BC Oil & Gas COMMISSION

2020/2021 Annual Summary Report

Water Monitoring of Small Watersheds Program
Project Number: ER-Water-2019-01

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Background

The collection of streamflow data (i.e. hydrometric information) has been declining over the past 20 years by the Water Survey of Canada; historically in northeast BC (NEBC) there was over 50 active hydrometric stations compared to the ~20 active stations today. The active stations are primarily collecting streamflow data for the larger systems such as the Kiskatinaw River or Halfway River which leaves a data gap for the smaller, tributary systems. This data gap represents a challenge with water licence requests on many of these smaller watersheds which have little to no hydrologic data to support decisions.

The OGC, MFLNRORD and various other users, rely on the Northeast Water Tool (NEWT) to support water licence and short-term use approval application decisions. The hydrologic model underlying NEWT relies on empirical (statistical) hydrologic regionalization methods; this approach is affected by the scalability of available data, where the representativeness over short time periods of weak spatial transferability to watersheds without streamflow data can severely limit the accuracy of estimates. It is widely accepted and acknowledged that NEWT is not without limitations and one of its greatest includes a higher degree of uncertainty for smaller basins, as data for calibration at this scale is limited.

The First Nation (FN) communities within Treaty Eight each have expressed water as their highest priority and concern. A specific concern relates to water withdrawals from small watersheds, the lack of data, and the reliance on NEWT for water management decisions given its potential limitations.

This project was designed to help address the small watershed data gap and FN concerns by collecting streamflow data in three smaller watersheds in NEBC. Once the data is processed it will be integrated into the hydrometric network and be used to inform future water allocation and watershed management. The long term objective is to build stronger relationships with FNs, gather streamflow information in smaller watersheds, and to update the hydrologic model supporting NEWT.

Funding for the Water Monitoring of Small Watersheds program is provided by BC Oil and Gas Research and Innovation Society (BC OGRIS) until the end of 2022. The project is being led by Suzan Lapp and Ryan Rolick with the BC OGC, with support from Barry Ortman with Peace Country Technical Services Ltd. We would like to thank the Blueberry River First Nations, Doig River First Nation, Prophet River First Nation, and Saulteau First Nations land's staff and community members for participating in the program.

Summary of Activities

The location of the four stations and upstream watersheds are shown in Figure 1: Martin Creek for PRFN, Le Bleu Creek for SFN, Upper Aitken Creek for BRFN, and Osborn River for DRFN.

Right at the onset of spring, COVID took us into rapid lockdown which meant we lost access to Commission vehicles and the FN communities were not allowing visitors. This had a significant impact on the field season and the re-installation of the equipment to measure streamflow at the three previously established sites. Commission staff gained access to vehicles in July and were able to re-install the equipment in Le Bleu Creek with the SFN (Figure 2), and in September, the station installed in 2019 in the Osborn River with the DRFN, was relocated to a more stable location upstream of the original location (Figure 3). At both sites, staff and community members from the respective FN community joined for the day.

Late in the spring, BRFN expressed interested in joining the project to have a hydrometric station installed in their territory. Following field reconnaissance, a site was identified within the Upper Aitken Creek watershed and the station equipment was installed on September 10th. Two lands staff and two community members joined for the installation (Figures 4).

The streamflow in Le Bleu declined significantly and the channel shifted away from the equipment location in late August, resulting in missing data. In September the station was adjusted to capture streamflow under more varied channel conditions (Figure 2).

PRFN expressed interest in moving the current Martin Creek station to a new location in the Trutch Creek area. The moving of this station to a new location will be further explored in the 2021-22 field season.

As of February 2021, all of the information, data and photos collected during the previous field season has been shared with the communities and data from the BRFN station is to be publically available by April 2021 through the Water Portal (http://waterportal.geoweb.bcogc.ca/) and provincial database Aquarius.

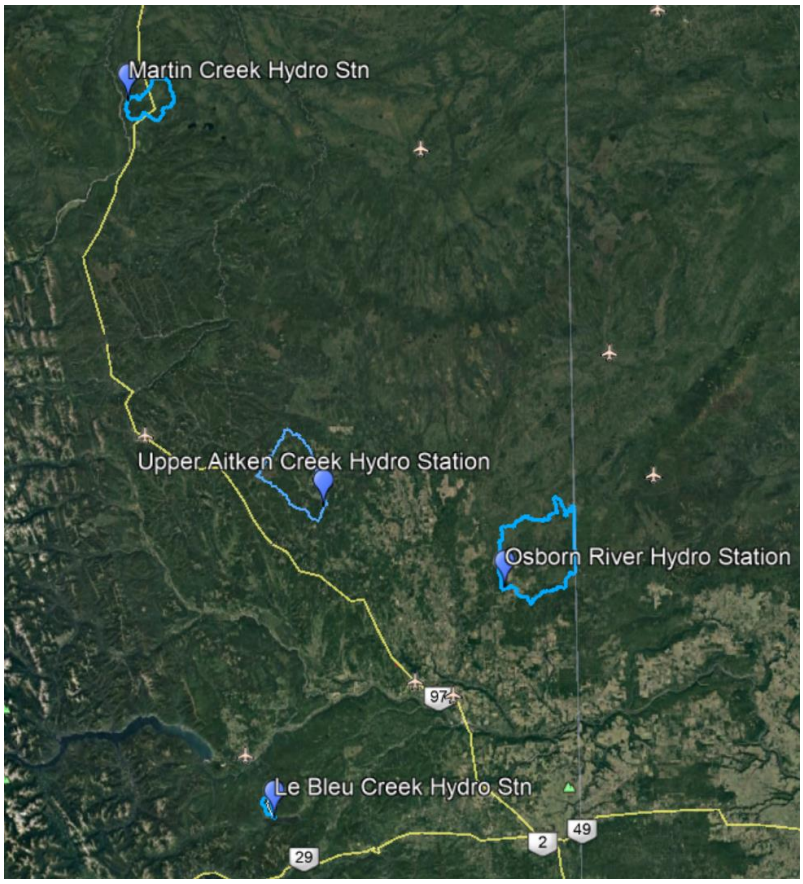
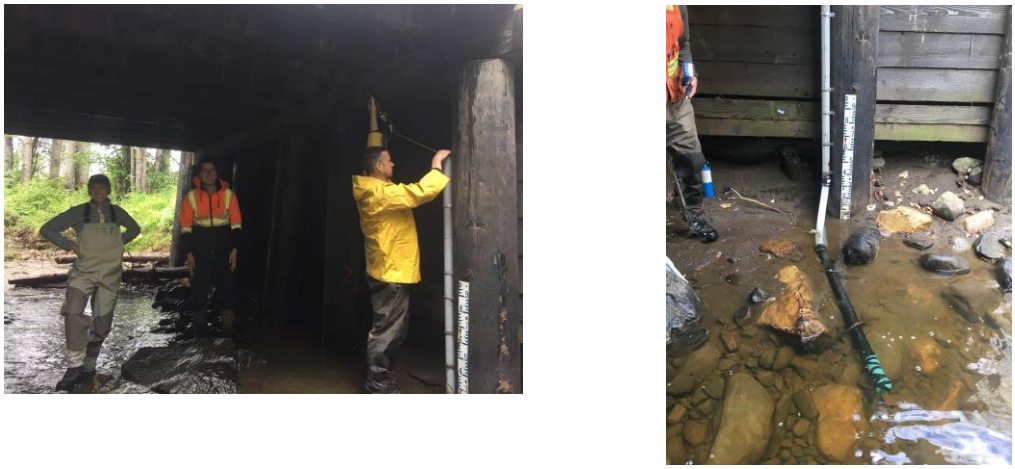


Figure 1. Location of the four hydrometric stations.



a. Re-installing equipment

b. Equipment redesign

Figure 2. Le Bleu Creek with SFN. a.) Re-installation on July 21, 2020. b.) Redesign of equipment placement on September 21, 2020.

a. Surveying bench marks

b. Surveying water level

c. Taking a discharge measurement

d. Station preparation

Figure 3. Osborn River re-installation of equipment September 23, 2020.

a. Installing staff gauge and logger.

b. Looking downstream from bridge.

c. Measuring stream discharge.

d. Drone photo of site.

Figure 4. Upper Aitken Creek at Mile 98 Road with BRFN, installed on September 10, 2020.

Deliverables

Daily streamflow hydrographs were derived for the Upper Aitken Creek, based on the information collected during the 2021 field season. Figure 5 shows the discharge during the month of September and early October. The data from Le Bleu Creek was not sufficient for analysis.

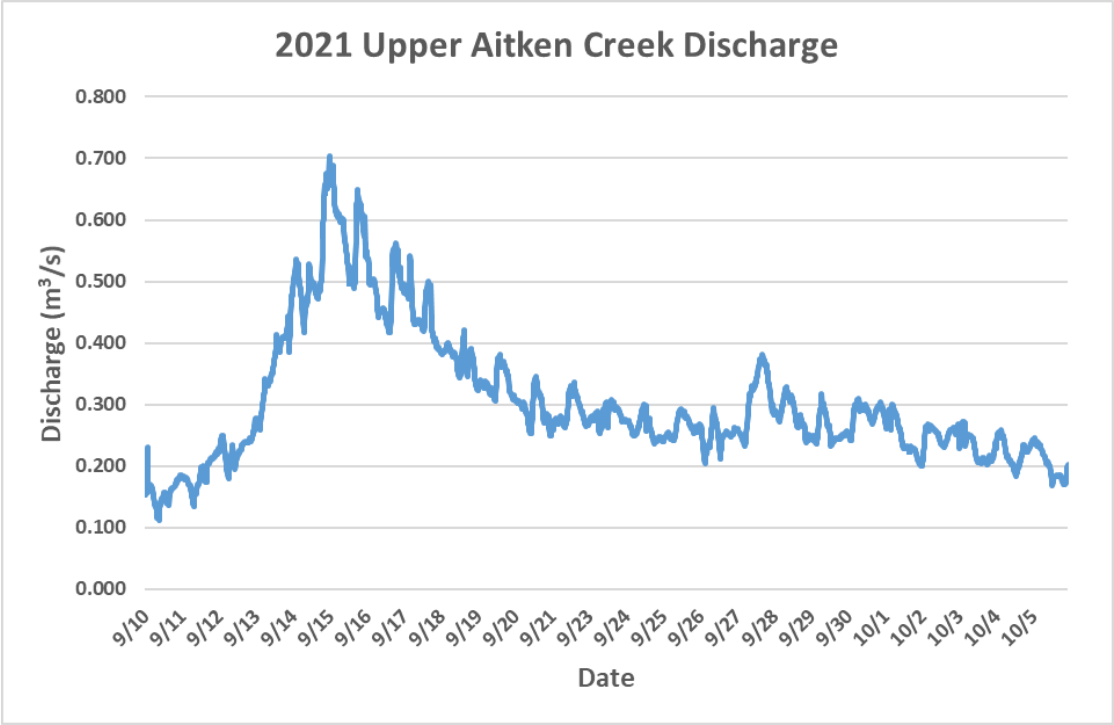


Figure 5. 2021 Daily discharge in Upper Aitken Creek at Mile 98 Road.

Streamflow in Upper Aitken Creek from early September through to early October ranged from approximately 0.10 m^3/s to 0.7 m^3/s, following a rain event. One of the challenges going forward will be measuring water flows amongst a newly built beaver dam.

Participant Comments

Appendix A is the 2020-21 Annual Report from BRFN. Mae provides some excellent recommendations and comments.

Conclusions

The COVID pandemic had a significant impact on the 2020 field season. All of the stations, other than at Martin Creek with PRFN, are ready for equipment re-installation pre-freshet in 2021 to capture the peak flows. Commission staff will be meeting with PRFN staff to confirm a new station location and re-install the equipment at this new site once the sites are accessible. Overall, the project is a success and the data/information being collected will continue to support water management decisions and the First Nation communities are excited to be part of the project.