

### Project Summary and Preliminary Findings



Rehabilitated road crossing found along the stream monitored in D-3. Uschenko 2018

**INTRODUCTION:** Small streams throughout British Columbia are at risk. Increased global temperatures, bark beetle outbreaks and corresponding salvage harvest and road building operations have reduced riparian forest across the province, impacting stream temperatures and the dependant aquatic life. Since 2017, the College of New Caledonia's Research Forest staff has been monitoring small, S4 streams in many Research Forest Units.

**OBJECTIVES:** This study of small stream temperatures is intended to improve the understanding of the post-harvest conditions that may significantly increase water temperature, and the potential options to minimize or avoid temperature changes.

**METHODS:** Previously, the sampling design implemented to monitor stream temperatures consisted of one Hobo®

Temperature data logger installed at both an upstream and downstream location, approximately 30-40m from active, deactivated or rehabilitated road crossings. A data logger was also installed at road crossings to monitor temperatures in exposed streams (deactivated stream crossing). Altered in 2019, to further understand factors influencing stream temperatures, temperature loggers were installed at 20m increments (max. 60m) both upstream and downstream of road crossings. Paired temperature loggers were also installed at all road crossing to minimize data loss from individual logger failure. Three streams were monitored in 2019, located in CNC Research Forest Unit A (A-2), Unit D (D-3) and Unit F (F-6). Two road crossings were built on the small stream in A-2 (within 300m). As a result, this sampling design was slightly altered to include both road crossings. An additional temperature logger was installed between the two crossings to monitor temperatures. All downstream monitoring occurred downstream of the 2<sup>nd</sup> road crossing.

**RESULTS:** The current findings indicate:

- All temperatures appear to increase downstream of road crossings, with the exception of D-3, in which lowest mean/max. daily temperatures were recorded at both the upstream 20m and downstream 40m station
- Little fluctuation in stream temperatures were noted in F-6, with temperatures at both the road crossing and downstream sites slightly higher than those observed upstream
- Average stream temperatures ranged between 8-10°C in A-2, 8-15°C in D-3, and 9-12°C in F-6 while max. temperatures of 13.5°C, 18°C and 14°C was recorded in streams A-2, D-3 and F-6 respectively.
- A lack of riparian forest retention was noted downstream of the 1<sup>st</sup> road crossing in A-2, throughout all monitoring sites in D-3 and in portions of the reserve downstream in F-6 and may account for the increased stream temperatures through direct solar radiation
- High sediment buildup downstream of road crossings may also account for the warming of stream temperatures as suspended particles may increase the absorption of radiation reaching stream water