

# 2021-2022 ADEC Kenai River Water Quality Monitoring

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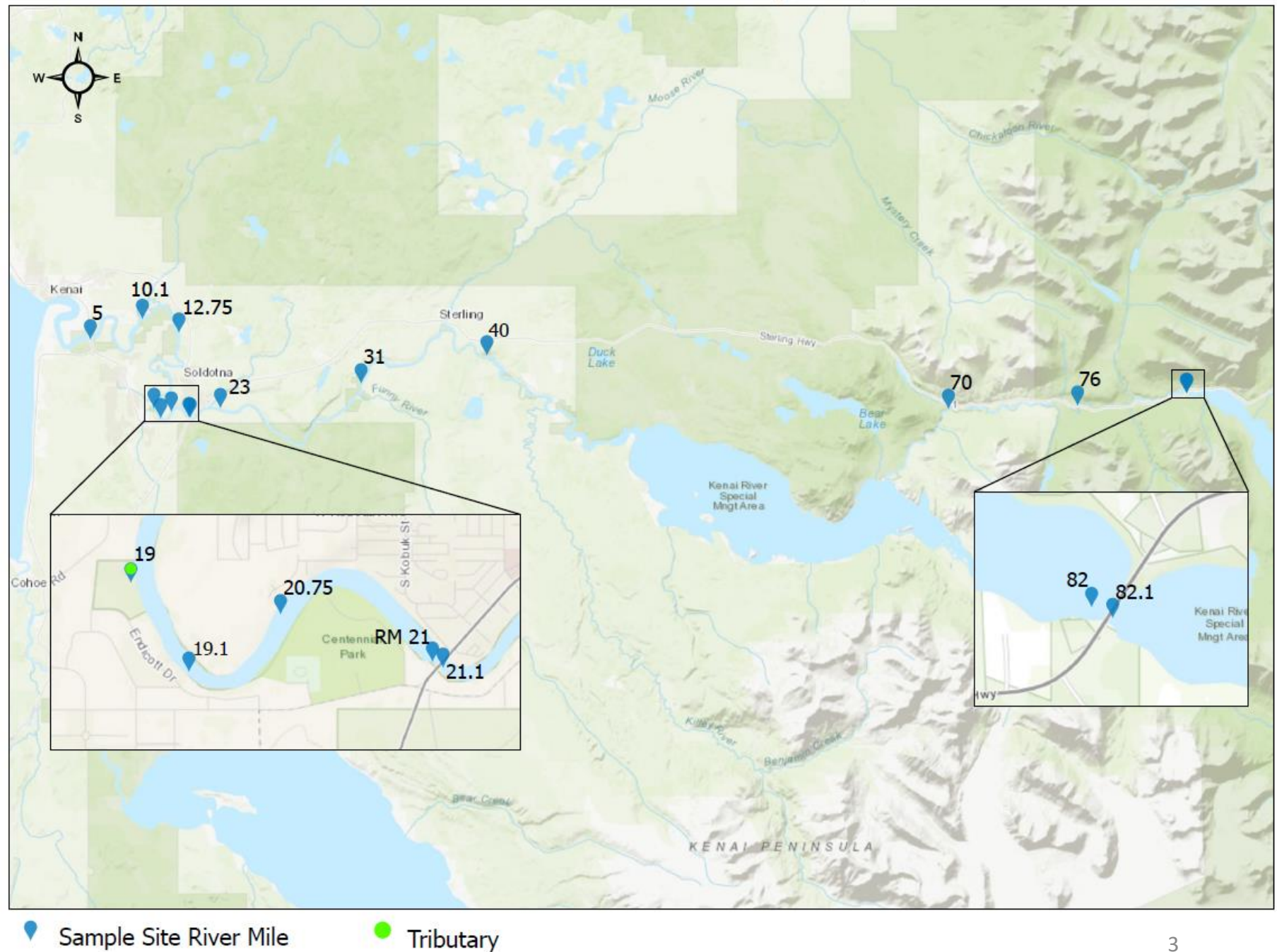
# Background

DEC's 2021-2022 Kenai River Metals monitoring project was developed to:

- Collect enough samples to determine current levels of trace metals in the Kenai River, especially dissolved zinc (Zn) and copper (Cu).
  - Why? Address community concerns about Zn and Cu levels in the Kenai River mainstem.
- 2021: Eight (8) sampling events between May – August
- 2022: Seven (7) sampling events April – November



- Collected water samples from the Kenai River mainstem at 14 locations, and 1 tributary
- New and historic sample sites selected





## Upper River Sites

- River Mile (RM) 82.1 and 82: Cooper Landing Bridge
- RM 76: Resurrection Pass Bridge
- RM 70: Jims Landing

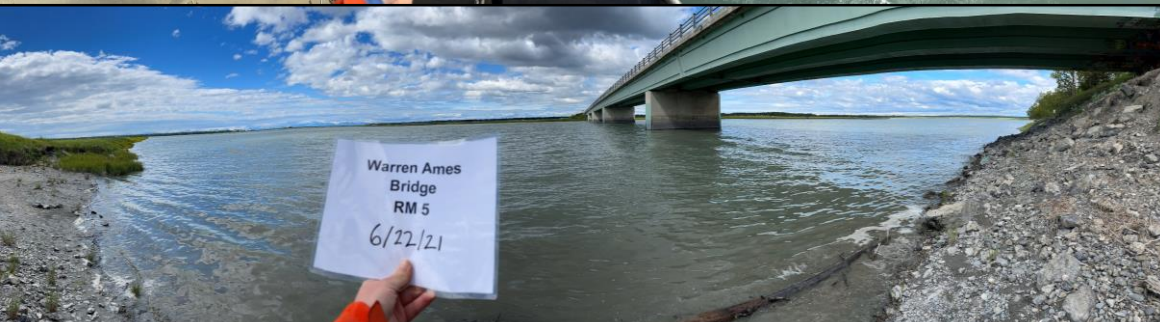
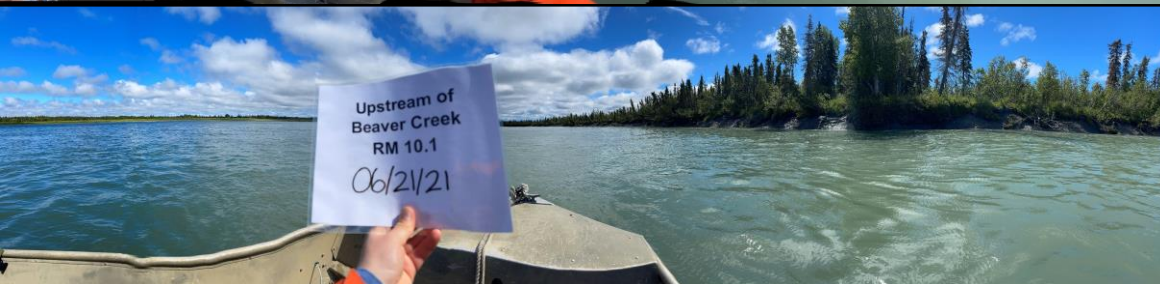
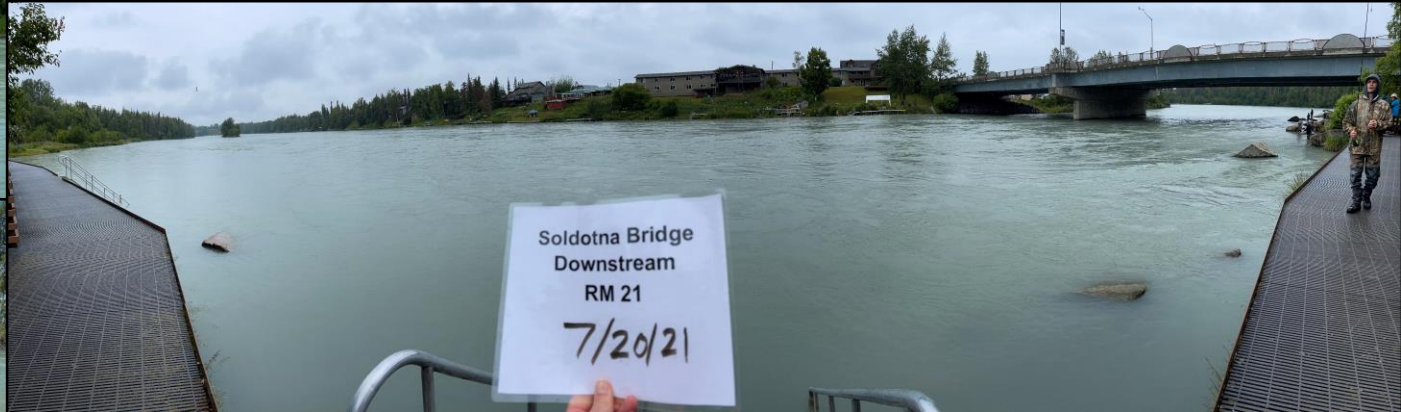




## Middle River Sites

- RM 40: Bings Landing
- RM 31: Morgans Landing
- RM 23: Swiftwater Park





## Lower River Sites

- RM 21 and 21.1: Soldotna Bridge
- RM 20.75: Centennial
- RM 19.1: Upstream of Slikok
- RM 12.75: Upstream of Pillars
- RM 10.1: Upstream Beaver Creek
- RM 5: Warren Ames Bridge



**RM 19 Slikok Creek**  
Only tributary  
sampled



**Sampled at set  
dates under all  
weather  
conditions**



# Methods

## Methods that were the same as historic studies:

- Sampled from Kenai Lake to the river mouth (Warren Ames Bridge)
- Incorporated both boat and foot access sites
- Used a laboratory to analyze the water samples

## Methods that were different from historic studies:

- Modified EPA Method 1669 'clean hands, dirty hands'
- Increasing sample frequency – 15 trips
- In-situ measurements collected simultaneously
- Focused on Quality Assurance/Quality Control by using field blanks, duplicate samples, laboratory filtering







# Clean Hands, Dirty Hands

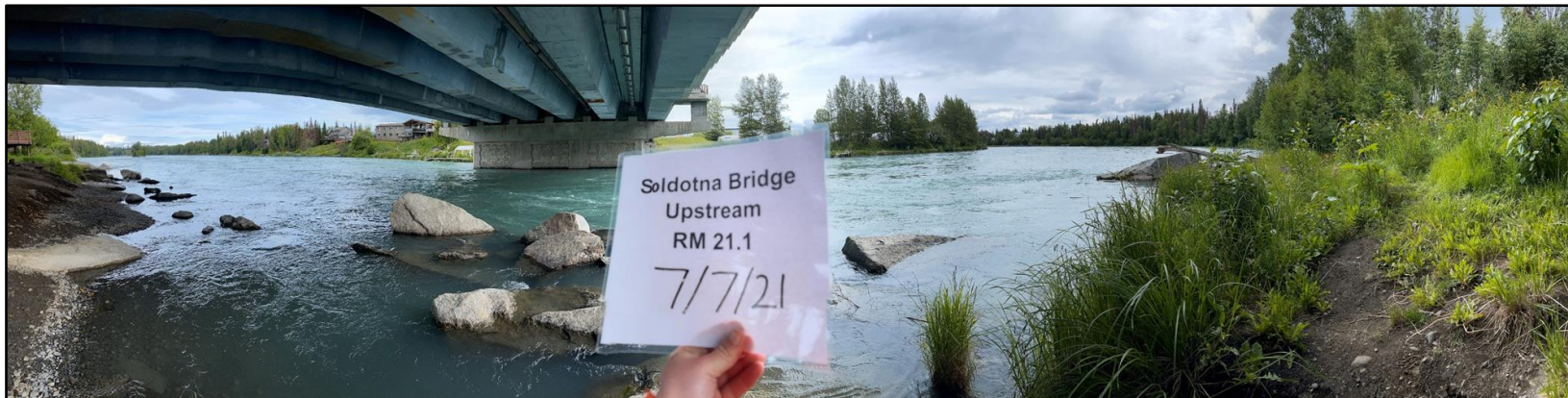
## EPA Method 1669, published July 1996

- Recognized difficulty with contamination during collection, transport, and analysis
- Developed for trace metal analysis
- Contamination control through minimizing contact with sample bottles
- Designated roles
- Emphasize use of field blanks and duplicates



# Field Blanks, Duplicates, and Total Metals...

- Field Blanks
  - Once per sample event 'Collect' lab provided deionized pure water
- Duplicates
  - Two identical samples collected simultaneously – Evaluate precision
- Total Metals
  - Analyzed for Cu and Zn
  - Total metals is dissolved metals and large particulates ( $> 0.45 \mu\text{m}$ )
  - Total  $\geq$  Dissolved

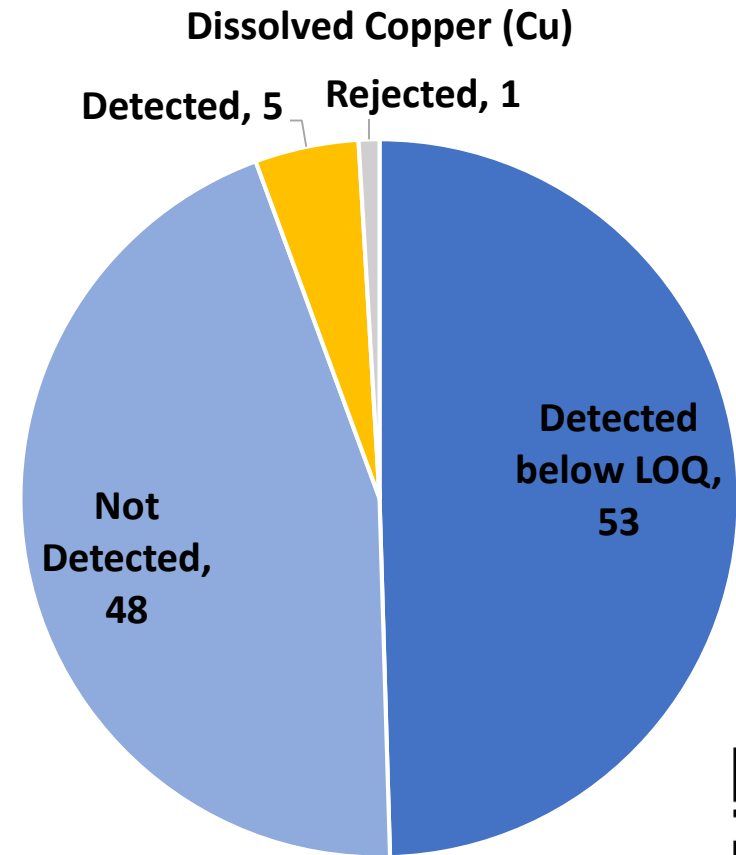
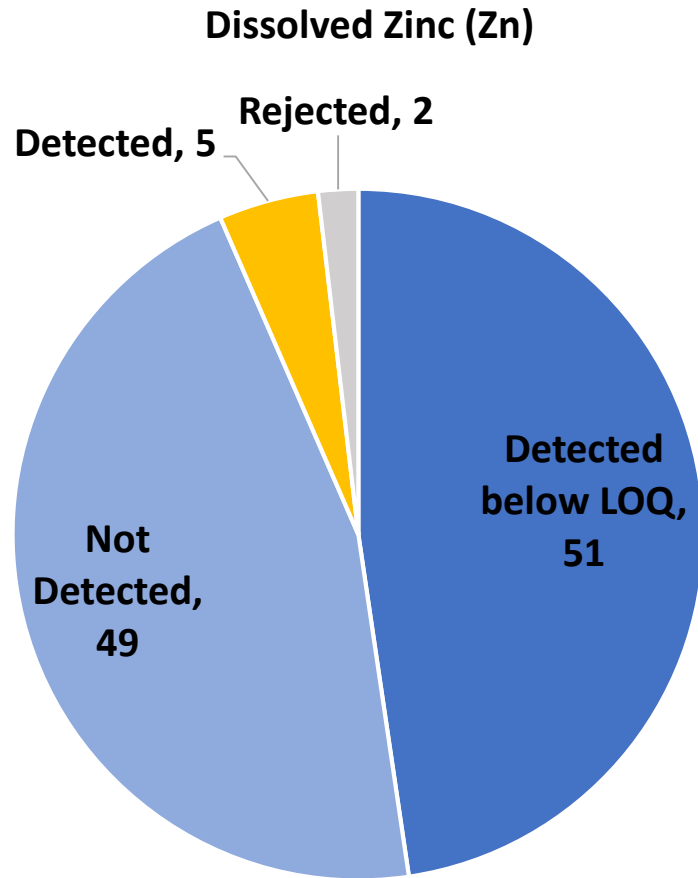




# Results

2021 and 2022 field seasons

# 2021 Dissolved Zn and Cu Results



**N = 107 samples each for zinc and copper**  
**No exceedance of acute water quality criteria**

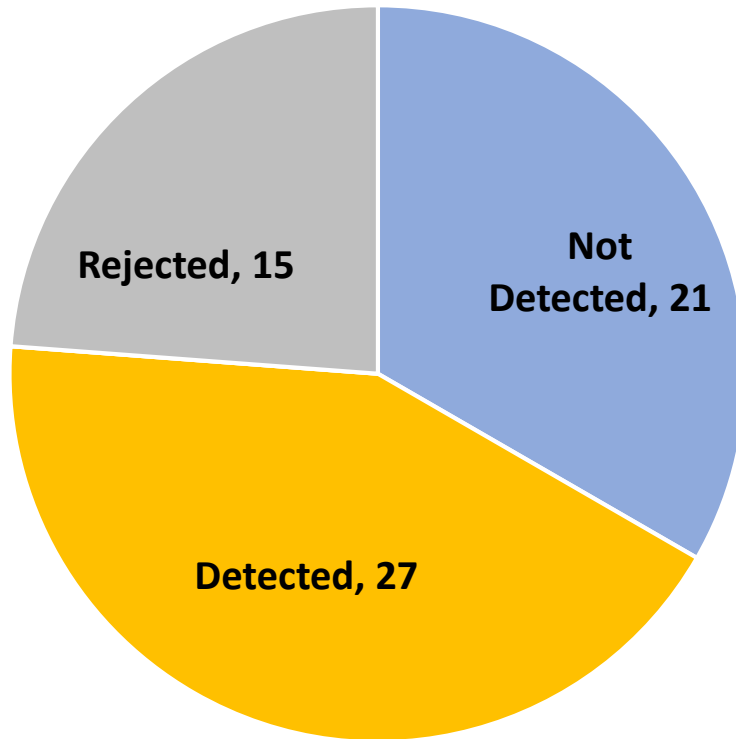


**2021 Field Report**

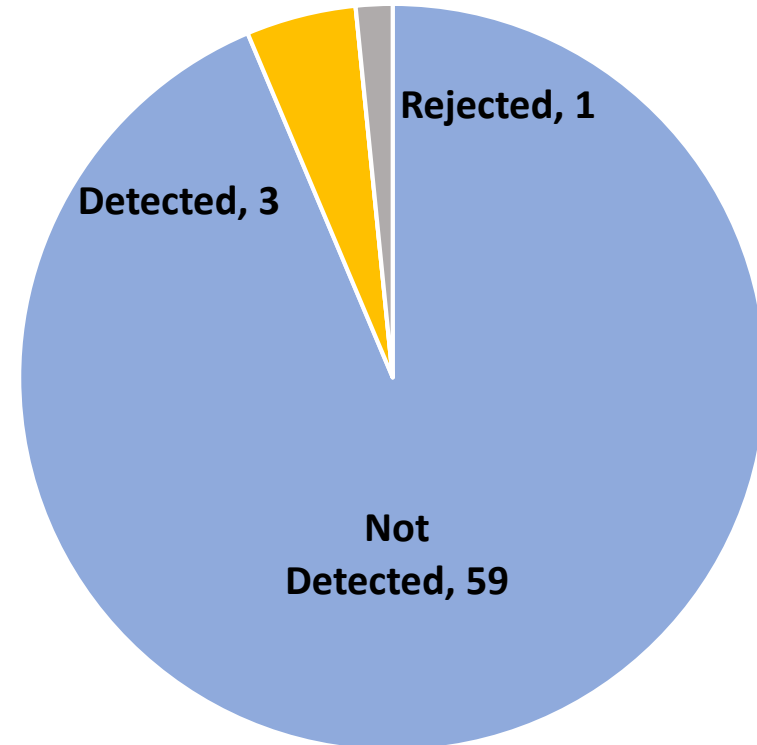


# Preliminary 2022 Dissolved Zn and Cu Results

## Preliminary Zinc



## Preliminary Copper



**N = 63 routine samples each for zinc and copper**

**No exceedances of water quality criteria that passed Quality Assurance Criteria**



Why all the rejected Zn in 2022?

- Dissolved is just part of the data story - Example: May 2022

Site	Dissolved Zinc
RM 20.75	58
RM 21	128
RM 82.1	100

Why all the rejected Zn in 2022?

- Dissolved is just part of the data story - Example: May 2022

Site	Dissolved Zinc	Duplicate
RM 20.75	58	Yes, Failed
RM 21	128	No
RM 82.1	100	No

Why all the rejected Zn in 2022?

- Dissolved is just part of the data story - Example: May 2022

Site	Dissolved Zinc	Duplicate
RM 20.75	58	Yes, Failed
RM 21	128	No
RM 82.1	100	No
Field Blank	138	-



Why all the rejected Zn in 2022?

- Dissolved is just part of the data story - Example: May 2022

Site	Dissolved Zinc	Duplicate	Total Zinc
RM 20.75	58	Yes, Failed	0
RM 21	128	No	0
RM 82.1	100	No	53
Field Blank	138	-	0

**Total Metals = Dissolved Metals (<0.45  $\mu\text{m}$ ) + Large particles**  
**In general, Total Metals > Dissolved Metals**

Why all the rejected Zn in 2022?

- Dissolved is just part of the data story - Example: May 2022

Site	Dissolved Zinc	Duplicate	Total Zinc	Hardness	Acute Criteria
RM 20.75	58	Yes, Failed	0	39	53
RM 21	128	No	0	38	52
RM 82.1	100	No	53	144	160
Field Blank	138	-	0	0	-

**Reject May 2022 dissolved Zn results from RM 20.75, 21, and 82.1**

# Lessons Learned

- Sample contamination does happen
  - Rejected values
  - Zinc
  - Filters
- Strong Quality Assurance Plan
- Communication
- Adaptive Action
  - Cross lab verification



# Conclusion

*2022 data is still under review; however, after 2 years of intense sampling, the data shows the Kenai River is meeting state criteria.*

## Moving Forward

- Final Report and press release - Spring 2023
- Integrated Report
- Advise and work with partners
- No immediate plans for additional monitoring from DEC

2021 Field Report



<https://dec.alaska.gov/water/water-quality/nonpoint-source-control/water-quality-resources/reports>





### Big Takeaways

- Detailed ‘Snapshot’ of the Kenai River mainstem
- Value of long-term monitoring programs
- DEC to continue promoting stewardship of the Kenai River and tributaries

# Thank You!

