WATERSHED REPORT

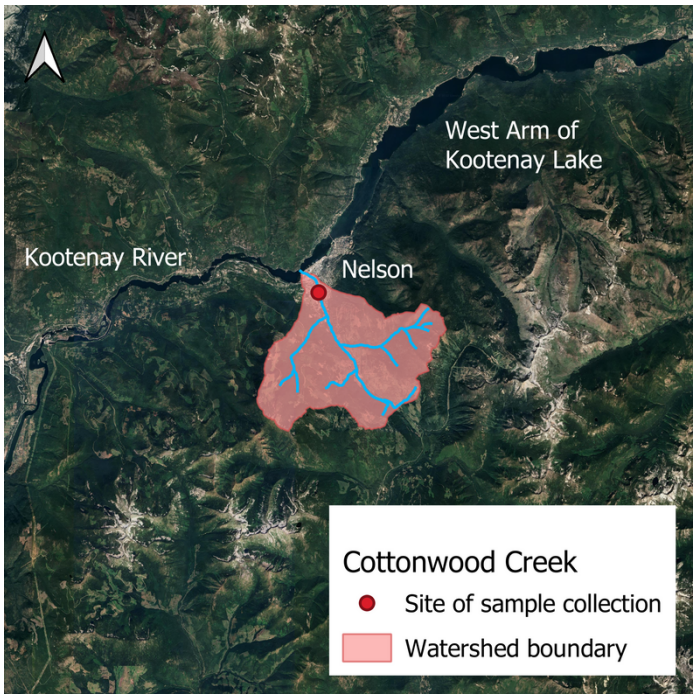
COTTONWOOD CREEK

Sample Date: September 10, 2020 and September 16, 2021

General Location: Tributary into the West Arm of Kootenay Lake, in the Nelson area of the south shore

Sampling location: Just south of Nelson off of Highway 6, near the park and ride (latitude = 49.480908, longitude = -117.292754

Stream Order: 3



Introduction and Methods

Cottonwood Creek became the site of the first hydroelectric power plant in BC with the construction of a dam and powerhouse just below its waterfall. It was used by First Nations for fishing Kokanee salmon, bull trout, rainbow trout and other species

We used a nationally standardized protocol for measuring freshwater ecosystem health called the Canadian Aquatic Biomonitoring Network (CABIN) protocol (find the full protocol here). It focuses on benthic macroinvertebrates, which are aquatic animals without backbones that live on the bottom of waterbodies and are visible to the naked eye. Counts of benthic macroinvertebrates are indicators of water quality and overall stream health in part because these organisms are sensitive to disturbance (more about the science of aquatic biomonitoring here).

We assessed stream health by summarizing the macroinvertebrate communities of sampled streams. We calculated the following standard measures of stream health and compared them to the values we should observe in healthy streams in the Columbia Basin (based on the Columbia Basin Reference Model)

1. **RIVPACS O:E Ratio** – River Invertebrate Prediction and Classification System ratio of observed taxa to expected taxa
2. **Metrics** – Various richness measures, numbers of individual taxa, compositional measures, and functional measures
3. **Bray-Curtis Dissimilarity** – Community structure similarity between test stream and healthy Columbia Basin streams

Results

Summary of Findings
Healthy (in both 2020 and 2021), relative to the median reference (healthy) stream in the Columbia Basin. *Median definition: Denoting the middle value of a series arranged in order of magnitude.*

Detailed Findings

1. *RIVPACS*
- Value = **1.18** in 2020 and **0.96** in 2021, indicating that the site was in excellent condition in 2020 and good condition in 2021. Generally, sites with O:E ratios close to 1 are in good condition, sites with O:E ratios above 1 indicate enriched communities, and sites with low O:E ratios are in poor condition.

2. *Metrics*
- Almost all metrics suggested that Cottonwood Creek is as healthy or healthier than the median reference (healthy) stream in the Columbia Basin, particularly in 2020 (all metrics suggested a healthier stream than the average reference stream)

In 2021, eight of the ten metrics indicated a healthy stream. The two exceptions were:
- *% Ephemeroptera that are Baetidae* was higher in Cottonwood than in the median reference (healthy) stream
- *% EPT Individual*s was lower in Cottonwood than in the median reference (healthy) stream

3. *Bray-Curtis Dissimilarity*
- Value = **0.59** in 2020 and **0.53** in 2021, indicating an intermediate level of dissimilarity between Cottonwood Creek and the median reference (healthy) stream (values close to 0 indicate identical communities; values close to 1 indicate completely different communities)
- Given that the RIVPACS and Metrics findings above indicate a healthy stream, this intermediate dissimilarity value suggests that the stream community is different in a "good" way (i.e., it has even more diversity and intolerant species than the median reference (healthy) stream in the Columbia Basin)

Discussion

The information gathered serves as a baseline to compare future stream health assessments to, in order to assess the impact of climate change and other future impacts to the watershed.

The two metrics that did not indicate a healthy stream could be due to the impacts of mining and logging in the area, as well as a large amount of address points, nearby roads and development. Further studies need to be conducted in order to determine the specific causes of impairment. Overall, this stream is healthy relative to the median reference (healthy) stream in the Columbia Basin.

Data and results are available on our website.

Thank you to our funders:

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