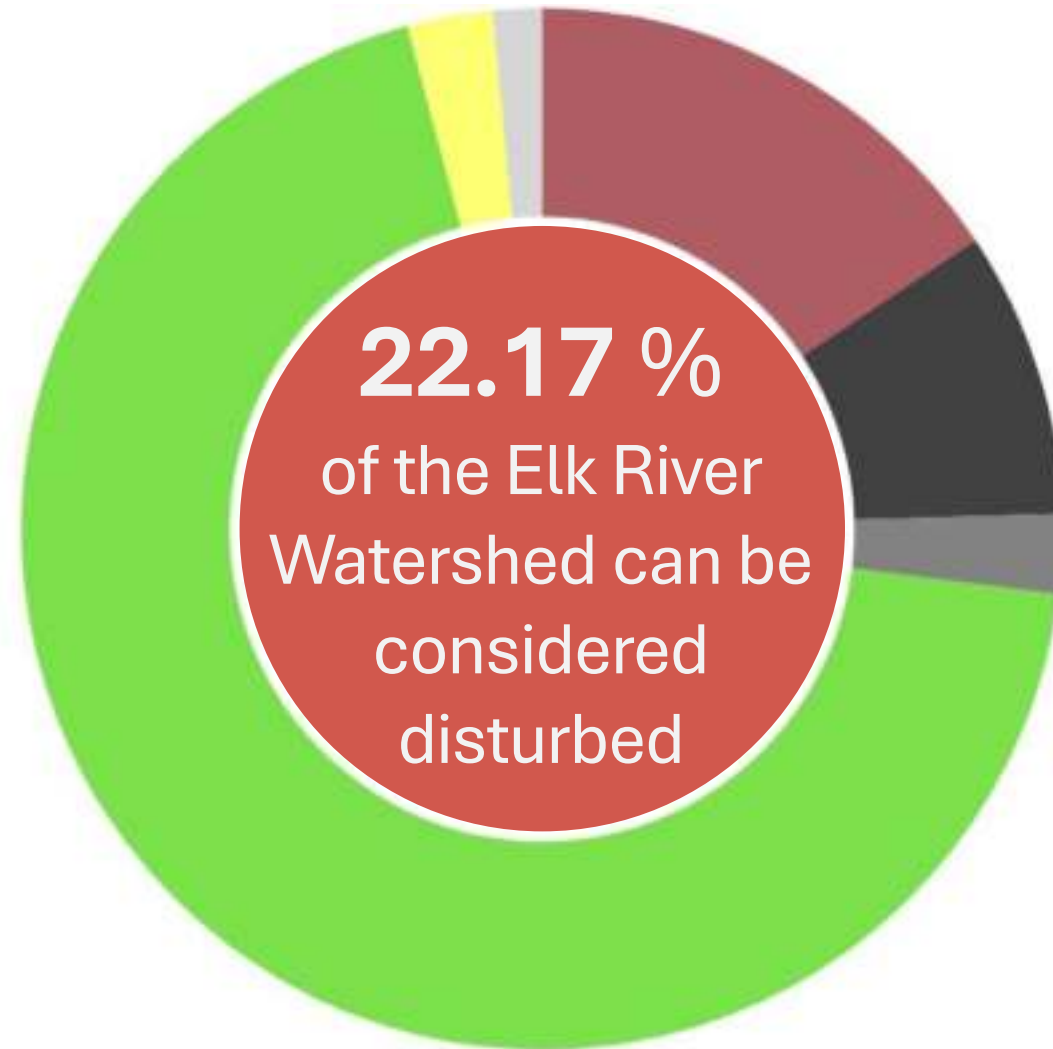
Understanding Human Impact



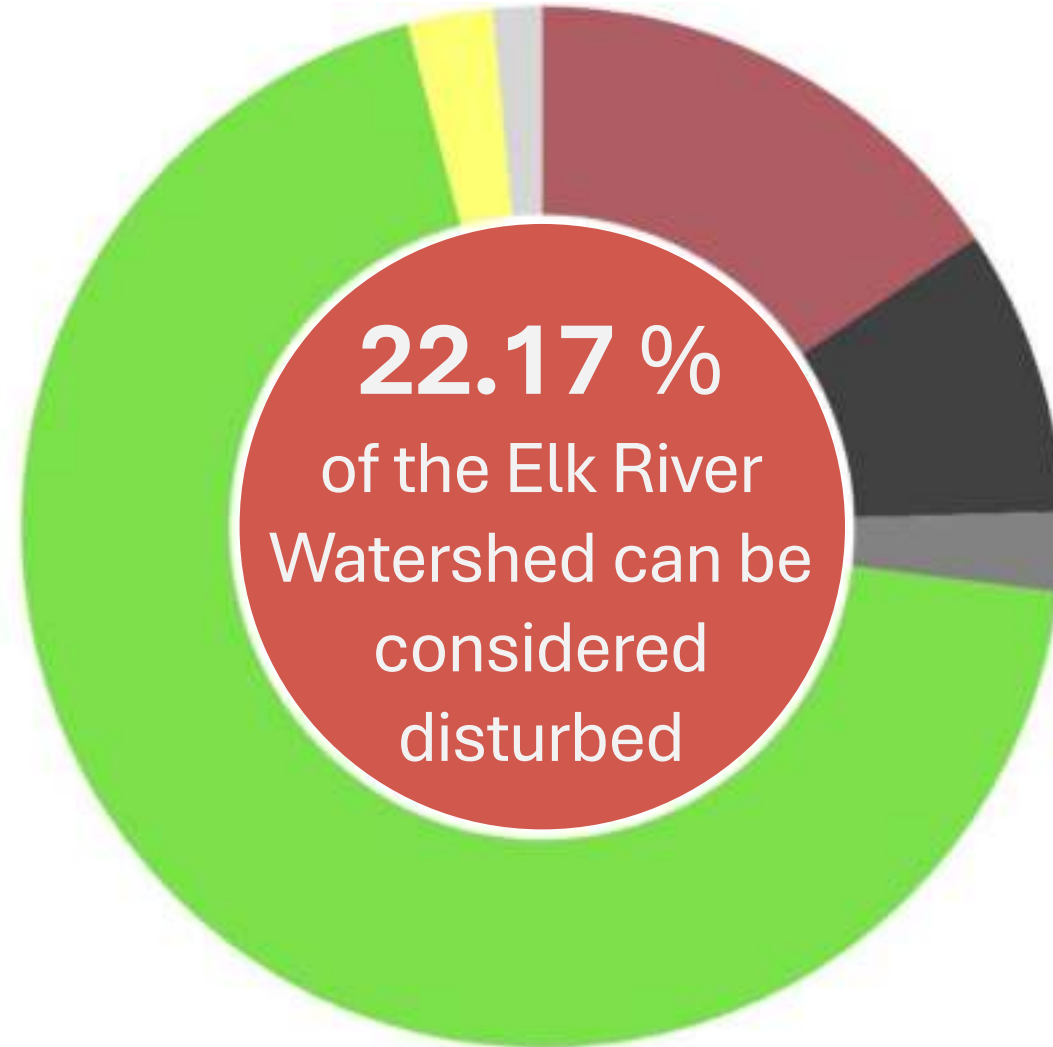
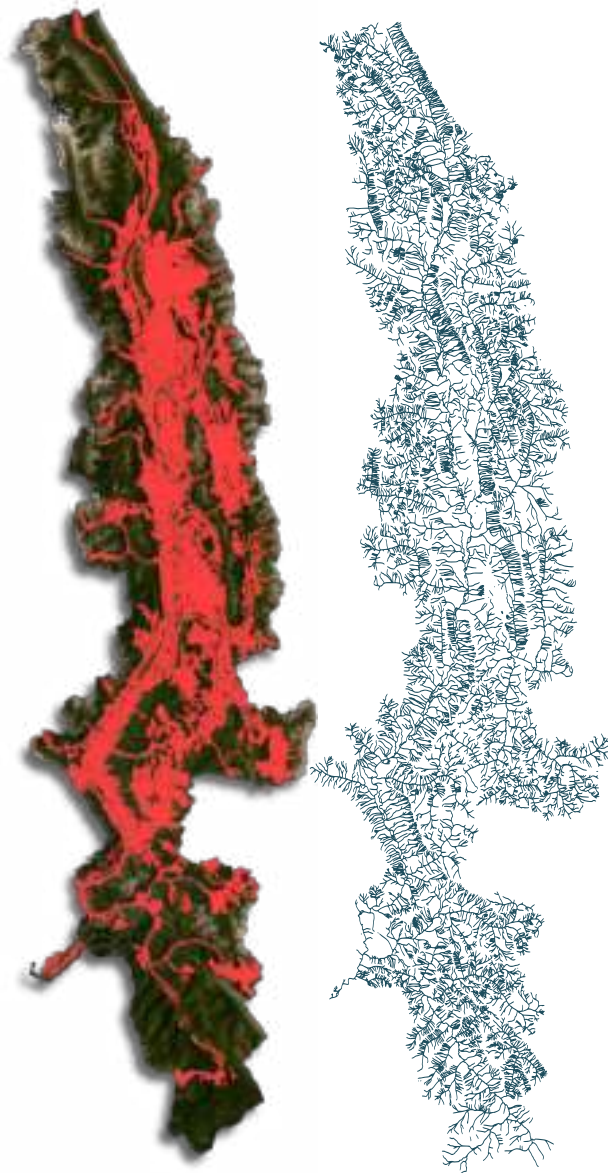
	Forestry Cutblocks	68.83%
	Roads	15.65%
	Mining and Extraction	8.88%
	Agriculture and Clearing	2.65%
	Urban or Built-Up Areas	2.48%
	Other	1.52%



Understanding Human Impact



Understanding Human Impact



The Collaborative



Elk River
Watershed
—
Qukin
ʔamakʔis

Collaborative Monitoring Program



Ministry of
Environment and
Climate Change Strategy



Yaqit ʔa'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



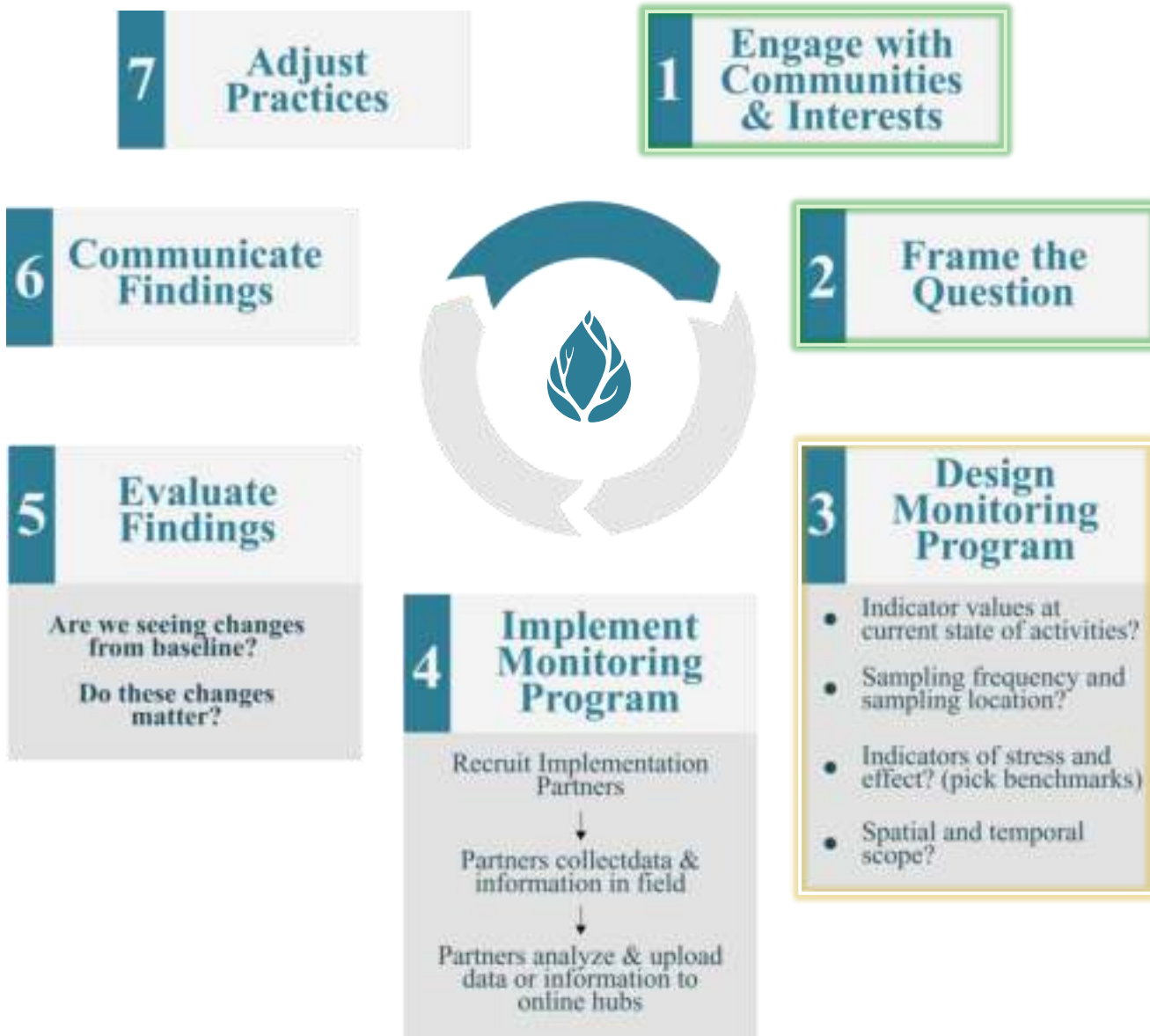
Fish Habitat



Ktunaxa Land and
Water Uses



Adaptive Monitoring Framework



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



Data Consolidation Work

What can we learn from existing data?

Data Consolidation



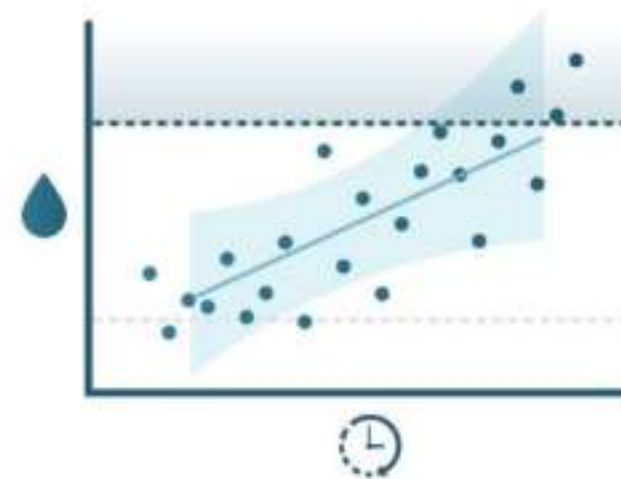
Collect data from different sources

Data Visualisation and Hypothesis Building



Explore trends related to key themes

Evaluation

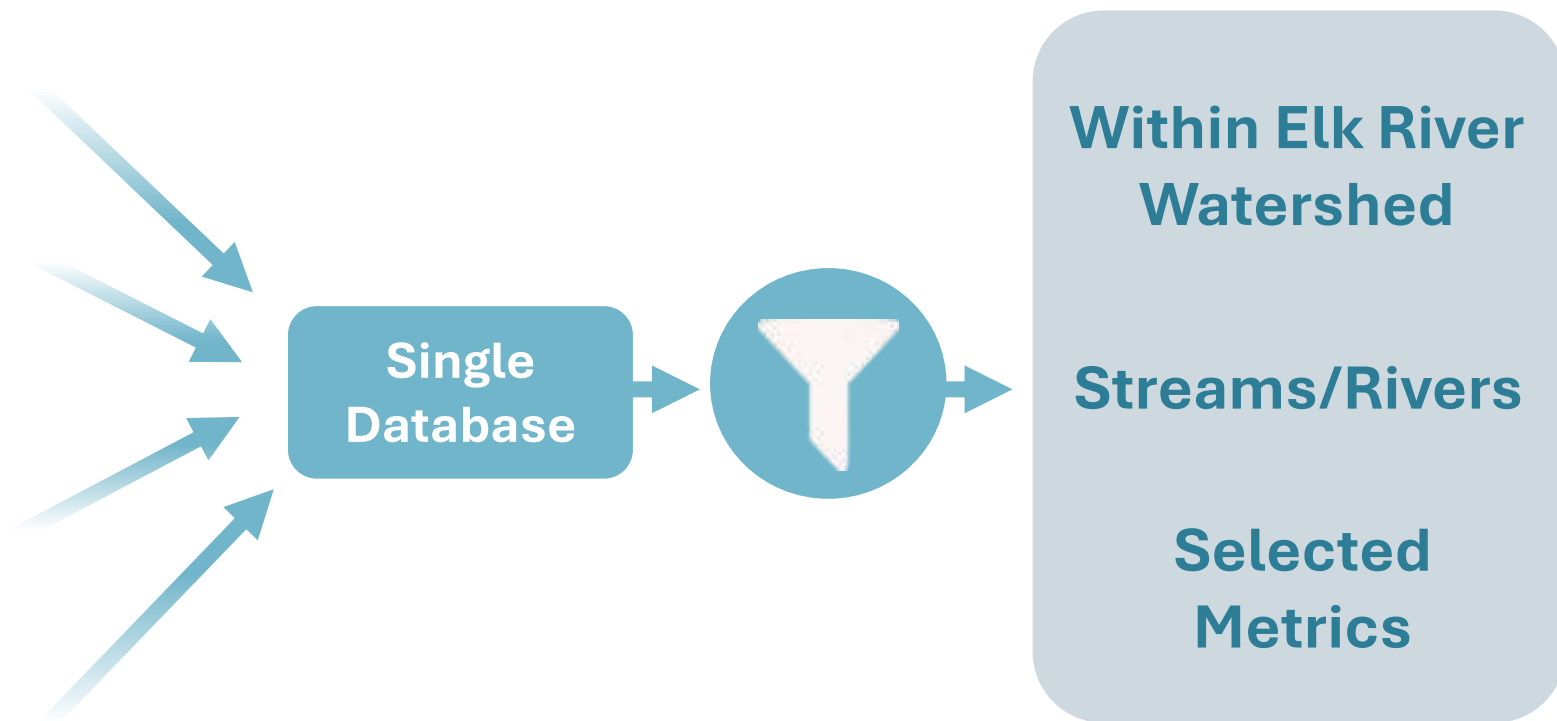
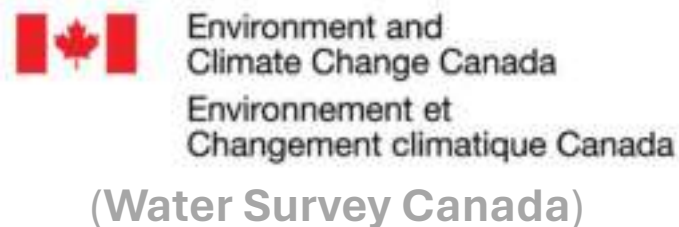


Statistically test hypotheses

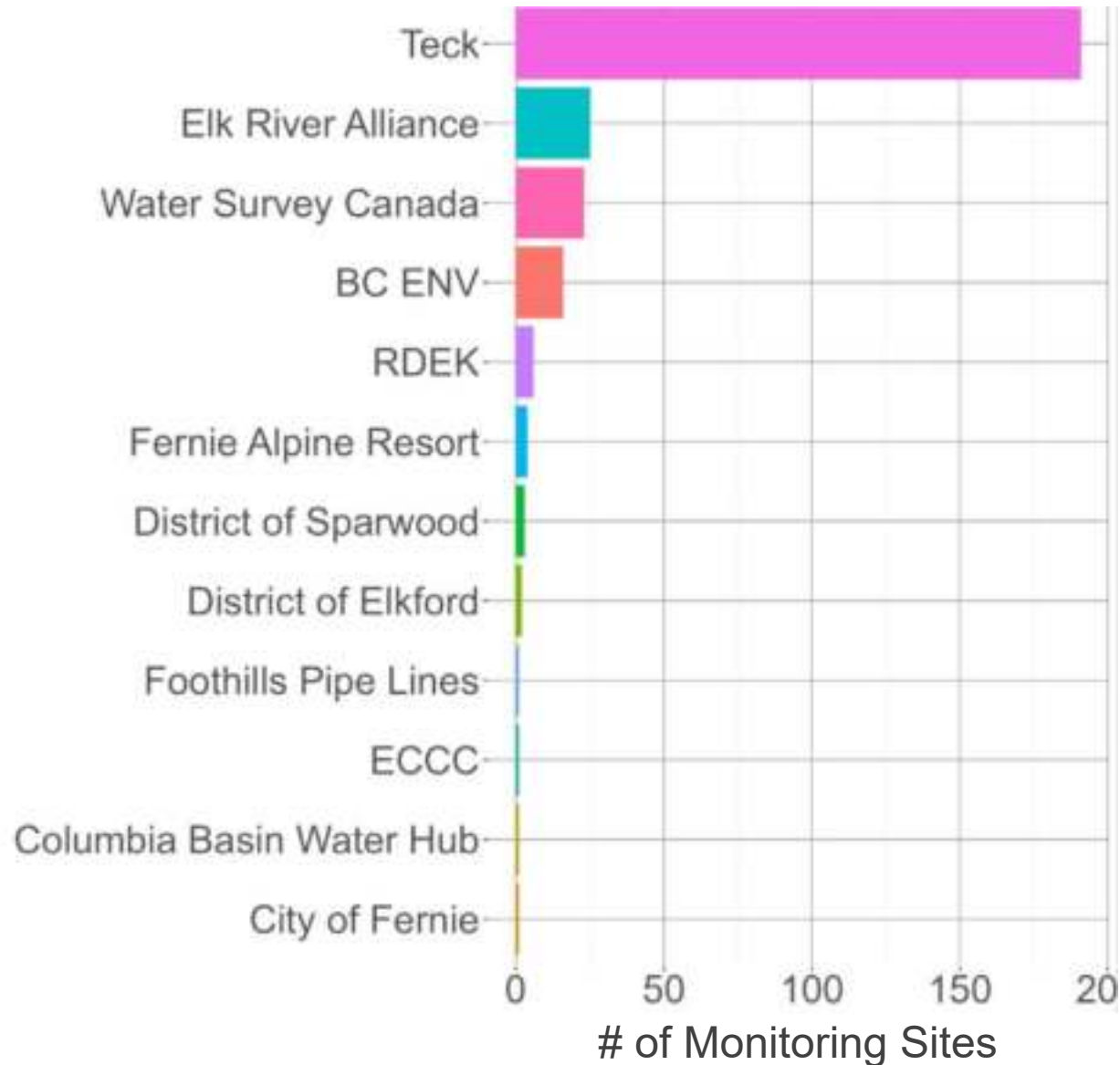
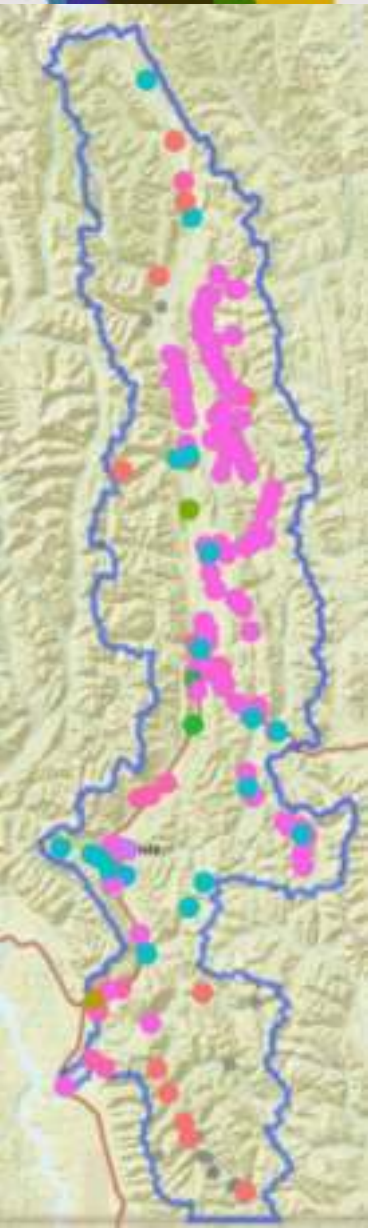


Publicly accessible data

5 public data repositories:



Who monitors Elk Valley water?



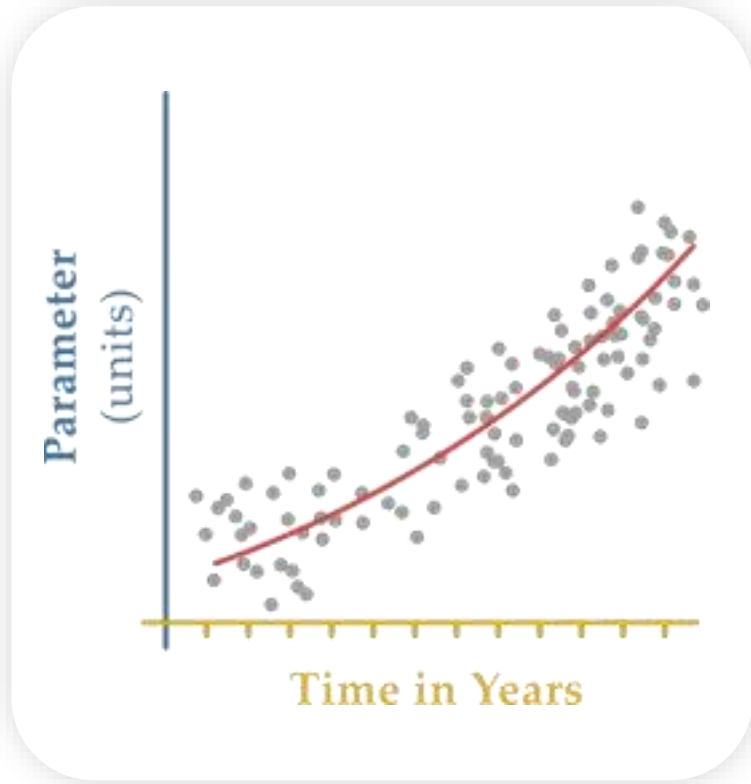
369 SITES

59 PARAMETERS

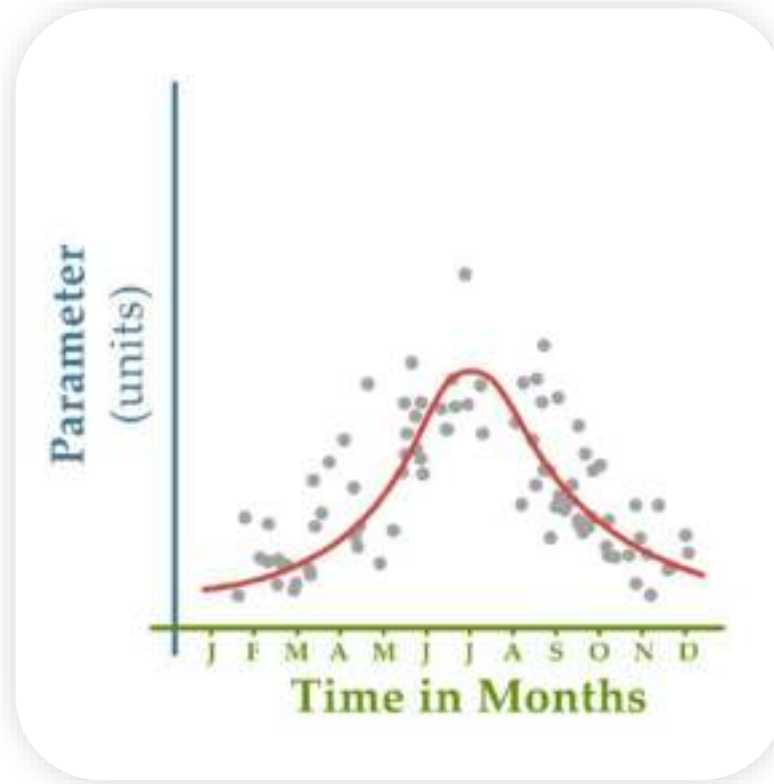


Stories with Data: Visualizing Variation

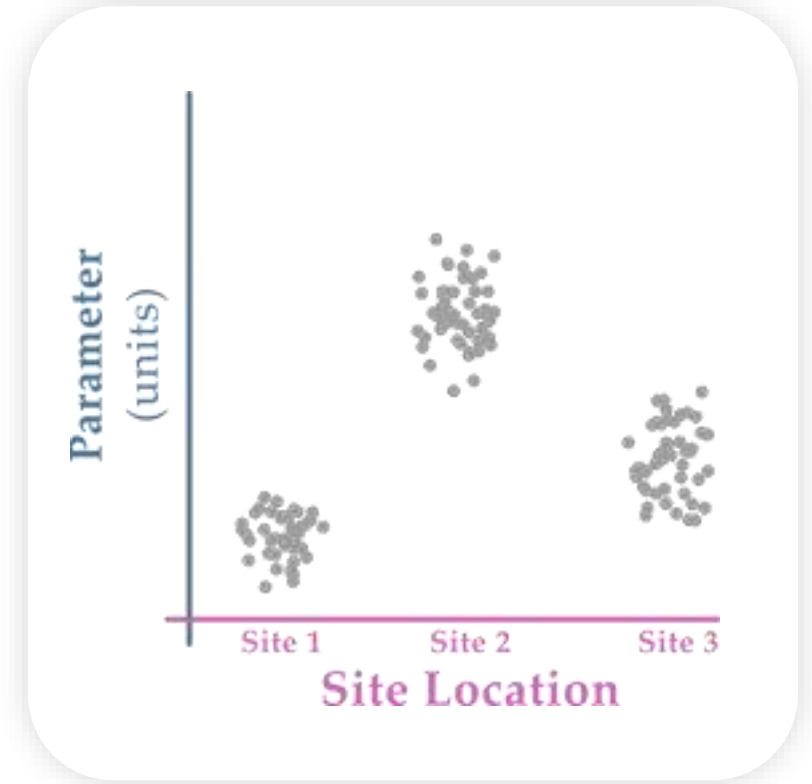
Long-term Variation



Seasonal Variation



Spatial Variation

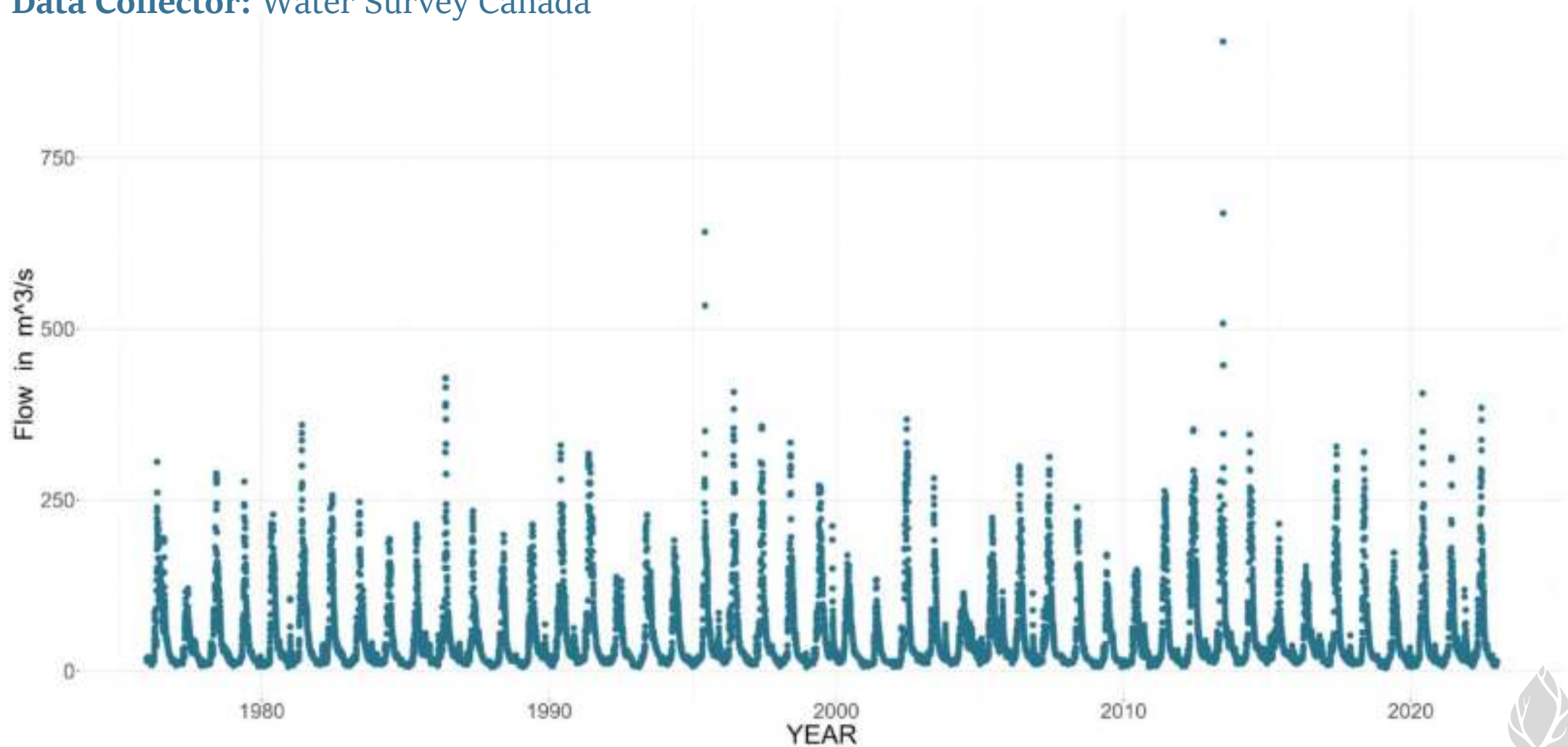


Stories with Data: Flow

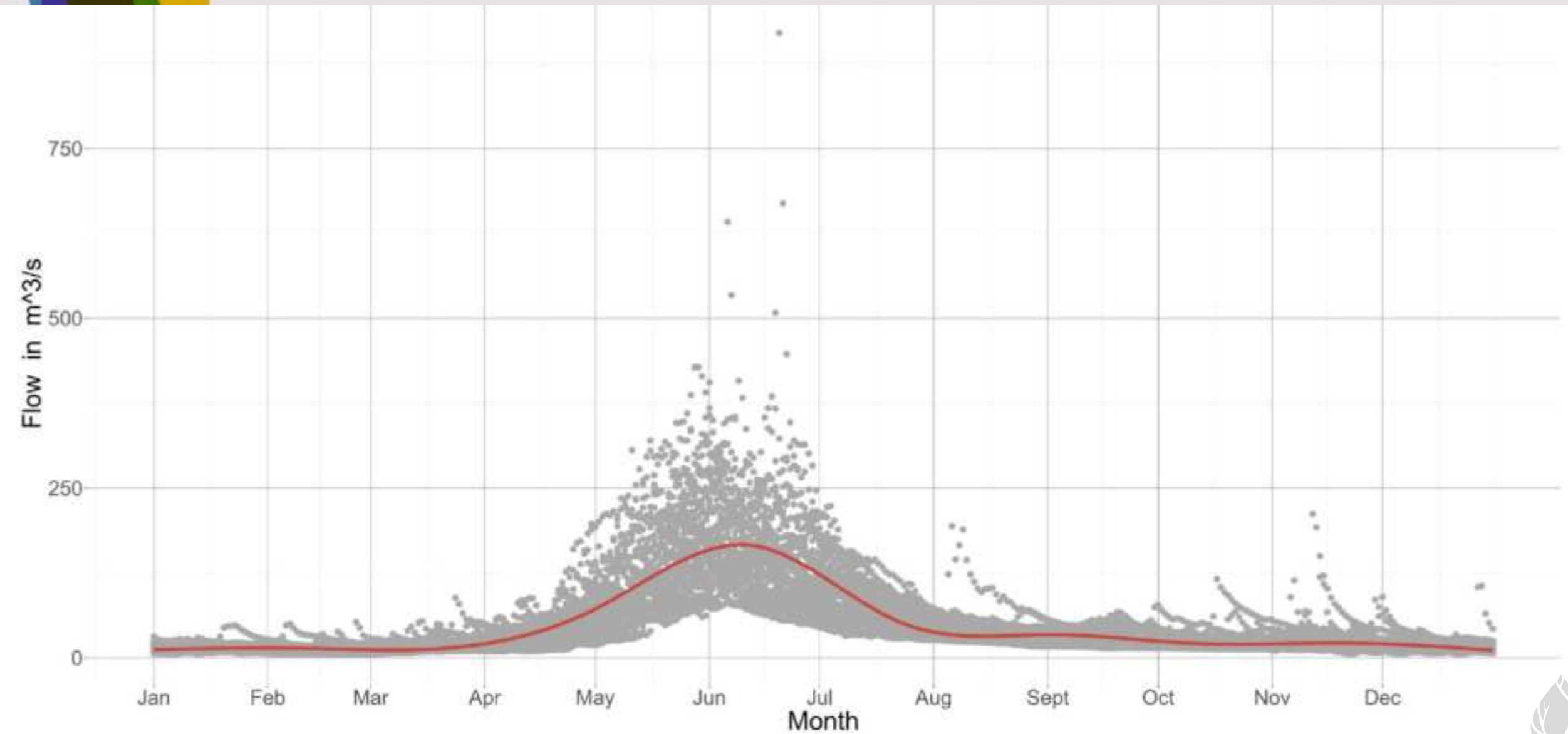
Site ID: o8NK002

Location: Elk River at Fernie

Data Collector: Water Survey Canada



Stories with Data: **Flow**



Stories with Data: Flow



Flow in m^3/s

750

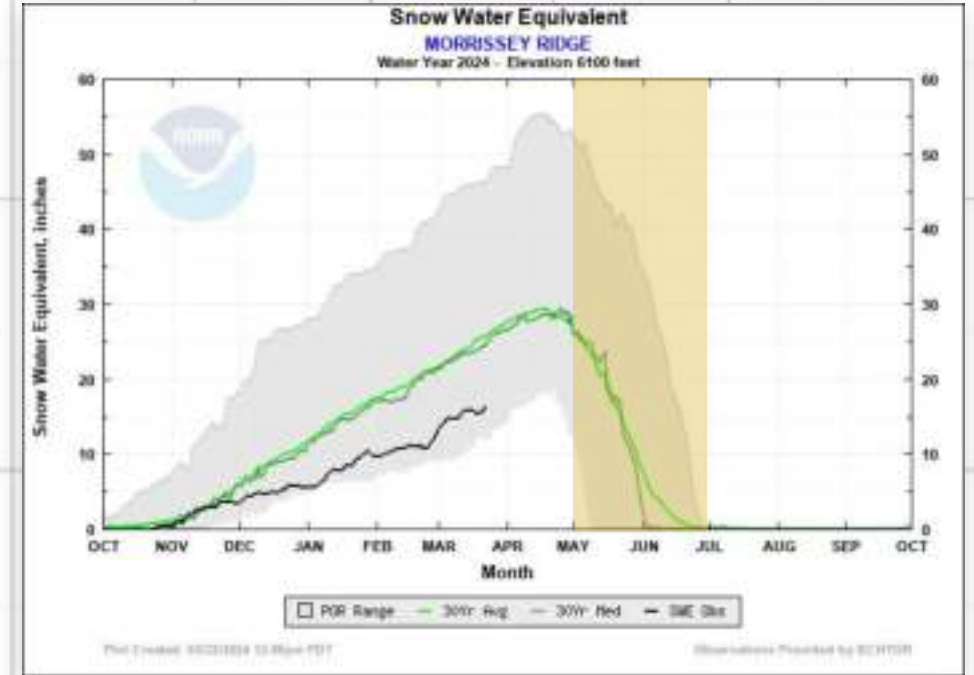
500

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

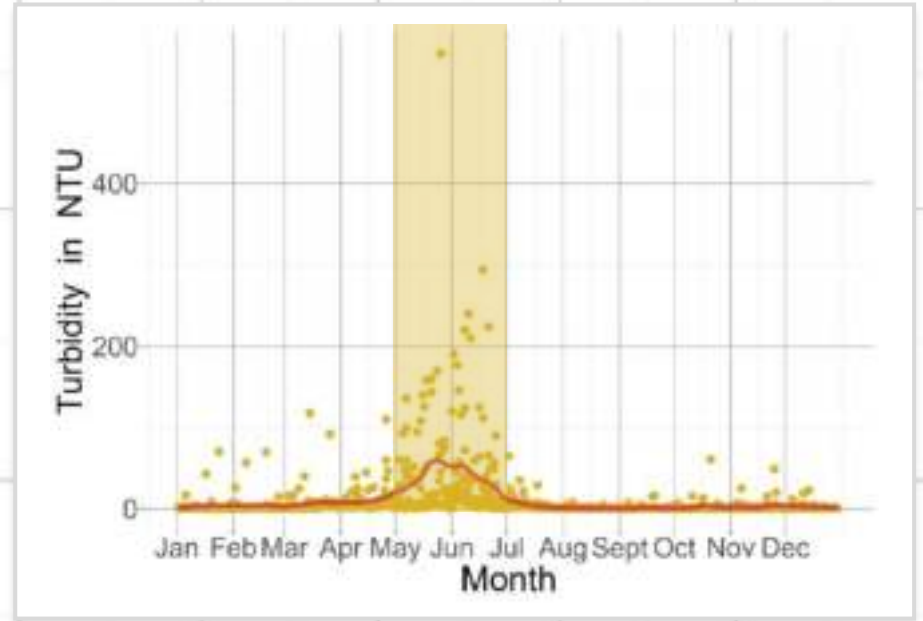
500

250

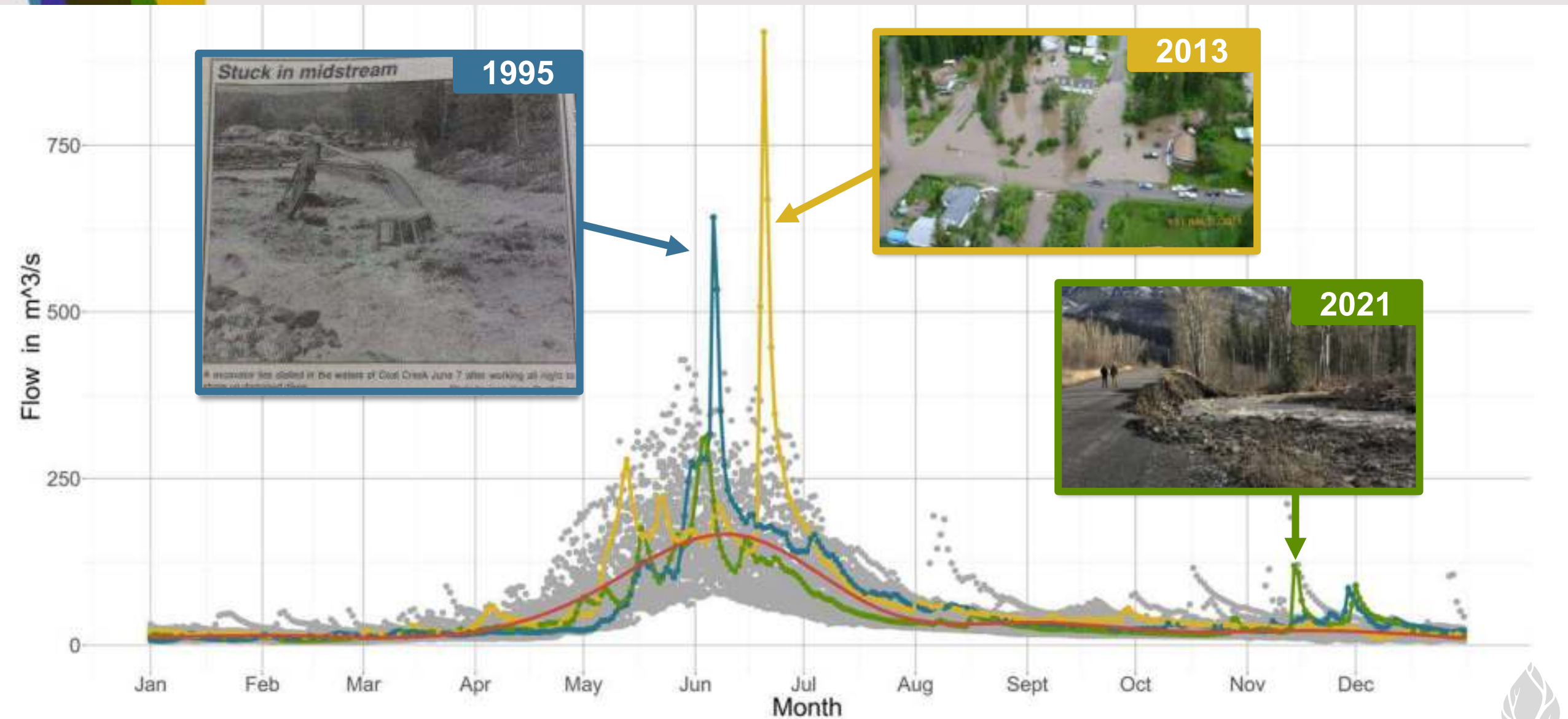
0

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

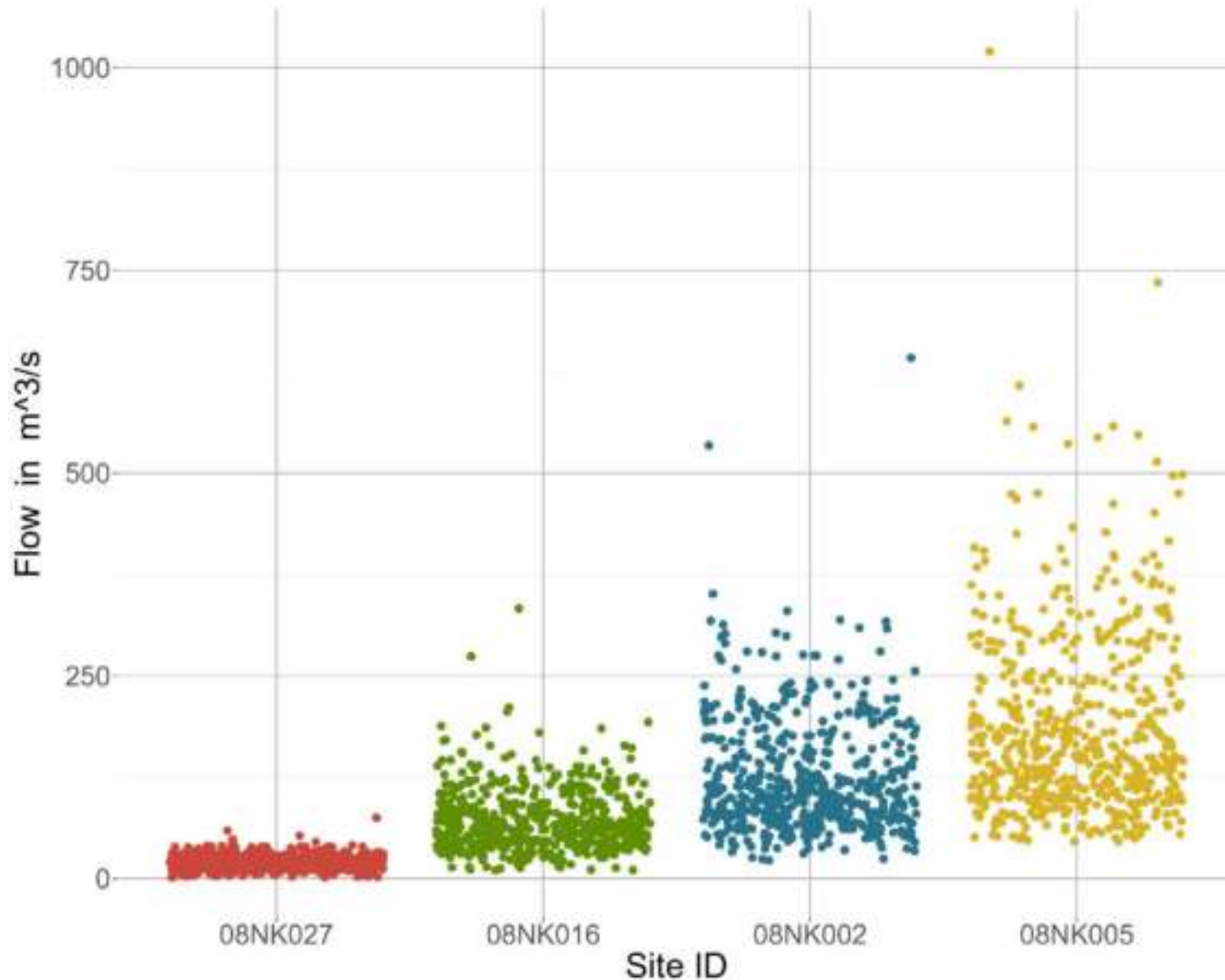
Month



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



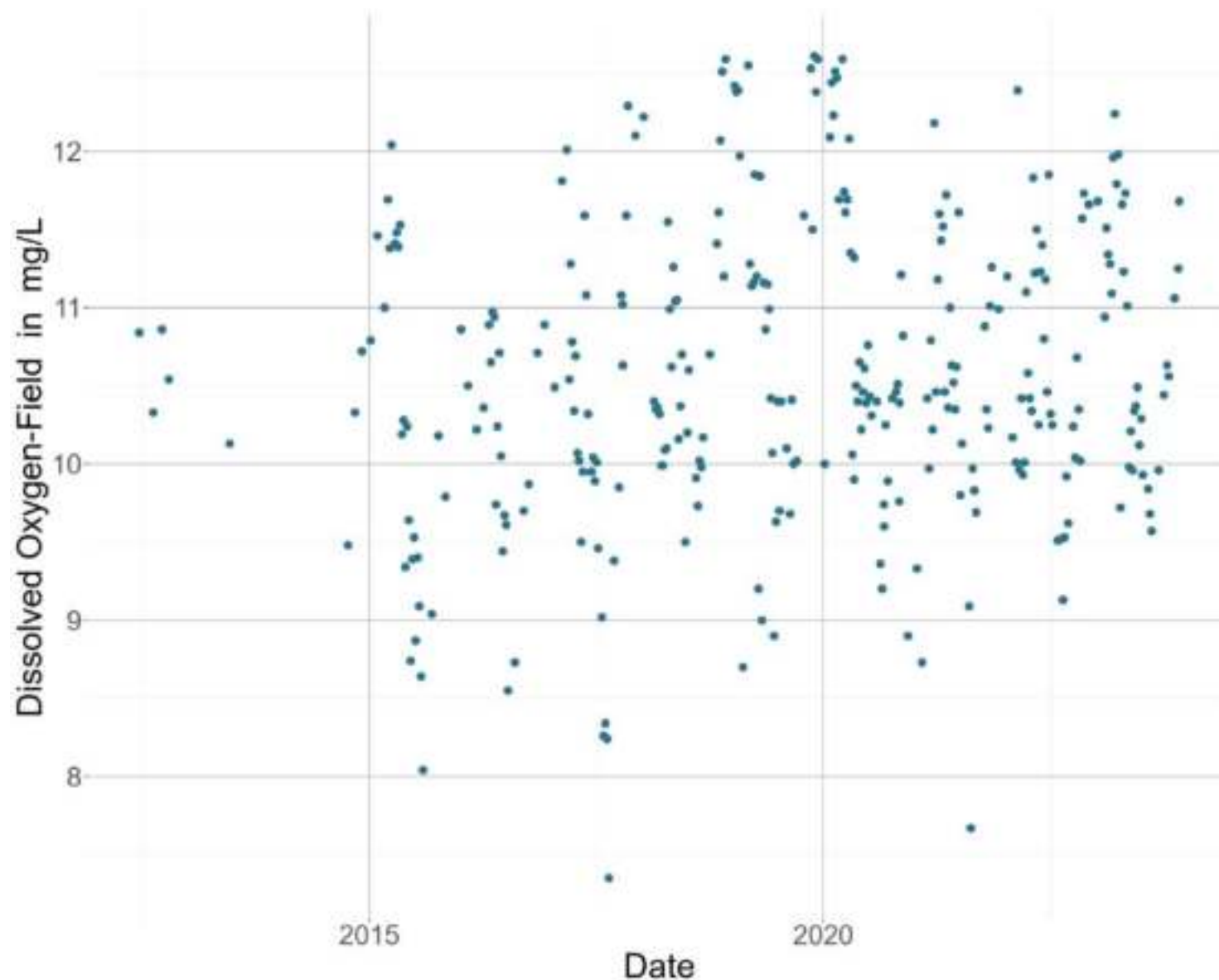
Site ID: 08NK002
Site Name: Elk River
at Fernie



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



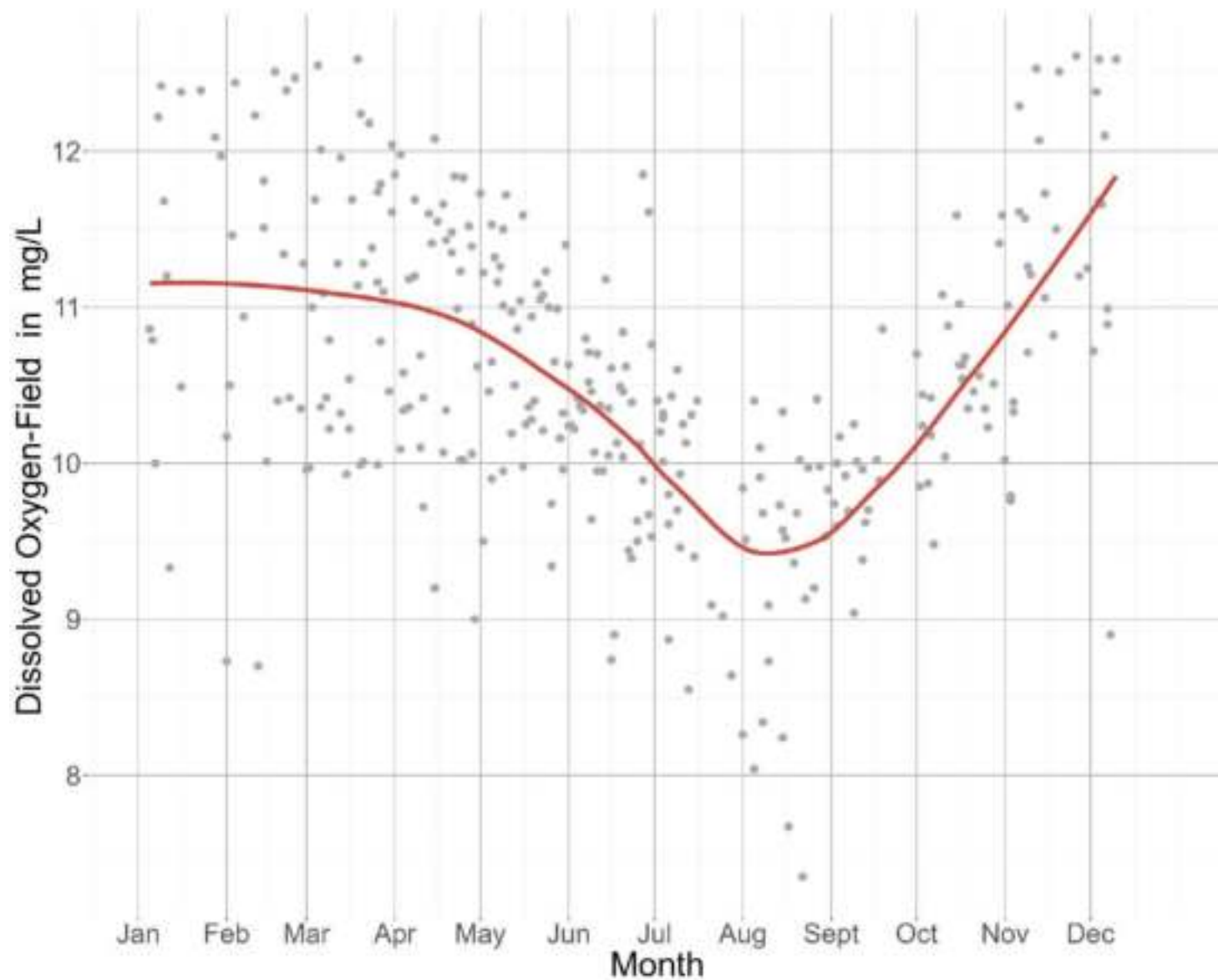
Stories with Data: Dissolved Oxygen



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



Stories with Data: Dissolved Oxygen



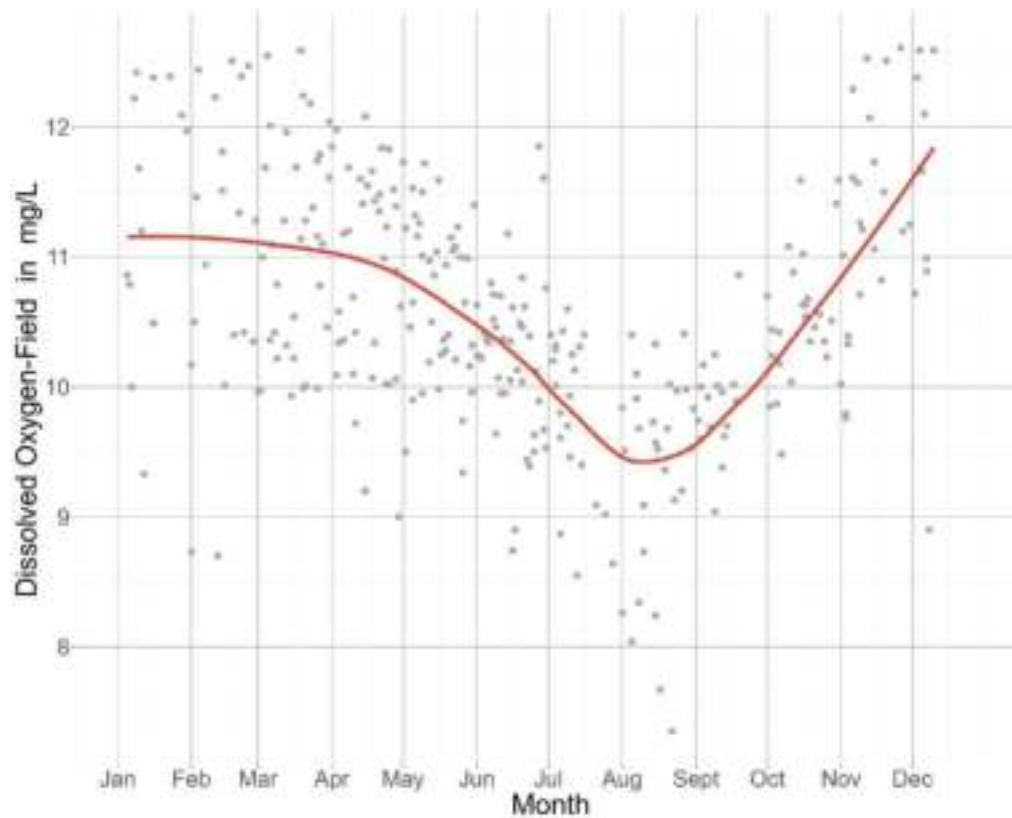
● **Site ID:** 0200389
Site Name: Elk River
Above Greenhills
Mining Operation
Data Collector: Teck



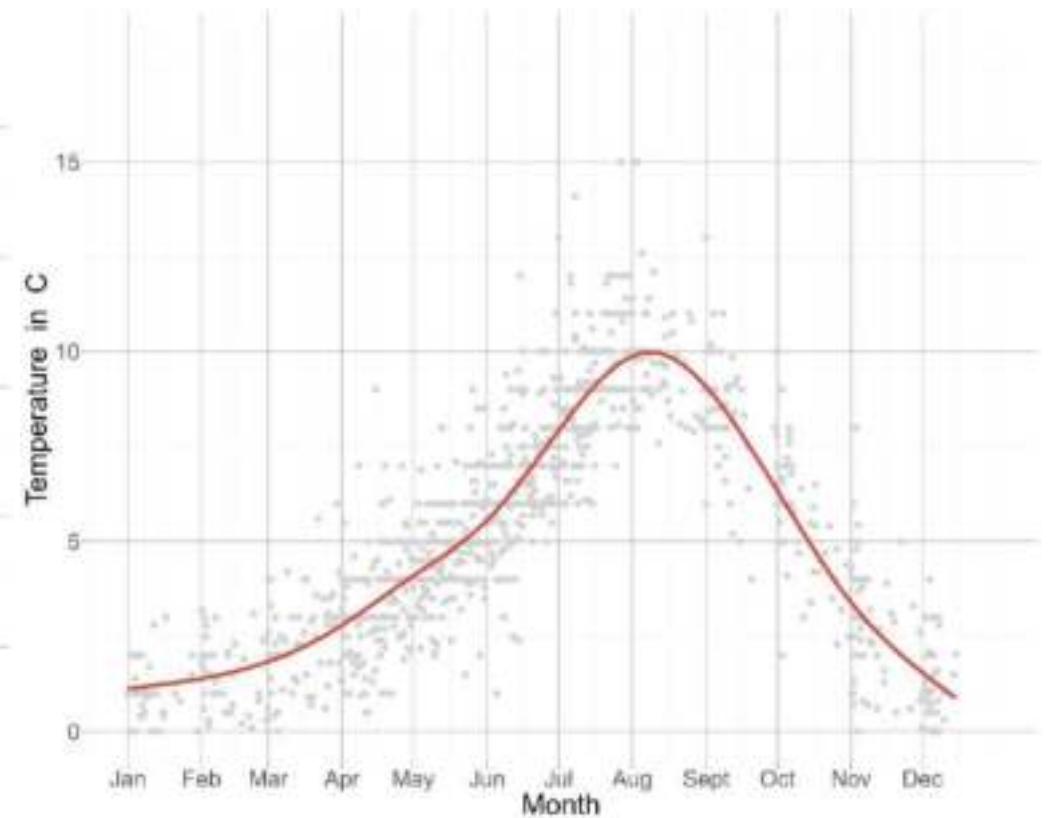
Stories with Data: Dissolved Oxygen



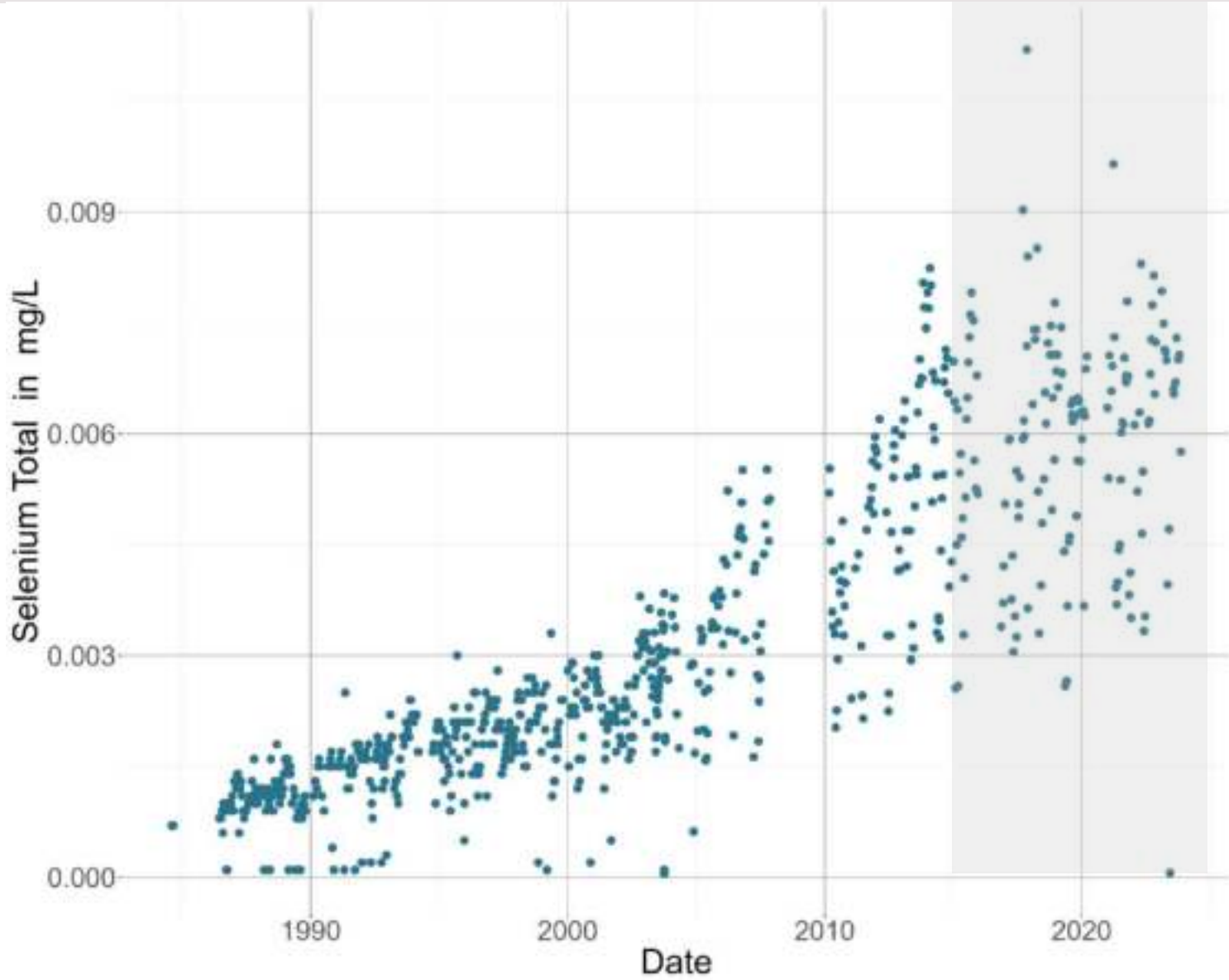
Dissolved Oxygen




Water Temperature



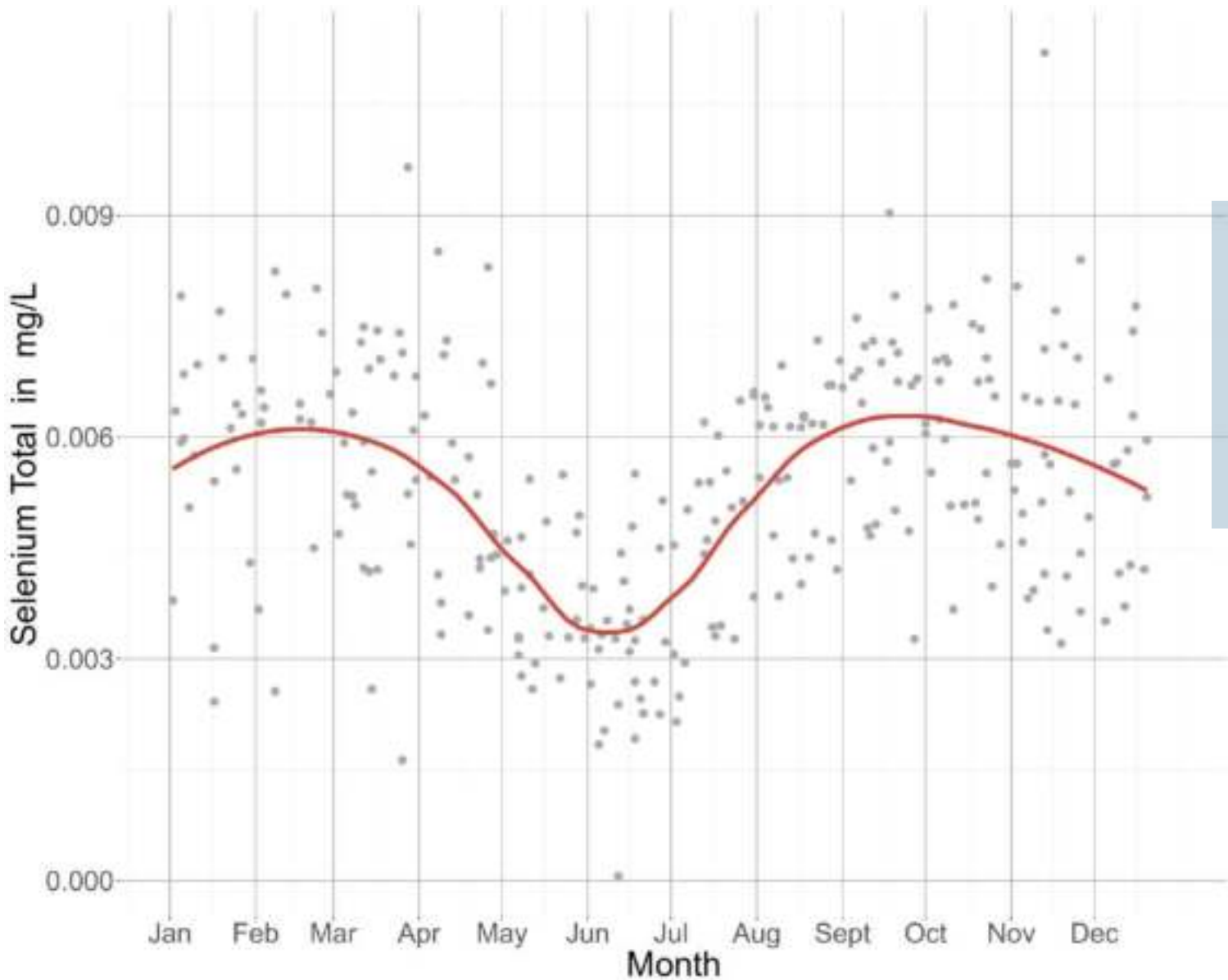
Stories with Data: Selenium




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



Stories with Data: Selenium



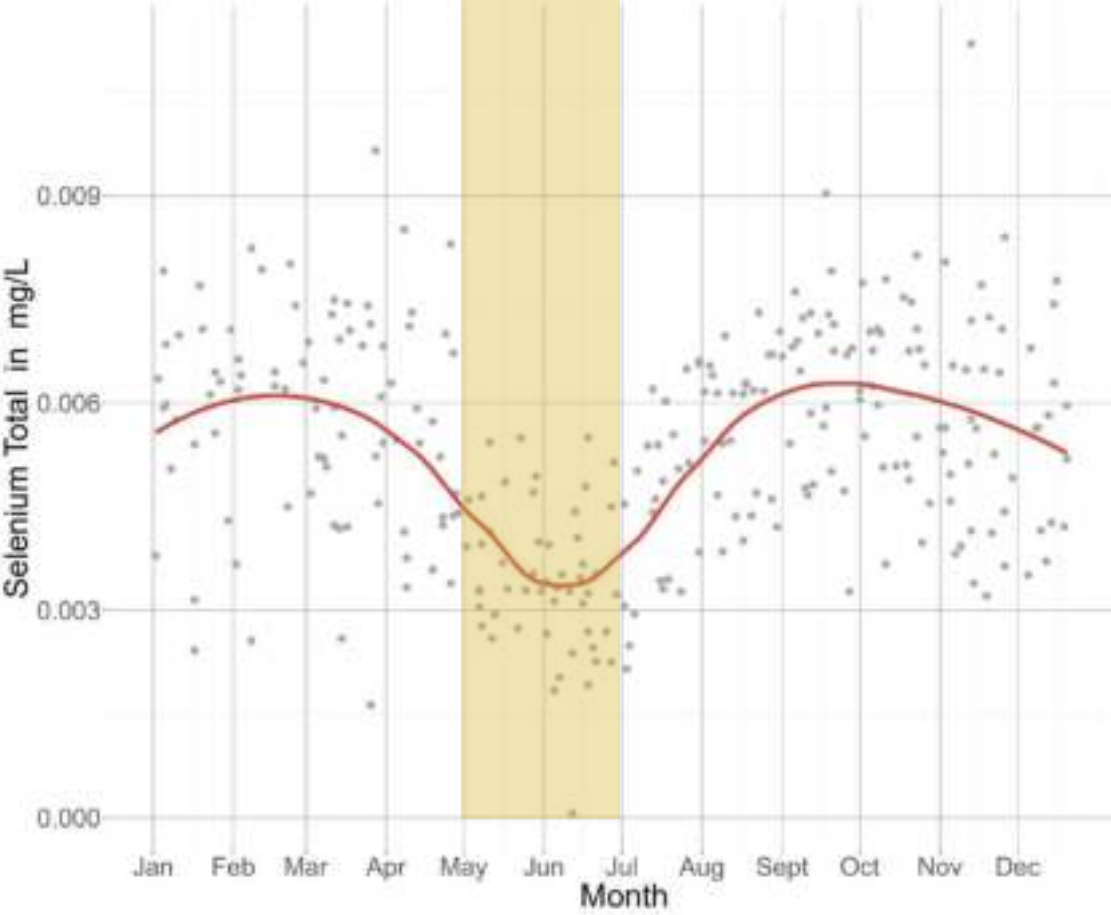
 **Site ID:** 0200016
Site Name: Elk River Above Highway 93
Data Collector: Environment and Climate Change Canada



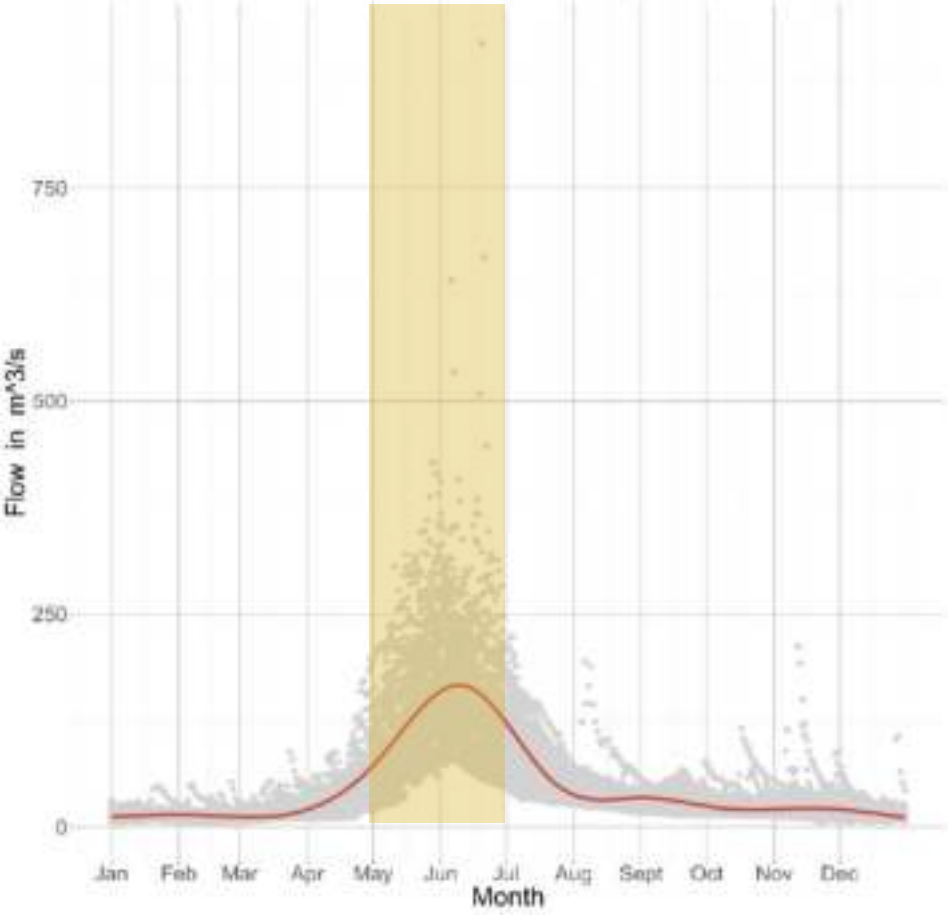
Stories with Data: Selenium



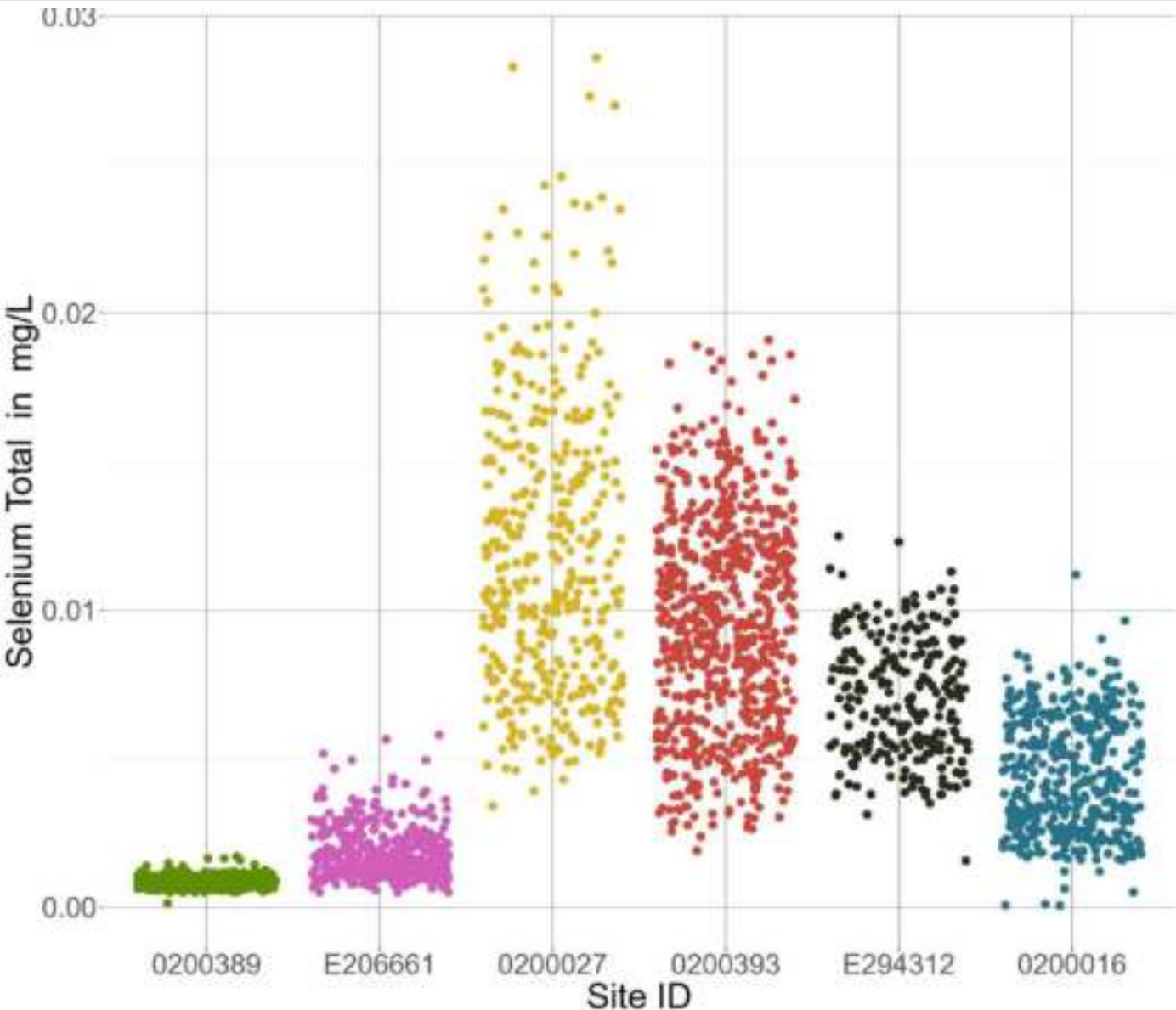
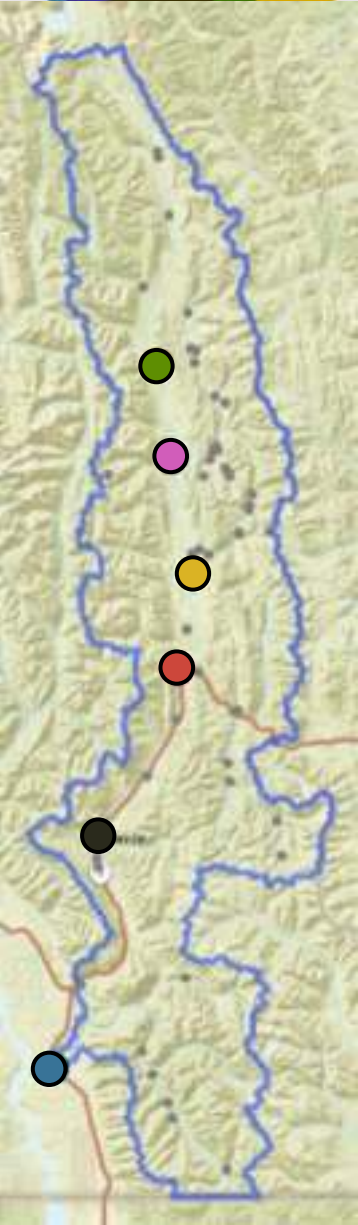
Selenium Concentration



Flow



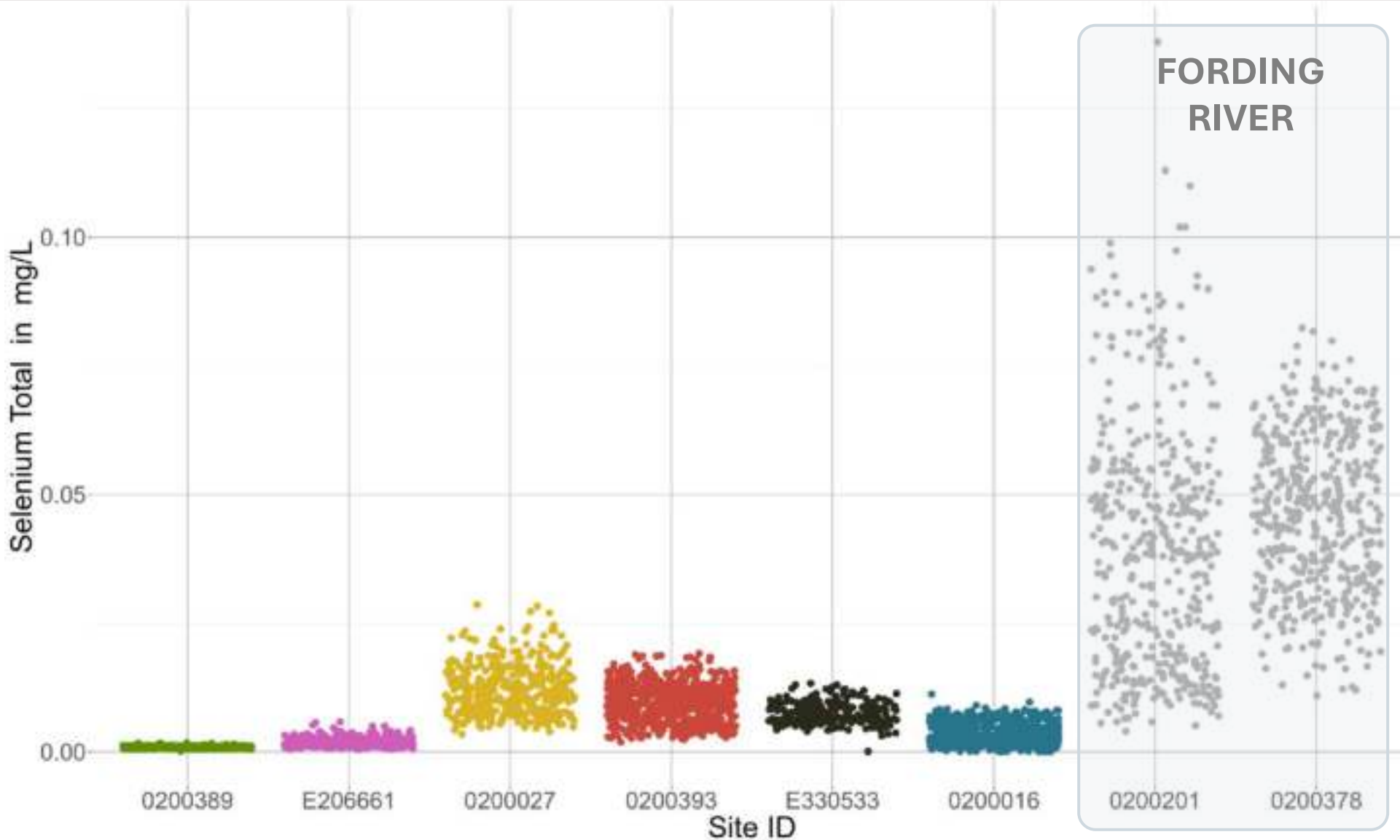
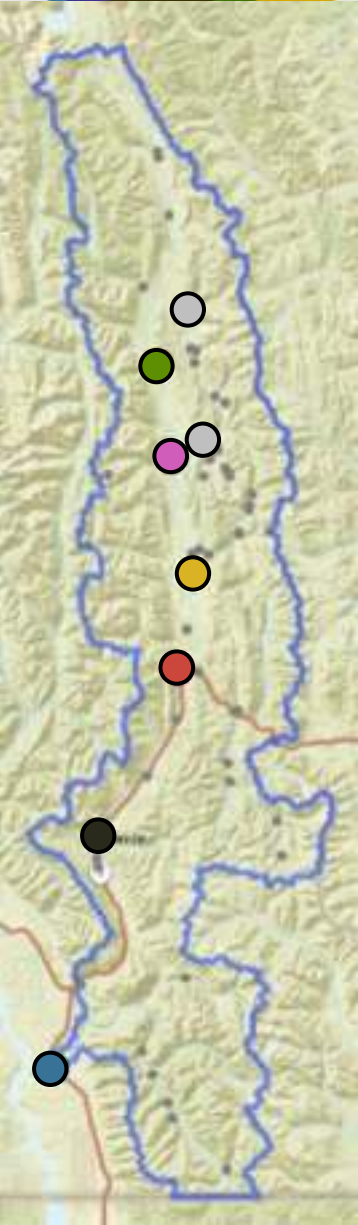
Stories with Data: Selenium



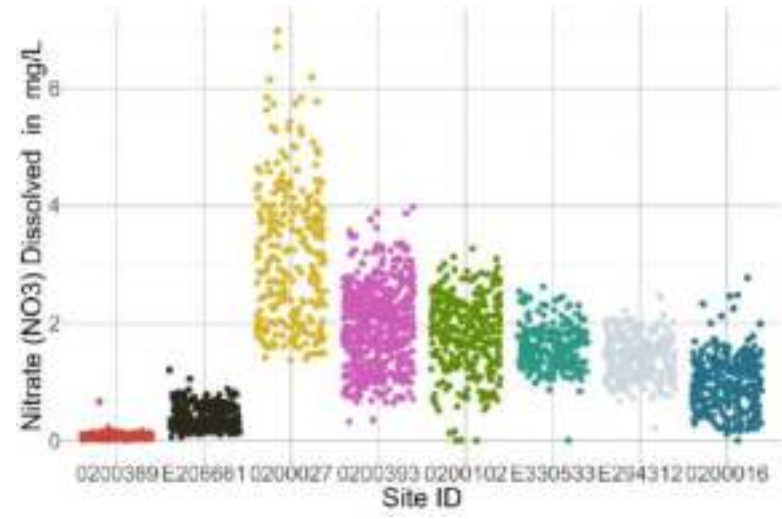
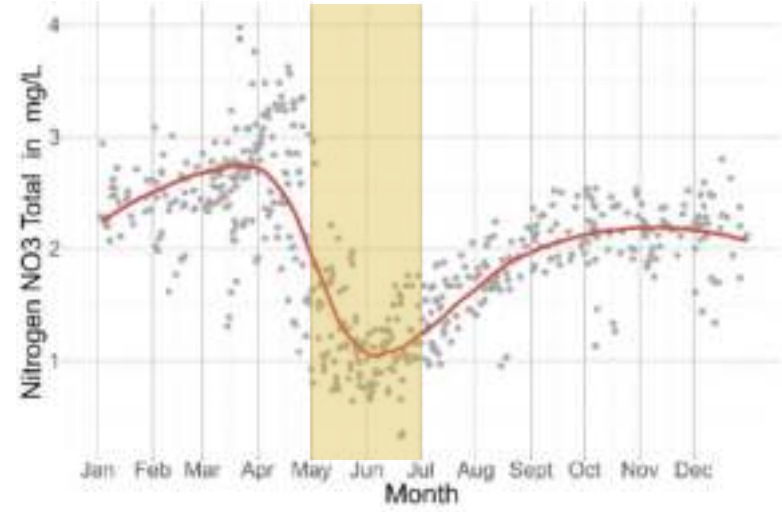
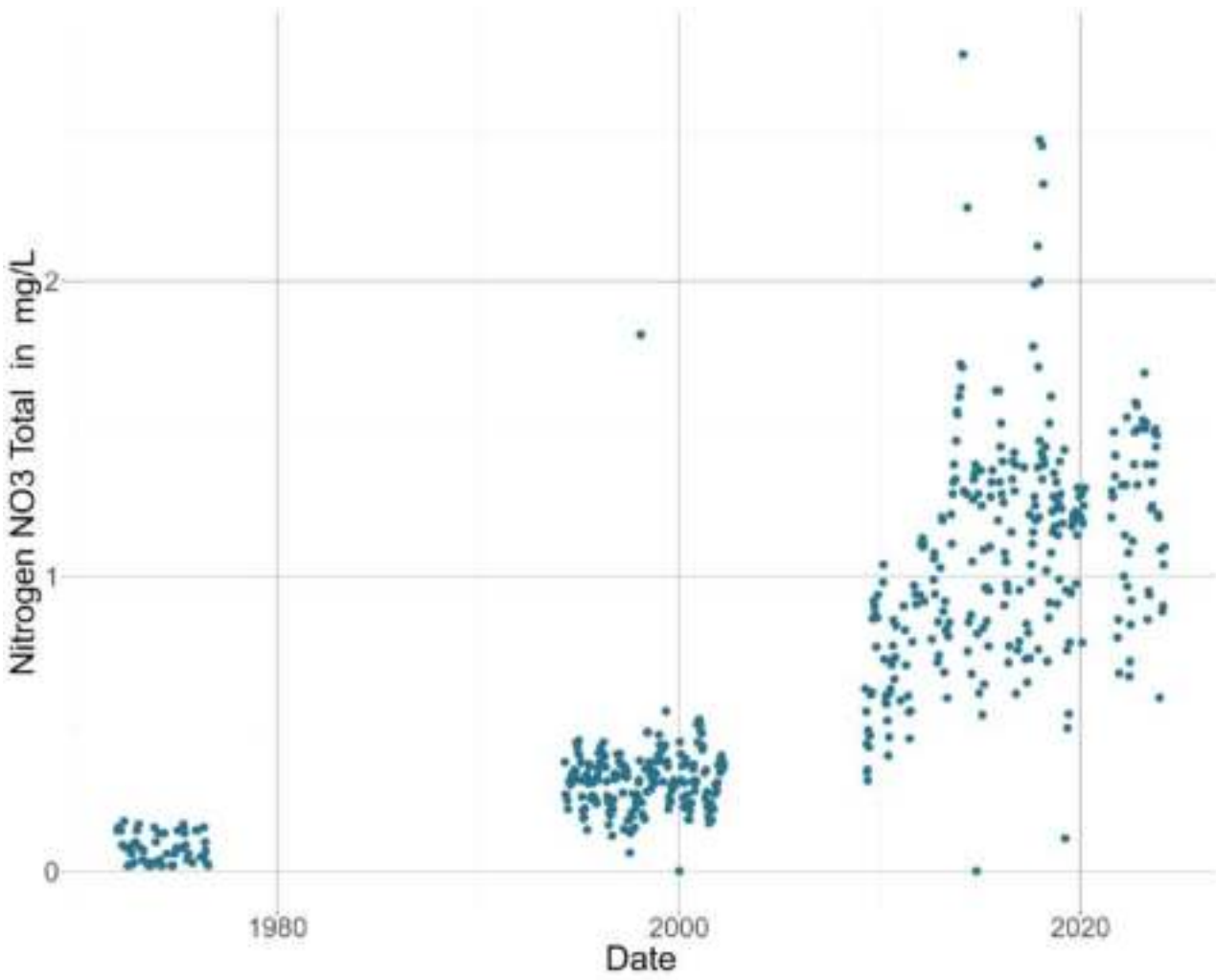
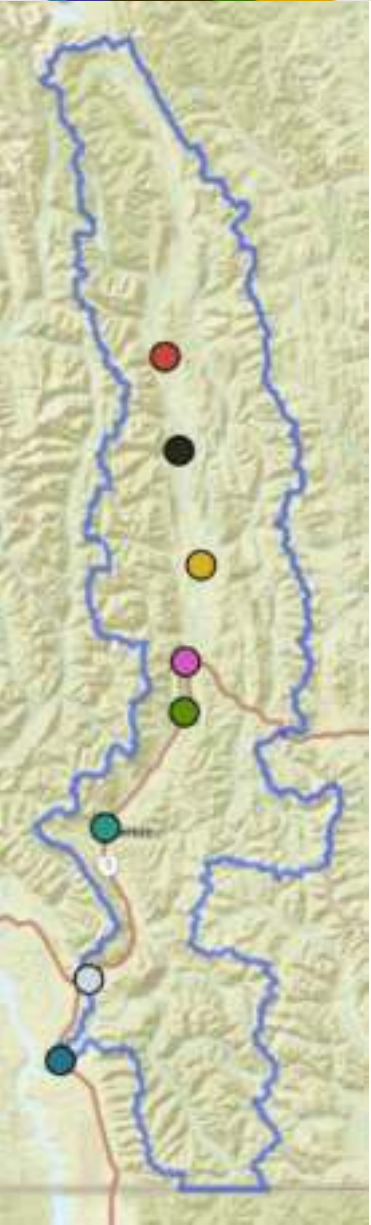
- Site ID:** 0200389
Site Name: Elk River above Greenhills Minig Operation
Data Owner: Teck
- Site ID:** E206661
Site Name: Elk River above Boivin Creek
Data Owner: Teck
- Site ID:** 0200027
Site Name: Elk River above Grave Creek at Abandoned Suspension Bridge
Data Owner: Teck
- Site ID:** 0200393
Site 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

https://127.0.0.1:7496 Open in Browser

Select Parameter: Alkalinity Total

Select Catchment: Elk River

Minimum number of samples: 1 31 61 91 121 151 181 211 241 271 300

Map Type: Satellite Map

Show 20 entries

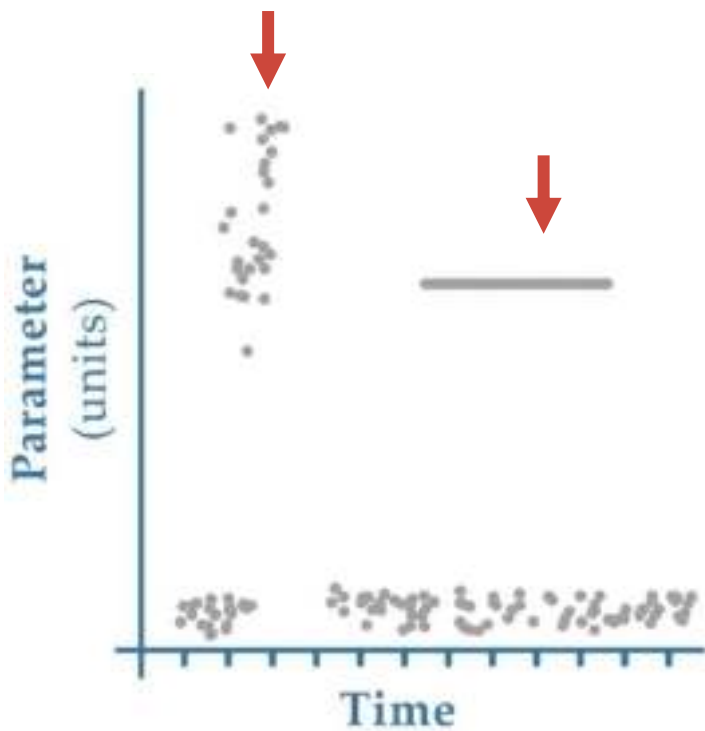
Search:

SITE_ID	MONITORING_LOCATION	DATA_OWNER	DATA_REPOSITORY	GNIS_NAME
10762	E267436 WOLF CREEK @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
10972	E267437 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	E267434 WILLOW CREEK NORTH @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11424	E267433 WADE CREEK @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11628	E267435 WILLOW CREEK SOUTH @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11675	E267432 COUGAR CREEK @ LRP ROAD	Teck	Environmental Monitoring System	Elk River
11751	0200389 ELK VALLEY COAL GH (PE6246) MICKELSON CR UIS ELK R.	Teck	Environmental Monitoring System	Elk River
12066	0200389 ELK RIVER ABOVE GREENHILLS MINING OPERATION	Teck	Environmental Monitoring System	Elk River

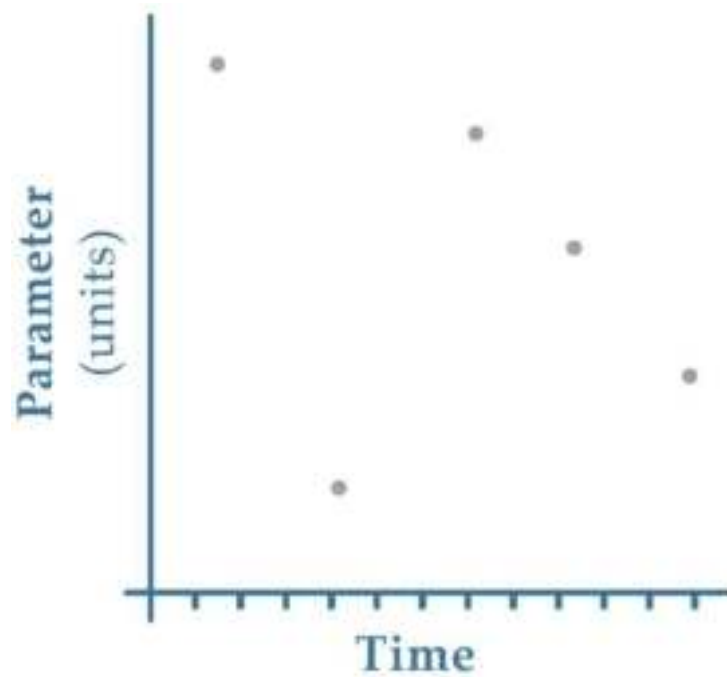


Next Steps: limitations of existing data

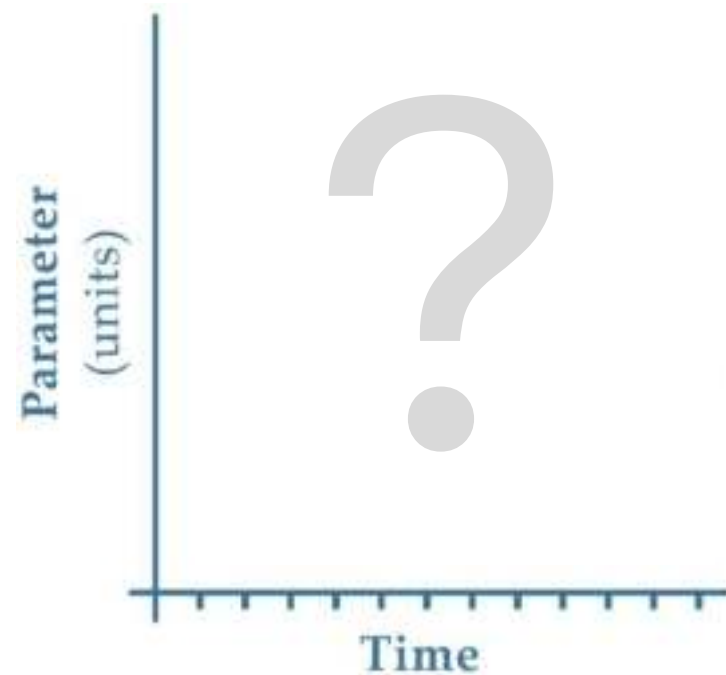
Incorrect Data Entry



Insufficient Data to make inferences

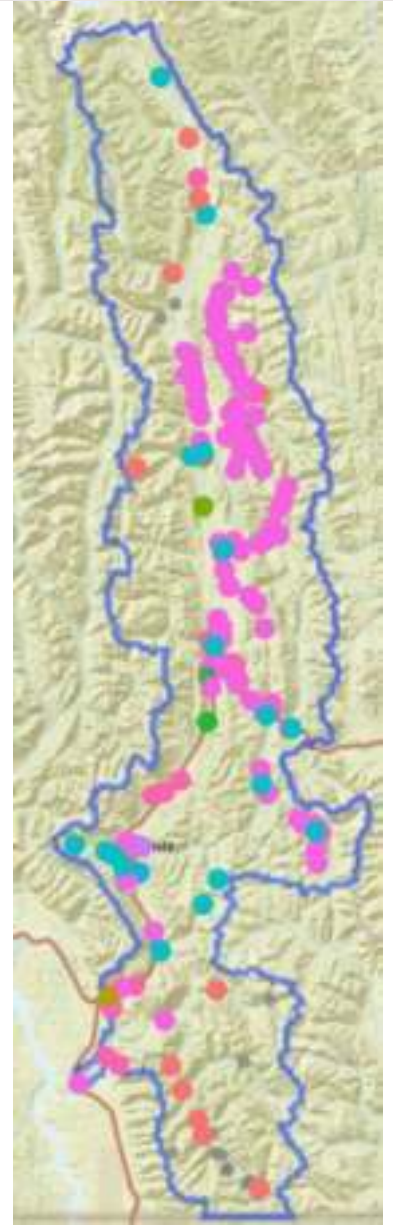


No data from some impacted areas



Take Home Messages

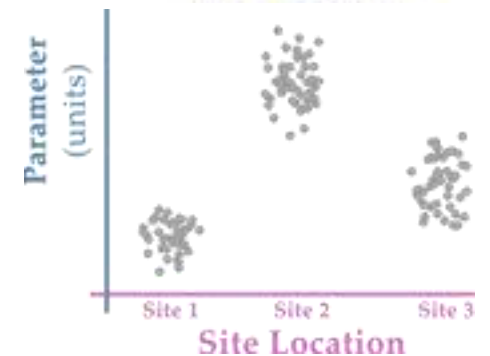
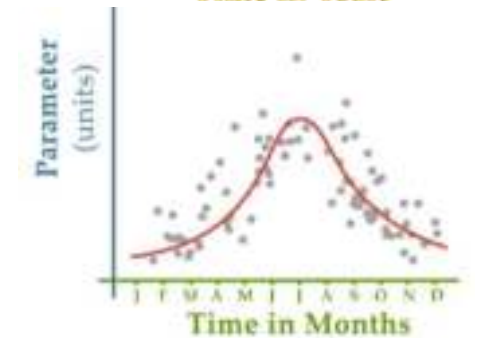
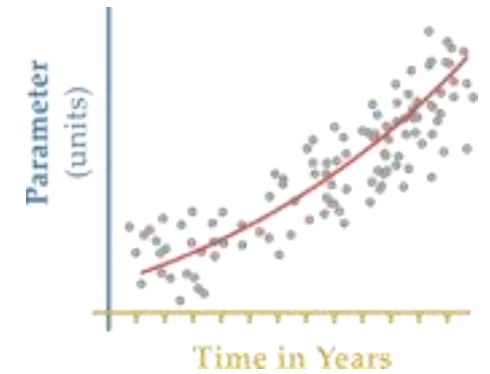
Many organisations collect data on the watershed



Take Home Messages

Many organisations collect data on the watershed

Different ways of looking at data can tell different stories

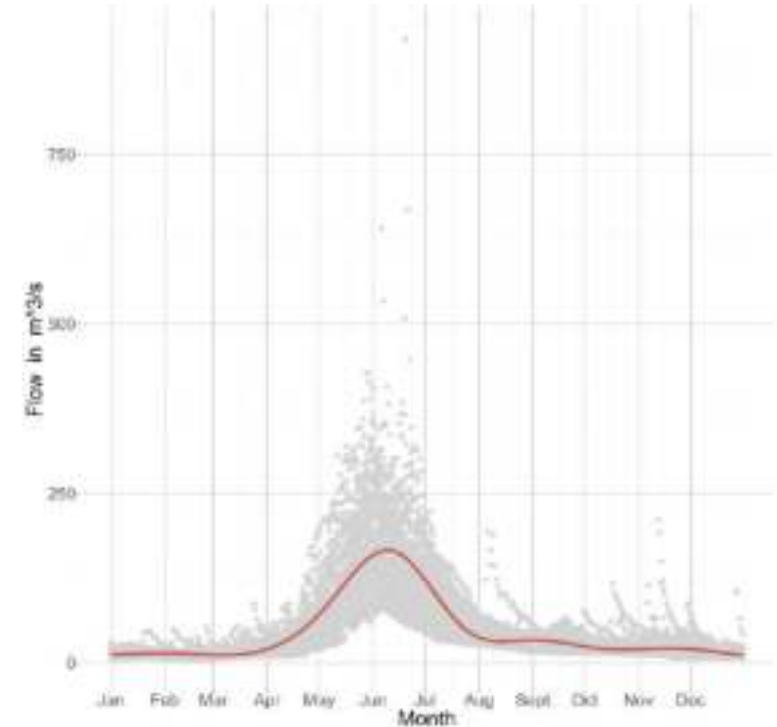


Take Home Messages

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



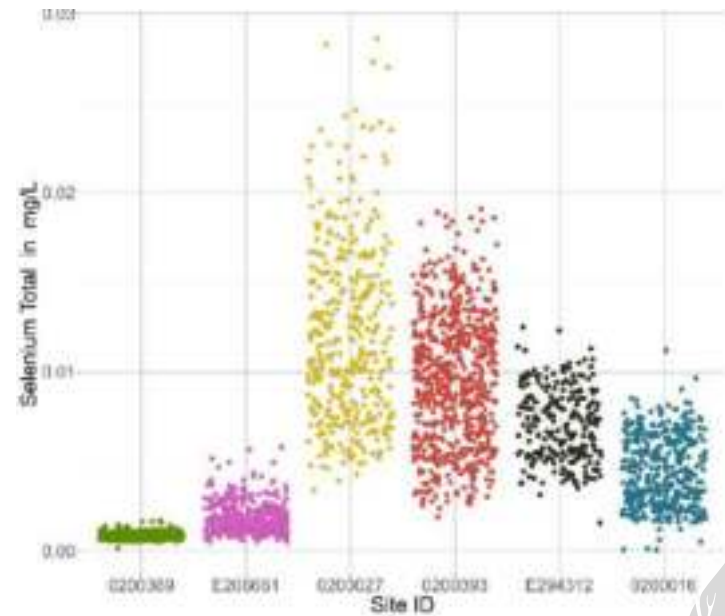
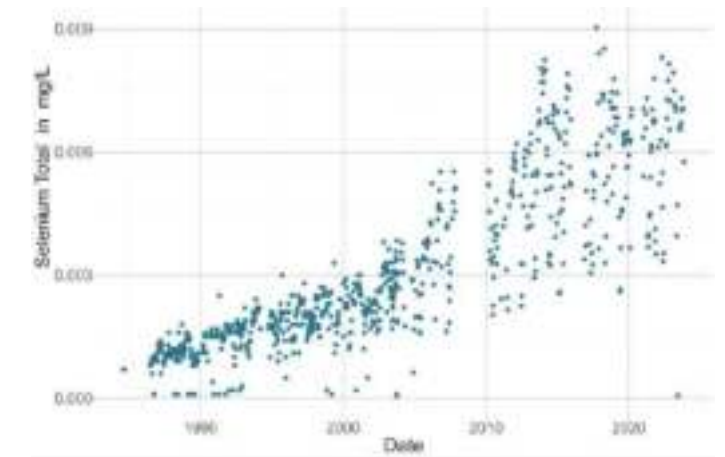
Take Home Messages

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

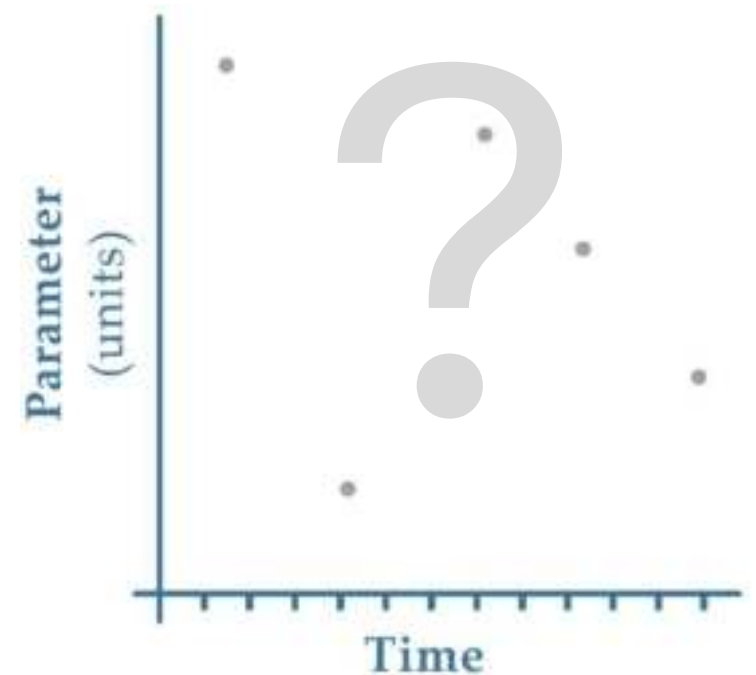
Many organisations collect data on the watershed

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





Questions