

TRIP REPORT

State of Alaska
Department of Fish and Game

Field Date(s): June 1 - 9, 2020

Location(s): **Red Dog Mine**

Objective(s): Spring Arctic grayling and Wulik River Dolly Varden sampling

Participant(s): Chad Bear, Todd Nichols, and Justin Burrows

Weather: Mostly sunny, 30°F to 45°F, Ice on Bons Pond and Tailings Impoundment

Access: Charter to Red Dog, Mine pick-up trucks for Bons and North Fork, AC-135 helicopter to Wulik River

On June 1, 2020, we flew to Red Dog Mine to perform the annual spring biomonitoring. Annual spring tasks include: 1) capture fish for Bons Pond Arctic grayling population estimate; 2) collect 15 juvenile Arctic grayling between 160 to 180 mm fork length (FL) from Bons Pond for whole body element analysis; 3) capture fish for North Fork Red Dog Creek Arctic grayling population estimate; and 4) collect seven adult Dolly Varden from the Wulik River for element analysis in select tissues.



Figure 1. Bons Pond ice covered near outlet, June 2, 2020.

On June 1, 2020, ice was still present on Bons Pond and covered 90 percent of the surface area (Figure 1). A small lead of water was present at the inlet from Bons Creek, the outlet of Bons Pond, and around the shoreline. The TSF was ice covered with almost no open water present (Figure 2). The water level had peaked in North Fork Red Dog Creek before we arrived at over 500 cfs and dropped to below 200 cfs when we began fyke netting on June 2. Discharge from snowmelt and runoff continued to decrease during sampling. Discharge in the Wulik River peaked at 10,000 cfs on May 23 and was still at 9,000 cfs when we began the adult Dolly Varden sampling on June 5 (Figure 3). The Wulik River was more turbid than observed in the past three years of spring

sampling (Figure 4). Ikalukrok Creek was turbid from new seeps that were documented during the summer and fall of 2019 (Figure 5).



Figure 2. Tailings Storage Facility (TSF) ice covered, June 2, 2020.



Figure 3. Wulik River discharge near Tutak Creek, May 16 to June 27, 2020.



Figure 4. Wulik River turbid June 6, 2020.



Figure 5. Confluence of Ikalukrok Creek and Wulik River, both turbid, June 4, 2020.

Bons Pond / Bons Creek

One fyke net was fished in Bons Creek and a second net was fished in the outlet of Bons Pond. Two hundred forty-eight Arctic grayling of taggable size (≥ 200 mm FL) were captured. Catch per unit of effort (CPUE) in the Bons Creek net was highest on June 2 and declined during the remainder of the sampling period (Figure 6). CPUE in the Bons Outlet net varied but was highest on June 6 near the end of the sampling period (Figure 7). One hundred forty taggable Arctic grayling were captured in the Bons outlet fyke and 108 were captured in Bons Creek over the six-day sampling period. Ninety-one Arctic grayling ≤ 200 mm were captured by both nets with the majority being from the Bons Pond outlet. Only six of these fish were less than 100 mm, which is considerably less than the 3,873 juvenile Arctic grayling captured in 2019. Of the ninety-one Arctic grayling under 200 mm, a majority were age-2 showing good survival of the large number of age-1 class captured in 2019.

Water temperature in Bons Creek ranged from 1.9°C to 2.9°C during the sampling period. It was slow to warm during the six days of sampling as spring melt water continued to enter the system. Water temperature at the Bons Pond outlet was warmer and ranged from 3.5°C to 5.7°C despite the almost complete ice cover.

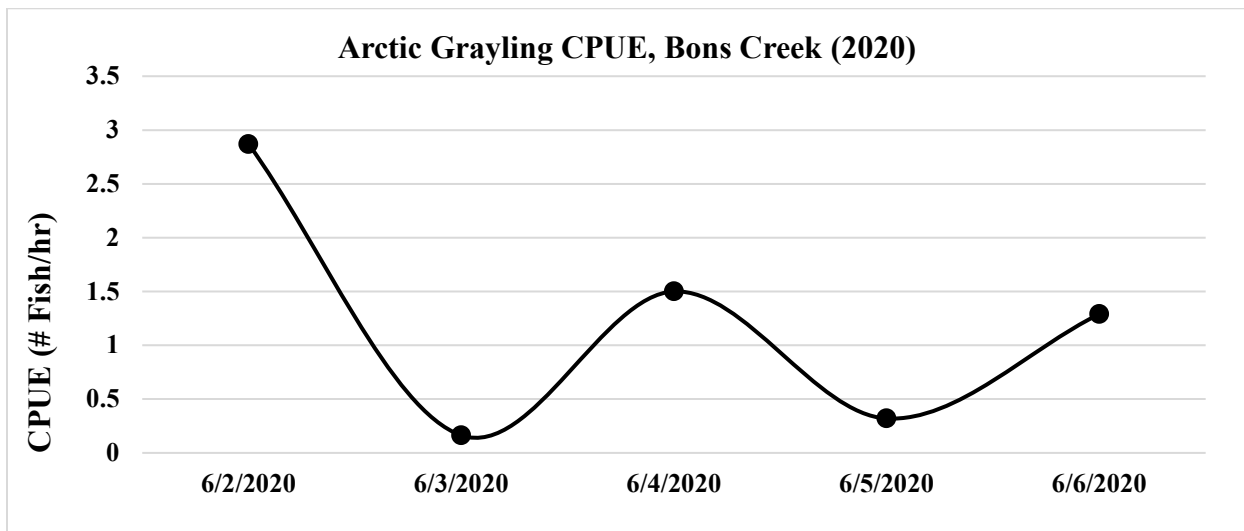


Figure 6. Bons Creek fyke net catch per unit effort (# fish/hr) of Arctic grayling, 2020.

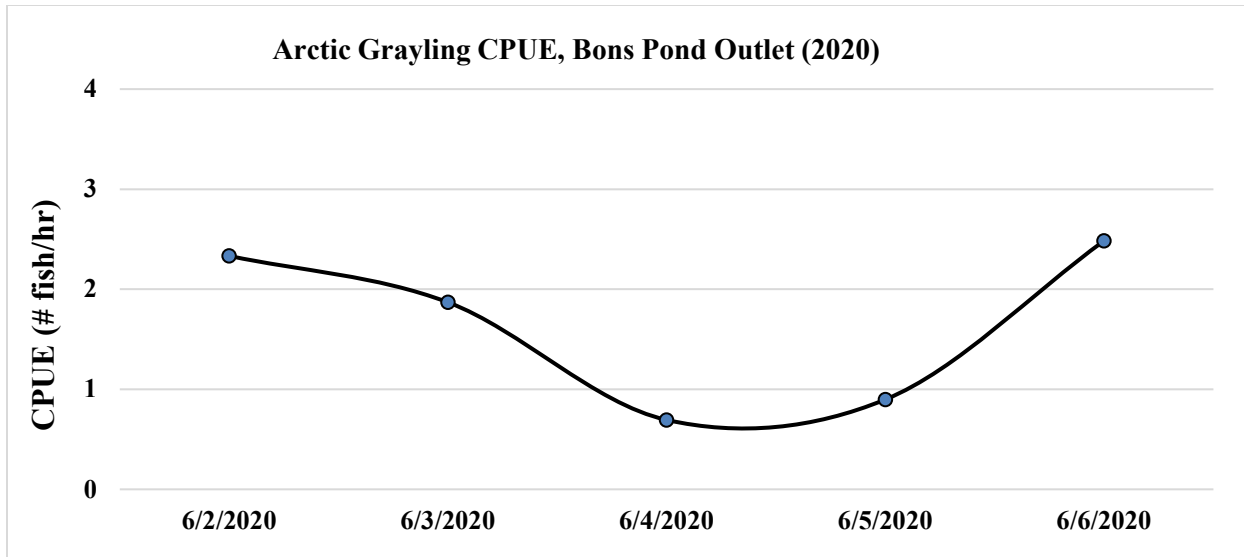


Figure 7. Bons Pond outlet fyke net catch per unit effort (# fish/hr) of Arctic grayling, 2020.

The length frequency of Arctic grayling captured in Bons Pond and Bons Creek was dominated by both age-2 class and large fish > 300 mm (Figure 8). Fifteen Arctic grayling were retained between 160 mm and 180 mm, age-2 and age-3 class, for whole body element analysis. In the past two previous years this size range was not abundant enough to capture fifteen during the spring sampling event. The large number of age-1 grayling captured in 2019 can be seen moving into the 150 – 200 mm size in 2020 (Figure 9).

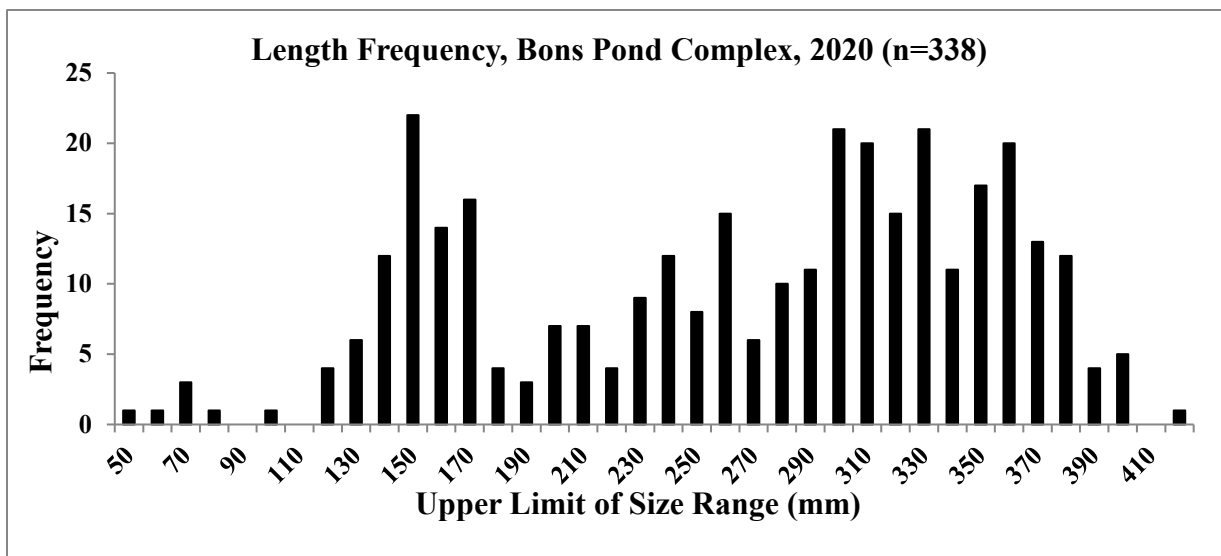


Figure 8. Length frequency distribution of Arctic grayling captured in Bons Pond outlet and Bons Creek, June 2020.

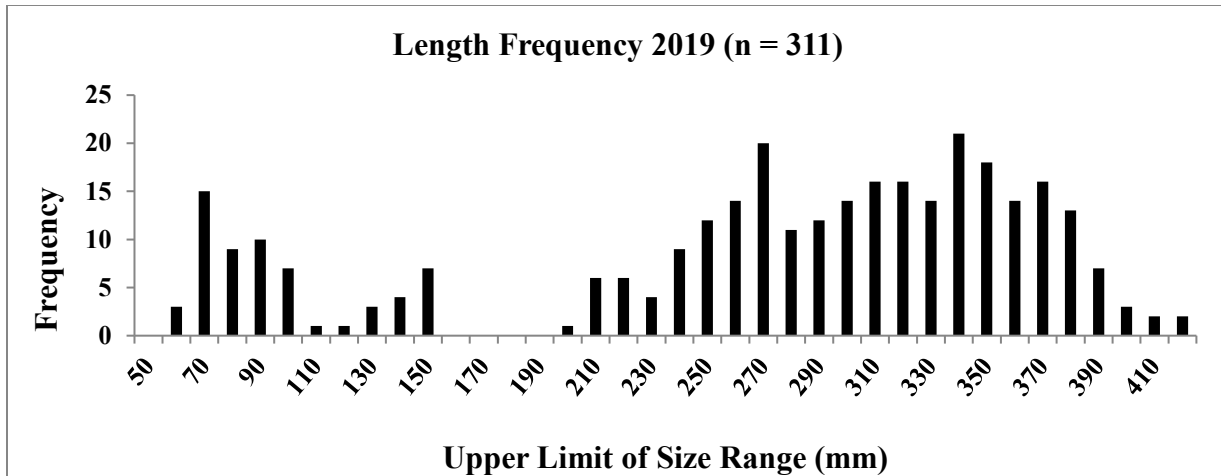


Figure 9. Length frequency distribution of Arctic grayling captured in Bons Creek and Bons Pond, June 2019. The unmeasured 3,843 juvenile fish are not included.

The estimated population of Arctic grayling in Bons Pond, based on the mark event in the spring of 2019 and the recapture event in the spring of 2020, was 720 fish ≥ 200 mm (95% CI, 605-835 fish). This is a decrease of 194 fish from the previous estimate (Figure 10). The population has been relatively stable since 2014 after decreasing from the initial high population during 2003 to 2007. Recruitment of juvenile Arctic grayling has increased in 2019 and 2020 and these fish may result in an increased population estimate for 2020 (Figure 11).

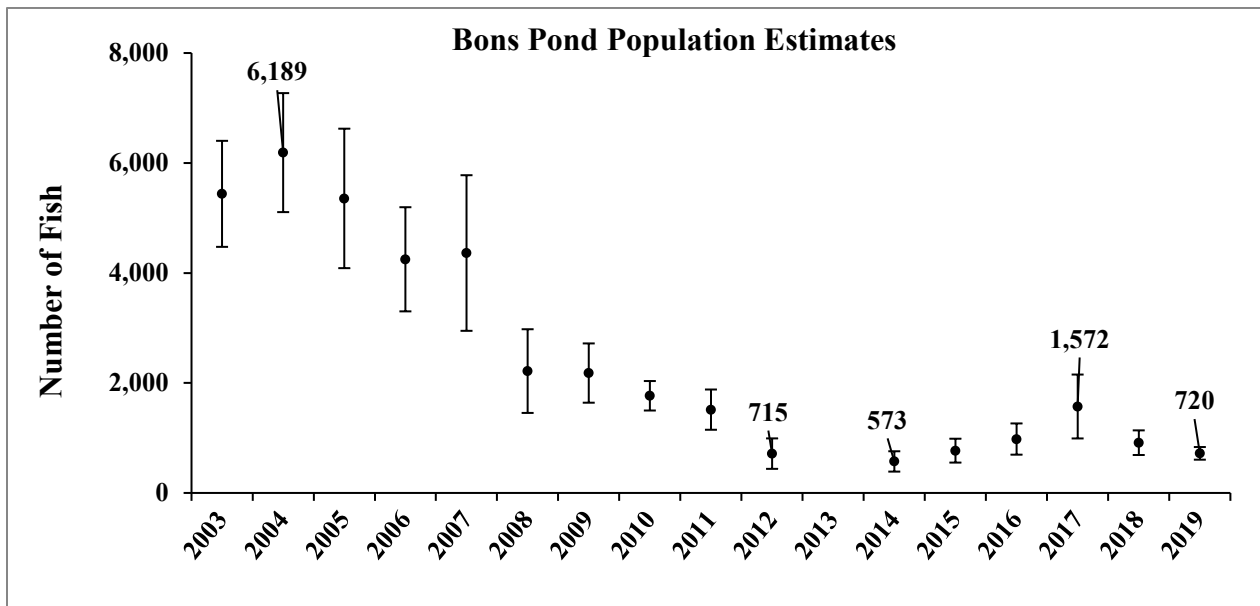


Figure 10. Bons Pond Arctic grayling population estimates (fish ≥ 200 mm) with 95% confidence intervals, 2003 – 2019.

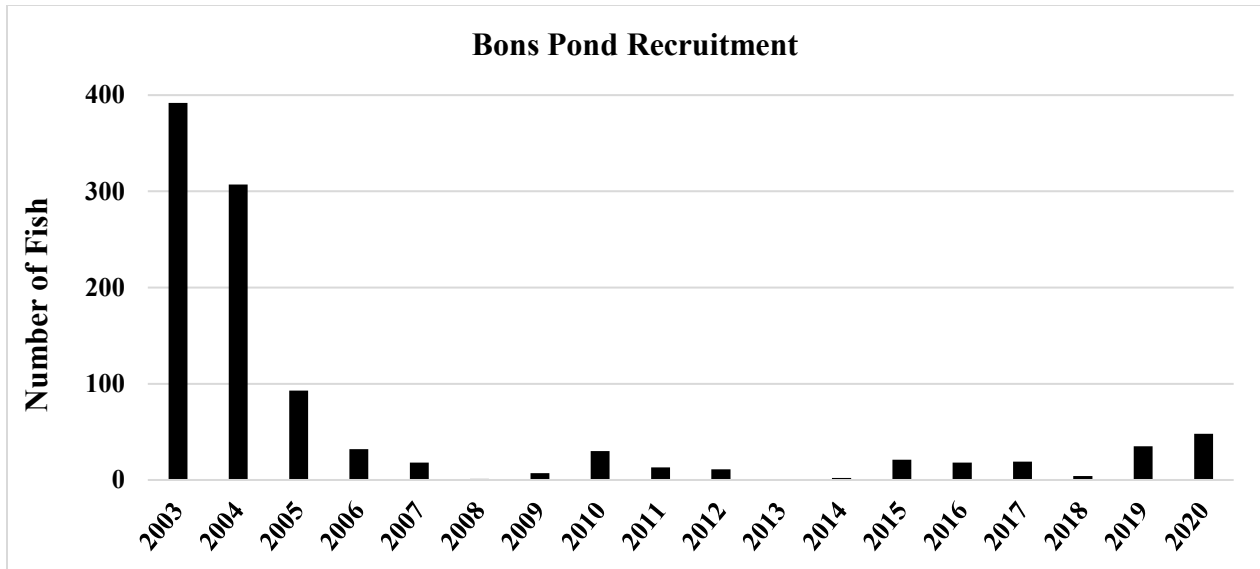


Figure 11. Bons Pond annual juvenile Arctic grayling recruitment, 2003 - 2020.

The 2019 Arctic grayling annual growth was the highest recorded in the data set. Growth was high when compared to 2003 to 2011 when the Arctic grayling population varied from 5,000 to 6,000 fish in Bons Pond (Figure 12). The population from 2003 to 2011 was comprised of more but smaller Arctic grayling and the annual growth rate was less (Figure 10 and 11). The current population of fewer Arctic grayling has resulted in better growth for all size classes.

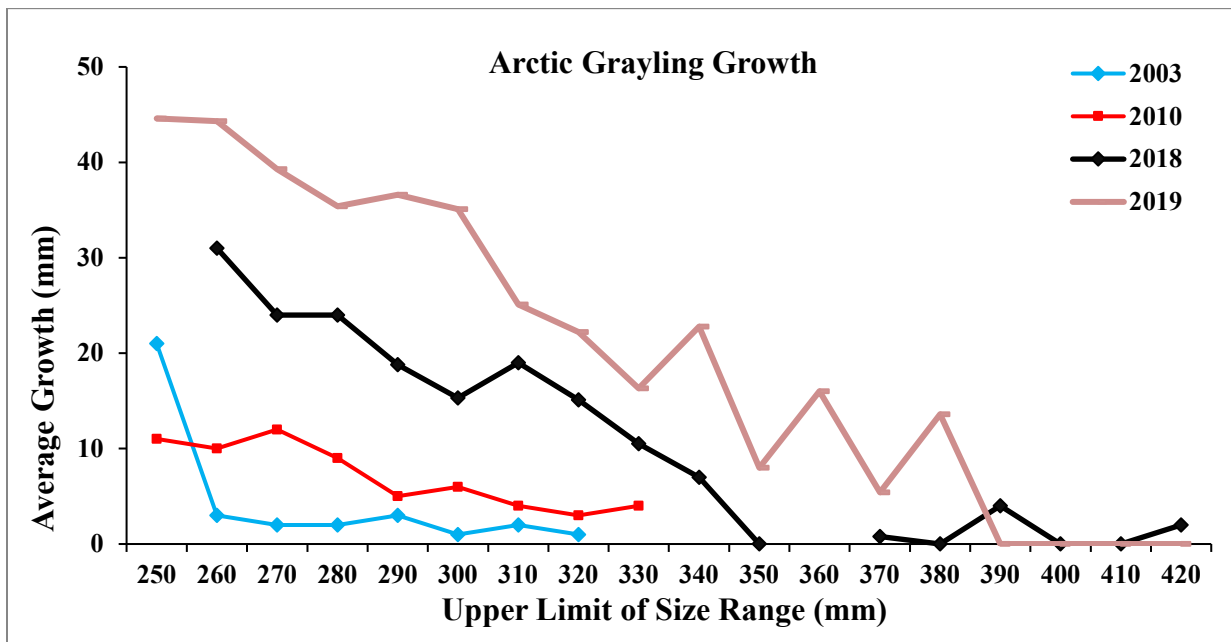


Figure 12. Average annual growth rates for Arctic grayling of various size classes captured in selected years from 2003 to 2019.



Figure 13. North Fork Red Dog Creek fyke net, June 2, 2020.

North Fork Red Dog Creek

Two fyke nets were fished in North Fork Red Dog Creek from June 2 - 8. The main fyke net was set just downriver from Station 12 to avoid the Red Dog USGS installed water sensors (Figure 13). The main fyke captured 22 Arctic grayling and 16 Dolly Varden moving upriver during the six-day sampling period. The 2020 catches were lower than in 2018 (87 grayling) and 2019 (86 grayling). CPUE peaked at 0.3 fish/hr on June 4, then remained low for the rest of the sampling period (Figure 14). Most of the captured Arctic grayling were ≥ 325 mm (Figure 15). A second net was fished to capture Arctic grayling moving downriver post spawning, but it captured zero fish. No fish were retained for selenium concentration analysis this year.

North Fork Red Dog Creek was at approximately 150 cfs on June 2 when the nets were installed and gradually dropped to 70 cfs by June 8. Water conditions were appropriate for sampling and the fyke net remained fish tight except for one large beaver hole on June 4. Water temperature ranged from 1.1°C to 5.6°C with the coolest temperatures in the morning and warmer temperatures in the late afternoon. Water was turbid on June 2 and gradually cleared as flows decreased. However, a milky white and reddish-brown precipitate was present in the water and on the rock surfaces.

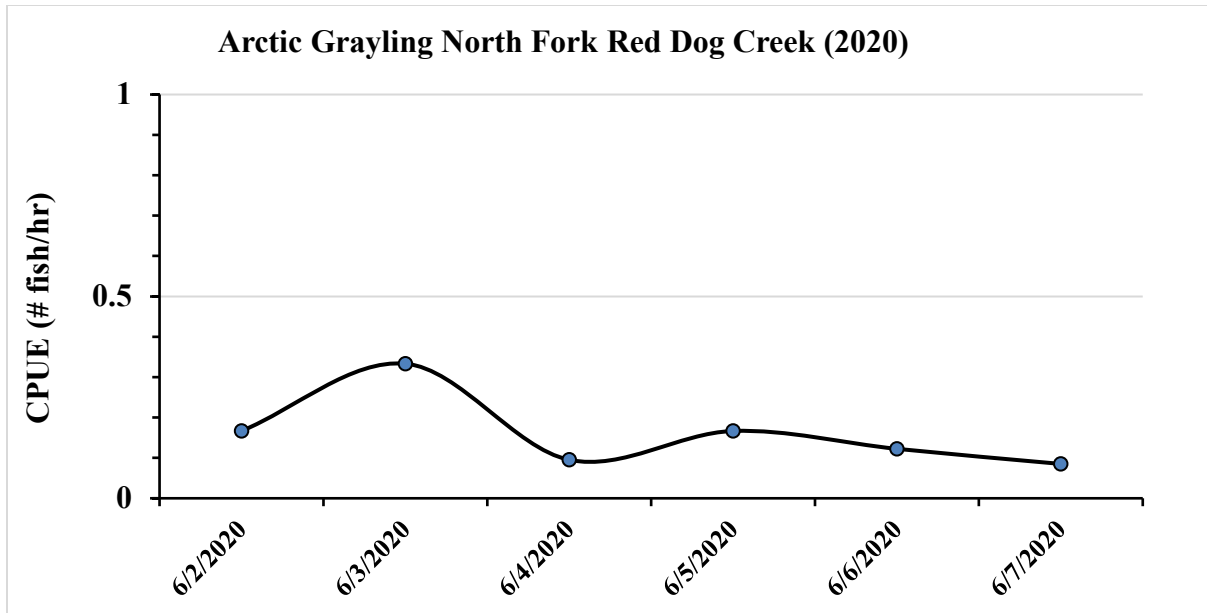


Figure 14. The catch per unit effort (#fish/hr) of Arctic grayling in the main fyke net fishing in North Fork Red Dog Creek, June 2020.

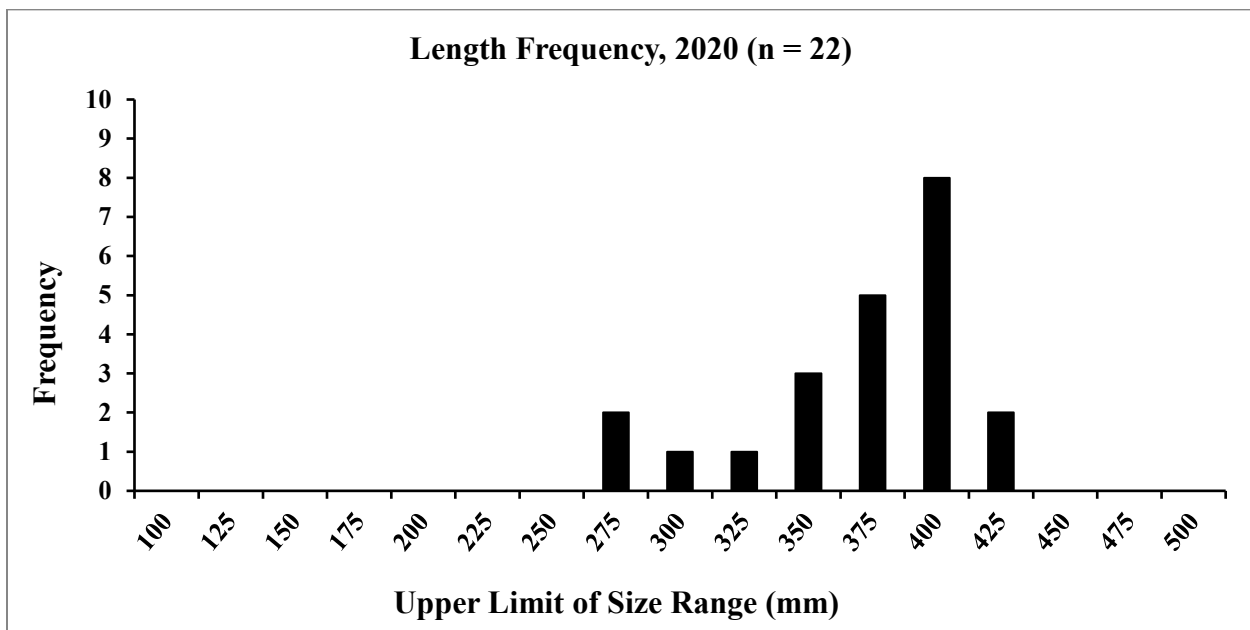


Figure 15. Length frequency distribution of Arctic grayling in North Fork Red Dog Creek, June 2020.

None of the Arctic grayling captured in North Fork Red Dog Creek in 2020 were recaptures from the 2019 sampling event, therefore a population estimate could not be generated. Additional effort was made to capture and tag Arctic grayling by hook and line sampling in North Fork Red Dog Creek above the fyke net. Six hours of fishing was completed in the deep pools and other typical habitat on June 8 (Figure 16). One tagged Arctic grayling (#6365) was captured during the hook

and line sampling effort. This Arctic grayling had been captured in the fyke net on June 3, 2020. No other Arctic grayling were caught, one was visually observed in a pool but was not captured. Fish density appeared to be very low in North Fork Red Dog Creek from visual observations and hook and line effort.

A tributary to North Fork Red Dog Creek on the north side of the drainage about 3 km upstream from Station 12 was documented as contributing turbid water in October 2019 and was still producing mineral rich water on June 8, 2020. There was an orange and brown layer of sediment present on the gravel creek bed below the tributary confluence (Figure 16). The gravel and water were relatively clear and clean above the tributary confluence.

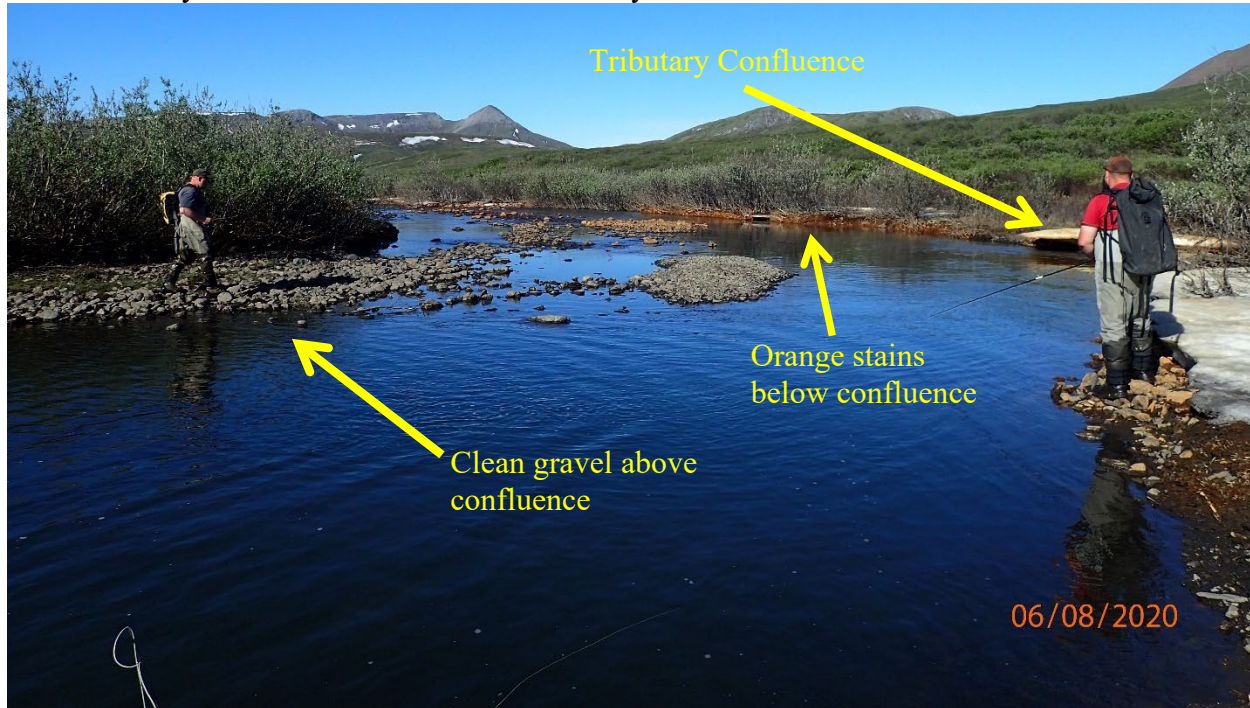


Figure 16. Hook and Line sampling North Fork Red Dog Creek, June 8, 2020. Orange sediment on rocks below tributary confluence observed, clean gravel above confluence.

Wulik River Dolly Varden

Adult Dolly Varden were sampled using hook and line gear in the Wulik River near the mouths of both Tutak and Ikalukrok creeks. Four Dolly Varden were retained. These fish were individually bagged and frozen, then transported back to Fairbanks where they were stored in a -15°F freezer to be dissected and analyzed for element concentrations. Forty-two total man hours of hook and line effort was conducted from June 4 - 8. Tutak Creek was clear and had normal water levels but unlike most years, Dolly Varden were not present near the creek mouth. The Wulik River was very turbid, and lures were not effective at any main stem locations (Figure 4). Ikalulrok Creek was turbid and the typical fishing locations at its confluence with the Wulik River could not be fished successfully (Figure 5). Because of the poor fishing conditions, the remaining three adult Dolly Varden will be captured during the fall 2020 sampling event.