DEPARTMENT OF ECOLOGY
State of Washington

Spokane River Sampling

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May 15, 2024

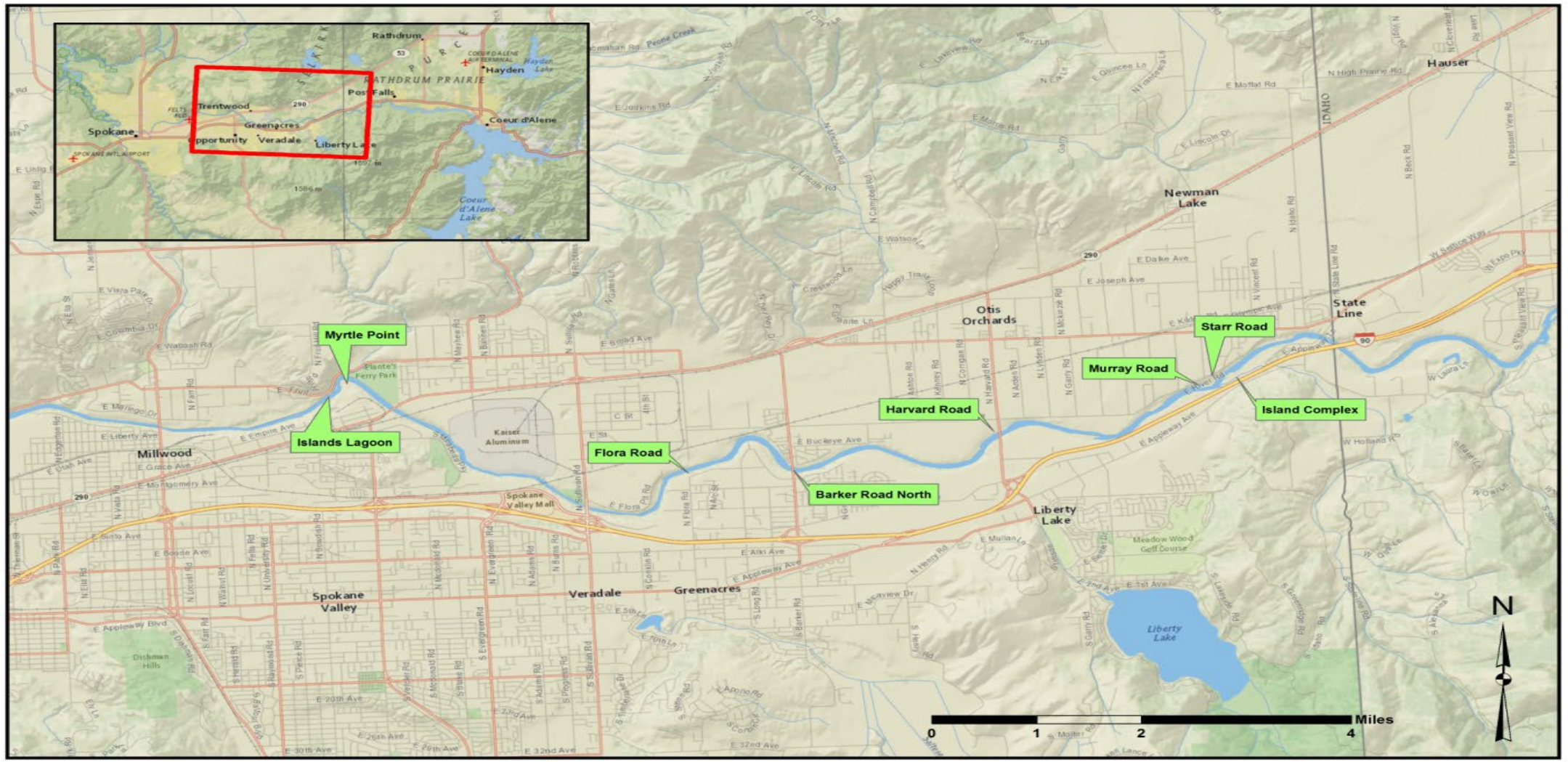
Superfund Site Definition

The Spokane River is included in the 2002 ROD

“For the Spokane River, the Selected Remedy includes a complete remedy for protection of human health upstream of Upriver Dam and a complete remedy for protection of the environment between Upriver Dam and the Washington/Idaho border.”

“For shoreline sediment depositional areas along that reach of the Spokane River within the State of Washington…,the Selected Remedy consists of a combination of access controls, capping, and removals.”

Shoreline Site Locations



Timeline for Beach Cleanups

2002
OU3 Record of Decision

2006
Starr Rd (EPA)

2007
Murray Rd and Island Complex

2008
Harvard Rd

2010
Flora Rd

2012
Barker Rd N, Islands Lagoon, and Myrtle Pt

2013
Sampling Event

2018
Sampling Event

2022
Periodic Review

Beach Cleanup Summary

- Gravel cap used at each beach with thickness and gravel size varying
- Harvard both a removal and backfill was done to maintain elevation
- Vegetation and improved recreational access done at several of the beaches

Post-Cleanup Monitoring

- Post-Remediation Monitoring Sampling and Analysis Plan developed in 2013
- Monitoring events in 2013 and 2018 with sediment sampling conducted at Upriver Dam in 2020
- Concentrations post-remediation are generally lower than pre
- Increasing trend of contaminants over time with upstream sites having higher concentrations than downstream
- Concentrations at the dam are similar to concentrations observed near the State-line

Periodic Review Conclusions

- Observed sediment deposition at on top of the gravel caps
- Each site showed signs of recreational use
- Some erosion observed at the Island Complex site
  - Result of annual high-flow events
  - Less than 50% of planted vegetation surviving
- Remedy intact, providing a barrier to eliminate direct exposure pathways to contaminated sediments
- Continued monitoring is needed to evaluate redeposition of contaminants

Cleanup Level Update (2022)

- Site cleanups were done using the RBCs from the USEPA ROD

Table 1. 2006 Cleanup levels for the Spokane River Shoreline Metals Sites (mg/kg)

Cleanup Level	Arsenic	Cadmium	Lead	Zinc
USEPA RBCs	~10[a]	49[b]	700[b]	17,109[b]
PECs	33	4.98	128	459

[a]Background for the Spokane, Washington area
[b]Draft Final Screening Level Human Health Risk Assessment for Nonresidential Receptors. Spokane River, Washington. Coeur d'Alene Basin RI/FS.

- In 2022, the cleanup levels were adjusted to match state requirements

Table 2: 2022 Cleanup levels for the Spokane River Shoreline Metals Sites (mg/kg)

Contaminant	Method A Human Health	Ecological protection	SMS-CSL	PEC	Background	Selected cleanup level
Arsenic	2.9[a]	7	120	33	9*	9
Cadmium	2*	4	5.4	4.98	1	2
Lead	250	50*	1,300	128	15	50
Zinc	6,000	86*	4,200	459	66	86

[a] Background for the Spokane, Washington area.
* means most restrictive screening level.

CSL = cleanup screening level
PEC = probable effects concentration
SMS = Sediment Management Standards

2023 Sampling Goals

- Collect and compare lab and XRF beach samples (As, Pb, Cd, Zn)
- Collect surface water and suspended sediment (As, Pb, Cd, Zn)
- Measure the volume of settling sediment
- Compare results between low, medium, and high flow regimes

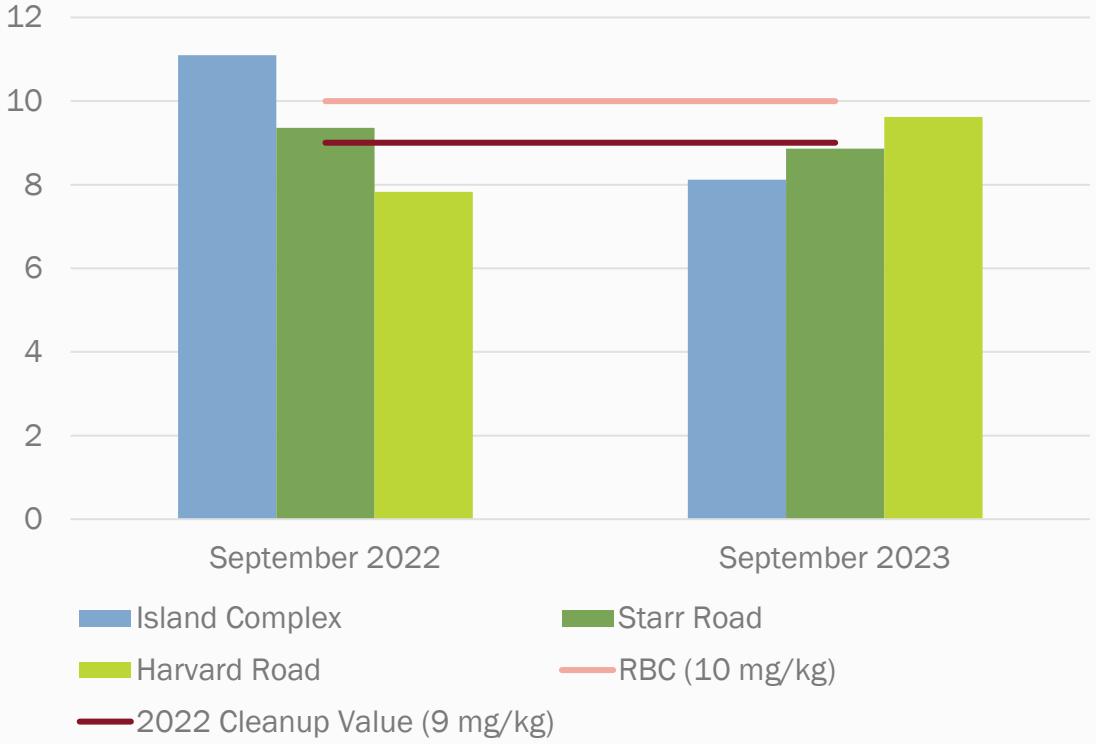
Sampling Results

Sampling Timeframe

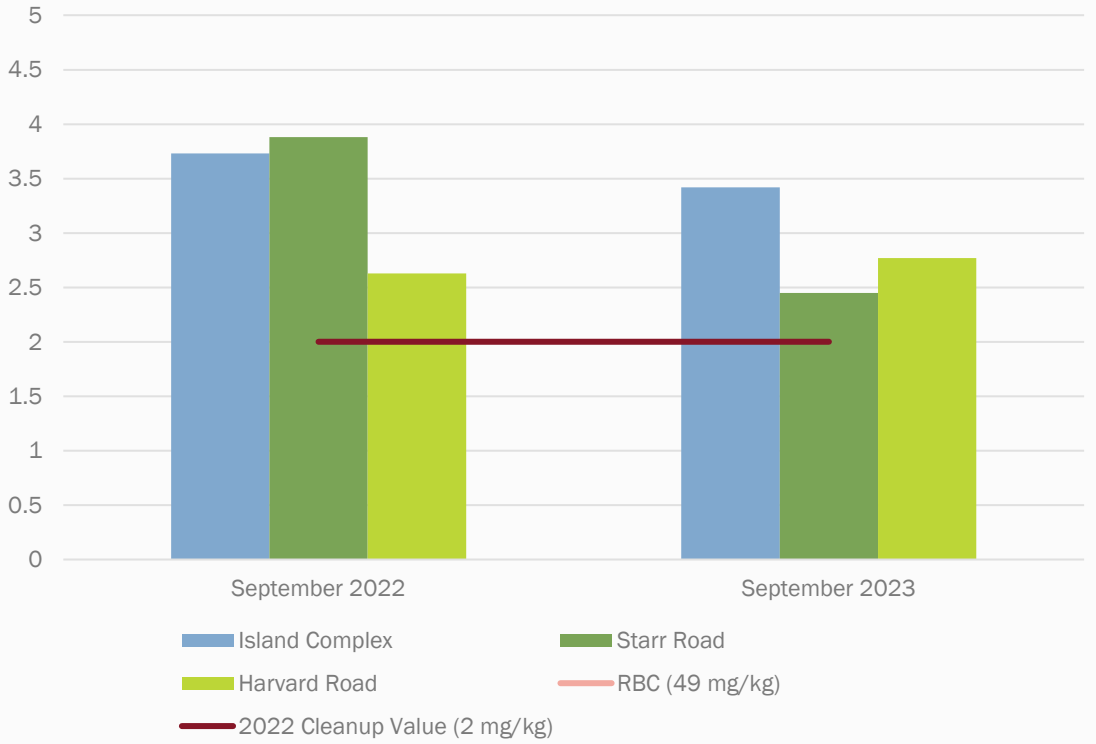
September – 2022	March – 2023	April – 2023	May – 2023	September - 2023
Low Flow 1,250 cfs	Medium Flow 3,850 cfs	High Flow 9,700 cfs	High Flow 22,400 cfs	Low Flow 1,320 cfs
Surficial Sediments Sediment Trap Suspended Solids Water Quality	Sediment Trap Suspended Solids Water Quality	Sediment Trap Water Quality	Suspended Solids	Surficial Sediments

Surficial Sediments

Arsenic



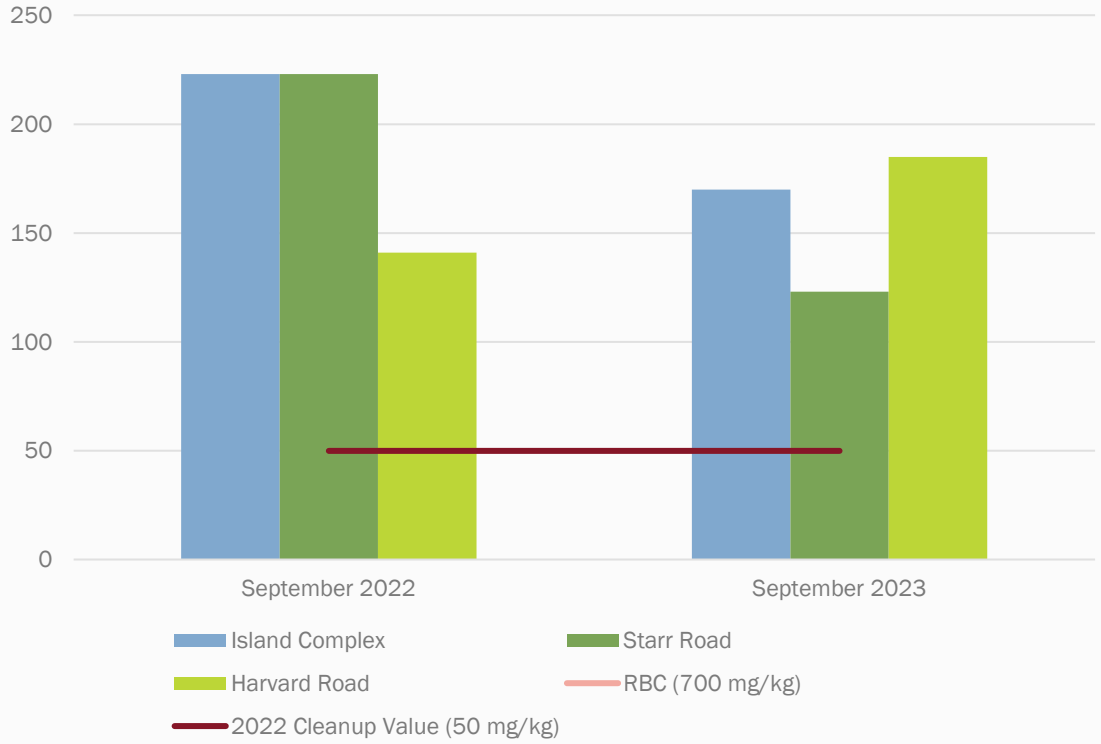
Cadmium



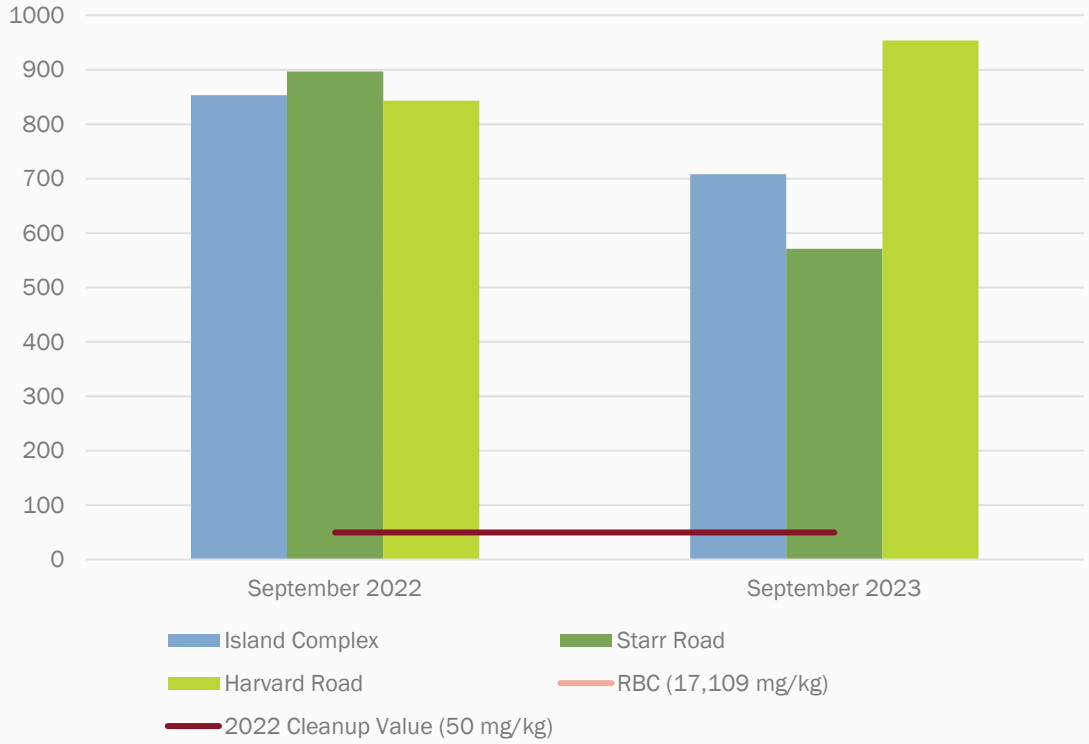
All values mg/kg

Surficial Sediments

Lead



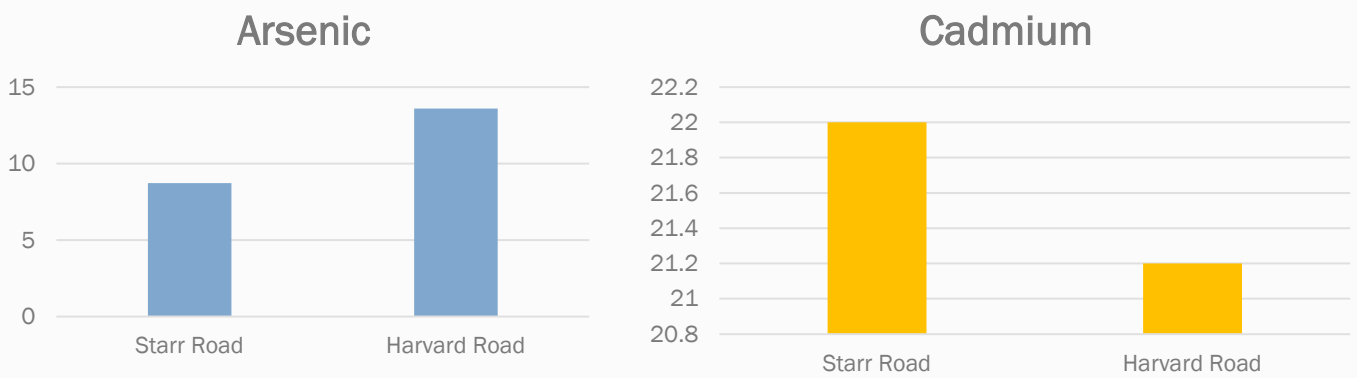
Zinc

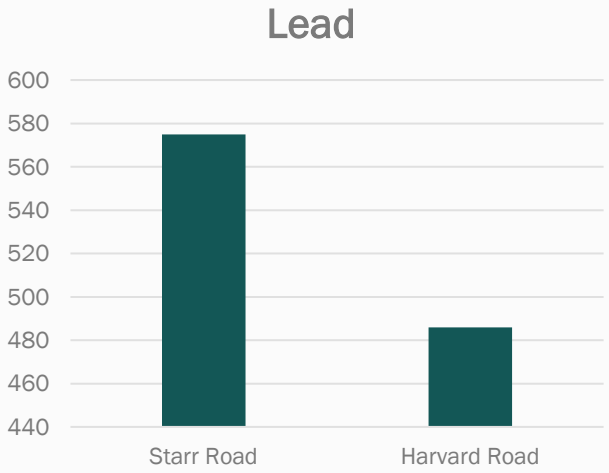


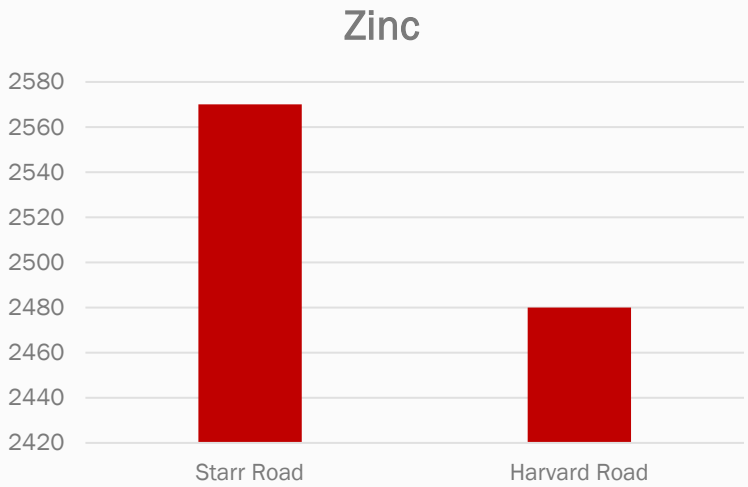
All values mg/kg

Sediment Traps

Collected September 16, 2022 – ~1,250 cfs



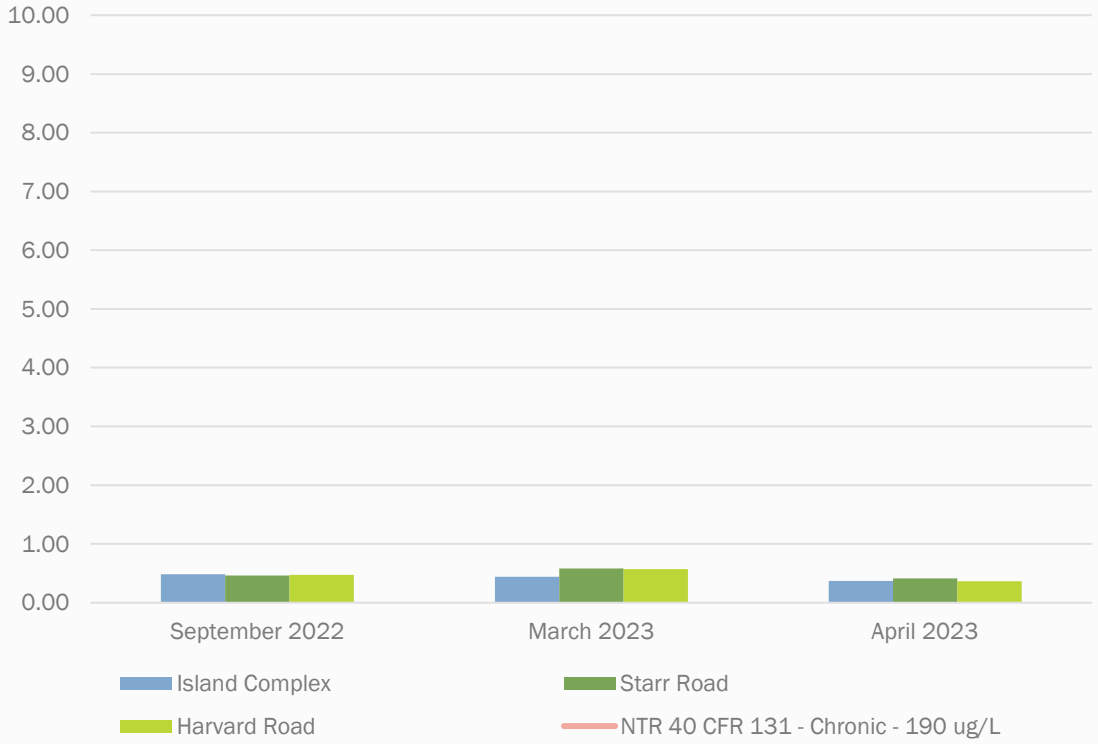




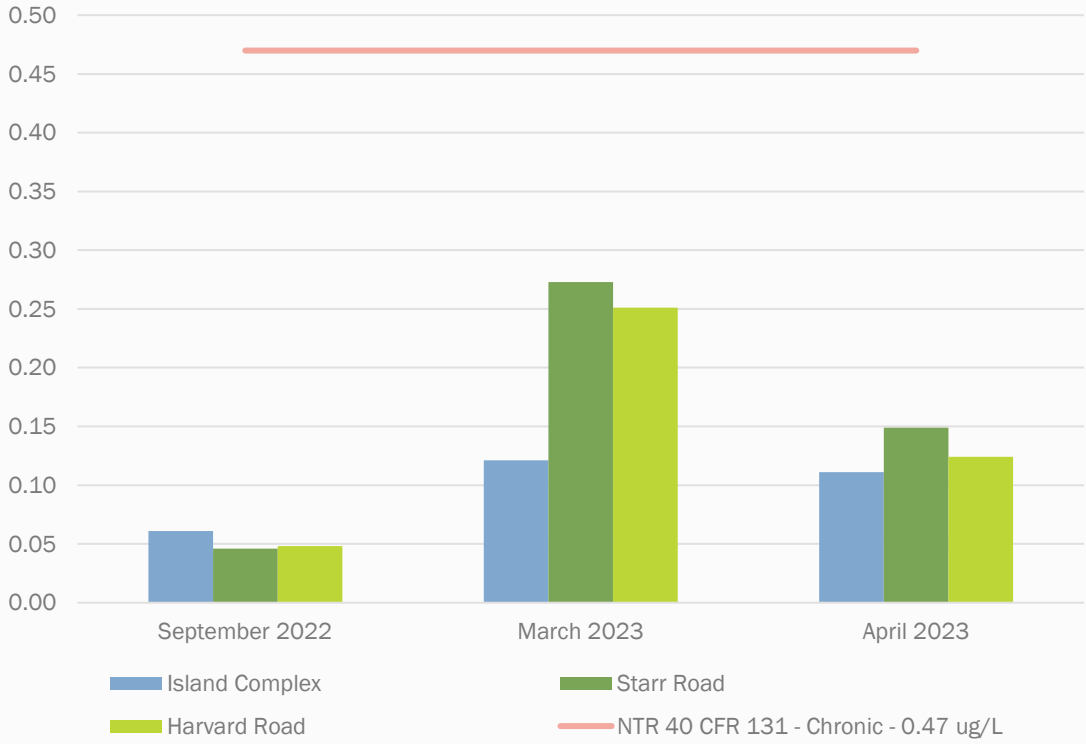
All values mg/kg

Surface Water – Dissolved

Arsenic



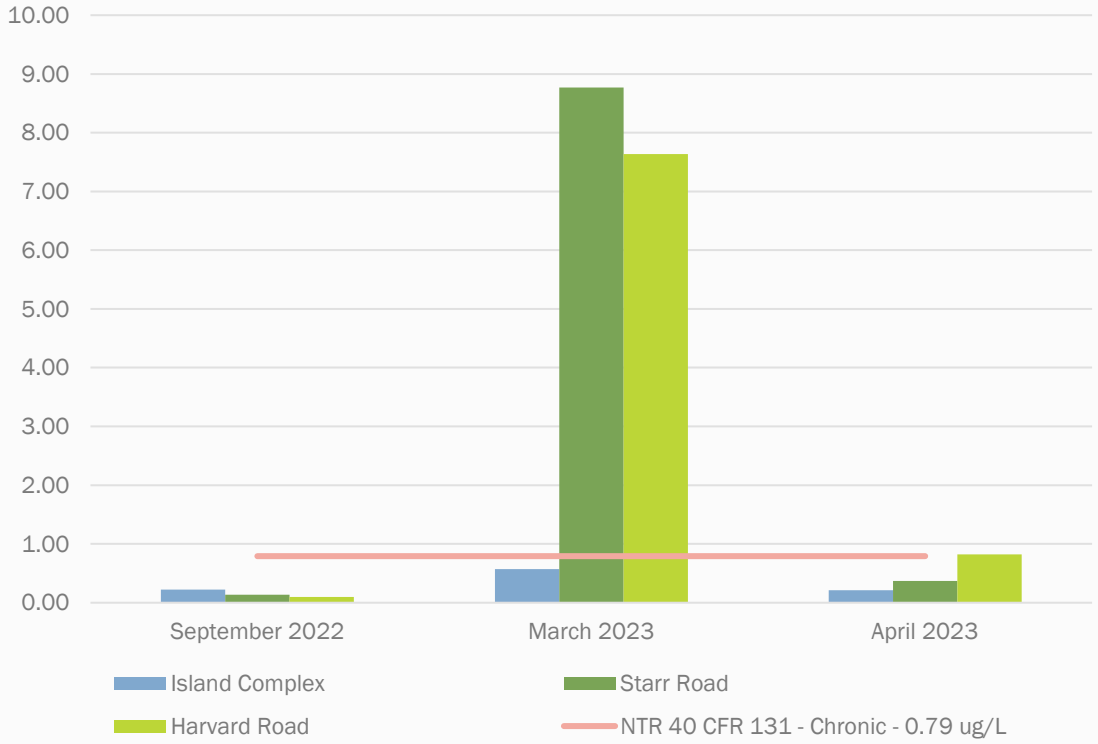
Cadmium



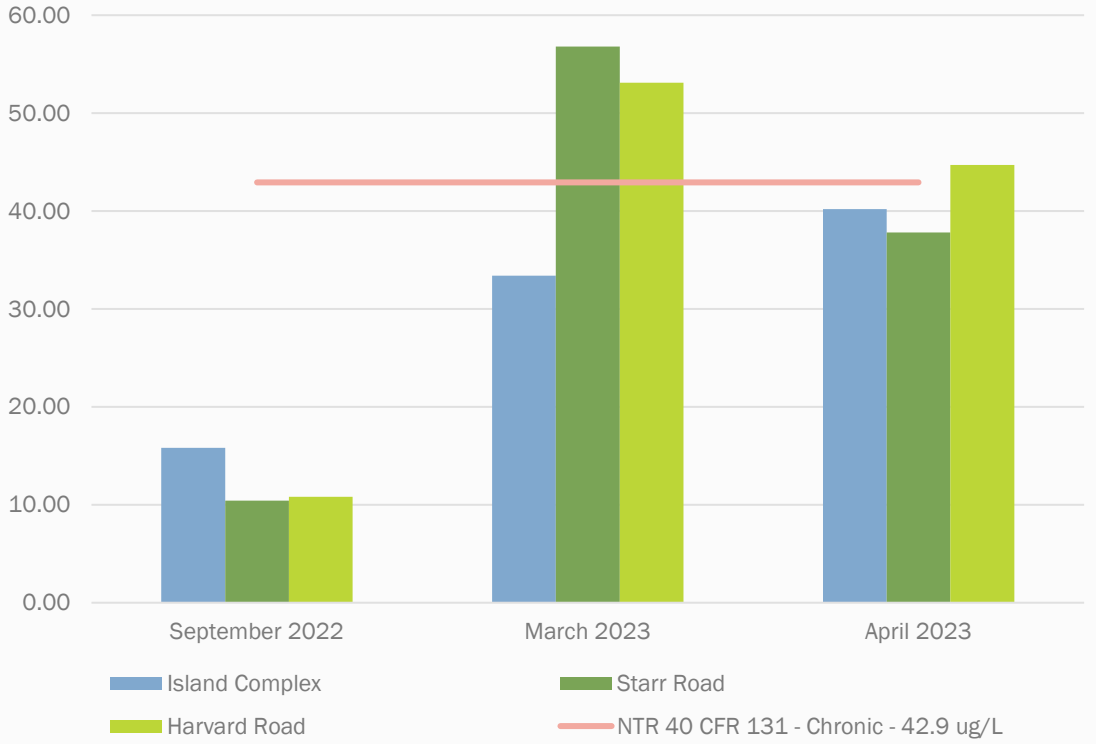
All values µg/L
Hardness = 35 mg/L

Surface Water – Dissolved

Lead



Zinc



All values µg/L
Hardness = 35 mg/L

Discussion / Next Steps

- Seasonal trend in dissolved metals similar to previous studies
- Continued transport of fine-grained sediments with heavy metals from upstream sources
- Additional sediment trap data needed to evaluate transport trends related to flow regimes

Thank you

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Ecology's Spokane River Sites