

TRIP REPORT

State of Alaska
Department of Fish and Game

Field Date(s): August 23 – September 2, 2021
Location(s): **Red Dog Mine**
Objective(s): Juvenile fish sampling and gamete collection for chum salmon/ Dolly Varden fertilization tests
Participant(s): Chelsea Clawson, Olivia Edwards, and Audra Brase (ADF&G HAB), Bill Morris and Morgan Bender (Owl Ridge), Kevin Brix (EcoTox), James Elphick and Yvonne Lam (Nautilus Environmental)
Weather: Variable - cloudy/foggy/rainy to partly cloudy, 30-50°F
Access: Pick-up truck and helicopter

On August 23, 2021, Olivia Edwards and Chelsea Clawson flew to the Red Dog Mine to conduct additional minnow trapping and assist in gamete collection for fertilization studies. Specific tasks we planned to perform were: 1) set minnow traps for juvenile fish at eight sites in the Wulik River drainage to determine late summer presence/absence, 2) retain seven juvenile Dolly Varden between 90 and 140 mm fork length from Red Dog Creek for whole body element analysis, 3) capture spawning condition Dolly Varden and chum salmon in the Wulik River drainage for egg and milt collection, and 4) capture, freeze and transport six adult Dolly Varden to Fairbanks for element concentration analysis from select tissues.

Ten minnow traps baited with cured salmon roe were set at each sample site and allowed to soak overnight. A total of 17 Dolly Varden were captured (Table 1). Seven juvenile Dolly Varden were retained from mainstem Red Dog Creek to reach the desired sample size of 15 for whole body element analysis. Eight fish were retained from the early August trapping event. No fish were caught in Volcano Creek in the early August trapping event, but eight fish were caught in the late August event. All other sites had similar catches between the two trapping events.

Table 1. List of minnow trap sample locations and catches, August 24-27, 2021, with number retained for element analysis in parentheses.

Sample Site/Name	Station #	Dolly Varden	slimy sculpin
Ikalukrok Creek u/s of Red Dog	9	-	-
Mainstem Red Dog Creek (lower)	10	7(6)	-
Mainstem Red Dog Creek (upper)	151	1(1)	-
East Fork Ikalukrok Creek	208	-	-
Lower Competition Creek	202	-	-
Grayling Junior Creek	209	1	-
Upper Grayling Jr 1	N/A	-	-
Volcano Creek	N/A	8	-

On August 26 Audra Brase and staff from Owl Ridge, Nautilus Environmental, and EcoTox arrived at Red Dog Mine. ADF&G Habitat staff began assisting Owl Ridge et al. in a fertilization study on August 28. The aim of this research is to understand the effects of increased turbidity on egg fertilization and embryonic development in both chum salmon and Dolly Varden. EcoTox and Nautilus were responsible for running lab experiments to quantify fertilization rate, sperm motility and embryo development. The role of ADF&G was to assist with gamete collection from chum salmon and Dolly Varden to be used in the lab experiments.

Prior to August 26 Chelsea and Olivia identified a few large groups of spawning fish in the Wulik River to target for sampling. Approved sampling methods for the study included rod and reel, fyke nets, and beach seine nets. Initial sampling was attempted with rod and reel to minimize the disruption of individuals on their spawning grounds. Chum salmon were more challenging than Dolly Varden to capture using this method, although success rates were low for both species. Given the success rate of rod and reel sampling, we abandoned that method and on August 28 set a fyke net near a group of spawning Dolly Varden and chum salmon. Many of the chum salmon captured were spent, but some ripe individuals were collected. Once gametes were collected (Figure 1), there was a limited amount of time that they were viable for fertilization, so small numbers of ripe fish were collected each day and the gametes were immediately processed in the on-site lab at the mine.



Figure 1. Egg and milt collection from Dolly Varden on the Wulik River.

It proved challenging to capture enough ripe individuals of both species for the fertilization trials, therefore on September 1 a second fyke net was set a few miles downstream of the first (Figure 2). After the first day, there was a brown bear at this second site that we chased away with the helicopter; however we still chose to keep the fyke net there because of limited additional locations with high densities of fish. A bear did find the net on September 2 but inflicted minimal damage and some fish were still in the net and alive when we arrived on site. However, that night a bear did major damage to the net, rendering it unfishable; therefore the

remaining fish needed for gamete samples were collected using just the first fyke net and a small beach seine (6 x 100 feet with 1 inch mesh).



Figure 2. Fyke net set on the Wulik River.

On September 1 and 2, Audra, Olivia and others flew to the confluence of the Tutak and Wulik rivers to catch non-spawning adult Dolly Varden for element analysis. Rod and reel gear were used with the goal of capturing six individuals. Four fish were caught the afternoon of September 1 and the remaining two the morning of September 2. These fish were bagged, labeled, frozen and flown back to Fairbanks for tissue dissection and analysis.

Chelsea departed Red Dog Mine on August 29 followed by Audra and Olivia on September 2. The other individuals working on the fertilization study stayed to continue collecting samples and departed on September 11.

Bill Morris performed an aerial survey on September 11- brief summary from email: “...Saw a handful of chums and reds (sockeye) in the Ik (Ikalukrok Creek), all in side channels/clear back waters. Maybe 50 to 70 fish total. Saw some grayling and DV (Dolly Varden) too. I was surprised we found any fish but they are there. There was virtually no visibility in the Ik or Wulik yesterday other than in sloughs and backwaters...”

Final numbers and specific sampling locations will be published in the ADF&G annual technical report.