Peter-Hope Lake
2024 Stock Assessment

Prepared by:
Jerica Pippolo and Paige Skofteby

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ABSTRACT

This report presents findings from a 2024 stock assessment of Rainbow Trout (*Oncorhynchus mykiss*) and Kokanee (*Oncorhynchus nerka*) populations at Peter-Hope Lake, British Columbia. Conducted by TRU staff and students, the assessment evaluates population health, growth patterns, and management efforts, building upon data from prior assessments in 2019 and 2023. Since 2008, the lake has undergone strategic stocking modifications, introducing all-female triploid (AF3N) Rainbow Trout (RB), then halting their stocking in 2020 while annually adding AF3N Kokanee (KO) since 2017 to enhance fishery quality. Length-weight regression analyses indicate a suboptimal body condition for RB (b = 2.837), with Fulton's K revealed diminished health indices in the larger cohorts of both species. Persistent issues, including a notable sex ratio imbalance and development of secondary sexual traits, emphasizes the potential limitations of AF3N stocking processes and success rates. Population structure analyses show a positive impact from management strategies aimed at reducing natural RB recruitment, reflected in the lake's declining RB population and the dominance of KO. Management recommendations suggest shifting to diploid KO to promote a self-sustaining fishery, given the lake's eutrophic characteristics. The results of the previous years stock assessments reinforce the efficiency of management efforts, and ongoing stock assessments and creel surveys are advised to monitor long-term outcomes. The observed ecological shifts suggest that Peter-Hope Lake may be optimally managed as a Kokanee-focused fishery, aligning with the current populations within the lake.

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INTRODUCTION

This report presents the results of the stock assessment performed on Peter-Hope Lake in British Columbia, Canada. This assessment was completed September 25th to 26th, 2024 and the data from it will be compared in this report to stock assessments completed in the year 2019, and 2023, around the same time of year. The stock assessments on Peter-Hope Lake were conducted by staff and students from TRU (Thompson Rivers University), this data will be provided to the Ministry of Water, Land and Resource Stewardship. The goal of this stock assessment is to report on the composition of the Rainbow Trout *(Oncorhynchus mykiss)* and Kokanee *(Oncorhynchus nerka)* stocked fishery, and the results will **determine if management efforts (to reduce natural recruitment of reproductive Rainbow Trout) significantly improved the quality of the fishery**.

Study Area

The stock assessment occurred at Peter-Hope Lake, watershed code 120-246600-53700-23700 (FIDQ, 2024), which is located about 59 kilometers South from TRU. The site sits at 1082m elevation, with a mean depth of 11.6m, being 116 ha in size (BCAN, 2024) Peter-Hope is situated within the Interior Douglas Fir biogeoclimatic zone, which can be described as a Douglas-Fir dominant forested ecosystem, described as a "dry-belt" zone meaning warm and dry summers and cool winters (Day, 1996). This area is under a range tenure (ArcGIS, 2024), so there are cattle that graze the surrounding area during the growing season and were spotted during the assessment.

The site is frequently used by recreationalists, with a Recreation Site being located at the North end of the lake, and cabins lining the East and West shores (fig 1). The lake is a very busy fishing lake according to the BC Adventure Network (2018). There are current restrictions on fishing within Peter-Hope in the BC Freshwater Fishing Regulations Synopsis (2024), including a bait ban, no ice fishing, requirements for a single, barbless hook, and a daily quota (limit) of 2 Rainbow Trout (RB) per day.

The stock assessment, and data research was conducted within the traditional and unceded territories of the Secwepemc, Syilx and Nlaka'pamux peoples.

Figure 1 Satellite imagery from 2018 of Peter-Hope Lake (Google Earth), showing the location of the Recreation site in the North end of the lake, and the cabins along the East and West sides. Rolling knolls seen to the East, and West of the lakes, with the patchy tree characteristics of the IDF biogeoclimatic zone surrounding the lake.

The lake has been stocked with RB periodically since 1932, although there have been some major notable changes in the stocking efforts being made; a change in 2008 started the stocking of all female triploid (AF3N) genotypes of Rainbow Trout, then in 2020 the stocking of RB halted. The stocking of large quantities of AF3N Kokanee began in 2017, and has occurred every year since, as seen in Table 1. These changes were made to improve the overall quality of the fishery within Perter-Hope, by using management efforts to reduce natural recruitment of reproductive Rainbow Trout.

Table 1 Stocking history of Peter Hope Lake from 2016 to 2024, with both Rainbow Trout (RB) and Kokanee (KO) species consisting of all female triploid (AF3N) genotypes (FIDQ 2024).

Species	Release Date	Brood Year	Life Stage	Released Quantity	Genotype
KO	2024-05-07	2023	Fry	3500	AF3N
KO	2023-05-16	2022	Fry	3500	AF3N
KO	2022-05-05	2021	Fry	3500	AF3N
KO	2021-05-03	2020	Fry	3500	AF3N
RB	2020-05-28	2019	Yearling	6000	AF3N
KO	2020-05-12	2019	Fry	3500	AF3N
RB	2019-06-20	2018	Yearling	12000	AF3N
KO	2019-05-16	2018	Fry	1250	AF3N
KO	2018-05-29	2017	Fry	3500	AF3N
RB	2018-05-17	2017	Yearling	12000	AF3N
RB	2017-05-19	2016	Yearling	20000	AF3N
KO	2017-05-11	2016	Fry	3500	AF3N
RB	2016-04-18	2015	Yearling	20000	AF3N

Methods

Prior to data collection, TRU faculty obtained the Fish Collection Permit, Permit No KA24-887844, to collect fish for scientific purposes at Peter-Hope Lake in the Thompson/ Okanagan Region. Field data collection occurred over a two-day period, September 25th and 26th, 2024. Two standardized gill nets (7 panel net, each panel 15.2m in length) were utilized for the collection of data for this assessment, being set in the evening of September 25th; net 1, a sinking (bottom) gill net, was set at 16:42 with a starting depth of 1.7m and an end depth of 5.6m, net 2, a floating (surface) gill net, was set at 17:50 with a starting depth of 1.5m and a end depth of 16.6m. Time between net sets were for the change of boat crews (applicable for net set and pull). The following morning, September 26th, net 1 was pulled at 7:50 and net 2 was pulled at 8:45, both nets having a total soak (submerged) time of approximately 15 hours. The gill nets were set in representative areas to avoid possible bias of the sampling method (gear bias) and in attempt to stay out of the way of recreationalists to avoid the destruction of sampling equipment.

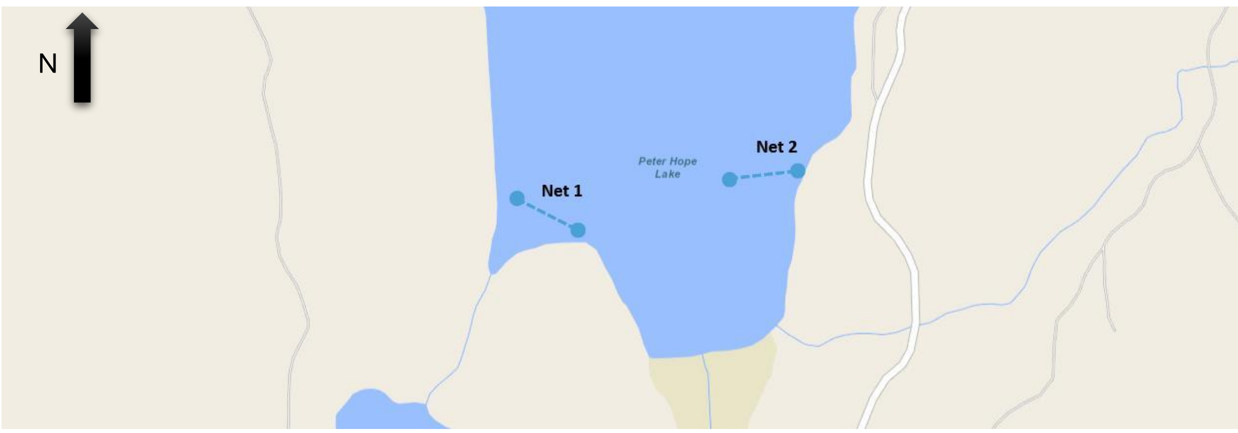

Figure 2 Location of the Gill Nets used in the stock assessment in 2024, in the South end of Peter-Hope Lake. Net 1 (bottom net) was set closer to the West shore, and the Net 2 (surface net) was set close to the East shore, map courtesy of Jacqueline Sorenson.

Both the Kokanee (KO) and Rainbow Trout (RB) were humanely euthanized in accordance with the Canadian Council of Animal Care (2005) *Guidelines on the care and use of fish in research, teaching and testing,* by an effort to stun (blow to the head), then cervical dislocation (for the purposes of this study, a filet knife was used). The fish were then transported to shore so that they could be processed. Numerous samples were obtained at the fish processing station on shore in accordance with the Fish collection methods and standards (RISC, 1997), including the species, fork length (mm), weight (g), sex (male, female or unknown), and maturation state of every fish (immature, maturing and mature, spawning, spent or resting). General health conditions of each individual were noted, and otolith samples were taken from a representative number of fish and were analyzed later (data unavailable for this stock report). The discarded fish samples were gutted and frozen, then gifted to the BC Wildlife Park to feed the animals within their care.

Limnological Samples were performed during the fish processing around 10:00, September 26th, 2024. The data was collected using a YSI meter, measuring the dissolved oxygen (percentage and mg/L), and temperature (C) every meter until an obvious solidified change occurred (when the probe reached well below the thermocline), ensuring confidence in the readings. The conductivity (uS/cm) and pH were also collected at the surface, and a Secchi disc was used to evaluate turbidity.

The data for the stock assessments in 2019 and 2023 in Peter-Hope Lake were provided by the Ministry of Water, Land and Resource Stewardship (requested by TRU Science Faculty). This data was used in conjunction with the data collected during the 2024 stock assessment to do an analysis of the management efforts of this lake. The analysis of this data was performed on Minitab, including the Length-Weight Regressions (b), Fulton's Condition Factor Indices (K), and size class histograms. Excel was also used to summarize sex and maturation data, and to display some of the analysis completed with Minitab.

DATA ANALYSIS

Lake Characteristics

The analysis of the chemical and physical properties of Peter-Hope Lake determined that the thermocline of the lake was at 10m depth at the time of the stock assessment (fig 3). Above the thermocline (0-10m depth), the oxygen levels (>8.00mg/L) and temperatures (14.8˚C) are optimal for salmonid growth, demonstrating suitable habitat for the recreational fishery. The mean Secchi disc depth recorded during the limnological samples was 5.42m, with the pH reading 8.51 and a conductivity reading of 853 uS/cm at the surface of the lake (table 2).

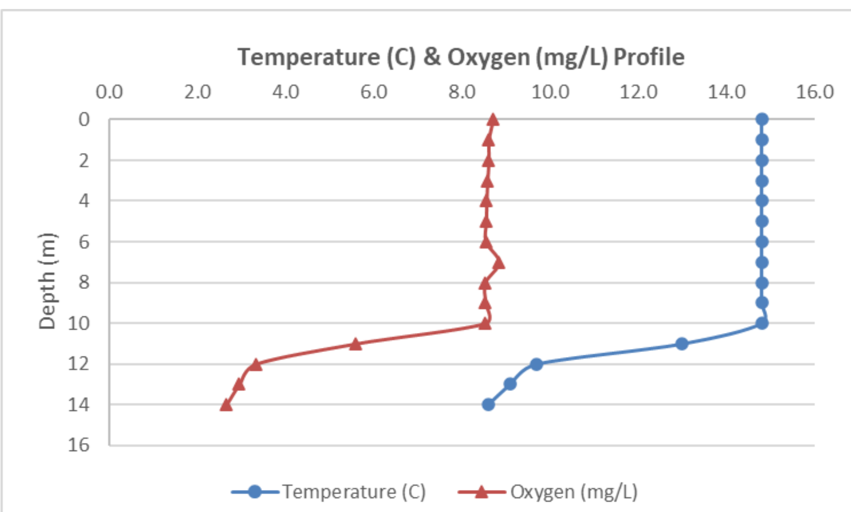

Figure 3 Depth profile graph of Peter-Hope Lake on September 26th, 2024, showing temperature and dissolved oxygen. Thermocline is observed at 10m depth, represented by the change in the temperature and oxygen profiles.

Table 2 Table of the limnological samples collected from Peter-Hope Lake in 2024, including a max depth of 20.2m, conductivity of 853uS/cm, pH of 8.51, and the mean Secchi disc reading of 5.42m.

Secchi Disc Mean Depth	pH	Conductivity (uS/cm)	Max Depth (m)
5.42	8.51	853	20.2

Fish Condition Assessment

Length-Weight Regression

To obtain an understanding of the physical health of the rainbow trout (RB) at Peter Hope Lake, we used the fork length (mm) and weight (g) to perform a linear regression on the population data collected in 2024. The slope of the regression line indicates the relationship between weight and fork length of the RB at Peter Hope Lake, which allows us to determine the health condition of the population. The ideal condition slope is b=3, with skinner population's having a slope less than 3 (b<3) and greater than 3 for larger populations (b>3). The RB had a slope of 2.837, placing them in the skinner category. As seen in Figure 4, the regression resulted in a R2 value of 93.7%, meaning that 93.7% of variations are explained within this relationship, implying a strong relationship between the two factors. Additionally, the statistical significance of the relationship is further shown through the P value of P=0.000.

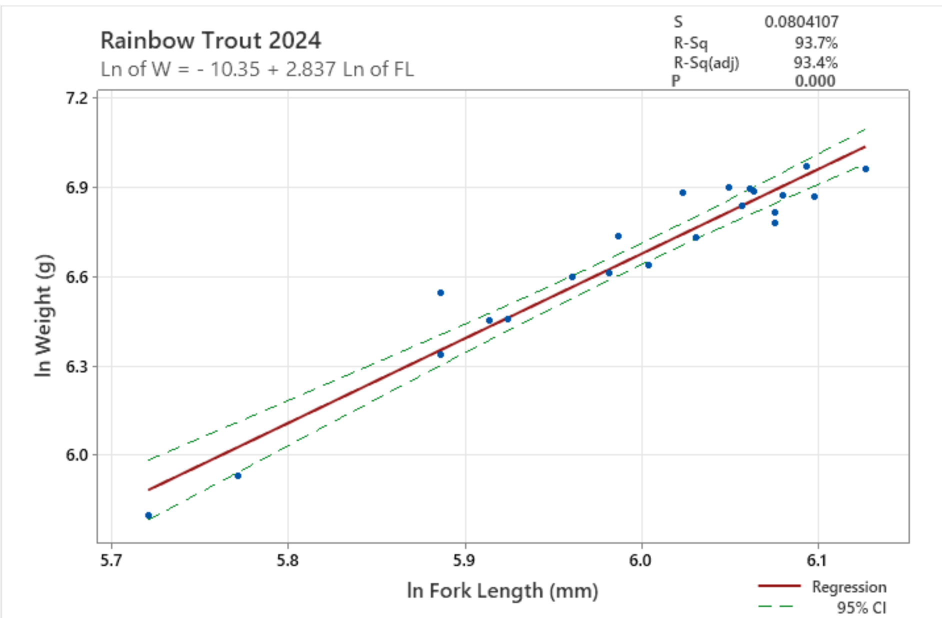

Figure 4 Length-weight regression of Rainbow Trout (RB) in 2024, determining the physical health using the natural log (ln) of weight (g) and fork length (mm) data collected with a gill net from Peter Hope Lake.

Fulton's Condition Factor Index (K)

As a means of identifying individual fish condition with respect to their weight and length, we applied the Fulton's K Condition Factor Index. We determined the ratio between observed weight and excepted weight based on the individual's length, using the equation $K = (W/L^3)(X)$, where the scaling constant X had an integer value of 100,000 for salmonids in our study. The results of K are placed in their corresponding length class to acquire an average condition for each bracket (50mm cohorts). RB had a K value range from 1.09 - 1.28 which is presented in Figure 5, with a higher range in each cohort compared to previous years. Fulton's K assumes isometric growth within populations (b=3), indicating that the RB population measured at Peter Hope Lake model a leaner, reduced weight in regard to their lengths.

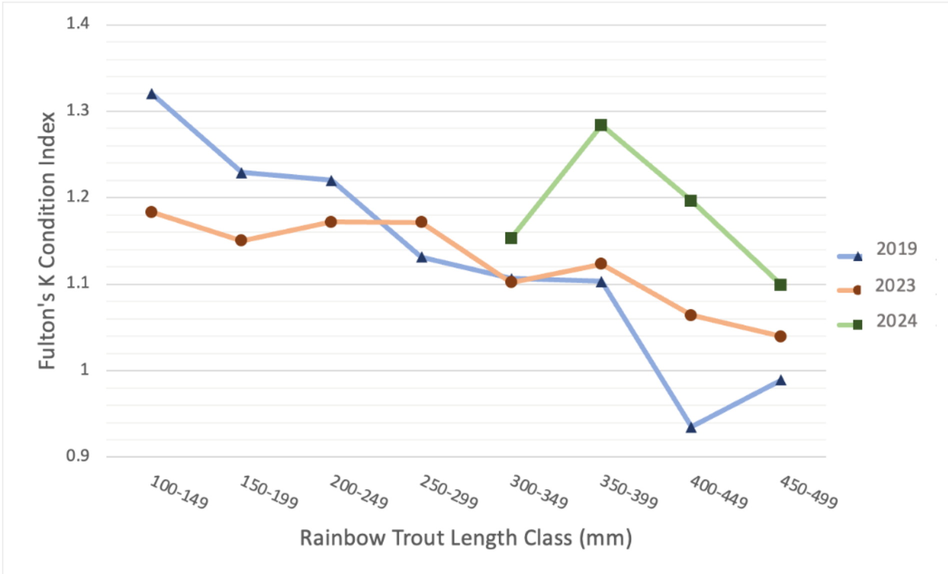

Figure 5 Rainbow Trout (RB) Condition Factor Index (K) averaged into length cohorts (50mm) for 2019, 2023, and 2024.

The Fulton's K analysis for KO had with a wider range in values between 0.89 - 1.42, which displayed a slimmer, lower body condition for the population (Figure 6). Not only did the 250-299mm group have the greatest value (K=1.42), it is also the highest recorded for the species out of all the years of this study. The KO population has an interesting distribution of K values amongst length classes between the varying years, with 350-399mm having the only comparable data between all years.

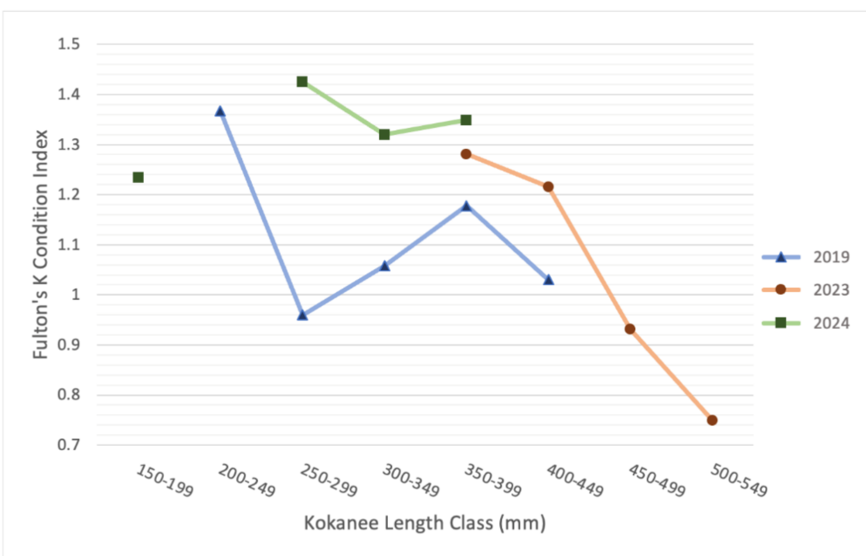

Figure 6 Kokanee Condition Factor Index (K) averaged into length cohorts (50mm) for 2019, 2023, and 2024.

Fish Population Structure & Health

Size Class Structure

Length-frequency histograms are beneficial for comprehending the health condition of a species' population. They demonstrate correlations between growth, reproductive rates, recruitment and age-group mortalities, which can help to distinguish problem areas in existing populations (Zale et al. 2013). By using a histogram, we can clearly see the number of fish collected from various length cohorts and which is the most successive in the population.

Length frequency histogram for the kokanee population had a left-skewed distribution in 2024, with a considerable gap for individuals caught between the 150-300mm age classes. The largest group of KO was in the 440mm age cohort, seen in Figure 7. The 2024 sample had the smallest and largest length out of all 3 years captured. Normal distribution was found in the 2023 sample, and the KO population in 2019 was also left-skewed, however a few more individuals in the smaller fork length class were caught, providing further insight on their cohort.

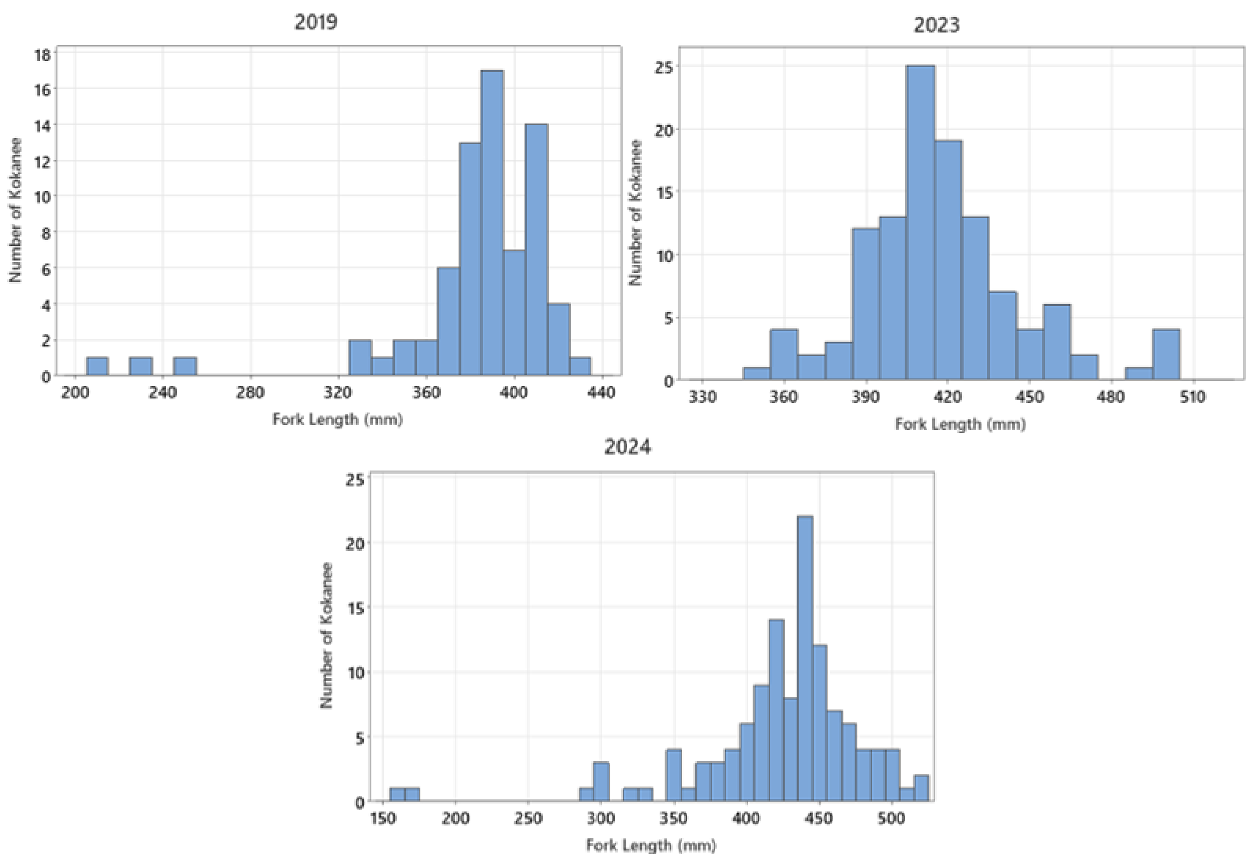

Figure 7 Length Frequency Histograms of Kokanee in 2019, 2023, and 2024 at Peter Hope Lake.

The findings of the length frequency histogram for the rainbow trout population had left-skewed distributions across all sampling years (Figure 8). Although a few individuals of the smaller length cohorts were caught, there is a consistent lack of information for that portion of the populations throughout the years of sampling. The most dominate length class capture was between the range of 416-448mm in 2024.

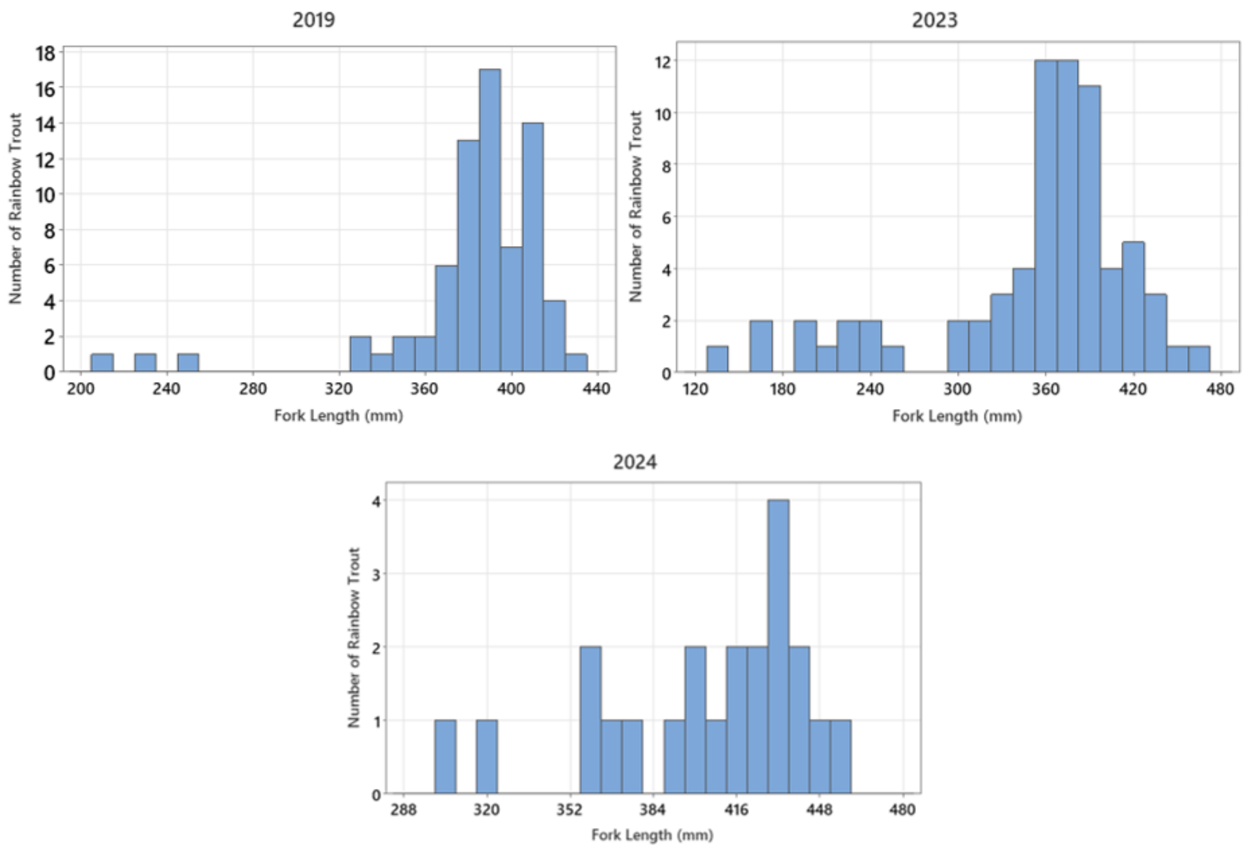

Figure 8 Length Frequency Histogram of Rainbow Trout in 2019, 2023, and 2024 in Peter-Hope Lake.

Sex and Maturation

Although maturity levels can be identified used some external characteristics, we also utilized the reproductive organs for an accurate assessment. There are four categories of maturity based on the development of the gonads: i) immature gonads being underdeveloped; ii) maturing ovaries and testes cover large portion of the body and eggs are visible; iii) mature gonads are at maximum size, body cavity feels full; iv) spawning has eggs or milt expelled when body is lightly squeezed (BC FISH COLLECTION METHODS). The Kokanee population was found to be predominately immature across all years of sampling, shown in Figure 9. The 2024 sample had a single female spawning and 6 males maturing, signifying very low reproductive. The largest variation of maturity was seen in the female population in 2023.

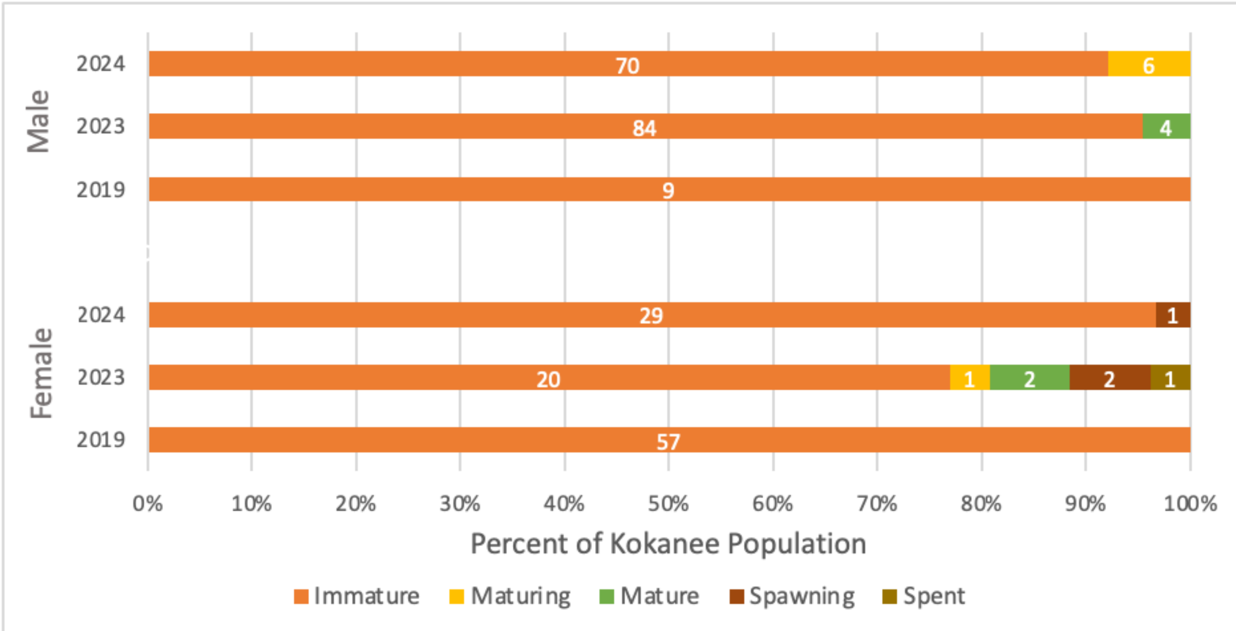

Figure 9 Kokanee maturation distribution for both Males and Females in the stock assessments in 2019, 2023, and 2024 in Peter-Hope Lake.

The composition of kokanee populations at Peter-Hope Lake is showcased on tallies to identify changes occurring over the years. Although the population size between 2023 and 2024 is relatively small, Figure 10 shows an increasing trajectory of the KO population over the past six year. The ratio of sexes within the populations are quite striking with 62% of the sample population in 2024 being male, considering that only all-female triploid kokanee have been stocked (Table 1), including 3500 individuals in May 2024.

2019

Sex	Count	Percent
F	57	79.17
M	9	12.50
U	6	8.33
N=	72	

2023

Sex	Count	Percent
F	26	22.41
M	88	75.86
U	2	1.72
N=	116	

2024

Sex	Count	Percent
F	30	24.59
M	76	62.30
U	16	13.11
N=	122	

Figure 10 Tallies of the distribution of sex of Kokanee in the 2019, 2023, and 2024 stock assessment of Peter-Hope Lake.

The maturity level of each individual was determined through examining the gonads. The maturity status between sexes of the rainbow trout populations is displayed using a cluster bar graph to obtain a visual understanding on the population structure. As seen in Figure 11, the portion of mature RB is dominate maturity status for both sexes in every year, apart from males in 2024. Another observation to note is the absence of any mature, spawning or spent maturity levels in the samples.

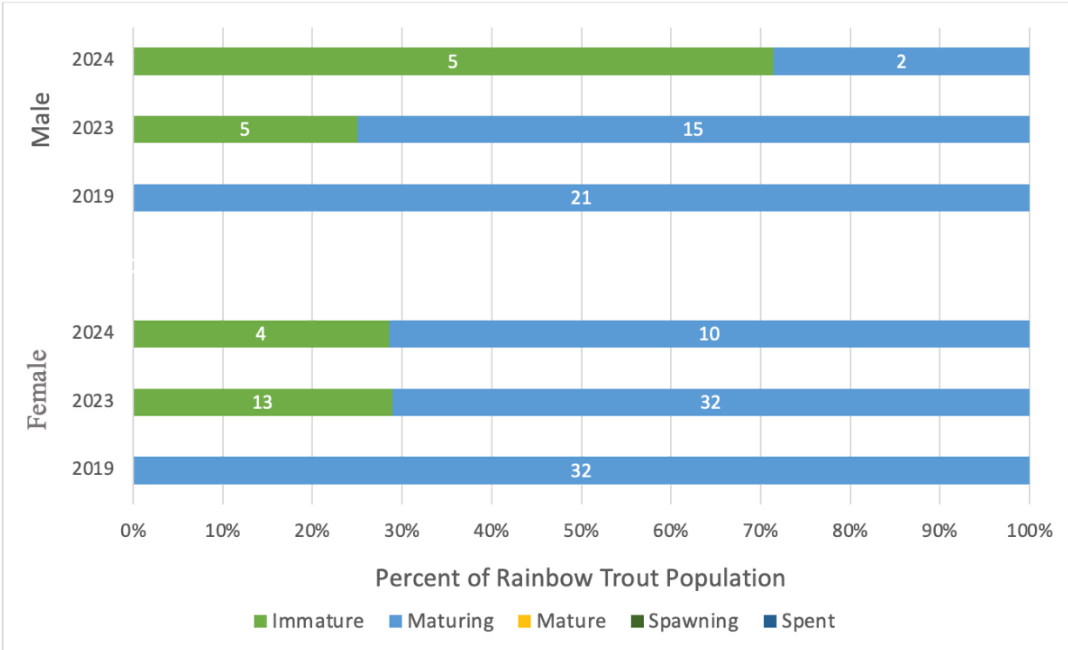

Figure 11 Rainbow Trout maturation distribution for both male and females in the stock assessments of 2019, 2023, and 2024 in Peter-Hope Lake.

The total population of rainbow trout sampled from 2019 to 2024 is portrayed on a tally to highlight the substantially dropped in population size over time, especially between 2023 and 2024 (Figure 12). The internal sex organs were assessed to identify the sex of each species. If the ovaries or testes were undetectable along the dorsal surface, the individual was classified as unknown. Although the ratio of females is consistently higher in the populations, the proportion of males present was unexcepted.

2019

Sex	Count	Percent
F	32	18.18
M	21	11.93
U	123	69.89
N=	176	

2023

Sex	Count	Percent
F	45	63.38
M	20	28.17
U	6	8.45
N=	71	

2024

Sex	Count	Percent
F	15	68.18
M	7	31.82
N=	22	

Figure 12 Tallies of the distribution of sex of Rainbow Trout in the 2019, 2023, and 2024 stock assessment of Peter-Hope Lake.

Health

The health of the sample population collected for the purpose of completing the stock assessment for the 2024 season was overall all good. It is to be noted that the assessment dd not look thoroughly into the health of the sample population (i.e. did not analyze stomach contents etc.), but general health characteristics were observed during the entirety of the fish handling/ sample collection process.

The health of the Rainbow Trout (RB) appeared to be relatively healthy, as there were minimal concerns about the health of the fish. The RB in the assessment all had good coloration, their eyes were clear and intact, with silky mucus, and bright red gills. Minimal parasite loads. Some individuals had mesenteric fat within their body cavity. There was one male RB that a cyst was found on the stomach, a photo of which can be found in Appendix A, Figure 15. It could potentially be an infection from a nematode, but it is unconfirmed. There were a few spawn bound females within the sample population, with four of the fifteen females collected having residual eggs within their body cavities, as seen in Figure 17, in Appendix A. The remainder of the RB sample population appeared to be in good overall condition.

The health of the Kokanee (KO) also appeared to be relatively healthy from the outside. Upon the opening of the stomach cavity, sixteen males and one female KO had an infected, gelatinous looking swim bladder (Figure 15, Appendix A). All the infected fish were displaying secondary sexual characteristics. Unfortunately, it is not known how this affects the KO, or what the infection is but photos and a sample of the infection was taken for further analysis. Results were unavailable during the synthesis of this report. There was also one standalone female KO that was severely emaciated in comparison to the others, having a weight severely below what was being observed for the other KO in the same size class (Figure 13, Appendix A). There was nothing visibly wrong with this KO other than the emaciated appearance both externally and internally. The KO that did not display any secondary sexual characteristics (23 out of 122 KO) were healthy and had mesenteric fat reserves (Figure 14, Appendix A), and the KO that were displaying the secondary traits also appeared to be healthy given spawning season.

DISCUSSION

The limnological samples taken in Peter-Hope Lake allude to a eutrophic lake status, that is very capable of sustaining a recreational fish hatchery of both the Kokanee (KO) and Rainbow Trout (RB). During the data collection, samples were experiencing very strong winds and observed Langmuir spirals occurring, which may have caused discrepancy in the data; although, the mixing from these spirals should only occur above the thermocline. The depth profile (Figure 3) shows a clinograde which is a trait of high productivity prior to fall turnover, and the temperature is well within the optimal growing rate of RB (Jiang et al. 2021). In general, the health of both RB and KO populations are in good standings, with no major parasite infestations, or mass diseases. The number of KO with an infected swim bladder does have the potential to be growing issue, management decisions on how to move forward will have to be made once the results from the sample have come in.

The results of the length-weight regression showed a powerful relationship between fork length (mm) and weight (g) as a health condition factor for the RB population. The ideal slope value (b) for this health measurement is 3 but can range from 2.5-4.0 to represent the health status of the population. The RB population at Peter-Hope Lake had a slope of b=2.837, indicating the population was overall skinnier than the ideal body condition (b=3). This measure of body condition is useful when comparing the same population over a long period of time. Contrasting the 2024 slope to previous years, the 2019 population had lower health condition with a slope of b=2.809, while 2023 data had a b=2.910 slope, showing a slightly healthier population that 2024. This slight oscillation of health condition between years could be attributed to higher lake productivity or reduced competition for resources, since smaller stocking sizes of RB began to occur following 2019 then stopping after 2020 (Table 1), however, the number KO being stocked has persistent which could be a factor in the condition decline between 2023 and 2024.

The length-weight regression analysis could be applied to the KO population since they have isometric growth up until their spawning lifecycle begins, which shifts them to allometric growth for spawning characteristics such as the hump and kype. However, these regressions are not typically used on spawning fish (Sorenson 2024). Despite the stocked KO consisting of all female triploid (AF3N) genotype, the 2024 sample had a larger portion of males (N=76) than females (N=30). Considering this, it is speculated that the AF3N process is less successful than we thought. Nevertheless, KO could be analyzed using length-weight regressions since it assumes allometric growth, however, biases could occur based on the rate of AF3N succession which could create a combination of allometric and isometric growth rates. Thus, other methods of body condition measurements should be used on KO before using this regression analysis.

The findings of Fulton's K showed a smaller, below average health condition for RB and KO. Both species' largest cohorts (KO = 450-499mm, RB = 500-549) had the smallest K values of all lengths, with RB having a value of K = 1.09 and K = 0.89 for KO. This could be contributed to the reduced succession of the AF3N process for both species, causing efforts to be placed into reproductive processes rather than focusing on growth. Figure 17 in Appendix A shows one of the spawn-bound RB individuals found during the sampling. Escalated competition for resources could be another contributing factor, particularly for the Pennask strain of RB, the strain of RB that Peter-Hope has been stocked with relatively consistently for the last 35 years (FIDQ 2024), which is a strain that is constricted to poor growth when competing with other species. A notable observation in Figure 5 was that RB had half the length classes in 2024 compared to previous years, preventing information of body condition for smaller length individuals. This gives reason to believe that the natural recruitment of reproductive RB has reduced from the recent management efforts.

Additionally, both species 'strongest values were linked with the middle length class, with KO having K=1.42 (250-299mm) while RB resulted in K=1.28 (350-399mm), which could result from more successful AF3N processing or the lake being more eutrophic. Given that Fulton's K assumes isometric growth within populations, it is unfit to scrutinize between the two species, or even the different age groups, since b does not equal 3. Due to the size bias associated with the equation, each length interval cohort must be test for isometric growth to use K properly (Blackwell, Brown & Willis 2000).

The changes that occur overtime within length frequency distributions can help comprehend population dynamics, while highlighting areas of concern such as excess mortality, reduced growth rates or absent age classes (Zale et al. 2013). In 2019, both species had a substantial number of their young age class absent (Figure 7 & 8), which could potentially be attributed to a sampling bias. If there is not having a large enough variety of mesh sizes on the gill net to catch smaller age categories, then there would be a direct effect on class structure in the distribution. To try preventing a high degree of bias, various sizes of mesh should be used and the timing of sample collection in critical, avoiding the late spring at Peter Hope Lake when stocks of KO are being added and RB are spawning. Our data was collected in the fall, when KO are spawning so they have allometric growth to develop secondary sexual characteristics such as their kype, hump, colouring, etc., while their body condition is decreasing at the same time. The petite portion of small fork length class found in the RB population is correlated to halt of RB stocks being added to Peter Hope Lake, and the efforts being made to reduce natural reproductive rates within the population.

When assessing populations, the level of maturity is a key condition factor as effects length-weight relationships (RISC 1997) and provides an understanding on the population structure. Consistently high proportions of immature kokanee seen in Figure 9, is relative to the 3500 individuals stocked annually. However, the lack of variation in other levels could insinuate the potential for age mortality, in more developed maturity classes. The findings for KO maturity levels correlates with the stocking genotype (AF3N, correlates with the triploid), however the high level of males present implies that the ability to increase reproductive rates is present meaning that the process of creating all females was not as effective as thought to be. Whereas the RB population was found to have only immature and maturing levels of maturity. The nonexistence of mature, spawning or spent maturity levels in the RB populations could indicate a pattern of age-specific mortality in the population.

The total population tallies are a useful method to display population ratios efficiently. The KO population has been on a consistent incline since 2019, due to factors including but not limited to the annual stocking of 3500 individuals (Table 1) and reduced competition from RB, with their population declining. Another prominent find in the sex ratio data was that nearly 75% of the KO population was male in 2023 and 2024. The population of RB has been on a significant decline since the first sample in 2019 (Figure 12), suggesting that the management efforts to reduce RB expansion have been valuable. The decrease is largely due to the discontinued stocking of RB, following the last population of 6000 yearlings were added in 2020 (Table 1) and the continuous annual stocking of KO. The increasing population of Kokanee (Figure 10) amplifies the competition between species, which is already an existing struggle for Pennask strain of RB to overcome. Further contribution is from the reduced natural reproduction rates from all female triploid (AF3N) stocking, although the number of males present throughout the years is higher than expected, again highlighting uncertainty to the success rate in the AF3N process.

Management Recommendations

The recommendations for fisheries managers on the fishery program at Peter-Hope Lake within the Interior of BC is to switch from stocking AF3N to diploid stocks. This will decrease the costs associated with the constant stocking of KO in the lake, as the population should be able to sustain itself within the eutrophic lake. As the current management efforts have been to reduce the natural recruitment of reproductive RB, the stocking of RB has been halted, and the low success rate of the recent stocks of AF3N KO, the KO are becoming the dominating species within the lake. Data is showing a decline in the RB population within Peter-Hope (proving efforts to be meaningful), it may be within the fisheries managers best interest to switch the lake to a KO fishery. Bag limits for RB can be increased to allow for greater management efforts. Annual creel surveys should be utilized to monitor the success of management efforts, in addition to the continuation of the annual stock assessments performed by Thompson Rivers University students and faculty.

Conclusion

The findings of the 2024 stock assessment at Peter Hope Lake provided insight on the composition of the Rainbow trout (*Oncorhynchus mykiss)* and Kokanee (*Oncorhynchus nerka*) populations dynamics and composition. The length-weight regression and Fulton's K Condition Factor Index suggest moderate condition levels for Kokanee (KO), while the Rainbow Trout (RB) population is continuing to decline. The decreasing RB population was also highlighted in the length frequency histograms and the maturity and sex ratios, further reinforcing the success of fisheries managers efforts!

Management effort in previous years have helped reduce the natural recruitment of reproductive RB by halting further stocking of RB and increasing competition by continuing to stock KO annually. The shift in population structure that is enabling Kokanee to be the dominate species in Peter Hope Lake, indicates that it should continue be the only fishery stocked. To improve the health of the Kokanee, we suggest that diploid Kokanee be stocked rather than all-female triploids, due to the evidently low rate of succession in the AF3N processing; not only would this reduce fishery program costs, but it could also create a more self-sustaining KO population.

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APPENDIX A – FIELD PHOTOS

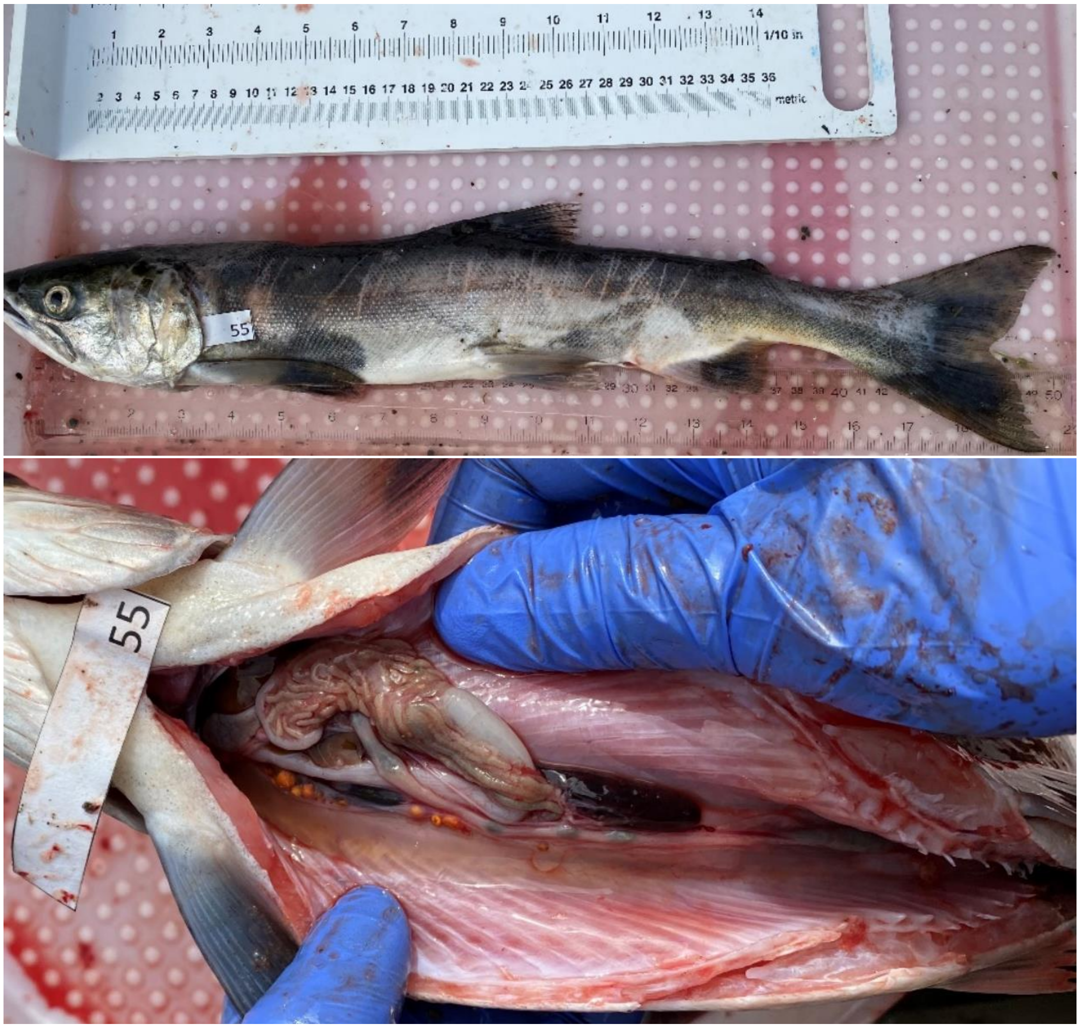

Figure 13 Photo of emaciated female Kokanee (internal and external).

Figure 14 Photo of healthy silver Kokanee (internal and external), sex unknown.

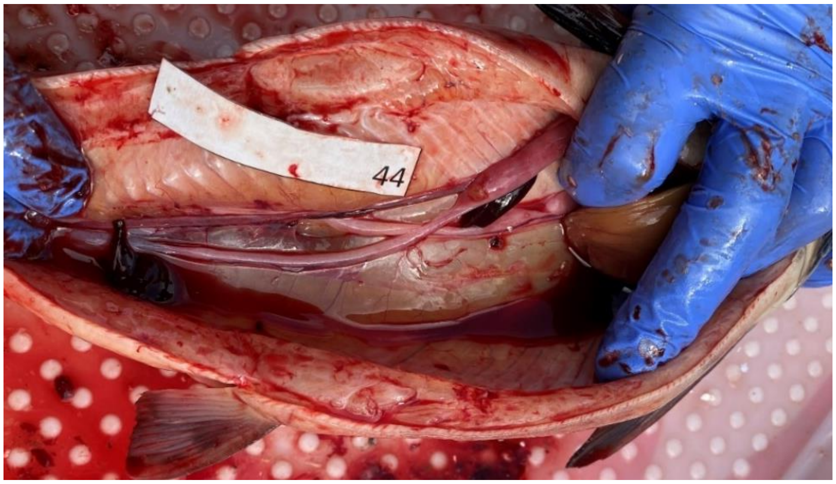

Figure 15 Photo of the infected swim bladder of male Kokanee.

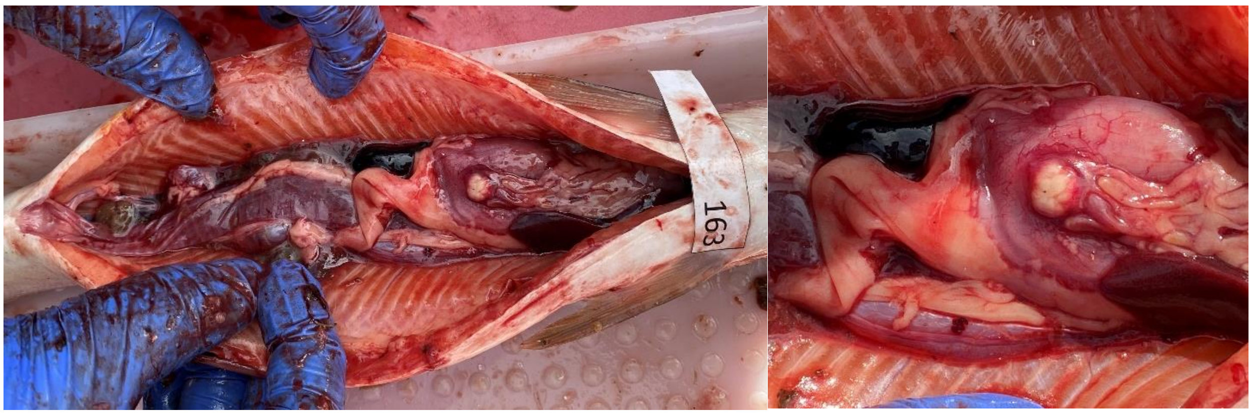

Figure 16 Photo of the cyst found on the stomach of maturing male Rainbow Trout.

Figure 17 Photo of one of the four spawn bound Rainbow Trout.