PROJECT #1009-008-14 GIS # HB-06-138 January 9 2012

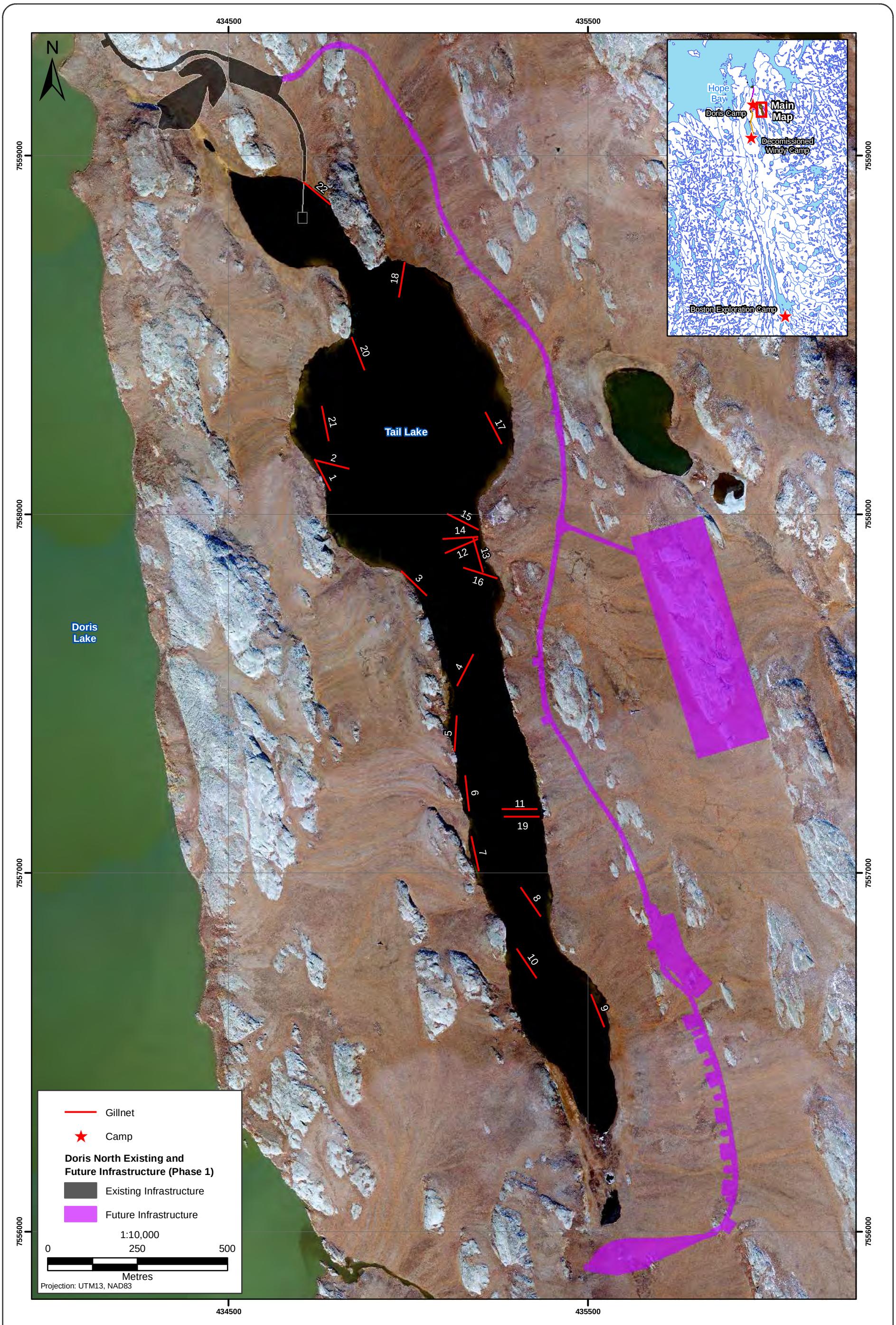

Figure 2.2-2

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Final Removal Phase Gillnet Set Locations, Tail Lake Fish-out, Doris North Project, 2011

Figure 2.2-2

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The remaining nine comparisons (36%) were considered to be valid RPD. They ranged from 0.18 to 15% with a median of 2.1%. None of the RPD exceeded the RPD limits established by ALS (30% for metals). ALS interpreted these results as showing low variability of analyses.

2.2.5 Data Analysis

The variables used to assess the fish community of Tail Lake included: relative species composition and abundance, catch-per-unit-effort (CPUE), mark-recapture population estimates, and removal methods for population estimation. The analysis of biological data for fish species included: length, weight, condition, sex, maturity, reproductive status, age, diet, and concentrations of metals in lake trout muscle tissue. Data analysis and interpretation for these variables followed Guy and Brown (2007). Several of these variables required calculation. A description of the calculations undertaken is presented below.

2.2.5.1 Mark-recapture Lake Trout Population Estimates

Several methods were used to estimate the total number of lake trout in Tail Lake using information collected during both the marking phase and the CPUE/Removal phase.

The Petersen method was used to estimate the initial lake trout population size (Ricker 1975). The equation is:

$$N = [(M + 1)*(C + 1)]/(R + 1)$$

where, N = the initial lake trout population size in Tail Lake at the time of marking, M = the total number of lake trout that were marked by the end of the marking phase, C = the total number of lake trout caught during the CPUE phase, and R = the number of marked lake trout that were recaptured during the CPUE phase. The calculation of 95% confidence limits for the Petersen estimate followed Seber (1982).

To further compare the accuracy of the mark-recapture methods, a Bayesian Maximum Likelihood estimator was also used to estimate the initial lake trout population in Tail Lake. This estimator is described in Gazey and Staley (1986) as:

$$\Pr\left[number\ recaptures = Y \mid N\right] = \frac{\binom{n_1}{Y}\binom{N - n_1}{n_2 - Y}}{\binom{N}{n_2}}$$

where, n_1 = original number of marked individuals, n_2 = size of recapture sample, Y = number of marked individuals in recapture sample and N is the estimated population size solved by maximum likelihood. The calculation of 95% confidence limits for the Bayesian Maximum Likelihood estimate followed Whitlock and Schluter (2009).

2.2.5.2 CPUE and Removal Population Estimates

The CPUE statistic is used as an estimate of relative abundance of fish (Hubert and Fabrizio 2007). A key factor that allows comparison of CPUE data is the standardization (type of net, mesh size, etc.) of sampling devices. As discussed previously, only standard multi-mesh gillnets prescribed under the DFO Fish-out Protocol (Tyson et al. 2011) were used during the CPUE/Removal Phase. Therefore, this gillnet gang is the standard unit, and the only CPUE variable that changed during this phase was the set duration (or effort) for each net. Thus, CPUE is simply shown as:

$$CPUE = number\ of\ fish\ caught\ /\ effort\ (set\ duration,\ h)$$

For the Final Removal phase, CPUE data was recorded and calculated in the field simply to track and illustrate CPUE through the duration of the Fish-out program. Because various gillnet mesh sizes, configuration of mesh sizes, and various gillnet gang sizes were used to capture remaining fish in the Final Removal phase, CPUE was not standardized and therefore not comparable. To avoid confusion and error, CPUE data was not reported for the Final Removal phase.

CPUE data (i.e., gillnet effort and lake trout catch/removed) were also used to estimate the lake trout population throughout the CPUE/Removal phase. The initial fish population size within a water body can be estimated by the sum of sequential catches required to remove all fish from the population. As the population is sequentially sampled and reduced, catch during subsequent sampling is further deduced. The rate at which catch declines provides a measure of the proportion of the initial population that has been removed (Hayes et al. 2007). In general, these methods are collectively called 'removal' or 'depletion' methods. Three commonly used variants of removal methods were used in the present fish-out study, including the Leslie, DeLury (Ricker 1975), and K-Pass (Carle and Strub 1978; Seber 1982; Hayes et al. 2007) methods.

Leslie's method is based on the following equation:

$$Ct/ft = qN0 - qKt$$

where Ct = total catch on day t, ft = total effort on day t, q = catchability (i.e., the fraction of a population taken by one unit of fishing effort), $N0$ = the original population size before removal began, and Kt = the cumulative number of fish caught as of day t. This equation is equivalent to a linear regression of Ct/ft on Kt where the intercept is $qN0$ and the slope is q. Therefore, $N0$ is calculated by dividing the regression intercept by q. The 95% confidence limits of $N0$ were calculated using methods described in Ricker (1975). The Leslie method was analyzed and graphed using SigmaPlot (2011), and also using the FSA and NCStats packages freely available in R.

Delury's method is based on the following equation:

$$Ct/ft = qN0exp(-qEt)$$

where Et = the cumulative fishing effort up to day t. This equation can be linearized by natural logarithms as:

$$ln(Ct/ft) = ln(qN0) - qEt.$$

This method is also equivalent to a linear regression in which the intercept is $ln(qN0)$ and the slope is q. Therefore, $N0$ is calculated by dividing exp(intercept) by q. The 95% confidence limits of $N0$ were estimated using methods described in Ricker (1975). The DeLury method was analyzed and graphed using SigmaPlot (2011), and also using the FSA and NCStats packages freely available in R.

The K-Pass method was a third removal method used to estimate the initial lake trout population size. This method uses a Bayesian maximum likelihood approach and is described in detail in Carle and Strub (1978), Seber (1982), and Hayes et al. (2007). The K-Pass method was also implemented using the FSA and NCStats packages freely available in R.

2.2.5.3 Catch Curve Analysis and Population Estimate

One method of estimating year-class strength of fish not fully recruited into the gillnet gear (and not captured) is to construct a linearized catch curve (Ricker 1975). This was done by plotting the ln-frequency

of fish against age. Because only a sample of the fish captured was aged, the von Bertalanffy equation used to estimate age of the remaining catch from length data.

Plotting (ln)frequency against age generally produces a dome-shaped plot in which frequency increases to a maximum point and thereafter decreases. The maximum frequency occurs at the age when fish become fully recruited into the gillnet gear. Fish younger than this age are often too small or too cryptic to be captured by the gear in use, or they may inhabit a different area (i.e., a nursery habitat).

A linear regression model was fitted to the plot of (ln)frequency vs. age.

$$ln(frequency) = a - b(age)$$

ln(frequency) is the number of lake trout, *a* is a coefficient, *b* is the slope of the regression (or mortality rate, Z), and age is in years.

The slope of the decrease in frequency after the age of full vulnerability provided an estimate of mortality (Z). Age classes not containing fish were excluded from the regression model. The number of fish in each age class prior to the age of full vulnerability to the gear was estimated by extending the regression to the y-axis. These numbers were then added to the number of fish in the fully exploited age classes to arrive at an estimate of the total lake trout population.

2.2.5.4 Biological Data Analysis

Condition and weight-length regressions are indicators of the relative health of fish within a lake. Condition factor was based on the following formula from Ricker (1975):

$$Condition = weight\ (g) \times 10^5 / length^3\ (mm)$$

Weight was multiplied by 10^5 to avoid fractional values, and a weight-length exponent of exactly 3 was assumed to apply to all species of fish.

Weight-length relationship (Pope and Kruse 2007) was calculated for sampled lake trout. Logarithmic transformations were performed on the data prior to conducting the regression.

$$ln(weight) = ln(a) + b[ln(length)]$$

Weight is in grams, *a* is a coefficient, *b* is the slope of the regression, and length is in mm.

Length-age relationships were described with the von Bertalanffy growth model (Isley and Grabowski 2007):

$$L_t = L_\infty(1 - exp\ (-K(t - t_0)))$$

where, L_t = length at age (mm), L_∞ = asymptotic length (mm) (i.e., length at infinite age), K = growth rate (year^{-1}) and t_0 = age (years) at L = 0 mm.

Gonadosomatic Index (GSI) was calculated for sexually mature lake trout as:

$$GSI = (gonad\ weight\ [g, ww] / total\ body\ weight\ [g, ww]) \times 100$$

Hepatosomatic Index (HSI) was calculated for fully biologically sampled lake trout as:

$$HSI = (liver\ weight\ [g, ww] / total\ body\ weight\ [g, ww]) \times 100$$

Length at 50% maturity (or L50) was calculated for female and male lake trout by fitting a three-parameter logistic curve to plots of the proportion mature vs. fork length. The logistic model used to estimate 50% maturity was:

$$y = a/(1+abs(fork\ length/x_0)^b)$$

where, *y* is the proportion mature, *a* is a coefficient, *b* is the slope of the logistic curve, and x_0 is the fork length (mm) at 50% mature.

For muscle tissue metals, metals in which 90% of the all concentrations were below the MDL were excluded from analyses. For the included metals, all values below the MDL were assigned values of one-half the MDL in order to use those values in statistical analyses. Mean metal concentrations—with standard error (SE), minimum and maximum—were calculated from that dataset for lake trout muscle tissues sampled from Tail Lake. Mercury concentrations were ln-transformed to normalize their frequency distributions—a pre-requisite of parametric statistics. The ln-transformed mercury concentrations were then compared to the Health Canada guideline for mercury in fish muscle tissue.

All statistics were conducted according to Zar (1984) using R (R Development Core Team 2011). Graphing and figure development was conducted using SigmaPlot (2011) software. All linear regressions were reported with the appropriate sample size (n), coefficient of determination (r^2, the fraction of variation in the independent parameter that was explained by the dependent parameter) and P value. Only n and r^2 were reported for non-linear regressions. All r^2 for linear or non-linear regressions were not adjusted for the degrees of freedom of the regression.

2.3 AQUATIC BIOLOGY AND LIMNOLOGY

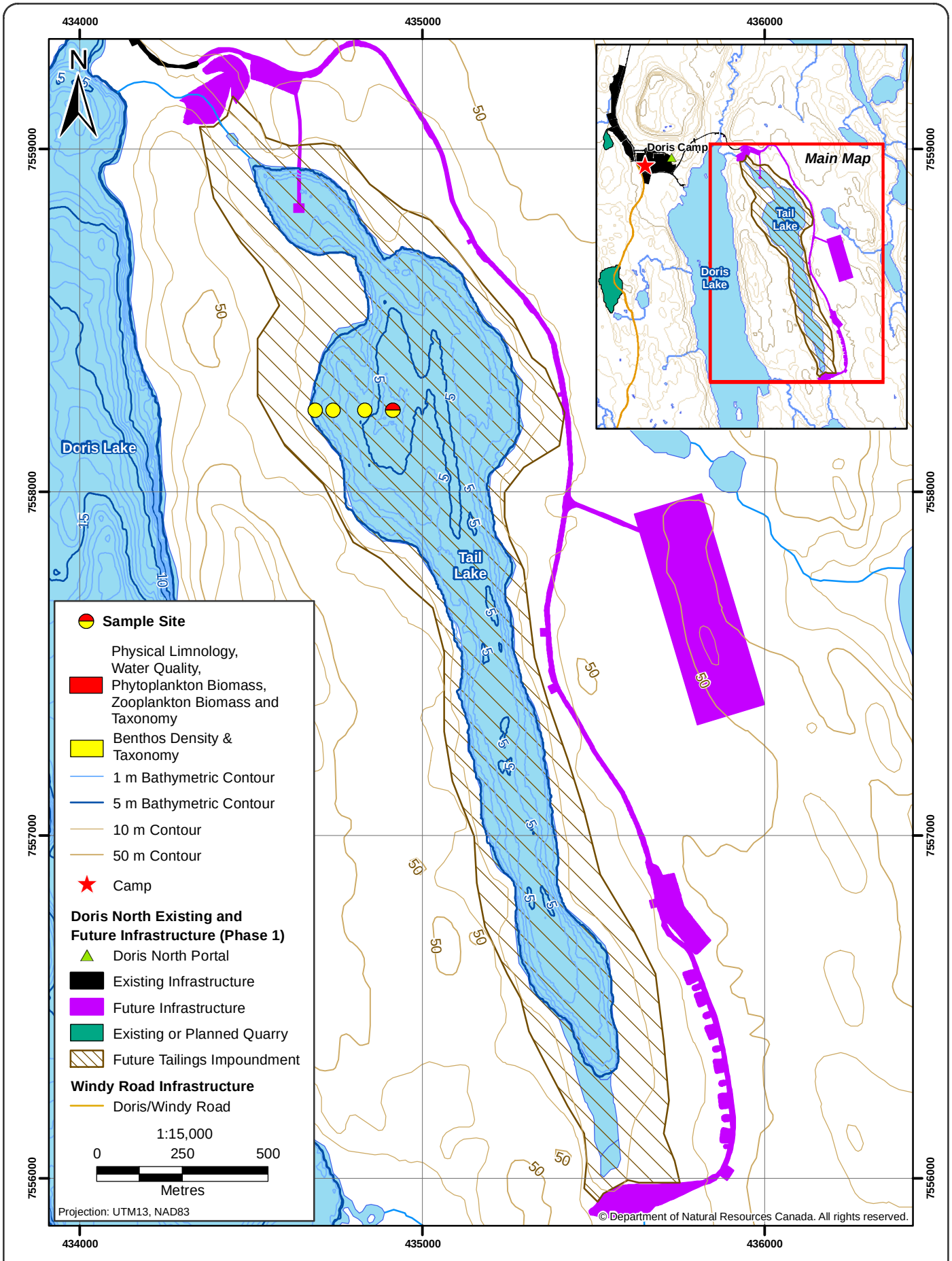
2.3.1 Outline

Methods used to characterize the biological and limnological characteristics of fish habitat in Tail Lake were guided by the General Fish-Out Protocol for Lakes and Impoundments in the Northwest Territories and Nunavut (Tyson et al. 2011). The dataset includes physical limnological characteristics, water quality, and lower trophic level biological characteristics; all of which were collected to identify the abiotic and biotic characteristics of Tail Lake and the fish community environment. Bathymetry, substrate characteristics and substrate quality were previously described in Golder (2007) and Rescan (2001). The data collected and the methods used will be incorporated into the Fisheries and Oceans Canada (DFO) master database of biotic and abiotic characteristics of Arctic lakes. In the future, this database may be used to determine linkages between biotic and abiotic characteristics of northern lakes and associated fish assemblages.

2.3.2 Sampling Design

In 1995 a permanent survey station was established in the deepest portion of Tail Lake near the north end of the lake (Golder 2007) (Figure 2.3-1). In 2011, the collection of physical limnology measurements, water quality, chlorophyll *a*, and zooplankton samples occurred at this permanent survey station during the months of July, August and September (Table 2.3-1). Benthic invertebrate samples were collected once, in August, from four different depth intervals (Figure 2.3-1).

The July and August collections of physical limnology, water quality and aquatic biology samples from Tail Lake coincided with the initial sampling of Lake Trout for the purpose of estimating population size. The September collection of aquatics data occurred during the final stages of the Tail Lake fish-out field work. Upon each visit, field sheets were used to record the surface water temperature, air temperature, cloud cover and wind direction along with each sample collected.



Tail Lake Aquatic Sampling Sites, Tail Lake Fish-out, Doris North Project, 2011

Figure 2.3-1

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Table 2.3-1. Physical Limnology, Water Quality and Aquatic Biology Sampling, Tail Lake Fish -out, Doris North Project, 2011

Sampling Date	Physical Limnology				Water Quality	Aquatic Biology				
						Phytoplankton	Zooplankton		Benthos	
	Depth	Temperature	Secchi Depth	Euphotic Depth		Chlorophyll *a*	Biomass	Taxonomy	Biomass	Taxonomy
24-Jul-11	x	x	x	x	x	x	x	x		
18-Aug-11	x	x	x	x	x	x	x	x	x	x
17-Sep-11	x	x	x	x	x	x	x	x		

2.3.3 Physical Limnology

The physical limnology measurements taken at the permanent survey station in Tail Lake included vertical profiles of depth, temperature, dissolved oxygen concentration and percent saturation, and Secchi depth.

2.3.4 Water Column Structure and Dissolved Oxygen

During each survey, vertical profiles of depth, temperature (ºC), dissolved oxygen concentration (mg/L) and percent saturation were collected at 0.5 m increments from the water surface to a depth of 0.5 m above the lake bottom using a YSI Model 550A electronic meter equipped with a 25 m cable marked off in 0.5 m lengths. Before conducting a profile, the probe was calibrated according to manufacturer's instructions. The probe membrane was inspected for air bubbles. If air bubbles were present, the membrane was replaced.

Profiles of temperature, dissolved oxygen concentration and percent saturation are presented and discussed in the results section. The raw data are tabulated in Appendix 3.2-1.

2.3.5 Light

Water transparency was measured using a standard 20 cm diameter black and white Secchi disk. The weighted Secchi disk was lowered over the shaded side of the boat using a metered line until it was no longer visible. It was then raised until it became visible and the depth was recorded to the nearest 0.1 m.

Secchi depth was used to estimate the depth of the euphotic zone, which is defined as the depth at which light intensity is 1.0% of surface light intensity ($Z_{1\%}$, measured in meters). It represents the depth at which the integrated gross water column photosynthetic production is the equivalent of the integrated gross water column respiration. Thus, there is net primary production above this depth, and, by contrast, a net loss of organic material below this depth. The lower boundary of the euphotic zone is often referred to as the compensation depth. The first step in obtaining the depth of the euphotic zone is to calculate the extinction coefficient (k', m^{-1}):

$$k' = \frac{1.7}{Ds}$$

where *Ds* = Secchi depth (m) and 1.7 is a constant (Wetzel 2001). After obtaining the extinction coefficient, we can calculate the depth of the euphotic zone, $Z_{1\%}$, as:

$$Z_{1\%} = \frac{4.6}{K'}$$

where 4.6 is a constant derived from Beer's Law.

2.4 WATER QUALITY

Water quality samples were collected at the permanent sampling station three times in 2011: July, August, and September. Triplicate samples were collected from a depth of 1 m below the water surface and 5 m below the water surface (approximately 1 m above the sediment surface) for a total of 6 samples at each sampling date.

Samples were collected using a Teflon-lined 2.5 L GO-FLO bottle using metal-clean techniques. The GO-FLO bottle was acid-cleaned by ALS Environmental prior to our use. All water samples were collected with the scientist wearing nitrile gloves. Prior to collecting a sample, the GO-FLO was submerged for one minute to properly cleanse the GO-FLO before sampling. The GO-FLO was opened

and lowered on a metered line to the desired depth and then closed by a Teflon-covered brass messenger. After retrieval of the GO-FLO bottle, water was transferred to labelled sample bottles provided by ALS Environmental. Prior to filing, the bottles were triple rinsed with sample water from the GO-FLO bottle. Samples were preserved as required, kept cold, and sent to ALS Environmental for analysis on the first available flight.

At the time of sample collection, the following preservatives were added to sample containers: ultra-pure nitric acid was added to total metals, hydrochloric acid to total organic carbon (TOC), and sulphuric acid to total Kjeldahl nitrogen (TKN). Dissolved metal samples were filtered under trace-metal clean conditions at the laboratory to avoid contamination associated with field filtration and to achieve the lowest possible detection limits. Water samples were analyzed using standard methods (MOE 2003).

Lake water samples were analyzed for general physical parameters, nutrients, total organic carbon (TOC), and total and dissolved metals at the lowest possible detection limit. Table 2.4.1 lists the parameters measured and the realized detection limits. The list includes many of the parameters recommended by DFO (Tyson et al. 2011), including: total phosphorus (as well as the metal total phosphorus), total nitrogen (the sum of total Kjeldahl nitrogen, nitrite and nitrate), total dissolved solids, dissolved nutrients (ammonia, nitrate, nitrite, ortho-phosphate and silica).

All raw water quality results and realised detection limits are presented in Appendix 3.3-1. Method detection limits were the lowest achievable by the lab, and lower than, or equal to, the Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of aquatic life (CCME 2011). The realized detection limits could have been higher than the theoretical minimum for some samples. This occurred when dilution of a sample was required to compensate for high concentrations of other, interfering parameters. All realised detection limit ranges are indicated on graphs.

2.4.1 Guidelines

All water quality parameters that have Canadian Council of Minister of the Environment (CCME) water quality guidelines for the protection of freshwater aquatic life were graphed, unless values were consistently below analytical detection limits. For analysis and graphing purposes, any values below the analytical detection limits were replaced with half of the realized sample detection limit. The water quality data are presented for shallow and deep depths separately to enable their comparison.

2.4.2 Quality Assurance/Quality Control

To determine sources of potential contamination during water quality sampling, a separate set of bottles for travel, field, and equipment blanks were included as part of the field quality assurance / quality control (QA/QC) program. The travel blank bottles were filled with double deionized water (DDW) in the lab and remained closed throughout the field trip. This allowed assessment of contamination associated with sample transit and lab procedures. The field blank bottles were also filled with DDW, but were opened in the field for 30 seconds, and preserved as required for respective analyses. This allowed assessment of contamination associated with field sampling, which includes airborne contamination, contamination of the lid/bottle, and contamination during preservation.

The equipment blank allows the assessment of any potential contamination due to transport or the presence of residual acid in bottles resulting from insufficient rinsing. Equipment blanks were prepared at Tail Lake prior to sampling according to the following protocol. First, the acid-cleaned, GO-FLO bottle was rinsed three times with double deionized water (DDW) supplied by ALS Environmental. The GO-FLOW was filled a fourth time and, after allowing the water to sit for a few minutes (as would occur with a real sample), sub-samples were drawn into sample bottles. Equipment blanks were preserved and handled using the same methods applied to regular samples.

Table 2.4-1. Water Quality Parameters and Realized Method Detection Limits, Tail Lake Fish-out, Doris North Project, 2011

Parameters	Detection Limits (mg/L)	Parameters	Detection Limits (mg/L)
Physical Tests		**Total and Dissolved Metals *(continued)***	
Colour, True (CU)	5.0	Arsenic (As)	0.000030
Conductivity (uS/cm)	2.0	Barium (Ba)	0.000050
Hardness (as $CaCO_3$)	0.50	Beryllium (Be)	0.00020
pH (pH units)	0.10	Bismuth (Bi)	0.00050
Acidity (as $CaCO_3$)	1.0	Boron (B)	0.0050
Alkalinity, Total (as $CaCO_3$)	2.0	Cadmium (Cd)	0.000010
ORP (Oxidation Reduction Potential)	-1000	Calcium (Ca)	0.020
Total Suspended Solids	1.0	Chromium (Cr)	0.00010
Total Dissolved Solids	10	Cobalt (Co)	0.00010
Turbidity (NTU)	0.10	Copper (Cu)	0.00050
Anions		Iron (Fe)	0.010
Bromide (Br)	0.10	Lead (Pb)	0.000050
Chloride (Cl)	0.50	Lithium (Li)	0.0050
Fluoride (F)	0.020	Magnesium (Mg)	0.0050
Nutrients		Manganese (Mn)	0.000050
Ammonia (as N)	0.0050	Mercury (Hg)	0.00050
Nitrate (as N)	0.0050	Molybdenum (Mo)	0.000050
Nitrite (as N)	0.0010	Nickel (Ni)	0.00010
Total Kjeldahl Nitrogen	0.050	Phosphorus (P)	0.30
Total Nitrogen	0.050	Potassium (K)	0.050
Orthophosphate - Dissolved (as P)	0.0010	Selenium (Se)	0.00010
Total Phosphorus (P)	0.0020	Silicon (Si)	0.050
Silicate (as SiO_2)	1.0	Silver (Ag)	0.000010
Sulphate (SO_4)	0.50	Sodium (Na)	0.010
Cyanides		Strontium (Sr)	0.00010
Cyanide, Weak Acid Dissociable	0.0010	Thallium (Tl)	0.000050
Cyanide, Total	0.001 - 0.0011	Tin (Sn)	0.00010
Organic / Inorganic Carbon		Titanium (Ti)	0.010
Total Organic Carbon	0.50	Uranium (U)	0.000010
Total and Dissolved Metals		Vanadium (V)	0.000050
Aluminum (Al)	0.0030	Zinc (Zn)	0.0030
Antimony (Sb)	0.000050		

Realized detection limits may differ from method detection limits.

All QA/QC data for field, travel, and equipment blanks are reported in Appendix 3.3-1. The frequency of detecting a concentration, for each water quality variable, greater than the analytical detection limit was noted for travel, field, and equipment blanks, indicating possible contamination. During the 2011 open-water season, water quality samples were collected for multiple studies as part of the Hope bay Belt Project. Travel, field, and equipment blanks were collected once per sampling event. As a

result, the blank samples had a slightly different sampling date and were analyzed with a slightly different parameter list (Appendix 3.3-1).

Also as part of the QA/QC program, the variability of water quality parameter measurements was determined (the relative percent difference). The relative percent difference (RPD) was determined for one of the triplicate sets of water quality samples from one randomly selected date (comprising 16.7% of samples). RPD was calculated for each water quality variable as:

$$RPD = 100 * \frac{|Xi - Xj|}{\overline{Xij}}$$

where X_i and X_j refer to the minimum and maximum values of a particular water quality variable and $\overline{X}$ is their average. For RPD to be considered accurate, water quality values need to be at least five times the minimum detection limit. RPD values of ± 20% indicate substantial variability among samples and may point to contamination or the possibility that the sample may not represent true water quality values (BCMWLAP 2003).

2.5 AQUATIC BIOLOGY

2.5.1 Phytoplankton

Samples of chlorophyll *a* as an index of primary productivity were collected at the permanent sampling station along with the physical limnology and water quality samples. Three chlorophyll *a* samples were collected in July, August, and September 2011 for a total of nine samples. Water samples were collected at a depth of 1 m using an acid-cleaned, Teflon-lined 2.5 L GO-FLO bottle. Once the bottle was retrieved, water was transferred to labelled 1 L bottles wrapped in duct tape to prevent exposure to light. Samples were kept in a cool, dark place until filtered.

At the Doris North Camp, water samples were filtered through 0.45 µm nitrocellulose filters using a portable filter apparatus and hand-pump. Water was filtered until a brown or green colour was visible on the filter. The total volume of water filtered was noted for each sample and ranged from 450 to 525 mL. The filter was then folded in half, wrapped in aluminum foil, and labelled. All samples were immediately frozen and remained frozen until analysis by ALS Environmental.

Chlorophyll *a* samples were analyzed using standard methods with a detection limit of 0.0006 µg and a realized detection limit of 0.01 µg (MOE 2003). Results are expressed as µg and concentrations (µg/L) were calculated based on total volume of water filtered.

2.5.2 Zooplankton

2.5.2.1 Methodology

Zooplankton play an essential role in food web dynamics and the transfer of energy in lake ecosystems. They inhabit the water column, feed mainly on phytoplankton, detritus, and other zooplankton and provide an important food resource for fish. At Tail Lake, zooplankton samples were collected at the survey station during each of the July, August and September open water sampling events. For each of the three events, six zooplankton samples were collected for a total of 18 samples.

Sampling was accomplished by vertical tows, from the bottom to the top of the water column, using a 30 cm diameter net with 118 µm mesh. A flow-meter was installed in the mouth of the net to record the volume of water filtered by each vertical tow. The first set of three samples was preserved in 10%

buffered formalin for measurement of zooplankton biomass. In the analytical laboratory, the samples were dried in an oven for 24 hours at a temperature of 60 ºC and then placed in a desiccator before being weighed. The second set of triplicate samples was preserved in 10% buffered formalin and submitted to the taxonomist Nell Postans, MSc, RPBio., for taxonomic identification and enumeration. These data were used to determine zooplankton community composition and density.

2.5.3 Benthic Macroinvertebrates (Benthos)

2.5.3.1 Methodology

The benthic macroinvertebrate community includes grazers, detritivores, filter-feeders and predators and are an important component of fish diets. As such, benthic invertebrates form an important link in aquatic food webs and in the transfer of energy in aquatic systems. To determine the benthic community composition and density, benthic invertebrates were sampled once during the August 17, 2011 sampling trip. Five replicate Ekman dredge samples were collected at four depth intervals, for a total of 20 samples. The four depth intervals were: 0—2 m; 2—4 m; 4—6 m; and 6—8 m (between 6 m and maximum lake depth). Each sample was taken using the following procedure. First, the Ekman was opened and lowered to the sediments using a metered line. The depth of the water column was recorded, and the Ekman triggered to close using a brass messenger. The Ekman was then carefully raised to the surface and inspected to ensure a complete benthic sample was obtained. The sample was next placed in a 500 µm sieve bucket and gently agitated to remove the fine sediments through the sieve. The filtered sample was transferred to a labelled 500 mL plastic jar and formalin was added to a final concentration of 10%. All benthos samples were stored in coolers for further processing.

All 20 samples were shipped to Jack Zloty Ltd. of Summerland, BC, for taxonomic identification and enumeration. There, the formalin was decanted and each sample was rinsed in water to remove the preservative. Each sample was then passed through a series of three sieves (1 mm, 500 µm and 180 µm mesh sizes) to make sorting easier. The organisms were separated from the substrate, enumerated and identified. When there was a large number of one or two particular species and/or a lot of material in the sample, then sub-sampling was performed by one of two methods. In large samples with lots of substrate, the sample was weighed on a Denver TL-603D electronic balance and the fraction analyzed (1/5 or 1/10) was measured by weight. This method has been tested for many years and yields accurate extrapolations (Sebastien, Rosenberg and Wiens 1988). When there were a large number of organisms but not much debris, then the sample was sieved as above, each aliquot was made up to 100 mL and a Hensen Stempel pipette was used to remove 10 mL once (1/10 subsample) or twice (1/5 subsample).

In as many cases as possible, the entire sample was examined for rare organisms. In some cases, only the coarse fraction was examined in its entirety, due to the large amount of dense debris. Replicate samples ensured that the rare organisms missed in heavily sub-sampled cases were encountered in another replicate. All organisms were identified to species level whenever possible using a dissecting microscope.

Sorted samples were stored in 70% isopropyl alcohol with a waterproof paper label inside stating project, location, date, and sample number. As each new organism was found, it was added to a reference or voucher collection vial containing 70% alcohol and a few drops of glycerine to prevent dehydration. Each vial was labelled with the name of the organism and a number was assigned.

The number of organisms was converted to density (organisms/m^2) using the surface area of the Ekman grab sampler (0.0225 m^2).

2.5.3.2 QA/QC

Ten percent of the benthic invertebrate samples (totalling two) were re-sorted to determine sorting efficiency. This was accomplished by counting the number of additional invertebrates found in the re-sort (i.e., the number found in re-sort, but not found in the original sample) and then comparing this to the sum of all invertebrates found in the original and re-sorted samples using the formula:

$$\% \text{ sorting efficiency} = [1-(R_N / N)] * 100$$

where R_N is the absolute value of the difference between the number of invertebrates found in re-sorted and original samples and N is the total number of invertebrates found in all samples combined. For clarification, the total number of invertebrates found is the sum of the number of invertebrates found in the original sample and any additional invertebrates found in the re-sorted sample.

2.6 PHYSICAL HABITAT INVENTORY

Bathymetry and substrate characteristics of Tail Lake are described in Rescan (2001) and Golder (2007). Additional littoral habitat data were collected in 2011. A littoral habitat survey was conducted by slowly boating along the shoreline and delineating habitat units based on the substrate composition of the littoral zone. Substrate composition was recorded as a percent coverage (e.g., 70% cobble and 30% boulder) within delineated zones. Habitat types were classified as bedrock, boulder, cobble, gravel, sand, silt and organic material. Emergent and submergent vegetation were noted and recorded on a field map. Photographs were taken to illustrate various habitat types. A GIS map of substrates, cover, and bathymetry were produced. This information supplements the substrate quality data collected from previous studies. Where possible, inferences and observation relating fish abundance with fish habitat were given.

2.7 MODELS OF LAKE FISH BIOMASS AND PRODUCTION

The final objective of the fish-out program was to compare the total biomass of lake trout captured from Tail Lake in 2011 with the predictions of regression models published in the scientific literature (e.g., Hanson and Leggett 1982). This exercise tested the usefulness of these models for fish populations in oligotrophic Arctic lakes. Although not a stated objective of the DFO fish-out protocol, this analysis is a logical extension of DFO's goal of characterizing the links between fish populations and their aquatic environment. This analysis was also conducted as part of the fish-out for the Meadowbank Gold Project (Azimuth 2009).

Fish biomass (B, kg/ha), also called standing crop, is defined as the total wet weight of a population of fish divided by the surface area of the lake in which they reside. Lake fish biomass models predict lake fish population biomass from environmental variables such as water depth, water temperature, nutrient concentrations, primary production (e.g., chlorophyll *a* concentrations) and secondary production (e.g., macrobenthos biomass).

Models that predict fish yield (Y, kg/ha/year) from environmental variables can also be used to predict fish biomass if one assumes that sustainable yield is directly proportional to biomass (e.g., Ryder 1965; Oglesby 1977; Downing et al. 1990). Yield is defined as the total biomass extracted each year from a lake fish population by all fisheries combined (e.g., commercial, recreational or subsistence). The models that predict yield assume that yield is sustainable; otherwise it would not be a useful indicator of biomass. Based on a comparison of measured production with sustained fishing yields, Downing et al. (1990) suggested that sustainable yield is approximately 10% of biomass. This means that biomass is approximately 100 times the predicted sustainable yield.

A second, related objective was to calculate the production of lake trout in Tail Lake from the measured biomass and predictive models of production that use environmental variables and lake fish population characteristics such as biomass and maximum body weight (e.g., Downing and Plante 1993, Randall and Minns 2000). This analysis was also conducted as part of the fish-out for the Meadowbank Gold Project (Azimuth 2009). This analysis will test the usefulness of those models for fish populations in oligotrophic Arctic lakes.

3. Results

3. Results and Discussion

3.1 FISH COMMUNITY AND HABITAT

3.1.1 Number and Fate of Lake Trout

In total 1,490 lake trout were captured and removed using gillnets. Only 15 ninespine stickleback were captured and removed during the fish-out gillnetting program. No additional effort was expended to capture and remove ninespine stickleback from Tail Lake. Where possible, all lake trout deemed suitable for human or dog consumption were cleaned, placed in ice-filled coolers and flown out of Doris Camp to the Cambridge Bay food bank for distribution. Although the exact number of cleaned lake trout or the weight of cleaned lake trout were not recorded, an estimate of the number and weight of lake trout provided for consumption can be deduced. Lake trout were deemed unfit for consumption if fish showed signs of decay, very poor condition, or deformities. Based upon the total number of lake trout removed during the entire fish-out program (1,490), approximately 1,120 (or 75%) lake trout were cleaned and prepared for consumption. Hoffman et al. (1999) reported lake trout carcass weight (i.e., cleaned weight) represents 85% of the total lake trout body weight. The mean total weight for lake trout removed during the fish–out program was 1,443 g (or 1.443 kg). If the 85% carcass weight from Hoffman et al. (1999) is applied to the mean lake trout total weight, the cleaned lake trout weight was 1.23 kg (1.443 x 0.85). As stated, approximately 75% of 1,490 (or 1,118) lake trout were deemed suitable for consumption. Therefore, approximately 1,371 kg (1,118 x 0.85) of cleaned lake trout were provided to local Inuit communities.

3.1.1.1 Distribution of Lake Trout to Local Communities

Upon receipt of the first shipment of frozen lake trout from Tail Lake in Cambridge Bay, HBML staff assembled five Elders from the Kitikmeot Heritage Society (KHS) Board of Directors and two Directors of the Ekaluktutiak Hunters and Trappers Association (EHTO) to evaluate the suitability of the fish for human consumption. The frozen fish were laid out in front of the group in the Cambridge Bay Expediting Building. The group first discussed the condition of the fish and then segregated the fish into two piles based on consensus; one pile evaluated as being good for people and the other pile of those thought only fit for dog food. The subjective criteria described and used included:

1. relative size of the head compared to the body of the fish;
2. relative thickness of the tail muscle immediately dorsal to the caudal fin compared to overall length; and
3. relative amount of fatty tissue along the belly and evident in the body cavity.

The Elders and EHTO members instructed HBML staff to segregate the fish in this manner throughout the fish-out operation and stated that this should be acceptable to the community. As fish were received in Cambridge Bay though out the fish-out operation, the fish were segregated exactly in this manner.

The KHS also expressed the desire to use some Tail Lake fish as part of a project to train local youth on how to produce traditional fish skin bags or pouches. However, none of the Tail Lake fish were of sufficient length for this purpose.

Based on this method, approximately 50% of shipped fish were delivered to the Cambridge Bay Food Bank operated by the Hamlet of Cambridge Bay, and were distributed immediately to recipients on a first come-first served basis. The remaining 50% of shipped fish were deemed only suitable for dogs and were stored at the Cambridge Bay Expediting Building. Over the course of fall and winter 2011/12 these fish were offered via local radio and poster to local dog owners for their use, and distributed based on request. The last of these fish were distributed in March 2012.

The length of time required to distribute fish as dog food was influenced by an influx of narwhal meat into the community August and September 2011, and the continual availability of Arctic Char and Muskox scraps from the Kitikmeot Foods Ltd. country food plant in Cambridge Bay. As winter progressed, less and less fish were requested by dog owners as the fat content of the lake trout was deemed insufficient to meet the nutritional needs of dogs in cold weather conditions.

Unused Styrofoam boxes surplus to the fish-out project were provided to the EHTO for use in their outfitting business.

No recipient expressed concern over the quantity or quality of the fish being provided.

3.1.2 Fish Community

Biological data for fish sampled from Tail Lake during all fish-out phases (i.e., mark-recapture, CPUE/Removal, and Final Removal) are presented in Appendix 3.1-1. The fish assemblage of Tail Lake was extremely simple and included only two species: lake trout (Plate 3.1-1) and ninespine stickleback (Plate 3.1-2). Numerous previous fish community studies were conducted at Tail Lake prior to the fish-out (e.g., RL&L/Golder 2003; Golder 2007). These studies also found that only lake trout and ninespine stickleback were historically present in Tail Lake.

Plate 3.1-1. A marked and recaptured lake trout from Tail Lake.

Plate 3.1-2. Ninespine stickleback captured from Tail Lake.

3.1.3 Mark-recapture Population Estimates

Although a mark-recapture study is optional according to the fish-out protocol, Tail Lake provided the ideal conditions for such a study. Hayes et al. (2007) lists the assumptions in mark-recapture studies to include: 1) that the population is geographically closed, with no immigration or emigration, 2) the population is demographically closed, with no births or deaths, 3) no marks (tags) are lost or missed, 4) marking does not change fish behaviour or vulnerability to capture, 5) marked fish mix at random with unmarked fish in the population; and 6) all fish have an equal probability of capture that does not change over time.

Tail Lake is an entirely self-enclosed water body, with no inflows from connecting water bodies and the outflow was dammed prior to the initiation of the mark-recapture, CPUE/Removal, and Final Removal phases. Therefore, the lake trout population was closed to immigration or emigration. Since the marking phase, CPUE/Removal, and Final Removal phases took place within a short time period (i.e., within the same year), the population was also considered demographically closed. Lake trout are the only large-bodied fish species in Tail Lake, and therefore were the only species required for marking and population estimation. Of the marked and recaptured lake trout, no tags were lost or missed from the recaptured group. Several tags were removed from lake trout due to net entanglement or handling; however, the tags associated with these fish were able to be confirmed through the presence of an adipose clip and tag wound. Assumptions 3) and 4) listed previously, are considered reasonable assumptions that are not supported by direct evidence from the present study. At the time of field studies for the marking and CPUE/Removal phases, assumption 6) was considered to true. However, subsequent analysis of the mark-recapture and biological data collected from the lake trout population showed clear evidence that not all lake trout had an equal probability of capture due to size selectivity of gillnets. Such size selectivity injected a sampling bias for larger, adult lake trout and resulted in an underrepresentation of small, young lake trout, and hence an underestimation of the initial lake trout population number generate by mark-recapture methods. Gillnet size selectivity and its role in biasing lake trout biological data are further discussed in the present section and Section 3.1.5.

The capture and marking of lake trout was conducted from July 13 to 18, 2011. During this period, 405 lake trout were captured by angling and small mesh (25 and 38 mm stretched mesh) gillnets set for short duration (i.e., one hour). The vast majority of these lake trout were captured by angling. Of the 405 lake trout, 29 showed signs of bleeding or signs of post-capture trauma (i.e., inability to recovery from exhaustive exercise, net entanglement). Lake trout exhibiting these signs were not tagged, released (if possible), and not included in the mark-recapture study. Therefore, a total of 376 lake trout were tagged and released in the marking phase and used for the study (Table 3.1-1).

Table 3.1-1. Summary of Lake Trout Mark-Recapture Results, Tail Lake Fish-out, Doris North Project, 2011

No. of Marked LKTR	No. of Recapture Mortalities	No. of LKTR New Mortalities	Population Estimates and 95% CIs					
			Petersen	Lower CI	Upper CI	Bayesian	Lower CI	Upper CI
376	280	1,133	1,521	1,443	1,599	1,521	1,450	1,607

Notes:
LKTR = lake trout
CI = 95% confidence limit
No. of LKTR Recapture Mortalities' and 'No. of LKTR New Mortalities' are derived from the conclusion of the CPUE/Removal Phase

The beginning of the CPUE/Removal phase initiated the recapture and removal of tagged and untagged lake trout from Tail Lake. The number of untagged (new mortalities) and tagged (recapture mortalities) were applied to both the Petersen and Bayesian Maximum Likelihood methods to estimate the initial lake trout population number. Both methods were used to track the population estimate throughout the CPUE/Removal phase (Figure 3.1-1). These mark-recapture methods produced nearly identical population estimates and similar confidence intervals throughout the CPUE/Removal phase. The final population estimate for both methods was 1,521 lake trout at the conclusion of the CPUE/Removal phase (Table 3.1-1). The 95% CI for the Petersen estimate was 1,443 (lower CI) and 1,599 (upper CI), while the 95% CI for the Bayesian Maximum Likelihood estimate was 1,450 (lower CI) and 1,607 (upper CI). These results confirm that when reasonable numbers of fish are marked and recaptured, the various methods for mark-recapture population estimation (i.e., Petersen and Bayesian Maximum Likelihood estimates in this case) tend to yield similar results (Hayes et al. 2007).

Although both the Petersen and Bayesian Maximum Likelihood methods produced identical lake trout population estimates with precise 95% confidence limits, they are underestimates of the true initial lake trout population. These population estimates only apply to the larger, adult lake trout population and not the total number of lake trout in the population. The smallest and youngest lake trout in the population were not captured, marked, or removed with the fishing gear (e.g., angling and gillnets) used in the fish-out program.

Recent studies have found that gillnets are selective for the larger, more catchable individuals within a given population (e.g., Finstad et al. 2000). To determine the length and age of lake trout for which the population estimates were valid, catch curve analysis was conducted (see Figure 3.1-11). Because the catch curve analysis relies upon lake trout aging data, catch curve data (e.g., mortality) are reported in Section 3.1.6. Based upon von Bertalanffy length-at-age data, the catch curve shows that lake trout were fully recruited into the gillnet gear at approximately age 15 or 480 mm. Therefore, the mark-recapture estimates reported above are valid for the proportion of the lake trout population greater than approximately 480 mm.

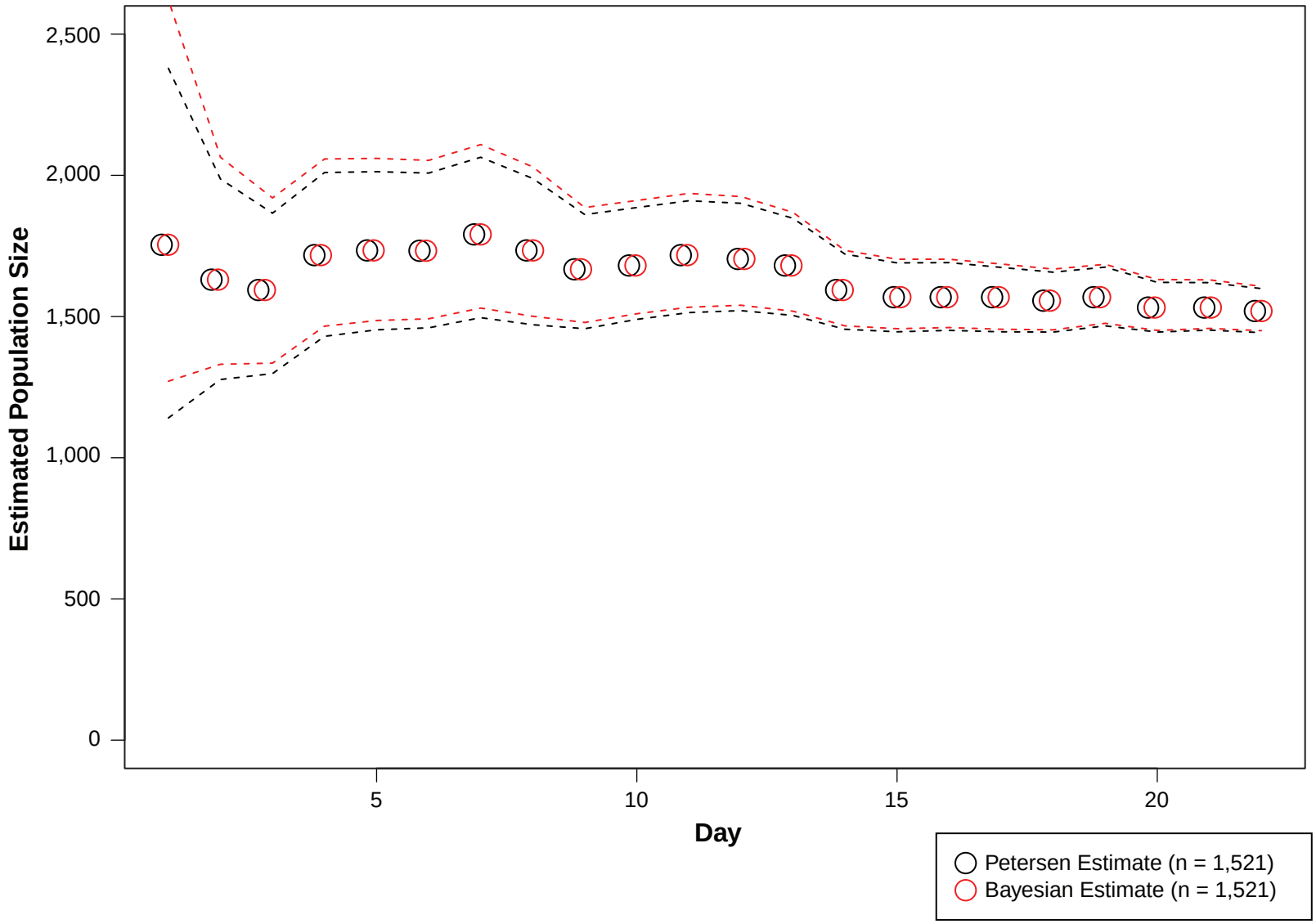

Figure 3.1-1

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Petersen and Bayesian Maximum Likelihood Lake Trout Population Estimates, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-1

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The total population estimate derived from the catch curve was 4,834 lake trout, of which 550 were age 0+, 485 were age 1 and 427 were age 2. The estimates for older age classes (age 3 to 15) were far higher than the actual catch and much higher than expected given that 75% of the marked fish were recaptured during the CPUE/Removal phase. It is probable that the catch curve method overestimated the numbers of lake trout in younger age classes.

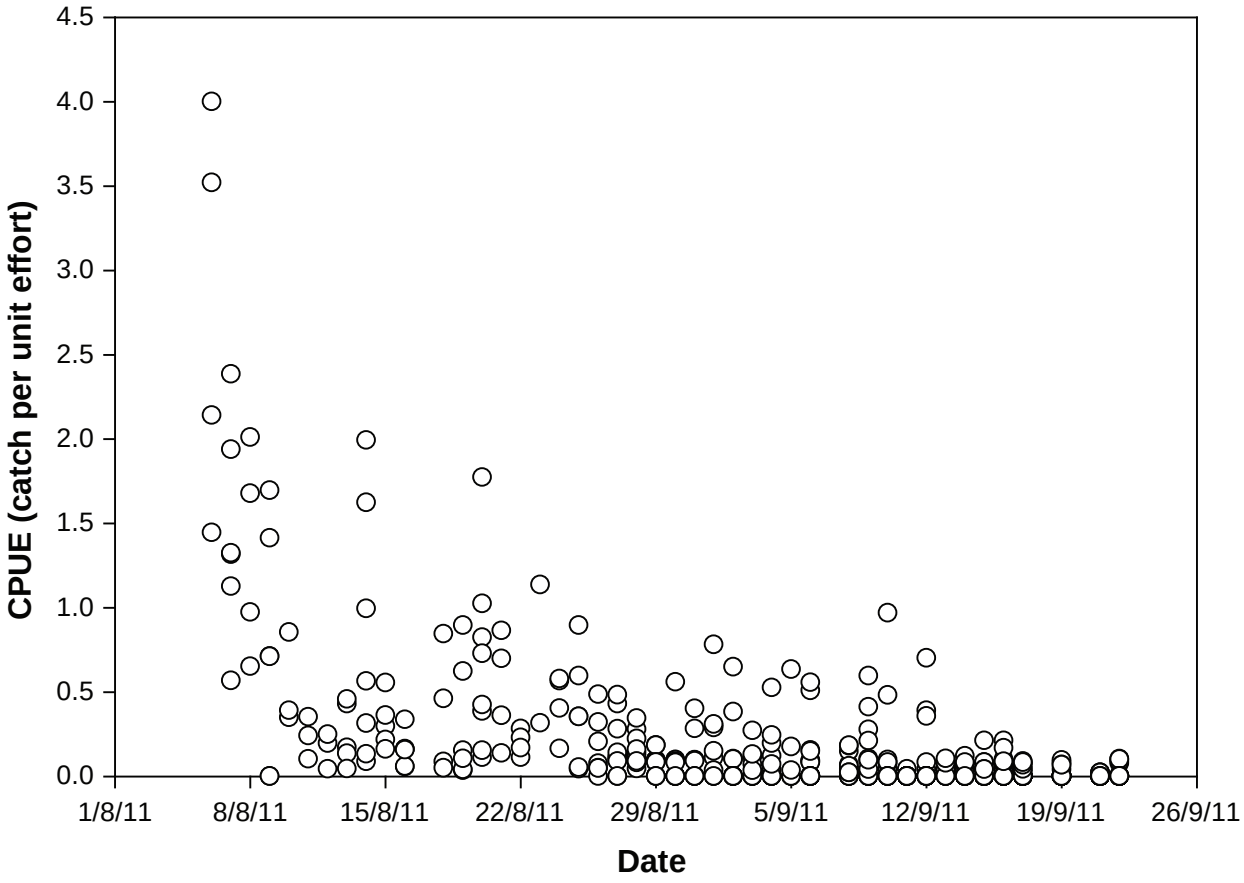
3.1.4 CPUE/Removal and Final Removal Phases

The objective of the CPUE phase was to collect CPUE (e.g., gillnet catch and effort data) relating to the lake trout population of Tail Lake. Biological data including species identification, unique fish sample number, fork length, weight, sex, maturity, reproductive status, aging structures, and biological tissues (e.g., muscle tissue, stomachs, etc.) were collected during this phase. Appendix 3.1-1 lists all biological data for fish captured during the CPUE and Removal phases of the program. Appendix 3.1-2 shows all gillnet set and catch data.

During the initial days of the CPUE phase, CPUE was very high (highest individual gillnet CPUE = 4.0; Figures 3.1-2 and 3.1-3). CPUE declined rapidly after the first week. A period of variable catch was observed during the mid-point of the CPUE phase (approximately August 12 through 25). This observed decline and variable CPUE was attributed to a change in lake trout behaviour and spatial distribution during this period, where lake trout began staging for spawning and moving to littoral habitat. Thus, a large portion of the adult lake trout population was no longer randomly distributed within the lake; producing very high (CPUE = 1.8) catches in the spawning locations and very low (CPUE = 0.09) catches in pelagic locations. The concentration of lake trout on the main spawning location also induced gillnet set location bias, where crews selected the known spawning location over random gillnet placement. This bias resulted in a spike in lake trout CPUE around August 22, 2011. As lake trout continued to be removed from the spawning location and other locations around Tail Lake, CPUE steady declined from 0.2 (August 25) and to approximately zero throughout the remainder of the CPUE/Removal Phase. A similar pattern of initially high and variable CPUE, followed by a steady decline in CPUE was also reported during a fish-out of the Northwest Arm of Second Portage Lake (Azimuth 2009).

Two commonly used variants of removal methods were used in the present fish-out study, including the Leslie (Figure 3.1-4) and DeLury (Figure 3.1-5) methods. The Leslie and DeLury methods provided similar estimates of the initial lake trout population of 1,081 and 1,094, respectively (Figure 3.1-6). The 95% CI for the Leslie estimate was 818 (lower CI) and 1,344 (upper CI), while the 95% CI for the DeLury estimate was 672 (lower CI) and 1,517 (upper CI). As discussed in Section 3.1.3, catch curve analysis showed that lake trout became fully vulnerable to the gillnet gear at approximately 480 mm. The removal methods for lake trout population estimation apply only to fully recruited ages and lengths, and therefore underestimate the total lake trout population. Such an underestimate is largely attributed to a violation of the assumption of a constant catchability coefficient relating effort to catch and the probability of capture being equal among fish. Violation of these assumptions during fish removal programs are well documented and the results of the Tail Lake fish-out are in complete agreement with previous studies cited in Tyson et al. (2011).

The initial lake trout population estimate using the K-Pass method was 1,397 (Figure 3.1-6). Although this estimate also underestimates this population size, the K-Pass method produced a more reasonable and realistic estimate. Previous studies have found that maximum-likelihood methods consistently produce less biased and more precise estimates than the Leslie and DeLury methods (Tyson et al. 2011). These observations are further supported through the population estimates calculated from the present lake trout removal.



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Individual Gillnet CPUE (all species) during the CPUE and Removal Phases, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-2

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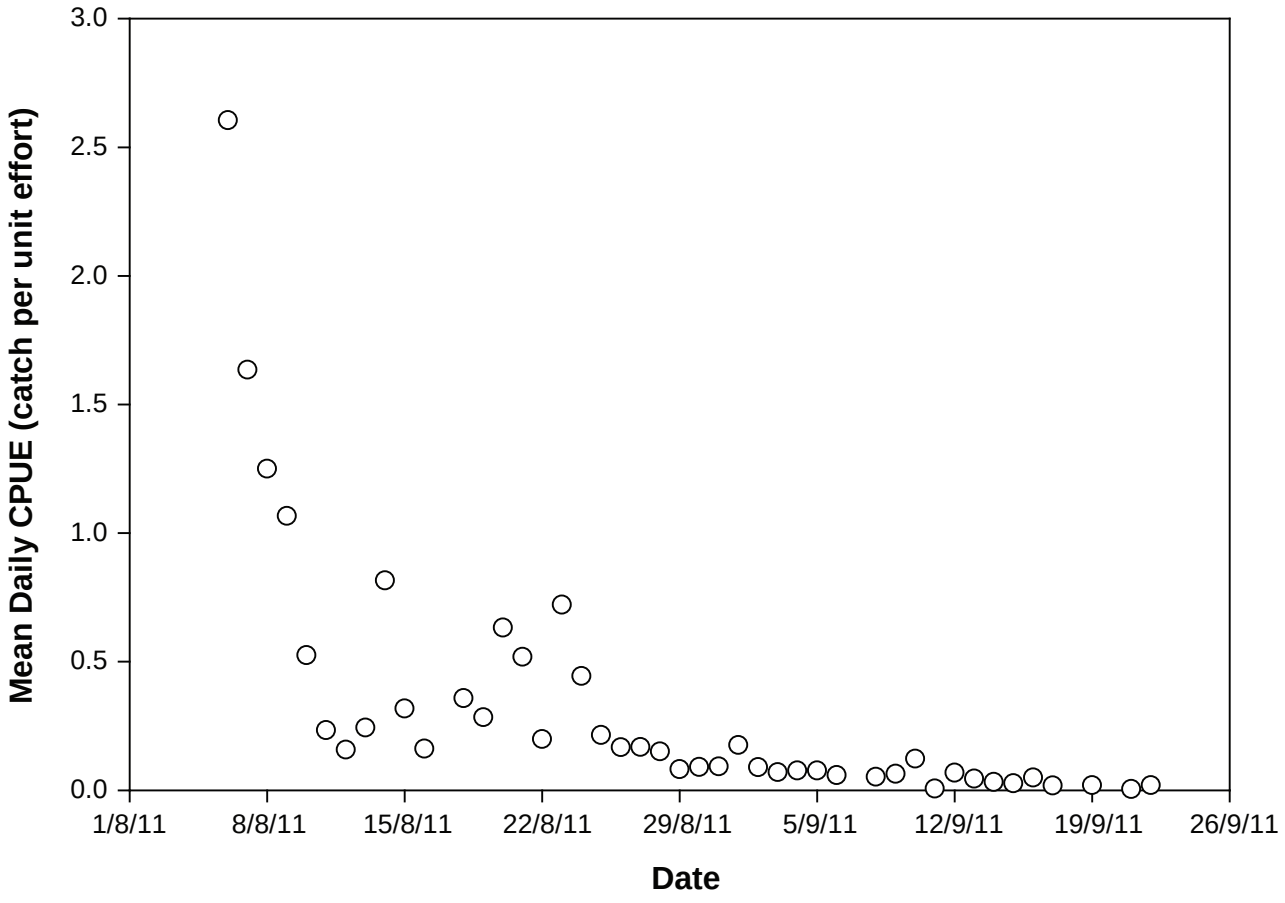

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Mean Daily Gillnet CPUE (all species) during the CPUE/Removal and Final Removal Phases, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-3

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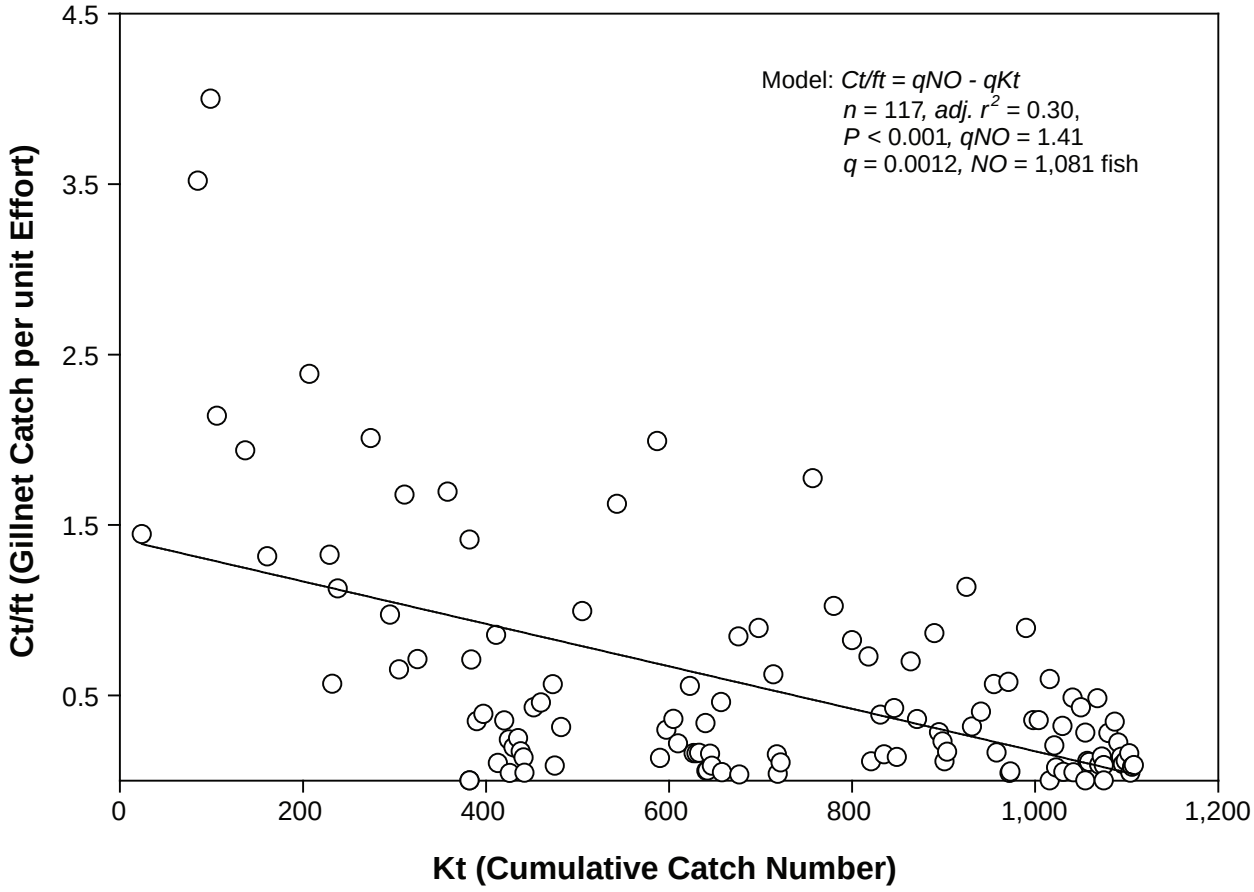

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Lake Trout Population Estimate Using the Leslie Method, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-4

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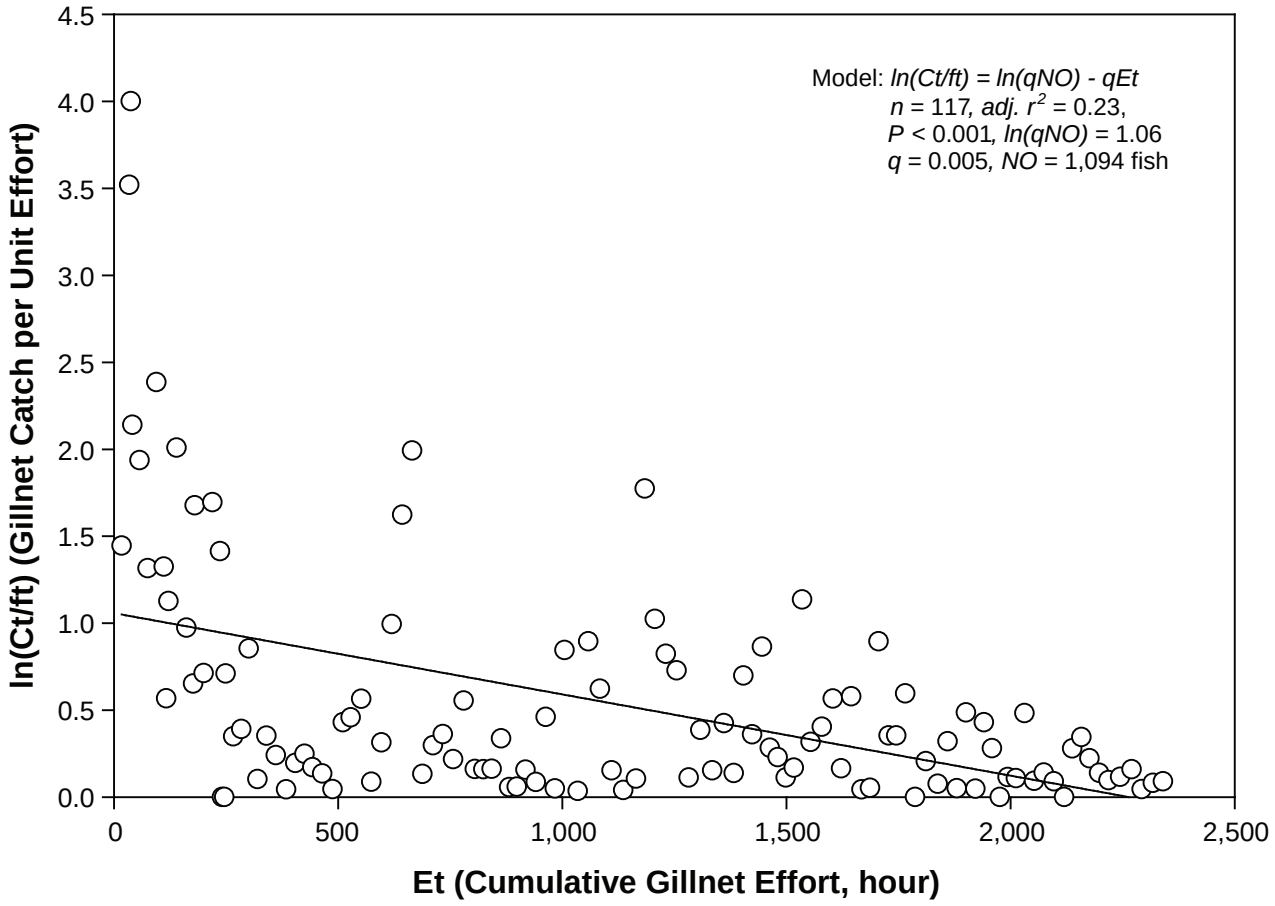

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Lake Trout Population Estimate using the DeLury Method, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-5

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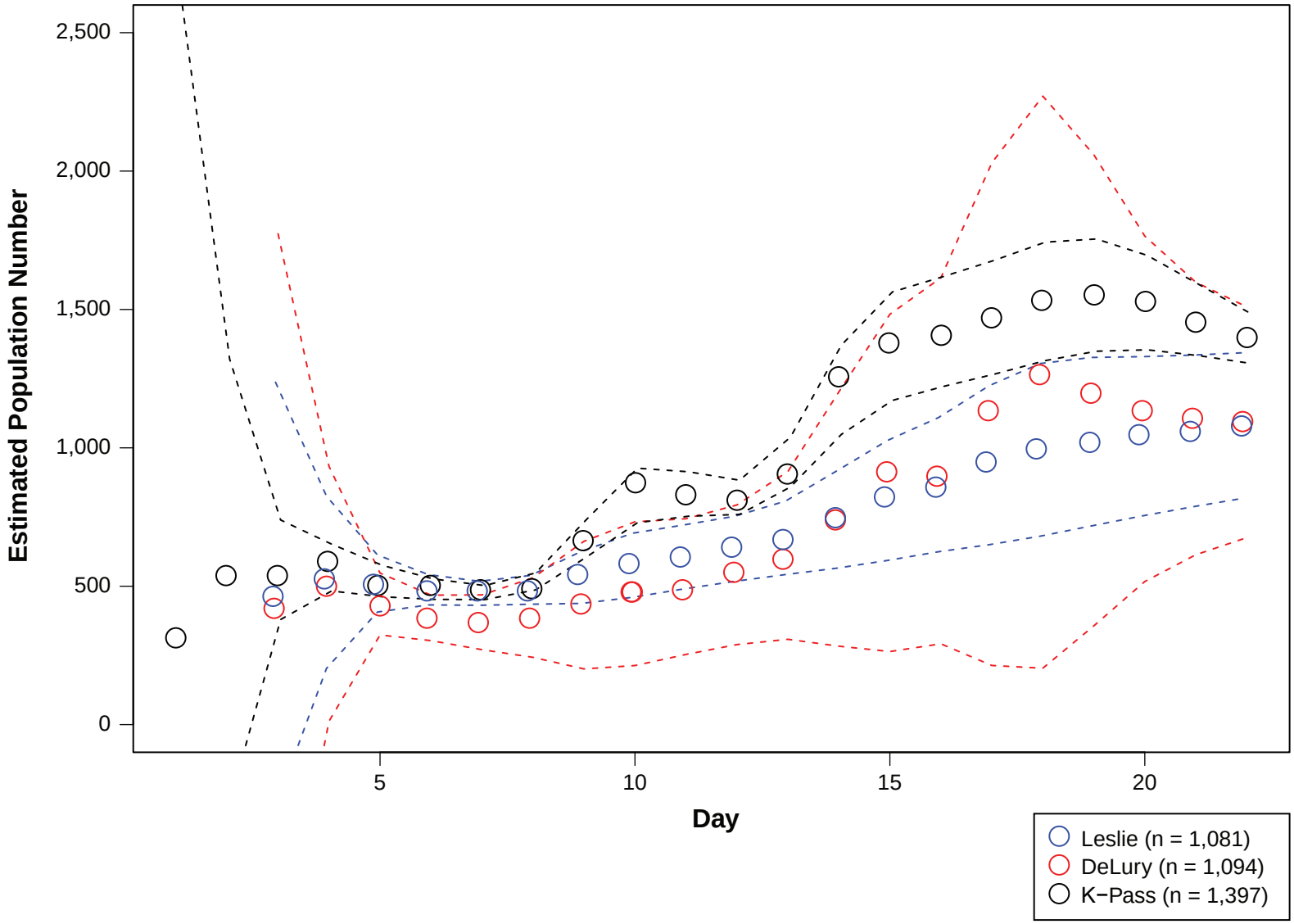

Figure 3.1-6

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Comparison of Lake Trout Population Estimates Using the Leslie, DeLury, and K-Pass Methods, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-6

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3.1.5 Length, Weight and Condition

Biological data collected from all fish removed and sampled from Tail Lake are located in Appendix 3.1-1. Table 3.1-2 summarizes descriptive statistics for lake trout and ninespine stickleback length, weight, and condition. The length-frequency graph shows a uni-modal distribution that is heavily skewed toward large, adult fish (Figure 3.1-7). The highest proportion (71%) of lake trout range from 500 to 620 mm FL, while relatively few lake trout are represented in smaller or larger size ranges. A similar length-frequency distribution was found by RL&L/Golder (2003). Large lake trout (>700 mm) were nearly absent in the Tail Lake population. Lake trout in Tail Lake may be prevented from attaining a large size due to the simple fish community, poor forage (e.g., absence of larger forage species such as cisco) and competition between conspecifics (i.e., cannibalism by larger lake trout).

Table 3.1-2. Mean Length, Weight and Condition of Lake Trout and Ninespine Stickleback, Tail Lake Fish-out, Doris North Project, 2011

	Fork Length (mm)					Weight (g)					Condition				
Species	n	Mean	Min	Max	SE	n	Mean	Min	Max	SE	n	Mean	Min	Max	SE
lake trout	1,490	512	126	895	109	1,490	1,443	17	7,450	595	1,490	0.99	0.26	2.98	0.17
ninespine stickleback	15	62	53	69	5	14	1.5	1.0	2.1	0.4	14	0.65	0.35	0.88	0.14

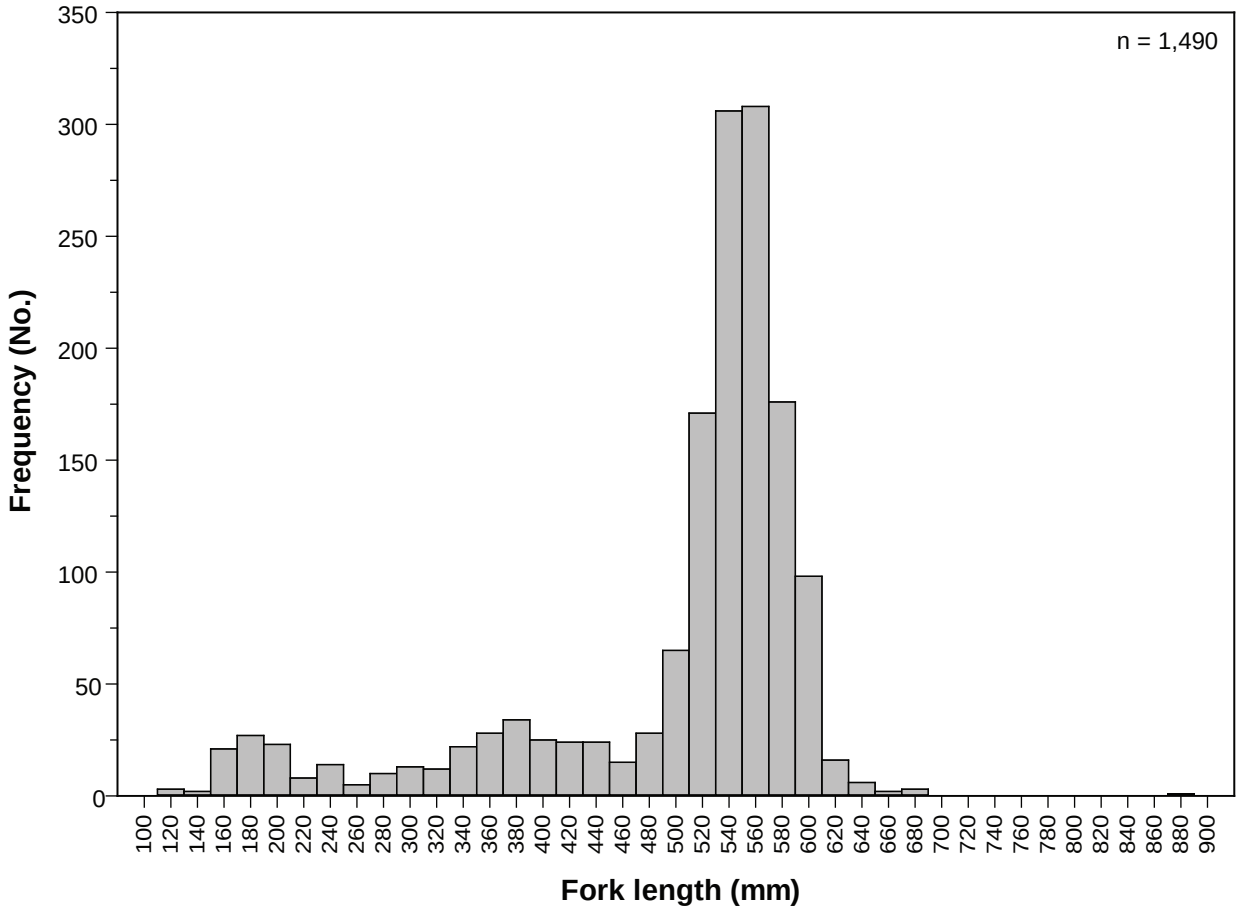
Notes:
mm = millimeters, g = grams, n = sample number, min = minimum, max = maximum, SE = standard error.

Similarly, the length-frequency graph also shows an absence of lake trout less than 120 mm FL. Previous fish community and population studies conducted by Golder (2007), suggest that the relatively low number of small lake trout may indicate that recruitment of juveniles is limited by a combination of predation and a lack of juvenile lake trout habitat. Past studies by Johnson (1983), examining simple fish communities in Arctic lakes found a similar uni- or bio-modal length-frequency distribution. Such a size distribution was thought to be an indicator of homeokinesis or stability, which is controlled through mechanisms responsible for energy partitioning and the maintenance of uniformity in the fish community (Johnson 1983). The lack of small lake trout also indicates that left-hand portion of the length-frequency distribution is influenced by size selectivity of the sampling gear.

Recent studies report that gillnet selectivity and catchability can heavily bias population demographics (e.g., length- and age-frequency distributions) measured by fisheries scientists (Finstad et al. 2000; Finstad and Berg 2004). Gillnets are passive fishing gears and their effectiveness is related to fish movement and behaviour (Beauchamp et al. 2009). This suggests that highly active fish are more likely to be caught than sedentary, cryptic, or cover-associated fish. Thus, season and the level of fish activity can heavily influence gillnet catches. The observed uni-modal length-frequency distribution derived from multi-mesh gillnet sampling used in the fish-out protocol may be a direct result of gillnet selectivity, where smaller, younger lake trout are underrepresented in the population.

Finstad et al. (2000) describe the process of gillnet capture as a series of sequential events, which can be written as an equation:

$$P(C) = P(O) \times P(E) \times P(R)$$



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Length-Frequency Distribution of Lake Trout, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-7

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In this equation, *P*(C) is the probability of capture, *P*(O) is the probability of overlap (i.e., the gear location and fish habitat overlap in space and time, *P*(E) is the probability of the fish encountering the gear, and *P*(R) is the probability of retention (i.e., the probability that fish will not escape the gear once captured). The effectiveness of gillnets also requires a degree of overlap between the gillnet location and the home range of the fish (*P*(O)). Encounter probability (*P*(E)) generally increases with fish size (Rudstam et al. 1984), as larger fish generally have larger home ranges and swim longer distances than smaller fish (e.g., Tupper and Rudd 2002). In addition, smaller fish swim more slowly and can manoeuver on a finer scale than larger fish (Breck and Gitter 1983), which may enable smaller fish to avoid gillnets more often.

Gillnets are highly selective for larger char and gillnet catches generate particularly poor estimates of absolute and relative abundance of fish less than 250 mm FL (Finstad et al. 2000, 2003). This is likely because of the more sedentary, shelter associated nature of small char. Lake trout length-frequency data obtained from the Tail Lake fish-out support conclusions by Finstad et al. (2000, 2003) in that young, small lake trout were underrepresented in gillnet catches, resulting in poor estimates of abundance and skewing population demographics.

The length-weight regression for lake trout was highly significant ($P<0.0001$) and explained 97% of the variation in ln (weight) (Figure 3.1-8).

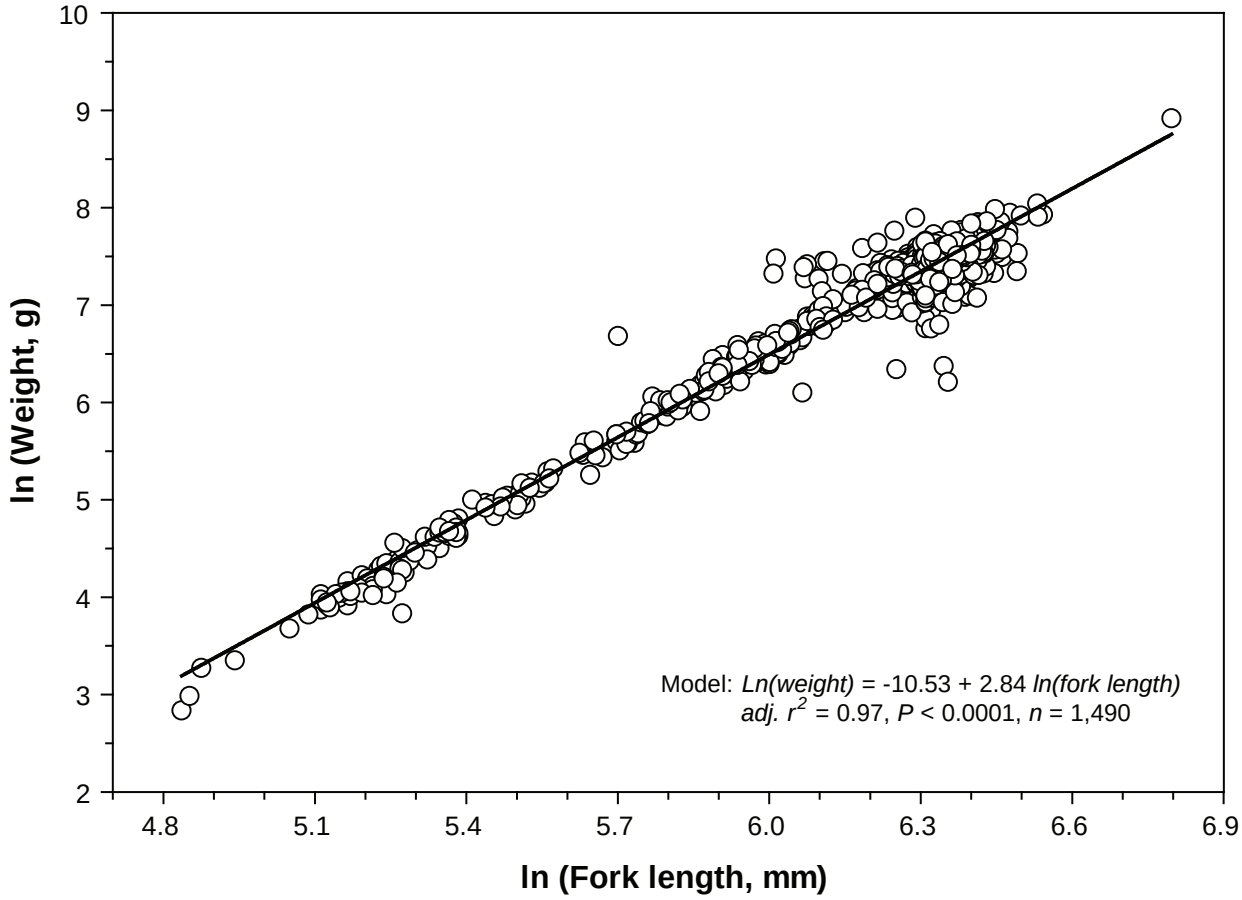
Lake trout condition ranged from 0.26 to 2.98 with a mean of 0.99 (SE = 0.17). Condition was also calculated for lake trout sampled from Tail Lake in previous studies and reported by RL&L/Golder (2003) and Golder (2007). These studies found a mean condition value of 0.95 (SE = 0.15), and a range of 0.59 to 1.32. The poor condition of Tail Lake lake trout was attributed to the forage base and simple fish community. Similar condition values were reported for lake trout sampled using similar gillnet gear from other lakes within the Hope Bay Belt project area (Rescan 2010b, 2011). Swanson et al. (2010) reported condition factors of lake trout ranging from 0.95 to 1.33 for other Arctic lakes not connected to the ocean. Therefore, lake trout condition values resulting from the fish-out are consistent with that of previous studies, similar to other lake trout populations in the Hope Bay area lakes and other Arctic lakes.

3.1.6 Age, Growth, and Mortality

Calcified structures (i.e., otoliths and pectoral fin rays) were analysed to determine the age of 473 individual lake trout. Aging analysis was not conducted for ninespine stickleback. Of the 473 lake trout age samples, 142 were otoliths and 331 were pectoral fin rays. Table 3.1-3 shows the total number of lake trout pectoral fin rays and otoliths aged in the study. Of the 142 otolith samples, only one otolith was sample was determined as inaccurate. Of the 331 pectoral fin ray samples, 65 were inaccurate. In particular, fin rays samples yielded inaccurate age estimates for lake trout older than approximately 15 years. Age readers were unable to determine a true age for these 65 samples due to poor annuli resolution (K. Ambrose, pers. comm.). Inaccurate age data obtained from otoltih and fin ray samples were removed from the data set and not included in further analyses. Thus, the number of lake trout older than approximately 15 years are under-represented in the age data. This underrepresentation skews the age-frequency distribution and von Bertalanffy growth models. Therefore, age and growth data should be evaluated with caution.

Table 3.1-3. Summary of Lake Trout Calcified Structures used for Aging Analysis, Tail Lake Fish-out, Doris North Project, 2011

Calcified Structure	No. of Structures Sent to and Aged by Laboratory	No. of Structures used for Analysis
Otolith	142	141
Pectoral Fin Ray	331	266
Total	473	407



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Weight-Length Regression for Lake Trout, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-8

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The age of sampled lake trout ranged from 2 to 56 years, with a mean age of 11 years (SE = 0.54). Age-frequency distribution of a representative population describes the status of successive age cohorts (Kohler and Hubert 1999). The age-frequency distribution for the Tail Lake lake trout population is shown in Figure 3.1-9. As stated, older lake trout are underrepresented due to inaccurate aging of fin ray samples.

The von Bertalanffy growth model explained 86% of the variation in length-at-age data for lake trout sampled using otoliths (Figure 3.1-10). The growth coefficient (K) for lake trout was 0.107 year^{-1}. The von Bertalanffy growth models show two distinct growth trajectories within the lake trout population. These trajectories can be attributed to relatively rapid pre-maturation (age 0+ to ~10+ years) growth and relatively slow and stable post-maturation (~10+ years onward) growth. Therefore, length-at-age for sexually mature lake trout was highly variable and has been previously reported in past studies of Arctic fish communities (Johnson 1983). In addition, this 'broken-stick' growth curve observed for Tail Lake lake trout is typical for an Arctic lake trout population.

A catch curve was created for 1,280 lake trout from a combination of direct measures of age and estimation of age from length data, using the von Bertalanffy equation (Figure 3.1-11). The regression of (ln)frequency against age indicated an overall mortality rate (Z) of 13.5% per year.

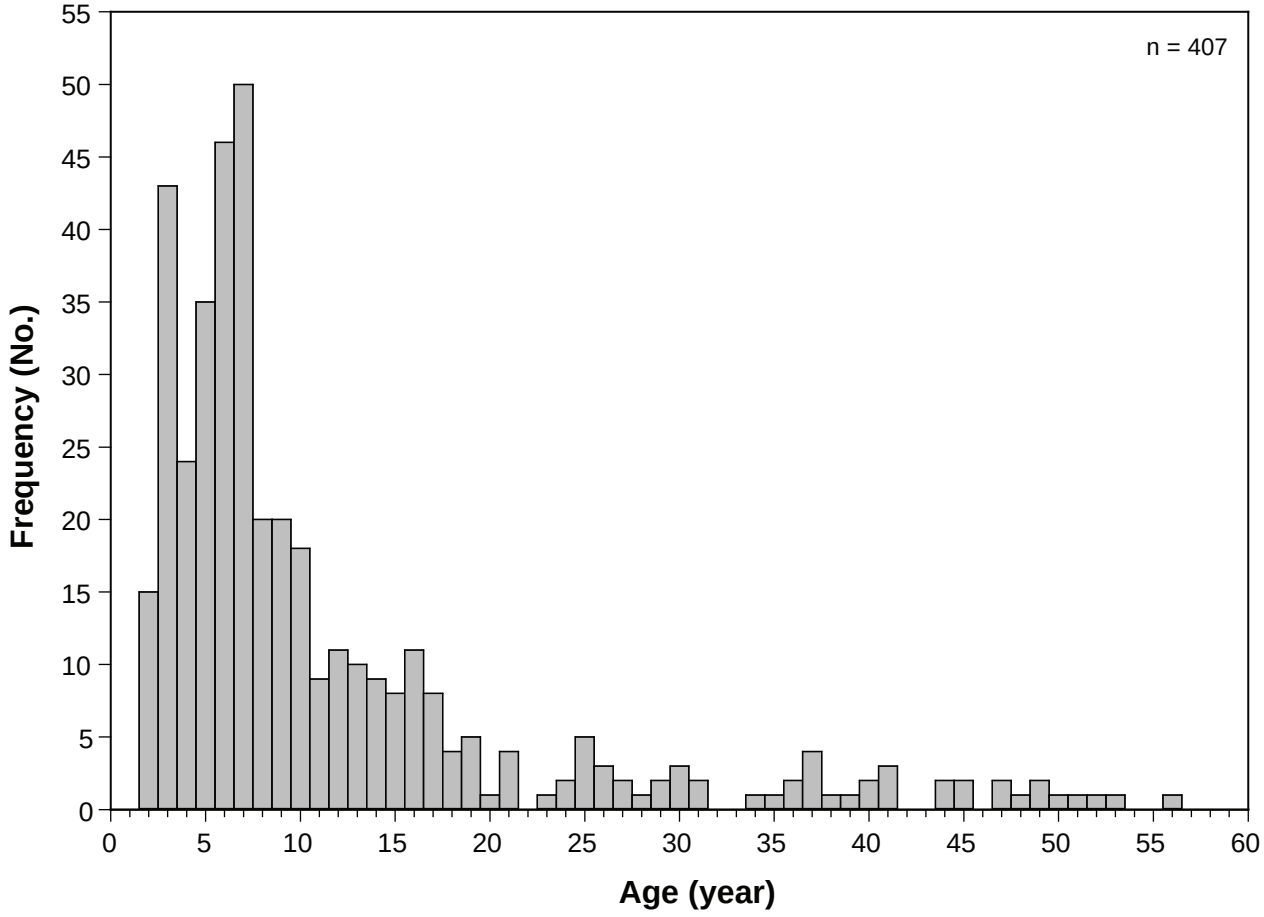
3.1.7 Sex Ratio, Maturity and Fecundity

A total of 904 lake trout were sampled for sex and maturity biological data (Figure 3.1-12). A total of 462 female and 424 male lake trout were identified, while the sex of an additional 19 lake trout was unknown. The ratio of female to male lake trout was 52% to 48%. The majority of sampled lake trout were mature (58% of females and 69% of males). L50 plots (Figure 3.1-13) show that 50% of sampled females were mature at 477 mm, while 50% of sampled males were mature at 460 mm. The reproductive status of the majority of lake trout was classified as green. Reproductive status was determined by seasonality and the timing of sampling. Since most lake trout were sampled prior to the height of the lake trout spawning period, this result is expected. In addition, 19% of the sampled females and 3% of sampled males demonstrated 'seasonal' (or 'resting') gonad development. These observations indicated that lake trout, particularly females, exhibited intermittent spawning where lake trout do not spawn on an annual schedule. This reproductive cycle is typical for fish inhabiting unproductive Arctic water bodies, because lake trout are unable to invest the required energy reserves for yearly gonadal development and reproduction.

Fecundity data for female lake trout will be provided by Dr. Heidi Swanson (University of Alberta) at a later date.

3.1.8 Somatic Indices

Gonad (ovary and testes) and liver weight were collected from sampled lake trout to measure Gondosomatic Index (GSI) and Hepatosomatic Index (HSI), respectively. GSI and HSI are both expressed as a ratio of gonad or liver weight to total body weight. For the purposes of analysis, GSI data (i.e., gonad weight and body weight) for immature fish were not included (Environment Canada 2011); however, lake trout exhibiting 'seasonal development or SD' were included in the data set. All lake trout sampled for liver weight and body weight were included in the analysis for HSI. Table 3.1-4 presents a summary of GSI and HSI values for female and male lake trout.



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Age-frequency Distribution of Lake Trout, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-9

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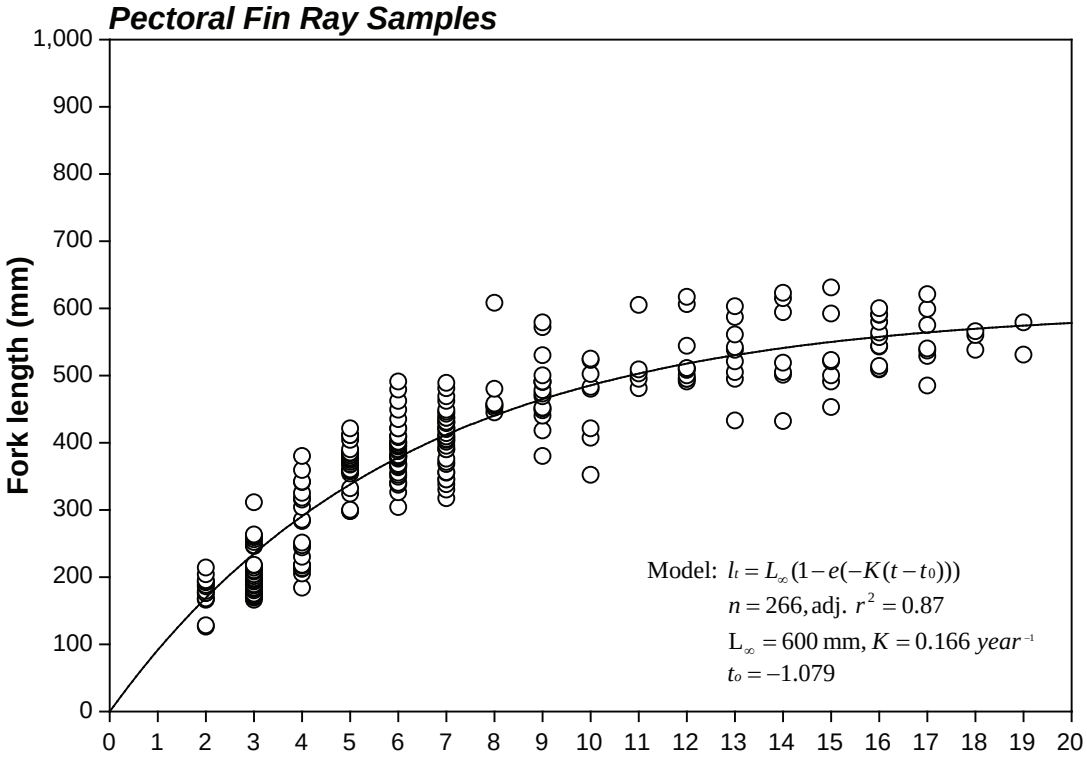

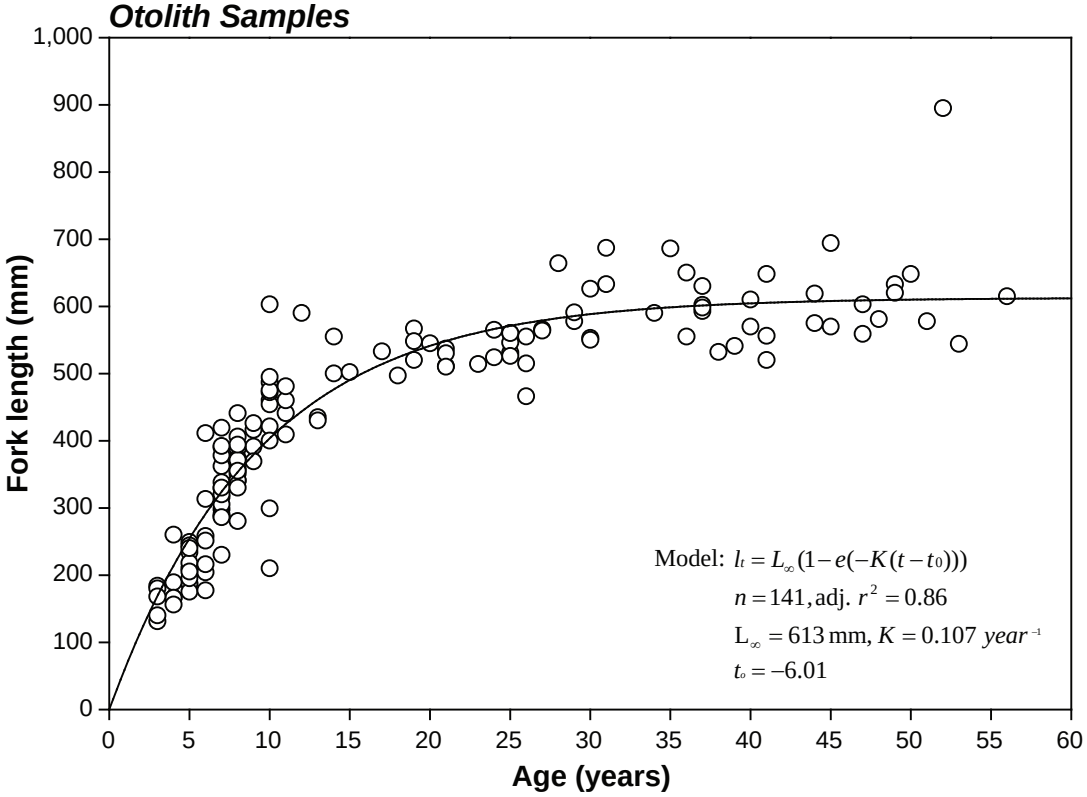

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von Bertalanffy Growth Models for Lake Trout Sampled using Pectoral Fin Rays and Otoliths, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-10

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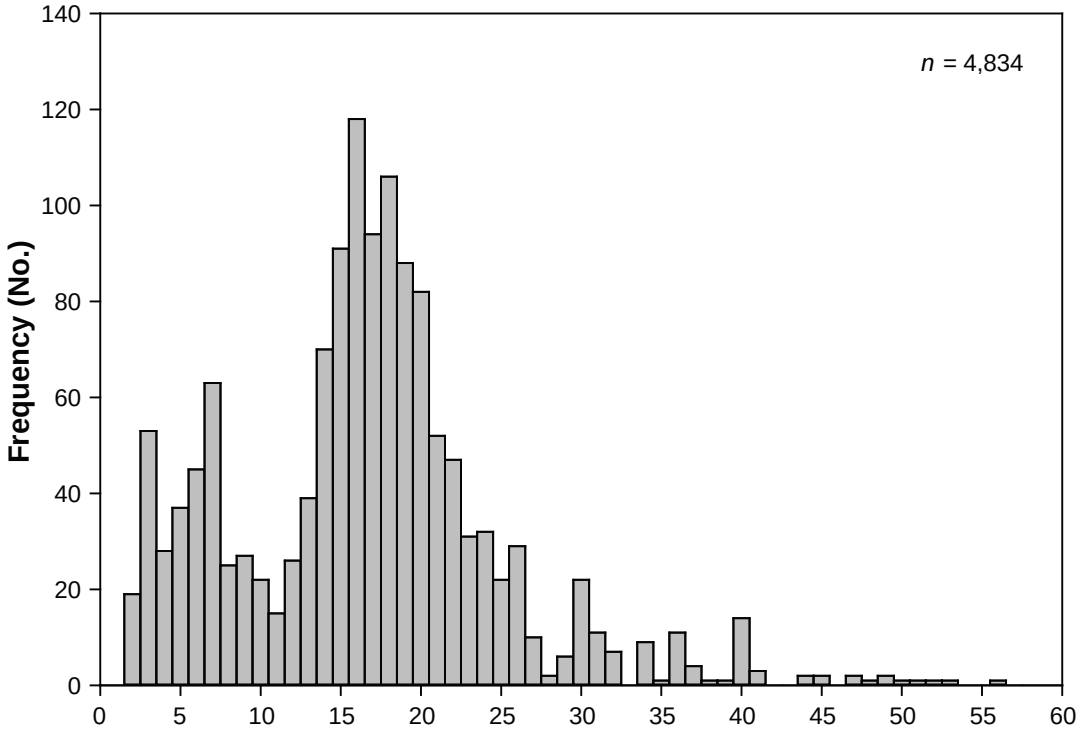

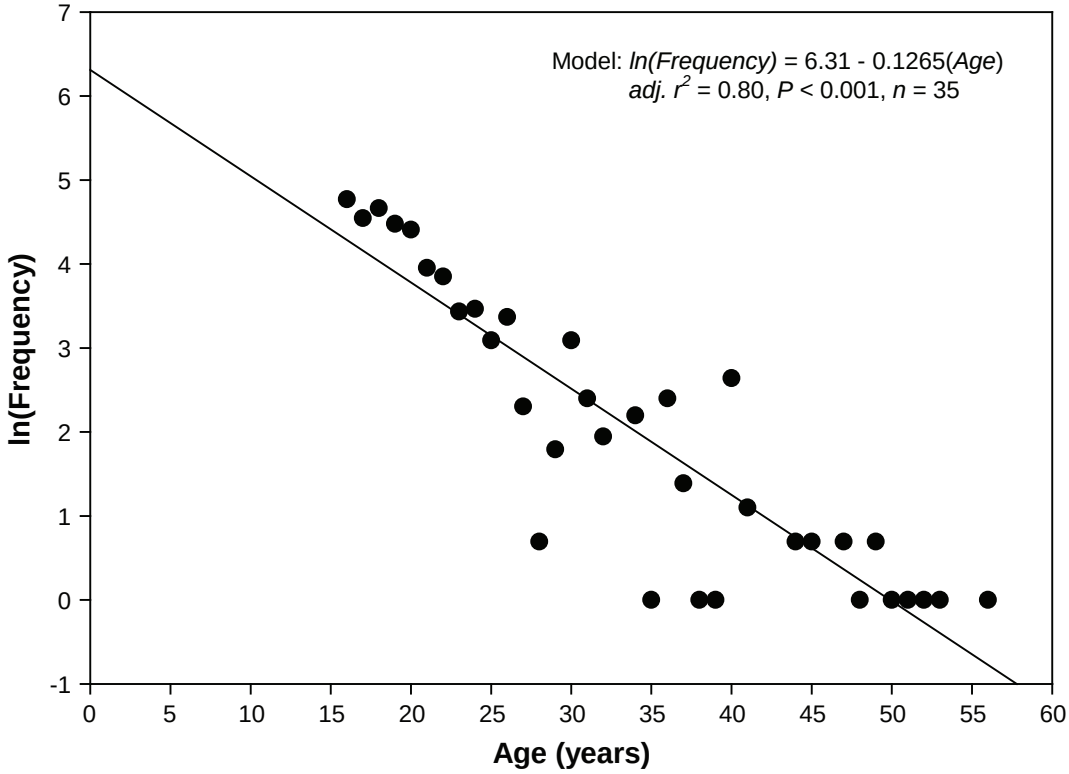

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Catch Curve for Lake Trout using Age Data from Otolith and Pectoral Fin Ray Samples, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-11

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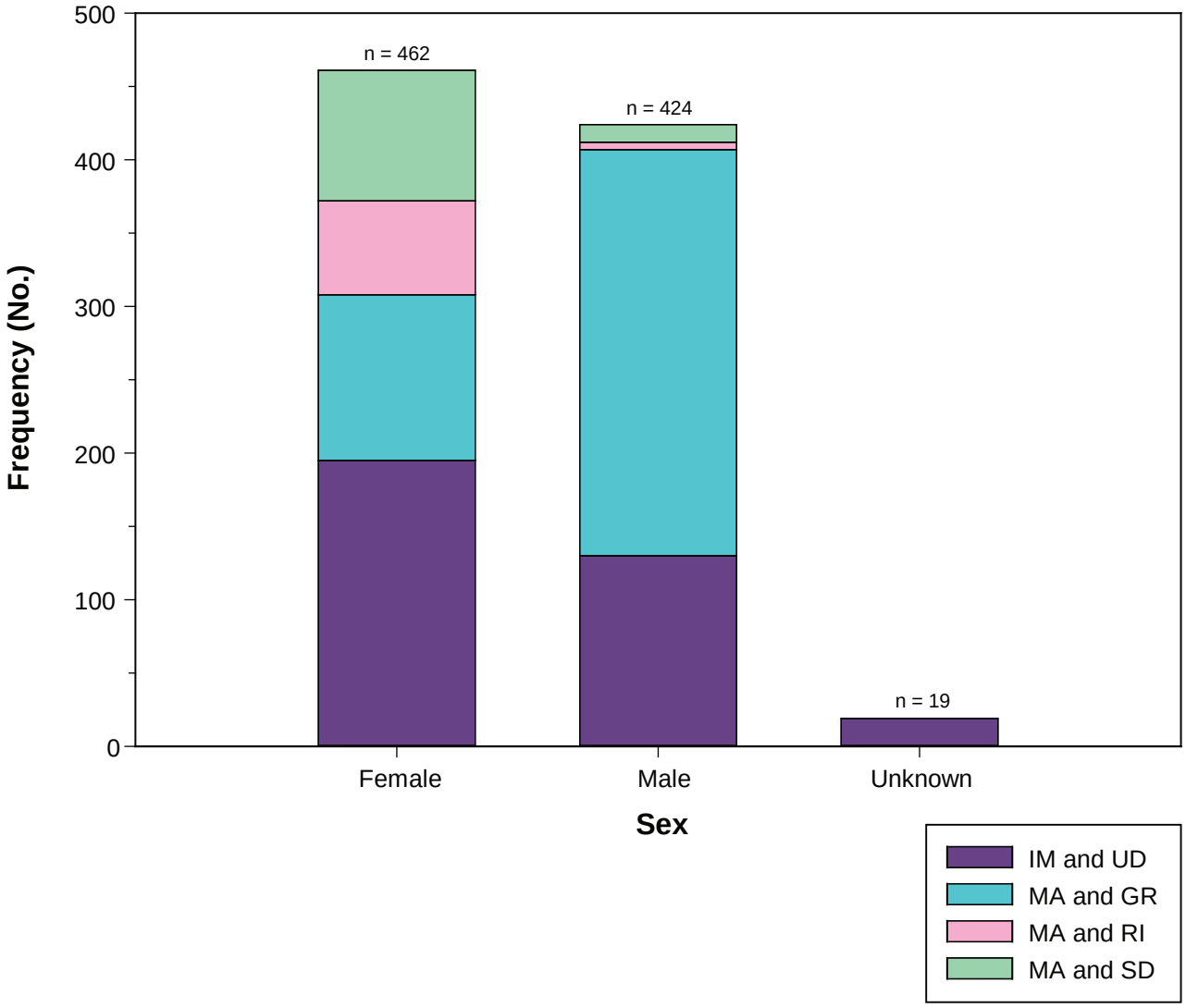

Note: Maturity Status: IM = immature; MA = mature
Reproductive Status: UD = undeveloped; GR = green; RI = ripe; SD = seasonal development

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Sex Ratio, Maturity and Reproductive Status of Lake Trout, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-12

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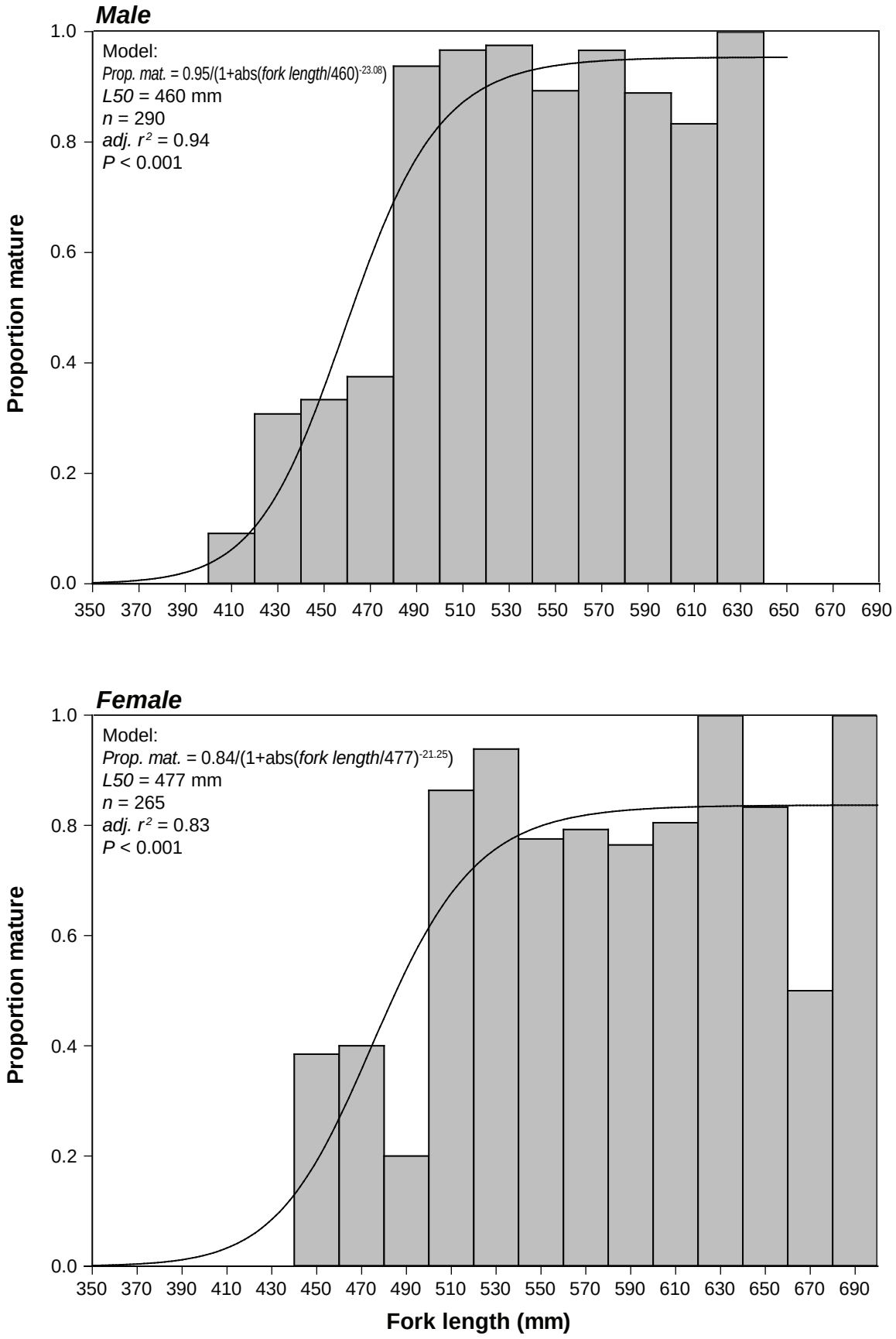

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Proportion of Mature Female and Male Lake Trout by Fork Length Showing Fitted Logistic Curves, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-13

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Table 3.1-4. Somatic Index Values for Female and Male Lake Trout, Tail Lake Fish-out, Doris North Project, 2011

Somatic Index	Sex	n	Mean	SE	Min	Max
Hepatosomatic	Female	434	1.17	0.58	0.05	8.82
	Male	411	0.90	0.31	0.05	2.38
Gonadosomatic	Female	248	4.68	3.39	0	12.35
	Male	288	2.84	1.11	0	9.58

Notes:
n = sample number, SE = standard error, Min = minimum, Max = maximum.

3.1.9 Diet

Taxonomic analysis of stomach contents was conducted on a total of 51 preserved lake trout stomachs. Full taxonomic results are presented in Appendix 3.1-3 (by number) and Appendix 3.1-4 (by wet weight). Diet composition was analyzed and presented by number (Figure 3.1-14) and by weight (Figure 3.1-15). It is important to note that some differences in the diet composition between numbers and weight are caused by the higher average weight of larger organisms (e.g., fish) versus smaller organisms (e.g., chironomids).

By number, the diets of lake trout sampled from Tail Lake were comprised predominantly of *Gammarus lacustris* (38%), *Triops longicaudatus* (37%), larval *Grensia* spp. (20%), and ninespine stickleback (5%). These four prey items accounted for approximately 98% of the diet of lake trout sampled from Tail Lake.

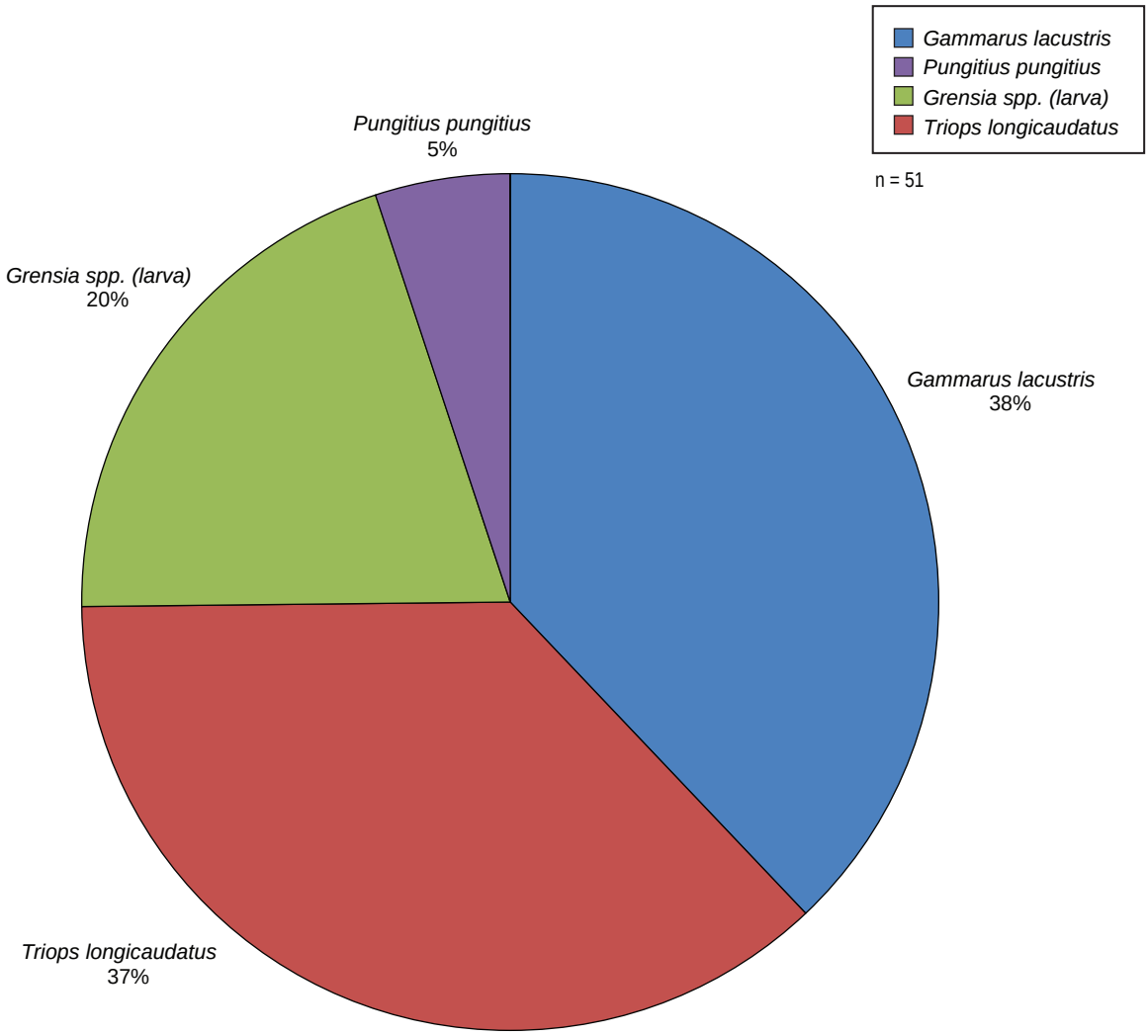
When diet composition was examined by weight, *Triops longicaudatus* accounted for the majority of food items at 61%. The remaining 38% of diet items by weight included: *Gammarus lacustris* (15%), *Rodentia* sp. (12%), ninespine stickleback (7%), and larval *Grensia* spp. (5%).

Overall, the predominant lake trout diet was composed of *Gammarus lacustris*, *Triops longicaudatus*, and ninespine stickleback. Juvenile lake trout were not found in the lake trout stomachs sampled. Predation by large, adult lake trout is thought to reduce the number of juvenile lake trout in the population. Therefore, not finding lake trout in the stomach samples conflicts with the theory that cannibalism/predation controls the number of juvenile lake trout in the population.

3.1.10 Tissue Metals

Appendix 3.1-5 shows the metal concentrations measured in each sample of muscle collected from lake trout in Tail Lake. Appendix 3.1-5 also displays the fork lengths of the lake trout, because length, not weight, is the conventional measure of body size for tissue metals analysis.

The first step in tissue metals analysis was to exclude those metals for which 90% of concentrations were below the metal-specific MDL. The following 15 metals were excluded: aluminum, antimony, beryllium, bismuth, cadmium, cobalt, lead, lithium, molybdenum, nickel, selenium, thallium, tin, uranium, and vanadium. This meant the inclusion of 11 metals for which 90% of the concentrations in muscle tissue were above the MDL. The metals kept for analysis included: arsenic, barium, calcium, chromium, copper, magnesium, manganese, mercury, strontium, and zinc. Table 3.1-5 shows the mean concentrations of the remaining metals for muscle tissue. To calculate the means, concentrations below metal-specific MDL were replaced by one-half of the MDL.



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Lake Trout Diet Composition by Number, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-14

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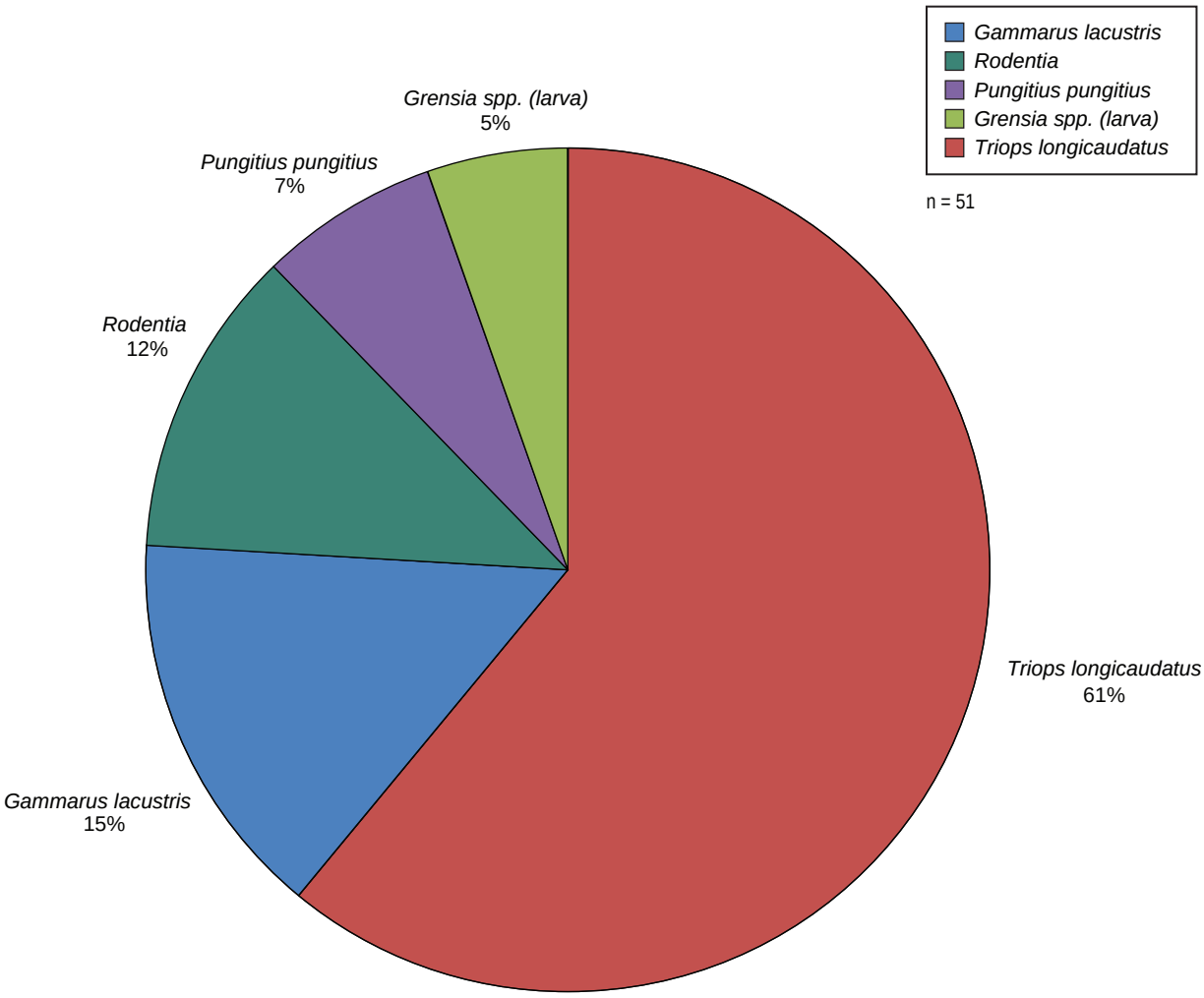

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Lake Trout Diet Composition by Weight, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-15

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Table 3.1-5. Mean Tissue Metals Concentrations Sampled from Lake Trout, Tail Lake Fish-out, Doris North Project, 2011

Variable	Units	Mean	SE	Min	Max
Fork length	mm	569	427	545	615
Moisture	%	77.6	3.7	73.5	80.6
Arsenic (As)	mg/kg	0.036	0.0002	0.024	0.076
Barium (Ba)	mg/kg	0.008	0.0002	0.001	0.051
Calcium (Ca)	mg/kg	141.7	3329.0	90.1	321.0
Chromium (Cr)	mg/kg	0.20	0.0004	0.16	0.25
Copper (Cu)	mg/kg	0.224	0.002	0.163	0.301
Magnesium(Mg)	mg/kg	279.1	247.7	246.0	303.0
Manganese (Ma)	mg/kg	0.194	0.002	0.140	0.284
Mercury (Hg)	mg/kg	0.1567	0.0018	0.0948	0.2630
Selenium (Se)	mg/kg	0.17	0.004	0.10	0.23
Strontium (Sr)	mg/kg	0.111	0.007	0.026	0.362
Zinc (Zn)	mg/kg	3.28	0.19	2.53	4.14

Notes:
Metals concentrations in units of mg/kg wet weight
SE = standard error, min = minimum, max = maximum

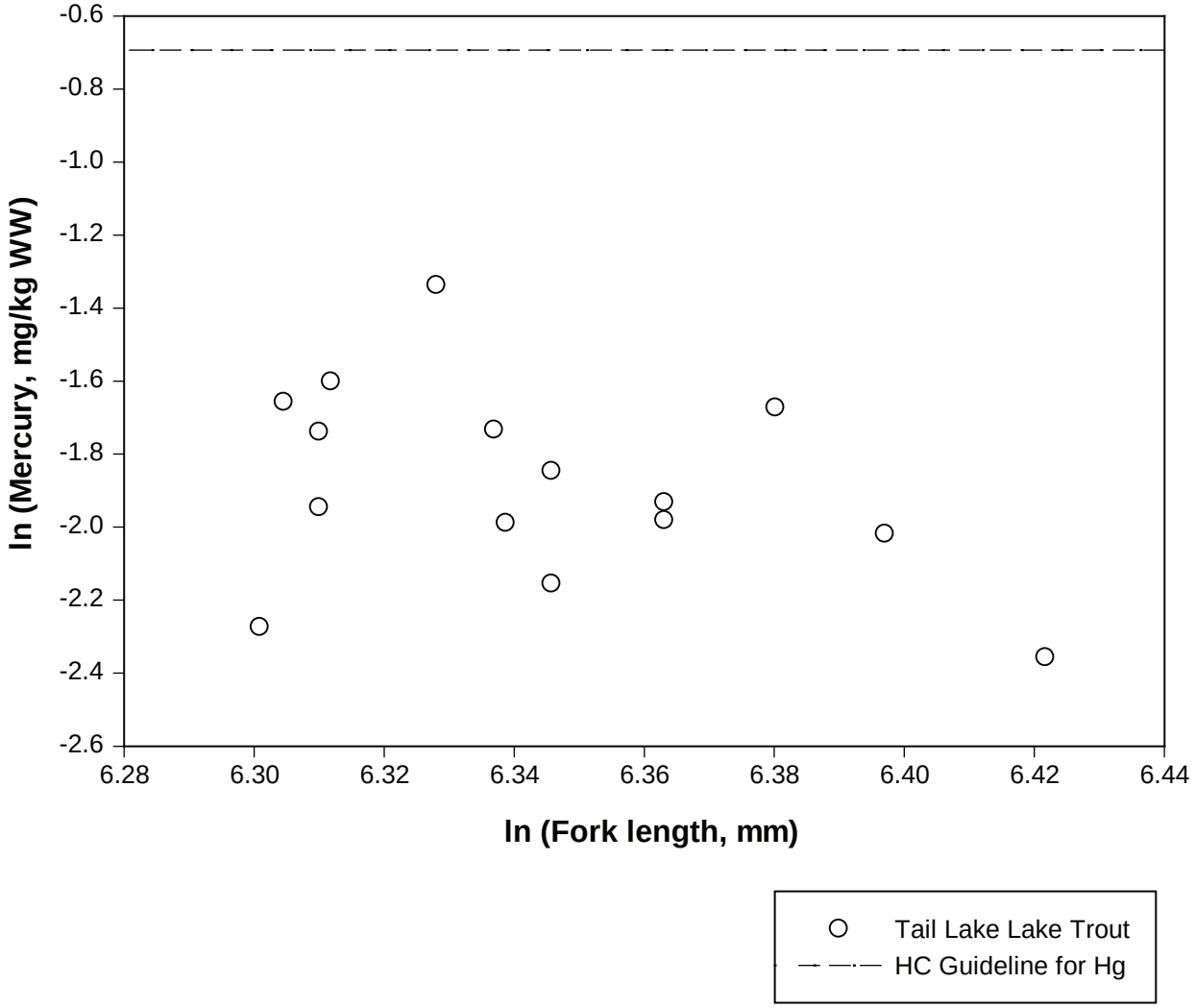
Mercury is a toxic metal with no known biological function (Eisler 1987). The concentration of mercury in muscle tissue commonly varies directly with fish body size and age. To confirm this relationship, ln-transformed data of mercury concentration in muscle tissue was plotted on ln-transformed data of lake trout fork length (Figure 3.1-16). Lake trout muscle samples showed a non-significant relationship (r^2 = 0.15, *P* = 0.1503) between mercury and fork length (Note: this non-significant relationship is not shown in Figure 3.1-16). This result suggests that mercury was not accumulating in the muscle tissues of lake trout sampled from Tail Lake.

The Health Canada guideline for maximum allowable concentration of total mercury in fish muscle tissue is 0.5 mg/kg WW (CCME 2011; Health Canada 2001). All lake trout muscle samples were below the Health Canada guideline. The highest concentration of mercury observed in lake trout muscle tissue came from Sample Number 6 which had a mercury concentration of 0.263 mg/kg ww - well below the Health Canada guideline. Thus, based on this sub-sample of tissues, lake trout from Tail Lake were suitable for consumption.

3.1.11 Physical Abnormalities

The usability of lake trout as food for the Inuit can be affected by the appearance of the processed fish (Environment Canada 2011). All lake trout that were fully biologically sampled (i.e., sampled for sex, maturity, stomach, and gonad and liver weight) were examined for the presence of lesions, tumours, parasites or other abnormalities.

A total of 485 (437 female and 411 male) lake trout were sampled for external and internal physical abnormalities. An additional 1,005 lake trout were examined for external abnormalities while collecting length and weight data. Only one lake trout exhibited an internal physical abnormality (Plate 3.1-3) as defined above. This lake trout was recorded as sample number 621 and photos were recorded as numbers 770 through 777. This lake trout exhibited a dramatically enlarged gall bladder. Although the exact cause of the expanded gall bladder is unknown, a parasite may have blocked the bile duct causing a build-up of bile, or this abnormality may have been caused by a genetic anomaly (P. Hodson, pers. comm.). This abnormality was not observed in other sampled lake trout.



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Mercury Concentrations Plotted on Lake Trout Fork Length, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.1-16

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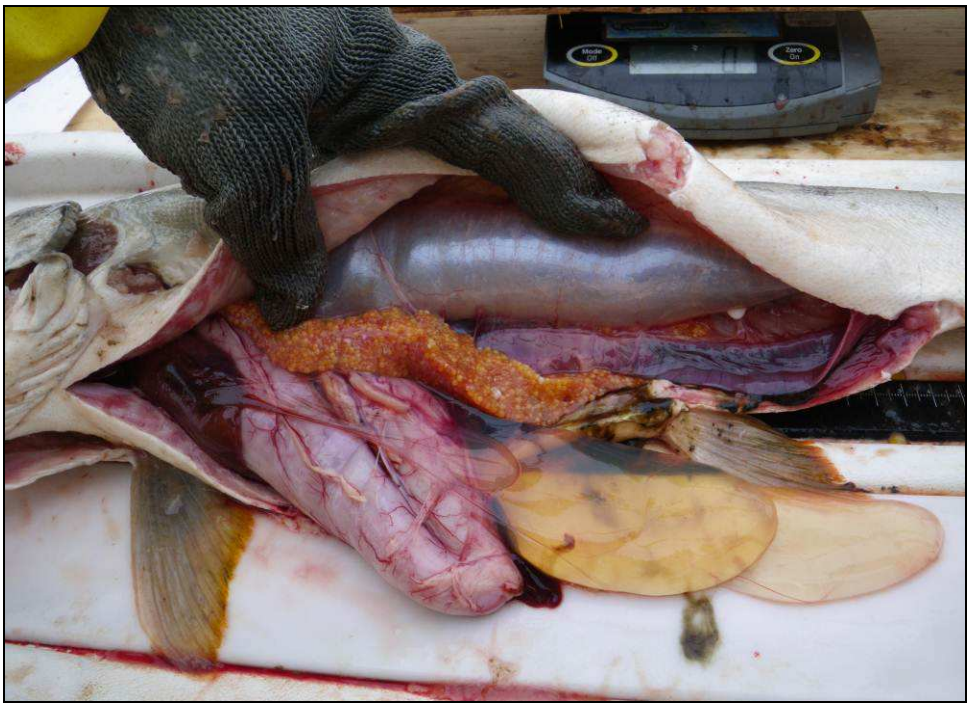


Plate 3.1-3. Lake trout sample number 621 showing an expanded gall bladder, possibly caused by a parasite blocking the bile duct.

Other physical abnormalities such as very poor condition (Plate 3.1-4), eroded caudal fins, scarring due to predation, and lesions caused by previous tagging studies (Plate 3.1-5) were also observed. Lake trout showing very poor condition were previously observed and documented in prior studies of Tail Lake (Golder 2003; 2007) and other lakes in the Hope Bay project area (Rescan 2010, 2011). As previously discussed, this observed poor condition is likely associated with intense intra-specific competition between lake trout for limited food resources and the relatively low productivity of Arctic lakes such as Tail Lake.

Plate 3.1-4. A lake trout in poor condition.

Plate 3.1-5. Lesion caused by a T-bar anchor tag from previous mark-recapture studies.

Eroded caudal fins were only observed on mature and ripe, spawning lake trout. Erosion of the caudal fin was only observed on the bottom portion of the fin and only observed during the peak spawning period (i.e., late-August to mid-September). Caudal fin erosion is a consequence of rubbing on rock substrate during spawning (Scott and Crossman 1973). Lesions caused by biting by other lake trout were also observed during the spawning period. Scarring was also apparent on several lake trout. Such scars were attributed to failed predation attempts by other lake trout.

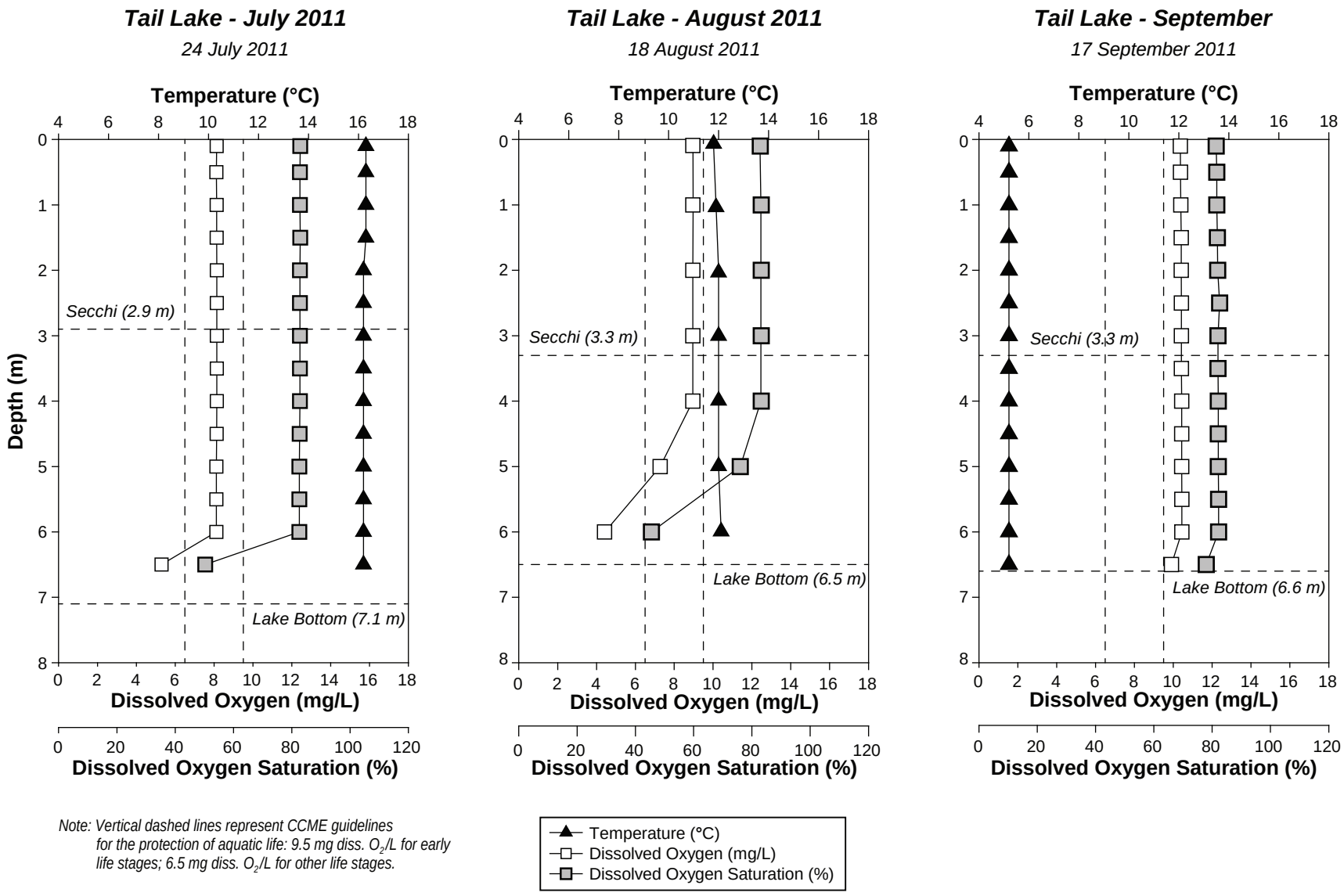
Previous mark-recapture studies involved the tagging of lake trout using Floy or T-bar anchor tags. A total of 71 lake trout were captured with T-bar anchor tags from past studies. Lesions were found on all previously lake trout with some lake trout showing very deep wounds. These lesions or wounds develop because water turbulence due to swimming causes the tag to spin and erode into the flesh. These lesions were not recorded as a physical abnormality because they are not natural phenomena.

3.2 LIMNOLOGY/WATER COLUMN STRUCTURE

3.2.1 Water Column Structure

The location of the permanent sampling station at the deepest point in Tail Lake is shown in Figure 2.2-1. Results of the physical limnology data collected at the sampling station in July, August and September 2011 are listed in Appendix 3.2-1. Figure 3.2-1 shows information on lake depth at the sampling site, temperature, dissolved oxygen concentration and percent saturation, and Secchi depth. Table 3.2-1 shows euphotic zone depths.

Lake depth at the sampling station varied between 7.1 m on July 24 to 6.5 m in August and 6.6 m in September (Figure 3.2-1). The lake was mixed, resulting in consistent water temperatures at all depths within a sampling date (Figure 3.2-1). Water temperatures were warmest in July at approximately 16 ºC and cooled to 12 ºC in August and 5.2 ºC in September.



Note: Vertical dashed lines represent CCME guidelines for the protection of aquatic life: 9.5 mg diss. O_2/L for early life stages; 6.5 mg diss. O_2/L for other life stages.

Figure 3.2-1

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Temperature and Dissolved Oxygen Profiles in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.2-1

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Table 3.2-1. Secchi Depth and Calculated Euphotic Zone Depth in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Sampling Date	Maximum Lake Depth (m)	Secchi Depth (m)	Extinction Coefficient (*k*)	Euphotic Zone Depth (Z1%) (m)
24-Jul-11	7.1	2.9	0.59	7.8
18-Aug-11	6.5	3.3	0.52	8.9
17-Sep-11	6.6	3.3	0.52	8.9

Note for all sampling dates the Euphotic Depth (1%) was deeper than the lake.

3.2.2 Dissolved Oxygen

Dissolved oxygen (DO) concentrations in Tail Lake varied between sampling dates and sampling depths (Figure 3.2-1). In the upper levels of the water column, dissolved oxygen concentrations increased from approximately 8.13 mg/L in July to 10.4 mg/L in September due to photosynthesis and diffusion from the atmosphere. At all sampling dates, dissolved oxygen concentrations decreased near the lake bottom due to microbial activity and respiration in the sediments. In July and August, dissolved oxygen concentrations near the lake bottom were below the CCME guideline level for freshwater aquatic life (6.5 mg/L) and below the CCME guideline for the lowest acceptable concentration for early life stages of salmonids and invertebrates (9.5 mg/L). However, these guidelines should be applied during times when salmonid spawning and invertebrate emergence occurs (CCME 1999). By September, when Lake Trout spawning took place in Tail Lake, DO concentration throughout the water column was consistently above the CCME guideline levels for all freshwater aquatic life stages (9.5 mg/L).

3.2.3 Light

Secchi depth was used to measure water transparency, and to estimate euphotic zone depth in Tail Lake. The Secchi and euphotic zone depths varied slightly between the July and August sampling, but were consistent between the August and September sampling dates (Table 3.2-1). The estimated 1% euphotic zone depth was greater than lake depth at all sampling dates revealing that more than 1% of the surface irradiance reaches the bottom of the lake. This indicates that sufficient light penetration exists for primary production to occur throughout the entire water column and implies that any limit to primary production must come from nutrient rather than light limitation.

3.3 WATER QUALITY

Water quality samples were collected at the Tail Lake permanent sampling station along with the physical limnology measurements. Samples were collected three times in 2011: July, August, and September. Triplicate samples were collected from a depth of 1 m below the water surface and 5 m below the water surface (approximately 1 m above the sediment surface) for a total of 6 samples at each sampling date.

All raw water quality data collected from Tail Lake in 2011 is found in Appendix 3.3-1. Realized detection limits can be found in both Table 2.4-1 and in Appendix 3.3-1. Water quality parameters that have CCME water quality guidelines for the protection of aquatic life (CCME 2011), as well as those recommended by DFO (Tyson et al. 2011) were graphed unless values consistently fell below analytical detection limits. Parameter concentrations were graphed to allow for comparisons between sampling depths and sampling dates.

3.3.1 Physical

Arctic lakes are often soft water, poorly buffered systems (0 – 30 mg $CaCO_3$), with relatively low levels of hardness, alkalinity, total dissolved solids, and conductivity (Pienitz et al. 1997; Ruhland and Smol

1998). Physical parameters from Tail Lake differed slightly from other Arctic and near-Arctic lakes (Pienitz et al. 1997; Ruhland and Smol 1998) with differences likely due to surrounding drainage basin characteristics (Healey and Woodall, 1973; Pienitz et al. 1997; Ruhland and Smol 1998). Tail Lake water would be classified as "soft" according to the USGS hardness classification, as hardness values in Tail Lake ranged from 32.1 to 35.7 mg/L (as $CaCO_3$) (Figure 3.3-1). Conductivity in Tail Lake (141 to 152 µS/cm) was higher than that found by Pienitz et al (1997) and Ruhland and Smol (1998), but lower than that found in Arctic lakes by Healey and Woodall (1973). Concentrations of total dissolved solids ranged from 69 to 90 mg/L.

Total alkalinity, a measure of the acid-neutralizing capacity of water, is often used as an index of the acid-sensitivity of a water-body. Table 3.3-1 summarizes the classification system used by Saffran and Trew (1996) for the acid-sensitivity of lakes in Alberta based on total alkalinity. Alkalinity in Tail Lake ranged from 26.5 mg/L in July to 30.2 mg/L in September (Figure 3.3-1) indicating a low sensitivity to acid. Tail Lake pH was slightly basic, ranging from 7.68 to 8.17, and well within the CCME guideline (6.5 to 9.0).

Table 3.3-1. Acid Sensitivity Classification of Lakes based on Total Alkalinity (as $CaCO_3$)

Acid Sensitivity	Total Alkalinity (as $CaCO_3$)
High	< 10 mg/L
Moderate	11–20 mg/L
Low	21–40 mg/L
Least	> 40 mg/L

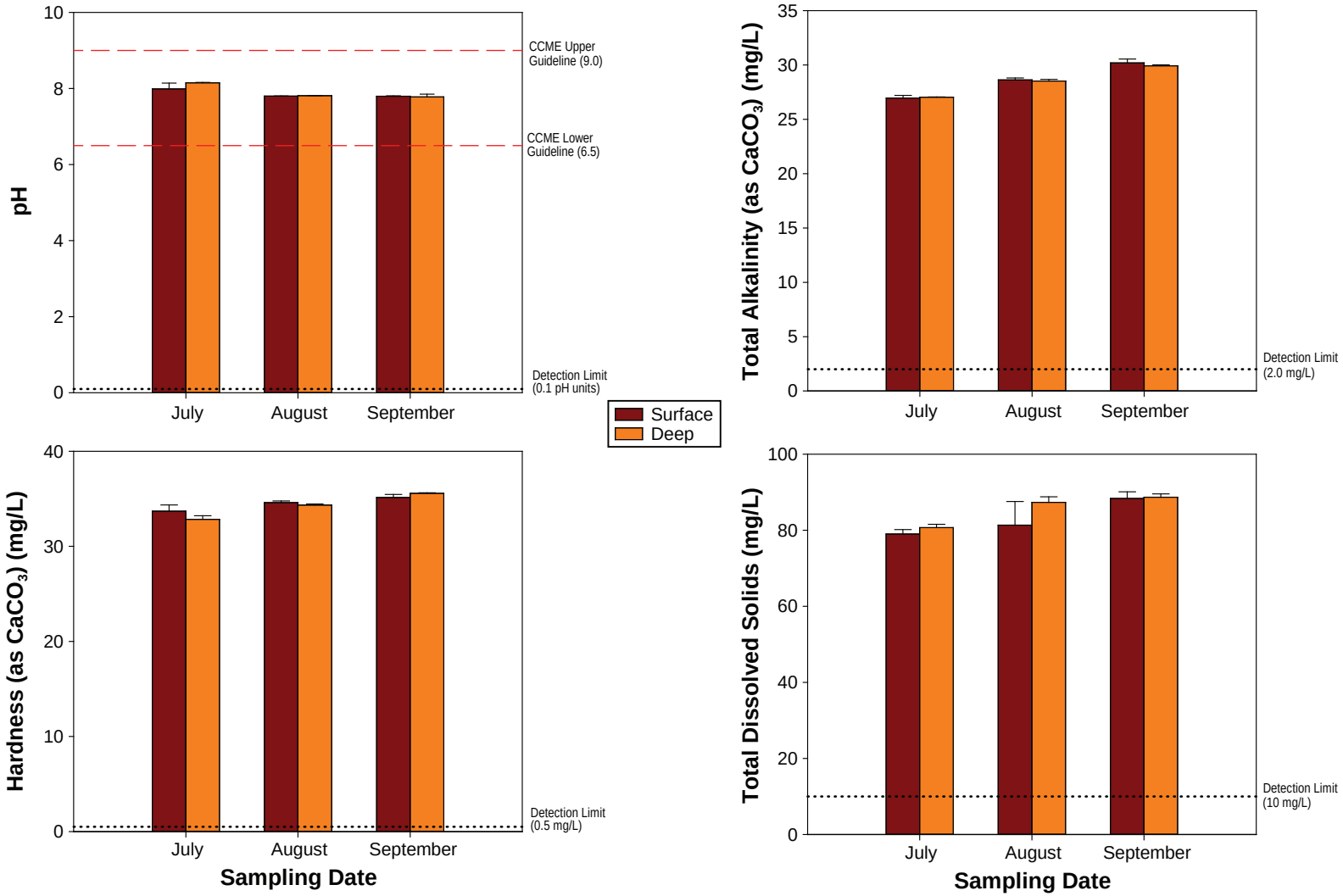
Source: Saffran and Trew (1996).

In general, pH, alkalinity, hardness, and total dissolved solid levels were similar between the surface and deep samples collected at a sampling date (Figure 3.3-1). PH levels decreased slightly between July and September, while alkalinity, hardness, and total dissolved solids increased slightly between July and September.

3.3.2 Suspended Material

Material suspended in the water column, whether dissolved or particulate, absorbs or reflects incoming irradiation, thereby affecting the light quantity and quality available to aquatic primary producers. Tail Lake was relatively free of suspended material, with no detectable levels of total suspended solids in July and September (TSS < 1.0 mg/L), and is characterized by low levels of turbidity (Figure 3.3-2). The absence of TSS indicates that the light regime is largely regulated by dissolved organic and inorganic material. Indeed, the low levels of light attenuating substances resulted in the clear water, deep Secchi depth and a euphotic zone that spans the surface to the bottom of Tail Lake (Table 3.2-1). Turbidity levels increased through the open water season from 0.77 mg/L in July to 1.6 mg/L in September (surface water concentrations), but the measurable euphotic zone was unaffected. This indicates that primary production was possible throughout the entire lake at all sampling periods.

Total Organic Carbon (TOC) consists of dissolved and particulate components, with dissolved organic carbon generally related to the surrounding vegetation in Arctic lakes (e.g., Pienitz et al. 1997). In Tail Lake, TOC was similar between sampling depths, but varied slightly among sampling dates with August showing the highest level (Figure 3.3-2). In surface water samples TOC ranged from 6.49 mg/L in July to 7.57 mg/L in August and 6.95 mg/L in September.



Notes: Error bars represent the standard error of the mean.
Black dotted lines represent the analytical detection limits.
Red dashed lines represent CCME water quality guidelines for the protection of freshwater aquatic life.

Figure 3.3-1

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Water pH, Alkalinity, Hardness, and Total Dissolved Solids in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.3-1

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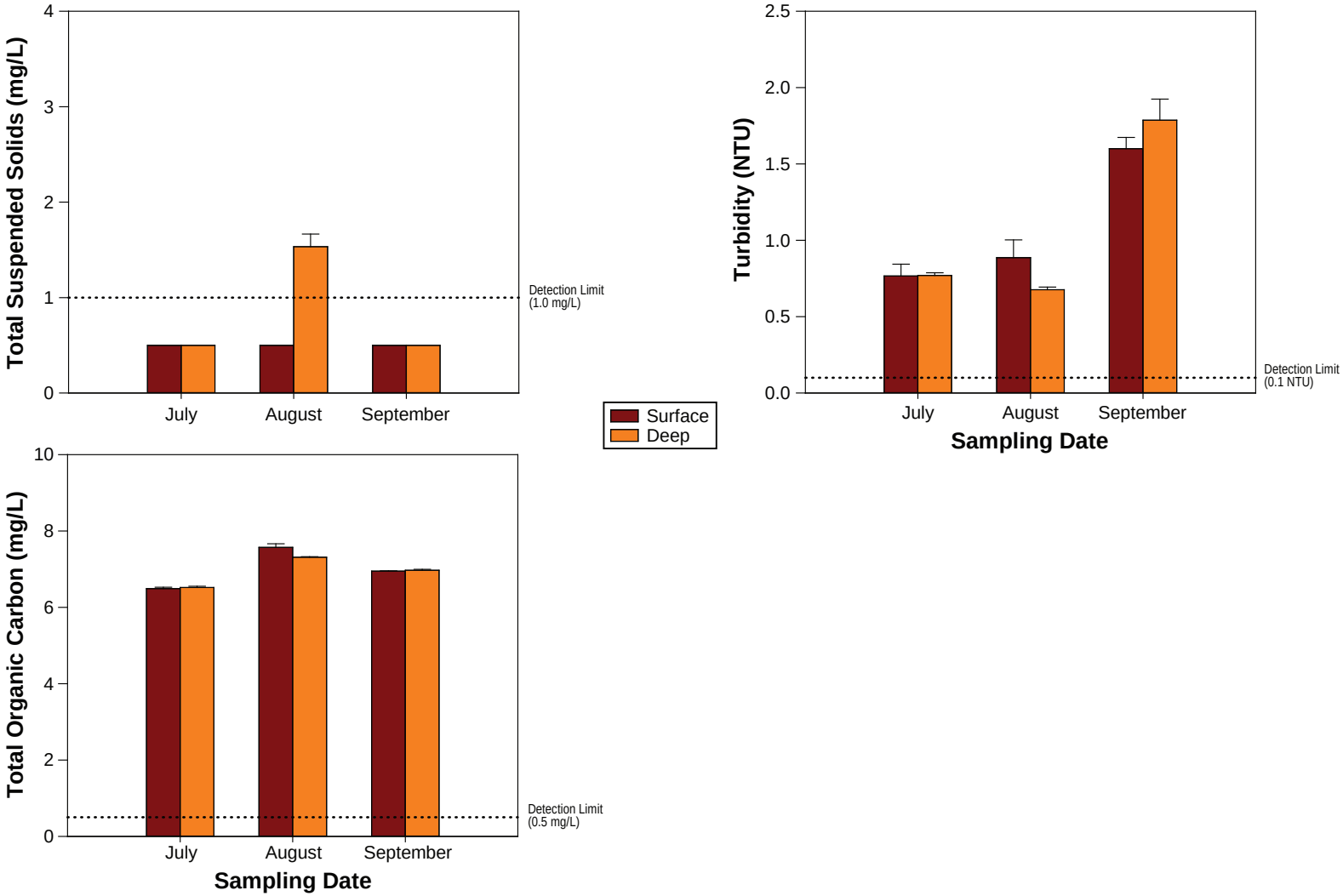

Notes: Error bars represent the standard error of the mean.
Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
The CCME water quality guidelines for total suspended solids and turbidity are dependent upon background levels.

Figure 3.3-2

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Total Suspended Solids, Turbidity, and Total Organic Carbon in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.3-2

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3.3.1 Nutrients

Nitrogen and phosphorus are key nutrients in aquatic ecosystems. The availability of the various forms of these two nutrients may limit, or strongly promote aquatic plant growth (primary production) and as a result secondary production. The list of nutrient parameters recommended by DFO (Tyson et al. 2009): include total phosphorus, total nitrogen (the sum of total Kjeldahl nitrogen, nitrite and nitrate), dissolved orthophosphate, silica and total dissolved nitrogen. Tail Lake had limited ammonia-N, nitrate-N, and nitrite-N. Concentrations of these nitrogen compounds were typically below detection limits (<0.005 mg/L, <0.005 mg/L <0.001 mg/L respectively; Figure 3.3-3, Appendix 3.3-1). Average total nitrogen concentrations in Tail Lake surface water ranged from 0.44 mg/L in July to 0.39 mg/L in August and 0.41 mg/L in September. It appears that the majority of total nitrogen was organic nitrogen (Appendix 3.3-1), which, in contrast to ammonia, is a form not easily available to plants for growth.

Like nitrogen, phosphorus is a critical macronutrient for plant growth in Arctic lakes. Tail Lake changed in trophic classification over sampling periods, from mesotrophic in July to oligotrophic in September, based on the CCME trigger ranges for phosphorus levels in freshwater systems (Table 3.3-2, Figure 3.3-4). Total phosphorus concentrations decreased between July and September from an average of 0.017 mg/L to 0.0097 mg/L. Total dissolved phosphorus concentrations were similar between depths, but decreased slightly from ~0.005 mg/L in July to ~0.0043 mg/L in September. The concentrations of dissolved orthophosphate were near the detection limit (0.001 mg/L) in July and August, and below detection in September (Figure 3.3-4).

Table 3.3-2. CCME Trigger Ranges for Total Phosphorus in Canadian Lakes and Rivers

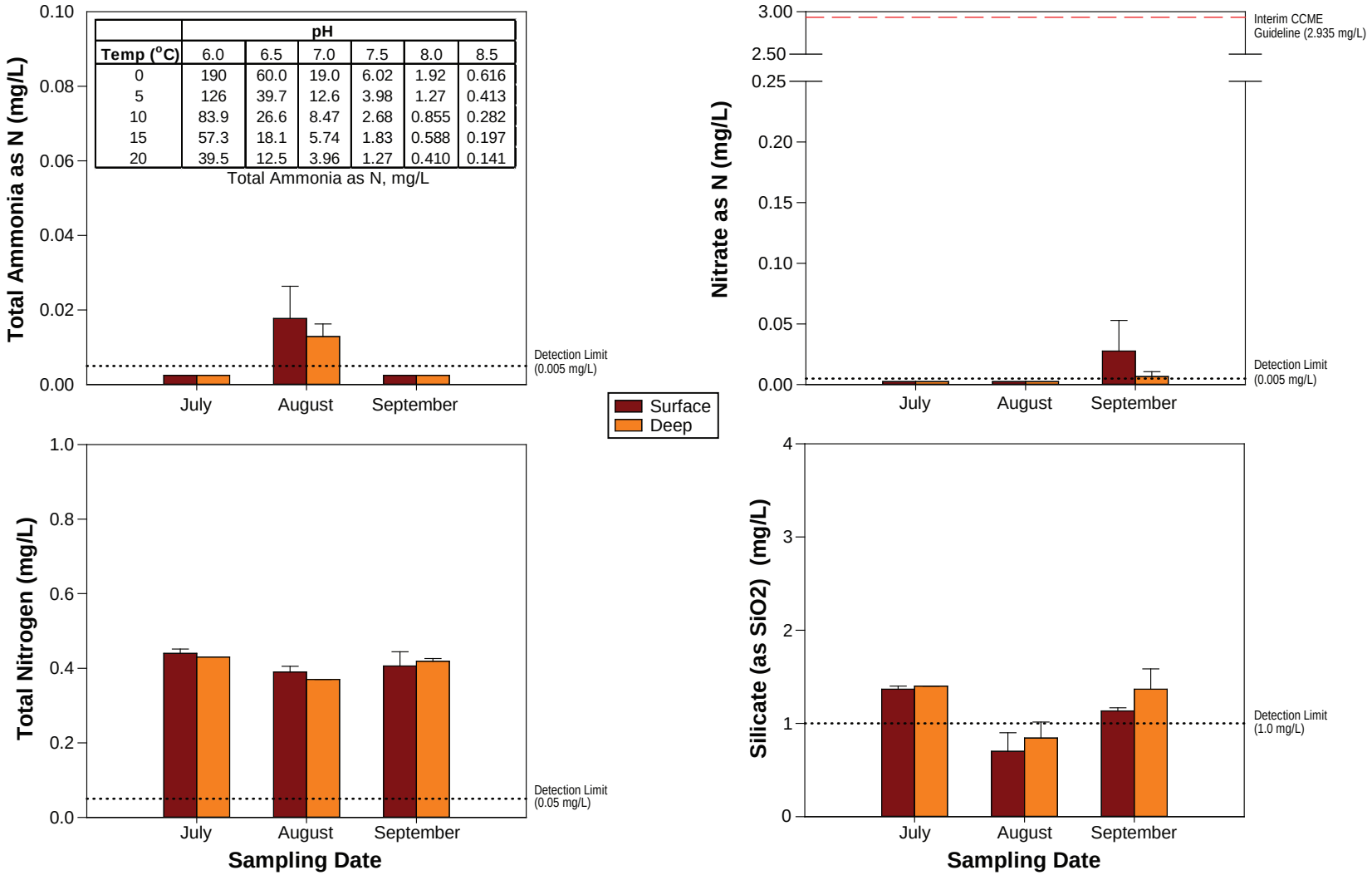
Trophic Status	Total phosphorus (µg/L)
Ultra-oligotrophic	< 4
Oligotrophic	4-10
Mesotrophic	10-20
Meso-eutrophic	20-35
Eutrophic	35-100
Hyper-Eutrophic	> 100

3.3.2 Cyanides

There are three classifications of cyanide: total cyanide, weak acid-dissociable (WAD) cyanide, and free cyanide. Total cyanide includes the free cyanides, WAD cyanide as well as the strong metal-cyanide complexes. WAD cyanide is often considered most important as it includes the toxicologically and environmentally important forms of cyanide: free cyanide and moderately strong metal-cyanide complexes. In Tail Lake, total cyanide was above detection limit at all sampling dates and depths (Figure 3.3-5). Total cyanide concentrations in the surface water samples ranged from 0.0049 mg/L in July to 0.0043 mg/L in August and 0.0047 mg/L in September. WAD cyanide concentrations were below detection limit (0.001 mg/L) in July and September. In August WAD cyanide concentrations averaged 0.0024 mg/L in surface samples and 0.0012 mg/L in the deep water samples. CCME guidelines for cyanide suggest that levels of free cyanide be less than 0.005 mg/L. The level of WAD cyanide, of which free cyanide is a component, fell well below the CCME guideline (Figure 3.3-5), indicating that the level of free cyanide is also well below the CCME guideline.

Temp (°C)	pH 6.0	6.5	7.0	7.5	8.0	8.5
0	190	60.0	19.0	6.02	1.92	0.616
5	126	39.7	12.6	3.98	1.27	0.413
10	83.9	26.6	8.47	2.68	0.855	0.282
15	57.3	18.1	5.74	1.83	0.588	0.197
20	39.5	12.5	3.96	1.27	0.410	0.141

Total Ammonia as N, mg/L



Notes: Error bars represent the standard error of the mean.
Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
Red dashed lines represent CCME water quality guidelines for the protection of freshwater aquatic life.
Inset table shows the pH- and temperature-dependent CCME guideline for total ammonia.

Figure 3.3-3

NEWMONT NORTH AMERICA

Ammonia, Nitrate, Total Nitrogen and Silicate in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.3-3

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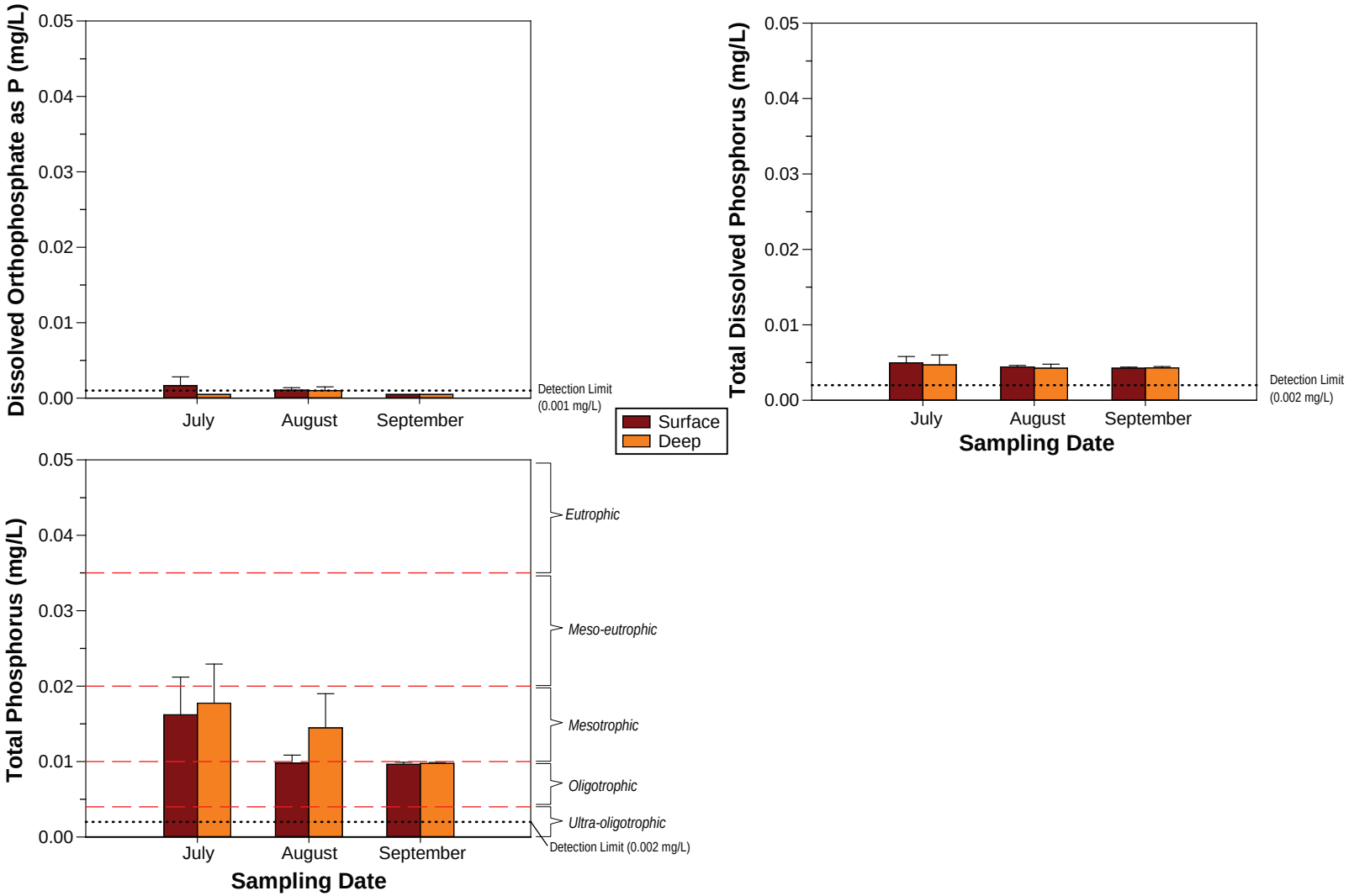

Notes: Error bars represent the standard error of the mean.
Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
Red-dashed lines represent CCME trigger ranges for total phosphorus (<0.004 mg/L = ultra-oligotrophic; 0.004–0.01 mg/L = oligotrophic; 0.01–0.02 mg/L = mesotrophic; 0.02–0.035 mg/L = meso-eutrophic; 0.035–0.1 mg/L = eutrophic; >0.1 mg/L = hyper-eutrophic).

Figure 3.3-4

NEWMONT NORTH AMERICA

Dissolved Orthophosphate, Total Dissolved Phosphorus, and Total Phosphorus in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.3-4

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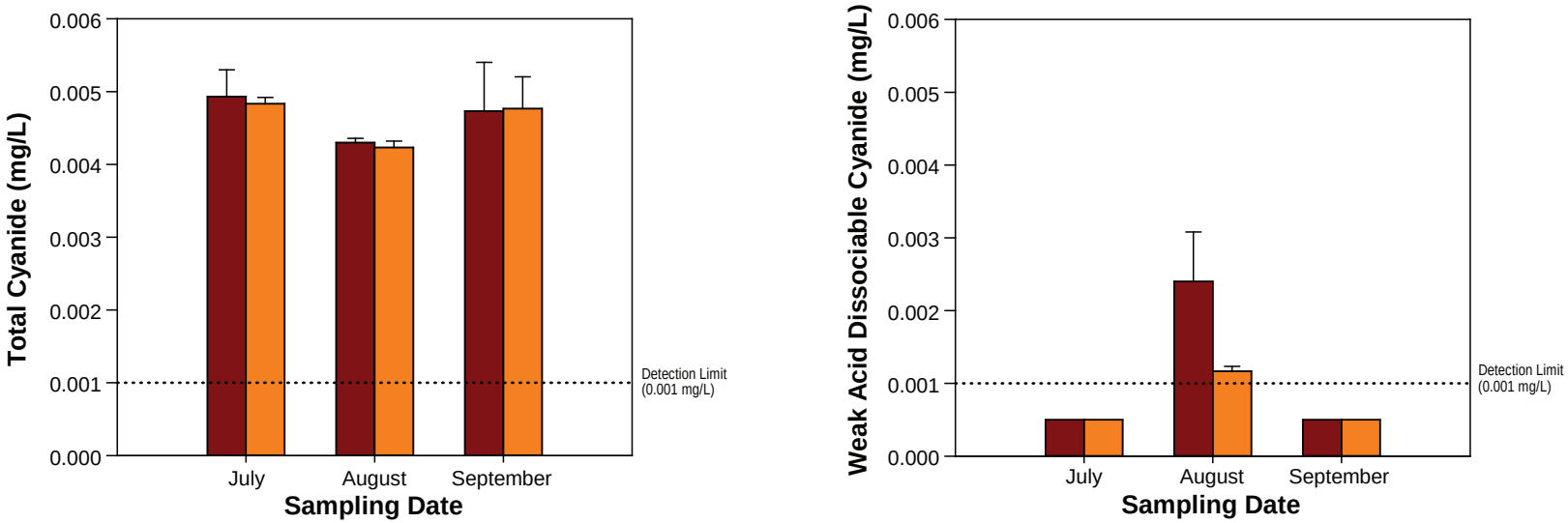

Notes: Error bars represent the standard error of the mean.
Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
The CCME water quality guideline for cyanide is 0.005 mg/L (as free cyanide).

Figure 3.3-5

NEWMONT NORTH AMERICA

Total Cyanide and Weak Acid Dissociable Cyanide in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.3-5

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3.3.3 Metals

Several additional water quality variables for which CCME water quality guidelines exist (CCME 2011) were included in the program. The following metals were included in the analyses of water samples: aluminum, arsenic, boron, chromium, copper, iron, lead, mercury, molybdenum, nickel, uranium, and zinc. Concentrations of cadmium, selenium, silver, and thallium were below the detection limits and these metals are not discussed further.

In most cases, the concentrations of metals were similar between surface and deep depths (Figures 3.3-6 to 3.3-8). The similarity between depths was expected due to the presence of a well-mixed water column present in Tail Lake during the sampling periods (Figure 3.3-1). Metal concentrations varied among sampling dates (Figures 3.3-6 to 3.3-8). In general, values measured during the September sampling period were higher than July and August, thought this trend was not uniformly consistent across all metals. A notable exception to this was the patterns observed for total copper and total lead (Figure 3.3-7), where the July concentrations exceeded that of August and September sampling events.

All water quality data collected from Tail Lake were compared to the CCME water quality guidelines for the protection of freshwater aquatic life (CCME 2011). In general, the concentrations of metals fell below the CCME guidelines, though the concentration of both copper and lead exceeded CCME guideline values in the July sampling period. Copper concentrations exceeded the calculated CCME guideline (0.002 mg/L) in one July deep water sample by a factor of 1.26 (Table 3.3-3). Lead concentrations exceeded the calculated CCME guideline (0.001 mg/L) in July, in two of the surface water samples and all three deep water samples. The guideline for lead was exceeded by a factor of 2.6 in surface water samples and 2.95 in the deep water samples. Note that the high concentration of lead in July samples may be due to contamination of the equipment (see Section 3.2.6 QA/QC equipment blank below).

3.3.4 QA/QC

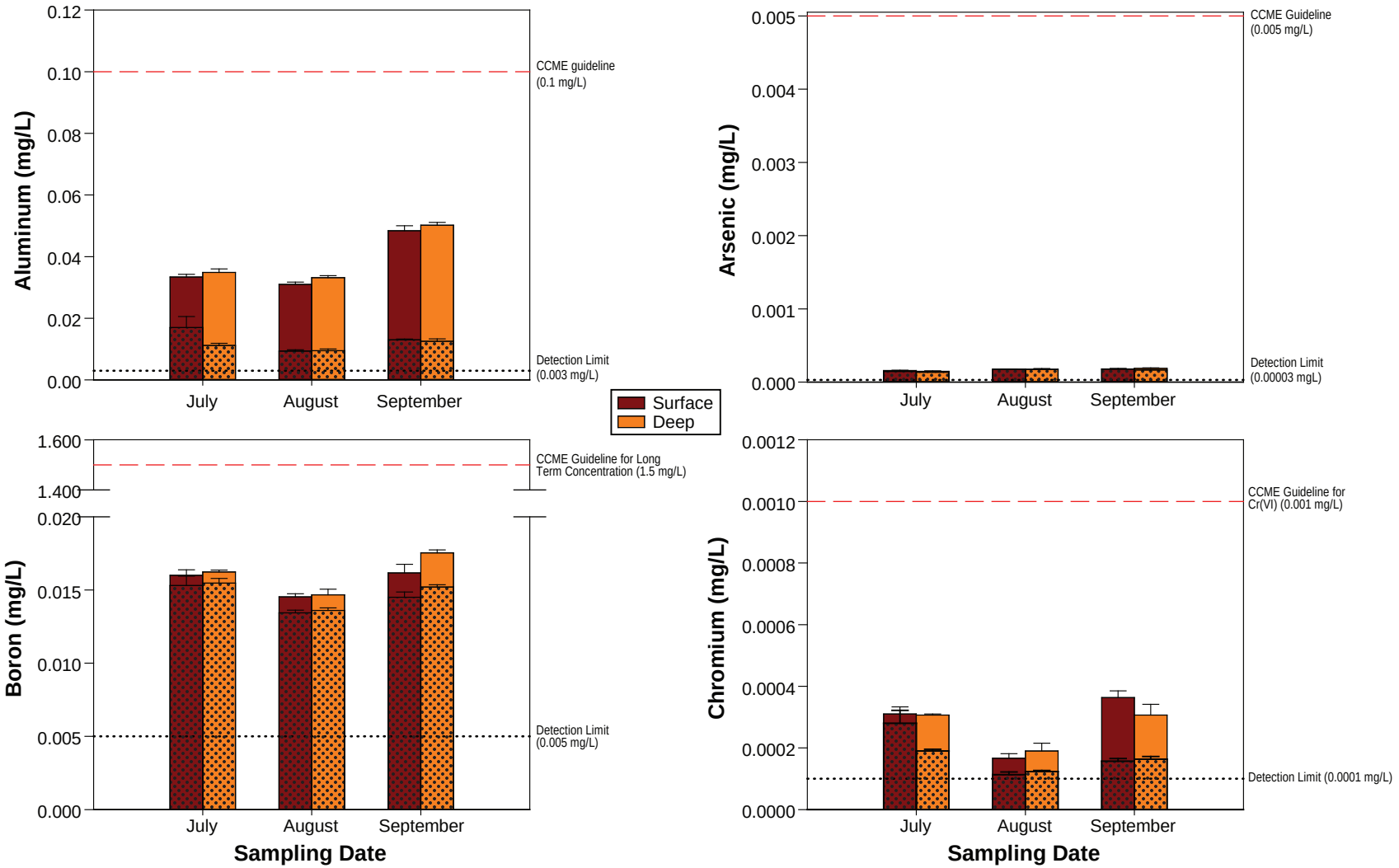
3.3.4.1 Duplicate Samples

The relative percent difference (RPD) was calculated between replicate samples collected from a sampling date and depth. To eliminate any bias, RPD was calculated for one randomly selected set of water quality samples from one sampling date and depth (July deep water samples). Since three water quality samples were collected, the RPD was calculated between the maximum and minimum values for each parameter. The results of the RPD calculations are included in Appendix 3.3-1.

Ninety-one water quality parameters were measured. Of these, 10 parameters or 9.1% had a RPD above the realized detection limit, and well within five times the detection limit (the range of analytical error). TKN was the only parameter with a calculated RPD above 20%, which may have resulted from sampling procedures.

3.3.4.2 Travel and Field Blanks

Results for the travel, field, and equipment blanks are presented in Appendix 3.3-1. Possible sources of contamination could be revealed if specific water quality variables in the respective blanks have concentrations greater than the analytical detection limit. The travel blanks had concentrations of ammonia (0.0108 mg/L) and boron (0.0111 mg/L) higher than analytical detection limits in July. However concentrations were less than five times the detection limit. The field blanks had concentrations of ammonia (0.029 mg/L) slightly higher than five times the detection limit in August. Boron concentration (0.0103 mg/L) in the July field blank exceeded the detection limit, but was less than five times the detection limit.



Notes: Error bars represent the standard error of the mean.
Solid bars represent total metals concentrations and superimposed dotted bars represent dissolved metal concentrations.
Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
Red dashed lines represent CCME water quality guidelines for the protection of freshwater aquatic life.

The CCME guideline for aluminum is pH-dependent (0.005 mg/L at pH < 6.5; 0.1 mg/L at pH ≥ 6.5); pH was greater than 6.5 in all Tail Lake samples.
The CCME guideline for boron is 1.5 mg/L for a long term concentration and 29 mg/L for a short term concentration.
The CCME guideline for chromium is dependent on its speciation (0.001 mg/L for Cr(VI); 0.0089 mg/L for Cr(III)).

Figure 3.3-6

NEWMONT NORTH AMERICA

Aluminum, Arsenic, Boron, and Chromium Concentrations in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.3-6

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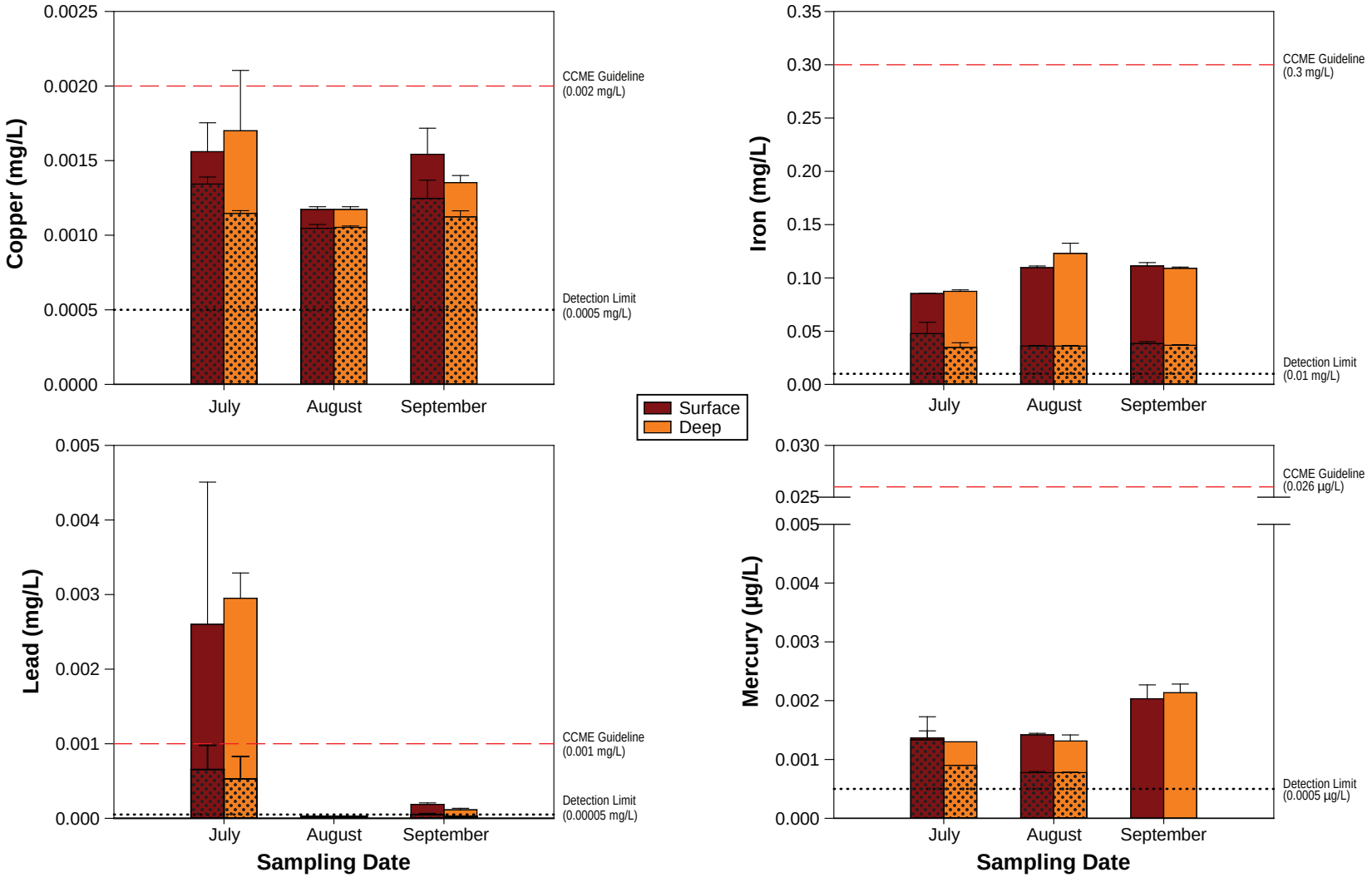

Notes: Error bars represent the standard error of the mean.
Solid bars represent total metals concentrations and superimposed dotted bars represent dissolved metal concentrations.
Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
Red dashed lines represent CCME water quality guidelines for the protection of freshwater aquatic life.

The CCME guidelines for copper and lead are hardness dependent.
The site-specific CCME guidelines for copper (0.002 mg/L) and lead (0.001 mg/L) are based on the hardness (as $CaCO_3$) range in Tail Lake of 32.1 to 35.7 mg/L.
The CCME guideline for mercury is for inorganic mercury (0.026 µg/L).

Figure 3.3-7

NEWMONT NORTH AMERICA

Copper, Iron, Lead, and Mercury Concentrations in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.3-7

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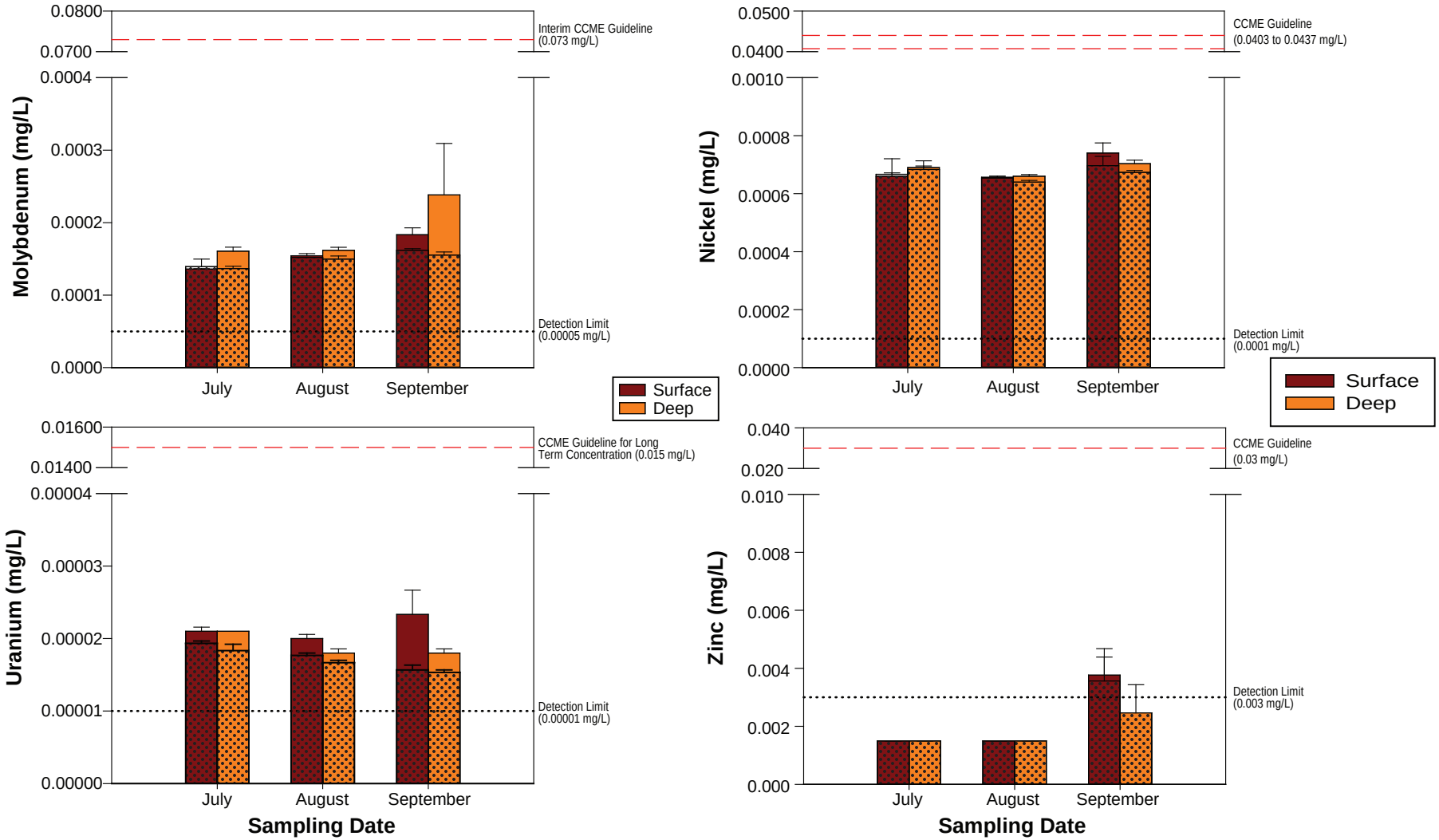

Notes: Error bars represent the standard error of the mean.
Solid bars represent total metals concentrations and superimposed dotted bars represent dissolved metal concentrations.
Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
Red dashed lines represent CCME water quality guidelines for the protection of freshwater aquatic life.

The CCME guideline for nickel is hardness dependent.
The minimum and maximum site-specific CCME guidelines for nickel (0.0403 and 0.0437 mg/L) are based on the hardness (as $CaCO_3$) range in Tail lake of 32.1 to 35.7 mg/L.
The CCME guideline for uranium is 0.015 mg/L for a long term concentration and 0.033 mg/L for a short term concentration.

Figure 3.3-8

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Molybdenum, Nickel, Uranium, and Zinc Concentrations in Tail Lake, Doris North Project, 2011

Figure 3.3-8

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Table 3.3-3. Lake Water Quality, Percent Samples which Exceed CCME Guidelines and Magnitude, Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

		July - Surface		July -Deep		August - Surface		August - Deep		September - Surface		September - Deep	
Parameter	CCME Guideline Value[a]	Percent Exceedance	Average Factor Exceedance	Percent Exceedance	Average Factor Exceedance	Percent Exceedance	Average Factor Exceedance	Percent Exceedance	Average Factor Exceedance	Percent Exceedance	Average Factor Exceedance	Percent Exceedance	Average Factor Exceedance
General													
pH	6.5 - 9.0	0	0	0	0	0	0	0	0	0	0	0	0
Ammonia (as N)	pH and temperature dependent	0	0	0	0	0	0	0	0	0	0	0	0
Nitrate (as N)	2.935 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Nitrite (as N)	0.06 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Total Phosphorus	Trophic status[b]	Mesotrophic	-	Mesotrophic	-	Oligotrophic	-	Mesotrophic	-	Oligotrophic	-	Oligotrophic	-
Total Metals													
Aluminum (Al)	0.005 or 0.1 mg/L[c]	0	0	0	0	0	0	0	0	0	0	0	0
Arsenic (As)	0.005 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Boron (B)	1.5 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Cadmium (Cd)	hardness dependent[d]	0	0	0	0	33%	1.7	0	0	0	0	0	0
Chromium (Cr)	0.001 or 0.0089 mg/L[e]	0	0	0	0	0	0	0	0	0	0	0	0
Copper (Cu)	hardness dependent[f]	0	0	33%	1.26	0	0	0	0	0	0	0	0
Iron (Fe)	0.3 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Lead (Pb)	hardness dependent[g]	67%	2.6	100%	2.95	0	0	0	0	0	0	0	0
Mercury (Hg)	0.000026 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Molybdenum (Mo)	0.073 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Nickel (Ni)	hardness dependent[h]	0	0	0	0	0	0	0	0	0	0	0	0
Selenium (Se)	0.001 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Silver (Ag)	0.0001 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Thallium (Tl)	0.0008 mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Uranium (U)	0.33 mg/L or 0.15 mg/L[i]	0	0	0	0	0	0	0	0	0	0	0	0
Zinc (Zn)	0.3 mg/L	0	0	0	0	0	0	0	0	0	0	0	0

Note: samples below detection limit were replaced with half the detection limit for analysis.

a) Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Updated January 2011.

b) Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004-0.01 = Oligotrophic; 0.01-0.02 = Mesotrophic; 0.02-0.035 = Meso-eutrophic; 0.035-0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

c) 0.005 mg/L at pH<6.5; 0.1 mg/L at pH>6.5

d) Guideline is hardness-dependent: cadmium guideline (mg/L) = $10^{\{0.86[\log(\text{hardness})]-3.2\}}$ / 1000.

e) 0.001 mg/L for hexavalent chromium (Cr (VI)); 0.0089 mg/L for trivalent chromium (Cr(III))

*f) Guideline is hardness-dependent: copper guideline (mg/L) = $e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ * 0.0002. Copper guideline is a minimum of 0.002 mg/L regardless of water hardness*

g) Guideline is hardness-dependent: lead guideline (mg/L) = $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ / 1000. Lead guideline is a minimum of 0.001 mg/L regardless of hardness

h) Guideline is hardness-dependent: nickel guideline (mg/L) = $e^{\{0.76[\ln(\text{hardness})]+1.06\}}$ / 1000. Nickel guideline is a minimum of 0.025 mg/L regardless of water hardness

i) 0.33 mg/L short term; 0.15 mg/L long term

3.3.4.3 Equipment Blanks

The equipment blank samples in July had concentrations greater than five times the detection limit (the range of analytical error) for conductivity, cyanide-total, aluminum, chromium, lead, manganese, nickel and zinc (Appendix 3.3-1). However, this does not appear to be an issue as Tail Lake sample concentrations were either below the blank concentrations (e.g., cyanide-total, aluminum, chromium, zinc), or concentrations were consistent between sampling dates when the equipment blanks were below detection limits (e.g., conductivity, manganese, nickel).

In August, the equipment blank had two parameters (nitrate and barium) that measured more than five times the analytical detection limit. Again, this did not seem to have an effect on the concentrations measured from Tail Lake; as nitrate concentrations were always below detection limit, and barium concentrations were consistent across all sampling dates (Appendix 3.3-1).

The September equipment blank samples had concentrations greater than five times the detection limit for conductivity, nitrate, total organic carbon, cyanide-total, aluminum, barium, calcium, strontium and tin (Appendix 3.3-1). The presence of these parameters in the equipment blank did not seem to effect concentrations of total organic carbon, cyanide-total, aluminum, barium, calcium, strontium, or conductivity in the Tail Lake samples, as concentrations for these parameters were either lower than the blank concentrations or consistent across the sampling dates and depths irrespective of equipment blank concentrations. The presence of nitrate and tin in the GO-FLO may have affected the measured concentrations of these parameters in the September Tail Lake samples. Nitrate and tin were only detected in Tail Lake in September, when they were also more than five times the detection limit in the equipment blank.

Contamination from the equipment may have affected the results for lead concentrations. Tail Lake sample concentrations for lead were similar to equipment blank concentration at all sampling events. In July the equipment blank measured a lead concentration of 0.00352 mg/L and Tail Lake samples had concentrations of 0.000123 – 0.00635 mg/L. In August, the equipment blank had a lead concentration below the detection limit, and Tail Lake samples also had lead concentrations below the detection limit. In September, the equipment blank had a lead concentration of 0.00022 mg/L, and the Tail Lake surface water samples had concentrations of 0.000210—0.000147 mg/L.

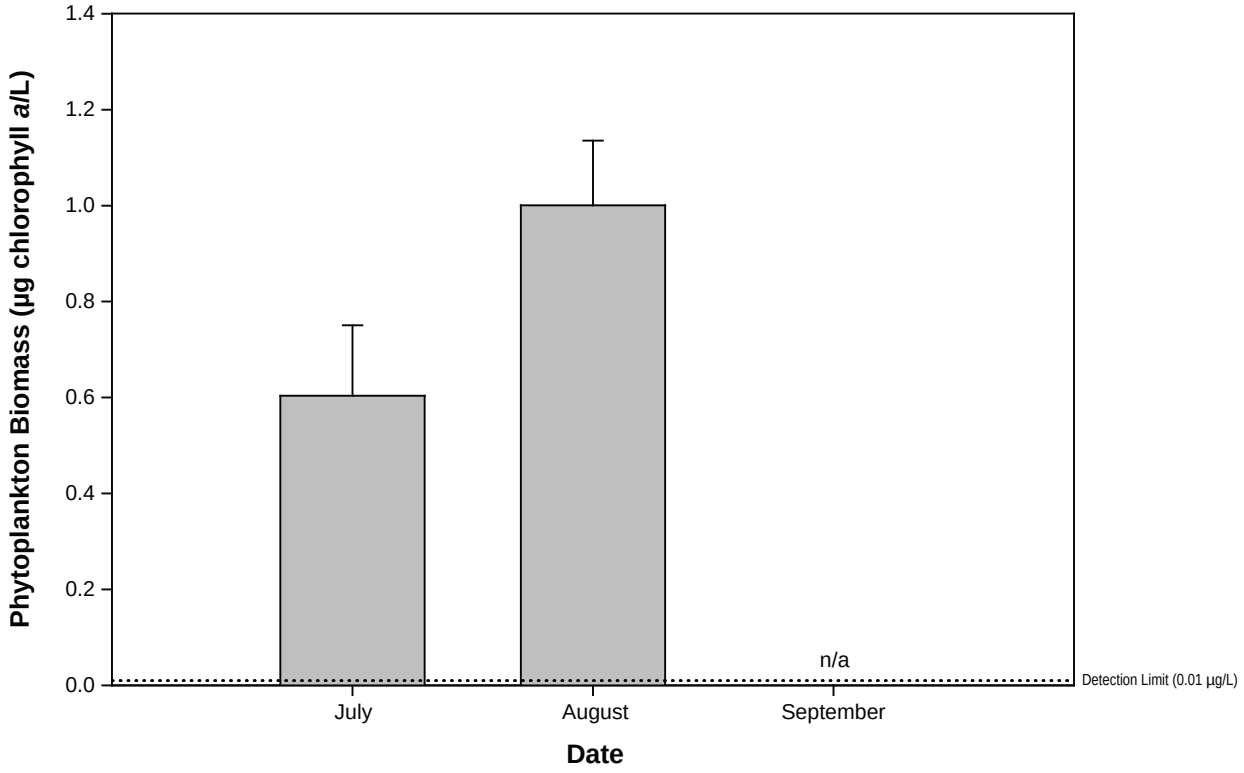
3.4 AQUATIC BIOLOGY

3.4.1 Phytoplankton Biomass

In July, August and September, 2011, triplicate chlorophyll *a* samples were collected as an estimate of phytoplankton biomass in Tail Lake. Chlorophyll *a* concentration from each sample are included in Appendix 3.4-1. Mean phytoplankton biomass (as chlorophyll *a*) in Tail Lake was 0.604 µg/L in July and increased to 1.001 µg/L in August (Figure 3.4-1). September samples were damaged or lost by the analytical lab and are therefore unavailable.

3.4.2 Zooplankton

Zooplankton occupy the water column and are predominantly primary consumers, feeding mainly on phytoplankton and diatoms, or secondary consumers, feeding on smaller zooplankters. In 2011, zooplankton samples were collected at the Tail Lake permanent survey station during the July, August and September open water sampling events. At each sampling event, three zooplankton biomass and three zooplankton taxonomy samples were collected. Appendices 3.4-2 and 3.4-3 list the zooplankton biomass, taxonomy and enumeration results.



Note: Error bars represent the standard error of the mean.
n/a = Results for September samples are not available due to loss at or on route to ALS Environmental Labs.

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Chlorophyll *a* Concentrations in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.4-1

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Zooplankton taxonomy samples were used to identify and enumerate zooplankton species and to determine community composition. Mean zooplankton density in Tail Lake was greatest in July ($44.34\times10^{-4}/m^3$) and decreased in August and again, to the lowest level, in September ($13.75\times10^{-4}/m^3$) (Figure 3.4-2). In contrasts, zooplankton biomass increased between July (438.9 mg/m^3) and August (673.7 mg/m^3) as the zooplankton community moved from one being dominated by small rotifers and daphnia to one with a greater number of larger copepod (Figure 3.4-2). Zooplankton biomass was lowest in September (180.9 mg/m^3).

In July, the zooplankton community was dominated by cladocerans (Daphnidae) and rotifers (Figure 3.4-2). Specifically, the July community was dominated by the species *Daphnia longiremis* (39.9%), *Kellicottia longispina* (39.5%) and *Asplanchna* (13%; Table 3.4-1). Cladocerans and rotifers typically hatch and grow rapidly in the spring, feeding on phytoplankton and produce large numbers of young quickly. Copepod eggs also hatch in the spring, but their maturation rate is slower. As a result, there was an increase in the number of copepods as summer progresses. This pattern was seen as a change in community composition between July and August, where the zooplankton community switched from one dominated by cladocerans and rotifers to one dominated by copepods and cladocerans. In August, the major groups contributing to community composition were an unidentified species in the order Cyclopoida (43.9%), and the cladoceran species *Daphnia longiremis* (40%) and *Bosmina longirostris* (4.8%). The September zooplankton community was comprised of an unidentified Cyclopoida (52.8%), *Daphnia longiremis* (15.9%), and the rotifer *Keratella cochlearis* (9.1%). In July, the zooplankton community was dominated by daphnia and rotifers that filter feed on phytoplankton and detritus. Through August and September, daphnia and rotifers became less abundant and copepods which prey upon rotifers became more abundant.

Table 3.4-1. Top Three Most Abundant Zooplankton Species in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

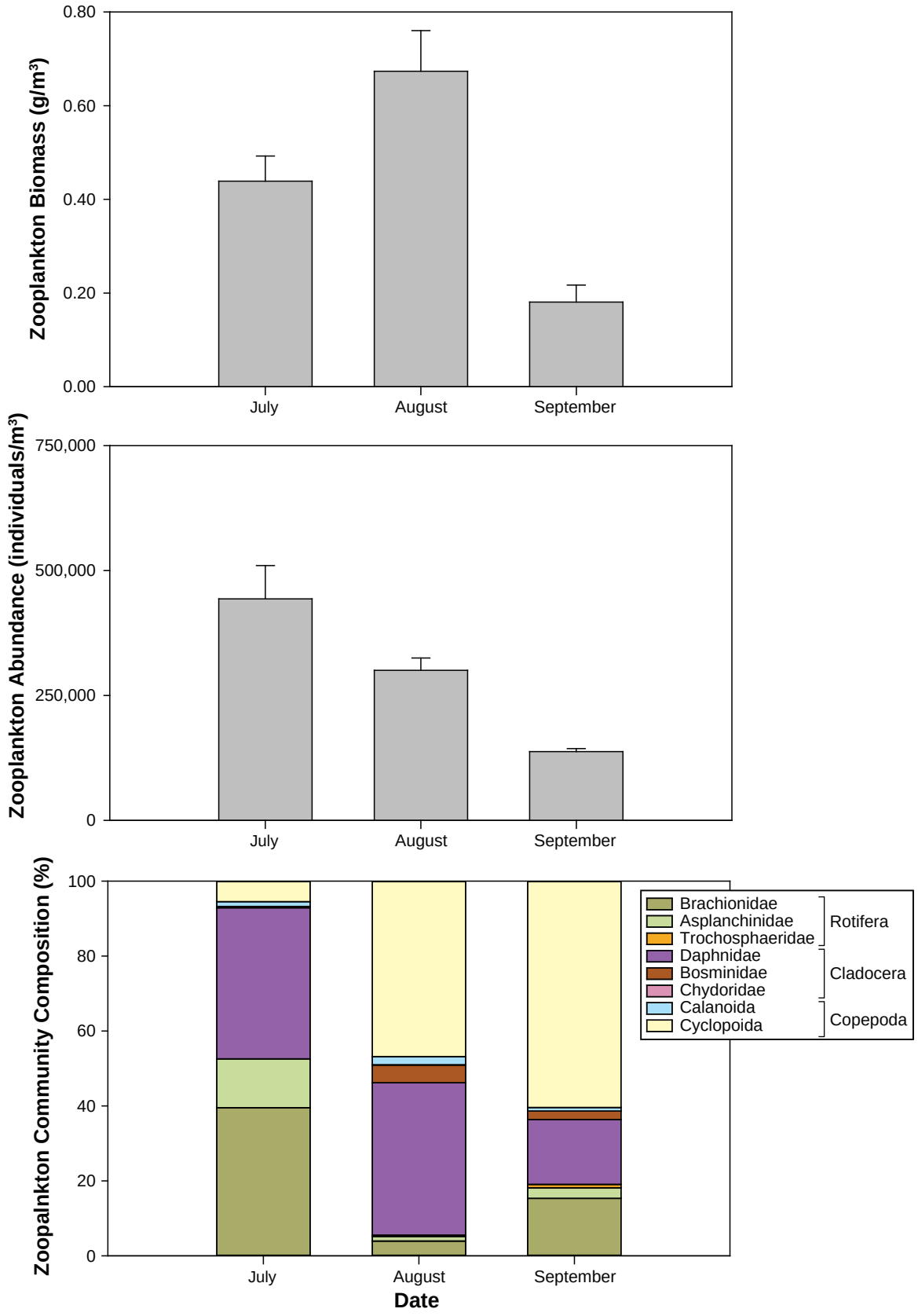
Sampling Date	Major Taxonomic Group	Family	Most Abundant Genera	Species (where identified to species)	Percent Abundance (%)[1]
24-Jul-11	Cladocera	Daphnidae	*Daphnia*	*longiremis* and *middendorffiana*	40.3
	Rotifera	Brachionidae	*Kellicottia*	*longispina*, *quadrata* and *cochlearis*	39.6
	Rotifera	Asplanchinidae	*Asplanchna*	-	13.0
18-Aug-11	Cladocera	Daphnidae	Daphnia	*longiremis* and *middendorffiana*	40.7
	Cladocera	Daphnidae	*Bosmina*	*longirostris*	4.8
	Rotifera	Brachionidae	*Kellicottia*	*longispina* and *quadrata*	3.9
17-Sep-11	Cladocera	Daphnidae	Daphnia	*longiremis* and *middendorffiana*	17.3
	Rotifera	Brachionidae	*Keratella*	*longispina* and *quadrata*	15.3
	Copepoda	Cyclopidae	*Cyclops*	*scutifer* and unidentified copepodites	7.6

Note: This table considered only individuals identified down to the genus level.
Unidentified copepod naupli made up between 1.5% and 53% of samples.
[1]Average percent of genus out of total individuals collected in samples, including unidentified individuals.

3.4.3 Benthic Macroinvertebrates

Benthic invertebrates live in and on the lake bottom, and can be an important food source for fish.

Benthic macroinvertebrate samples were collected from four depth zones in Tail Lake: 0—2 m, 2—4 m, 4—6 m, and 6—8 m (6 m to maximum lake depth) (Figure 2.1-1). All samples were analyzed for invertebrate taxonomy, density and biomass (Figure 3.4-3). All benthic invertebrate taxonomy and abundance data are found in Appendix 3.4-4. Benthic invertebrate density, the percent composition of major groups, average number of taxa, and the number of genera contributing to 90% of abundance were determined (Appendix 3.4-5).



Note: Error bars represent standard error of the mean.
Community composition values represent the mean of replicates.

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Zooplankton Biomass, Density and Community Composition in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.4-2

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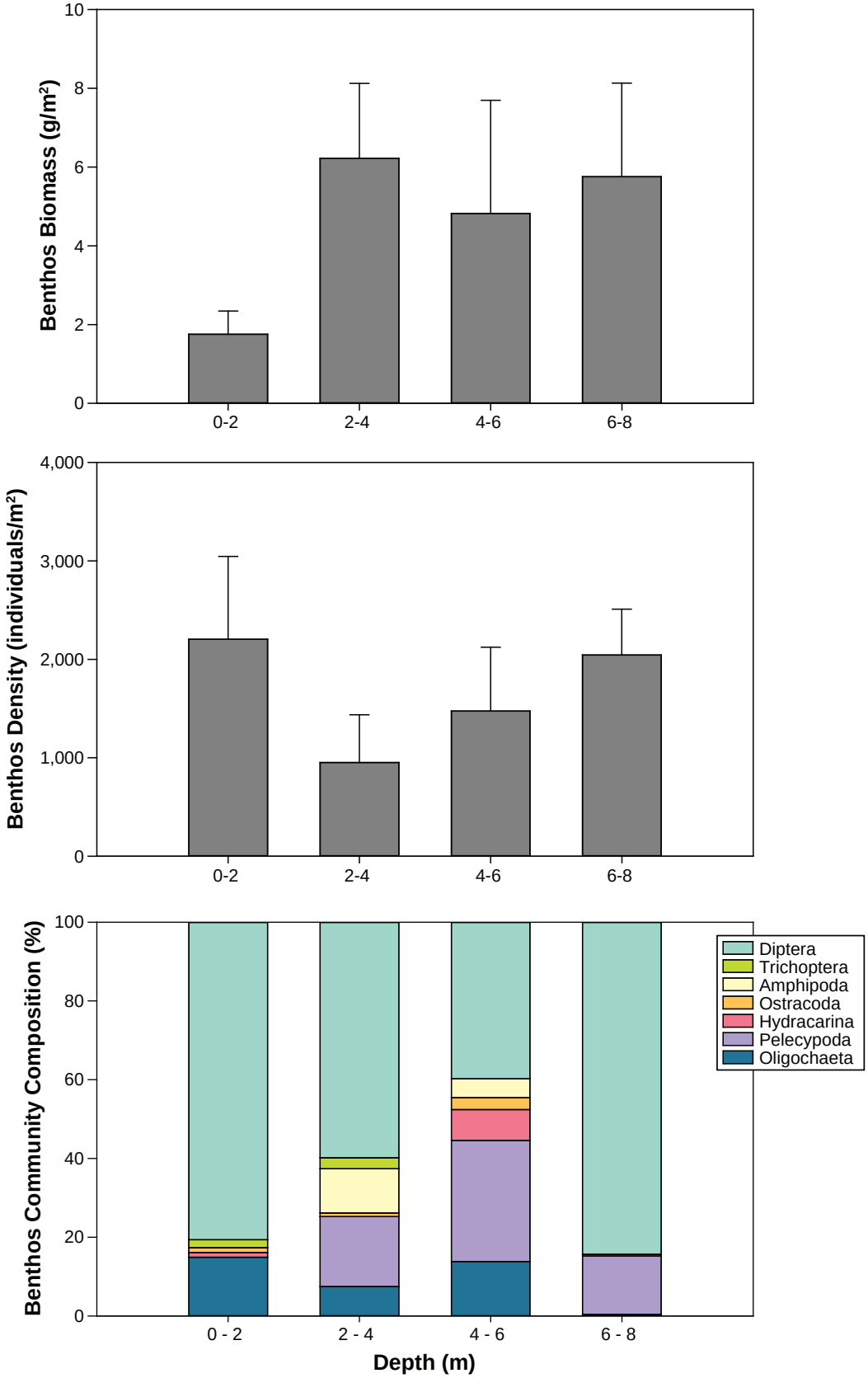

Note: Error bars represent standard error of the mean.
Community composition values represent the mean of replicates.

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Benthic Invertebrate Density and Percent Composition of Major Taxonomic Groups in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.4-3

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Benthic samples can include non-benthic genera such as zooplankton, fish, amphibians and terrestrial invertebrates. All taxa that were not benthic macroinvertebrates were removed from the data set prior to analysis of benthic macroinvertebrate community composition and abundance. When multiple life-stages were present (e.g., pupae and larvae), they were grouped together. When an invertebrate could not be identified to genus level, a single genus was assumed.

3.4.3.1 Density, Biomass and Community Composition

Figure 3.4-3 illustrates mean benthic invertebrate density in each Tail Lake sampling depth-zone. Mean benthic invertebrate density was greatest from 0—2 m depth (2,204 invertebrates/m^2), though this was very similar to the density observed in the 6 m to maximum lake depth (2,044 invertebrates/m^2). Benthic invertebrate density was lowest in the 2—4 m zone (951 invertebrates/m^2), and then increased steadily from 2 to 6 m, and 6 m to maximum depth. Median benthic invertebrate density followed a similar pattern as mean density, with greatest abundance in 6—8 and 0—2 m depth zones.

Mean benthic invertebrate biomass increased sharply between the shallowest depth (0—2 m) and the 2—4 m zone (Figure 3.4-3). Though some variation in biomass is observed among the 2—4, 4—6 and 6 m to maximum depth zones, mean biomass remained much higher when compared with the 0—2 m zone.

Benthic invertebrate community composition changed with depth in Tail Lake, though all depth classes were dominated by the Diptera (Figure 3.4-3; Table 3.4-2). As depth increased from 0-2, to 2-4 and to 4-6 m, the contribution of diptera to community composition decreased, though still it remained the dominant taxon. At depths beyond 6 m, the contribution of diptera to community composition increased sharply, comprising greater than 80% of community. Changes in community composition with depth were also present in other taxa: Oligochaeta, Hydracarina and Ostracoda were only found at depths less than 6 m; Trichoptera were only found at depths less than 4 m; Amphipoda were found between 2 and 6 m deep; and Pelecypoda were found at depths greater than 2 m (Figure 3.4-3).

Table 3.4-2. Three Most Abundant Benthic Invertebrates Occurring at Different Depth Zones in Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Depth Zone	Major Group	Family	Subfamily	Tribe	Genus	Percent Abundance (%)
0 to 2 m	Diptera	Chironomidae	Chironominae	Tanytarsini	*Cladotanytarsus*	36.14
	Diptera	Chironomidae	Chironominae	Tanytarsini	*Tanytarsus*	11.52
	Oligochaeta	Naididae	Tubificinae	-	-	8.9
2 to 4 m	Diptera	Chironomidae	Chironominae	Chironomini	*Stictochironomus*	31.5
	Oligochaeta	Lumbriculidae	-	-	-	26.1
	Diptera	Chironomidae	Chironominae	Chironomini	*Sergenta*	9.6
4 to 6 m	Pelecypoda	Sphaeriidae	-	-	*Pisidium*	15.28
	Diptera	Chironomidae	Prodiamesinae	-	*Monodiamesa*	13.09
	Oligochaeta	Lumbriculidae	-	-	-	11.6
6 to 8 m	Diptera	Chironomidae	Chironominae	Tanytarsini	*Tanytarsus*	37.56
	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus*	28.67
	Diptera	Chironomidae	Tanypodinae	Procladiini	*Procladius*	14.4

Note: This table considered only individuals identified down to the genus level.
Individuals unidentified to the genus level made up made up between 7% and 39% of samples.
[1]Average percent of genus out of total individuals collected in samples, including unidentified individuals.

Depth specific results show that, at 0—2 m depths, the community was comprised of 80.6% diptera, 14.9% oligochaeta (segmented worms), 2.0% trichoptera (caddisflies), ~1% hydracarina (mites) and ostracoda. At 2—4 m depths, the community was comprised of 59.8% diptera, 7.5% oligochaeta, 17.8% pelecypoda (freshwater molluscs), 11.2% amphipoda, and 2.8% trichoptera. At 4—6 m depths, the community was comprised of 39.7% diptera, 30.7% pelecypoda, 13.8% oligochaeta, 7.8% hydracarina, 4.8% amphipoda. At depths greater than 6 m, the community was primarily comprised of diptera (84.3%) and pelecypoda (14.7%).

Although the order diptera was the dominant major taxonomic group at all depths, the dominant genus varied with depth (Table 3.4-2). At 0—2 m depth, the Chironomidae *Cladotanytarsus* and *Tanytarsus* were the dominant genera followed by the oligochaeta family Nadidae. At 2—4 m depth, the chironomidae *Stictochironomus* were dominant, followed by the oligochaeta family Lumbriculidae. At 4—6 m depth, the freshwater mollusk *Pisidium* was the most dominant genus followed by the chironomidae Monodiamesa. At depths greater than 6 m, the Chironomidae *Tanytarsus, Chironomus* and *Procladius* were the top three dominant genera and are typically abundant in boreal lakes regardless of environmental conditions (Mousavi 2002).

The number of benthic invertebrate taxa and the number of genera that contributed to 90% of invertebrate abundance varied with sampling depth. The average number of benthic invertebrate taxa was greatest in samples from the 0 —2 m depth zone (11 taxa), and 4—6 m depth zone (8 taxa). The number of taxa decreased in the 2—4 m and 6—8 m depth zones (5 and 6 taxa respectively). The 0—2 and 4—6 m depth zones also had the greatest number of genera required to contribute to 90% abundance. At 0-2 m depth, 11 taxa were required to reach 90% abundance. At 4-6 m depth, 10 taxa were required to reach 90% abundance. However in 2-4 m depths and 6-8 m depths, 90% abundance was reached with only 7 and 4 taxa respectively, indicating a less diverse community at these depths.

QA/QC

Benthic invertebrate samples are often quite large, complex, and often filled with debris. Initial processing of benthic samples requires sorting and separating the benthic invertebrates from the substrate. This process is labour intensive and meticulous, and the efficiency and accuracy of completing it may affect benthic invertebrate abundance and community composition results. To determine sorting efficiency, ten percent of the benthic samples from Tail Lake were re-sorted, resulting in an estimated 100% sorting efficiency by the taxonomist (Table 3.4-3).

Table 3.4-3. Benthic Invertebrate Sample Sorting Efficiency QA/QC

Sample	Replicate	Percent Sorting Efficiency
TL 02	4	[1-(0/(18+0))]*100 = 100
TL 46	2	[1-(0/(14+0))]*100 = 100
		Average efficiency - 100%

Calculated using % sorting efficiency equation found in Section 2.6.1.2.

3.5 PHYSICAL HABITAT INVENTORY

A littoral habitat survey of Tail Lake was conducted during the end of the Final Removal Phase. Fish habitat data collected during this survey are presented in Appendix 3.5-1. A small volume of water was being transferred from Tail Lake to Doris Creek in order to preserve the partially constructed frozen core dam. Thus, the water level at the end of this phase was considered the lowest elevation achieved, providing the best opportunity to visibly survey littoral fish habitat. A visual habitat survey was conducted by boating around the perimeter of the lake and delineating habitat units. The boundaries

of these habitat units were defined by abrupt changes in the composition or characteristics of the visible littoral habitat. Habitat (predominately substrate and cover) data are summarized in Table 3.5-1. The substrate composition of each habitat unit assessed is described as a percent of the total littoral lake area. Based upon the characteristics of the visible littoral habitat, Tail Lake was divided into 34 habitat units (Figure 3.5-1).

Organic substrate accounted for the vast majority of the overall substrate composition in the littoral zone of Tail Lake. These data confirm observations of past fish habitat studies (Golder 2007) which further characterized habitat units for the purposes of fish habitat compensation. Although organic substrates are typically considered poor relative to important lake trout life history stages such as spawning and egg incubation, organic littoral substrates were found to provide shelter (in the form of submergent aquatic vegetation) for juvenile lake trout throughout the fish-out program, especially when juvenile lake trout were targeted in the Final Removal Phase. It was thought that juvenile lake trout utilized aquatic vegetation as cover to escape predation by larger lake trout and as feeding habitat due to the abundance of ninespine stickleback and benthic invertebrates found in these locations.

Important lake trout spawning habitat was discovered within Habitat Zones 27 and 28 (Figure 3.5-1). Large numbers of lake trout were captured and removed from this location during both the CPUE/Removal and Final Removal phases. These Habitat Zones were characterized by relatively high proportions of cobble, gravel and fine substrate. The location of these sites relative to the prevailing north and northwest winds, combined with substrate type and depth contour, offered excellent spawning habitat for lake trout. Anecdotal evidence from gillnet catches suggest that a large number of lake trout were removed near these Habitat Zones. Lake trout removed from these zones were often in female/male pairs, sexually mature, and of 'ripe' reproductive status. Loose cobble, roughly the size of baseballs, were also tangled in the bottom of gillnets set in greater depth off-shore of these Habitat Zones.

3.6 MODELS OF FISH BIOMASS AND PRODUCTIVITY

The last of the stated objectives of the fish-out program was to compare the total landed biomass and lake trout biomass estimated by mark-recapture population estimates with the predictions of regression models published in the scientific literature (e.g., Hanson and Leggett 1982). This exercise tested the usefulness of these models for fish populations in oligotrophic Arctic lakes. Although this is not a stated objective of the DFO fish-out protocol, it is a logical extension of DFO's goal of characterizing the links between fish populations and their aquatic environment. This analysis was also conducted as part of the fish-out for the Meadowbank Gold Project (Azimuth 2009). Ten models were identified and used to estimate fish production for the Meadowbank fish-out. In order to facilitate comparisons between production estimates from the Meadowbank Fish-out and from Tail Lake, the same models are used in this report as in Azimuth's (2009) study.

3.6.1 Models Used to Estimate Fish Yield, Production, and Biomass

All models used to estimate fish yield, production and biomass are described in detail in Azimuth (2009). Brief descriptions of the same models used in the present biomass estimate analysis and comparison are presented below.

Two models were used to directly predict fish biomass, they included:

- Model 1: FB = 5.692 M/z + 28.7 (Hanson and Leggett 1982), where FB is fish standing crop (kg/ha, wet weight), M is macrobenthos standing crop (kg/ha, wet weight) and z is mean depth (m).
- Model 2: log FB = 0.708 logTP + 0.774 (Hanson and Leggett 1982), where FB is the fish standing crop (kg/ha, wet weight) and TP is mean total phosphorus (µg/L).

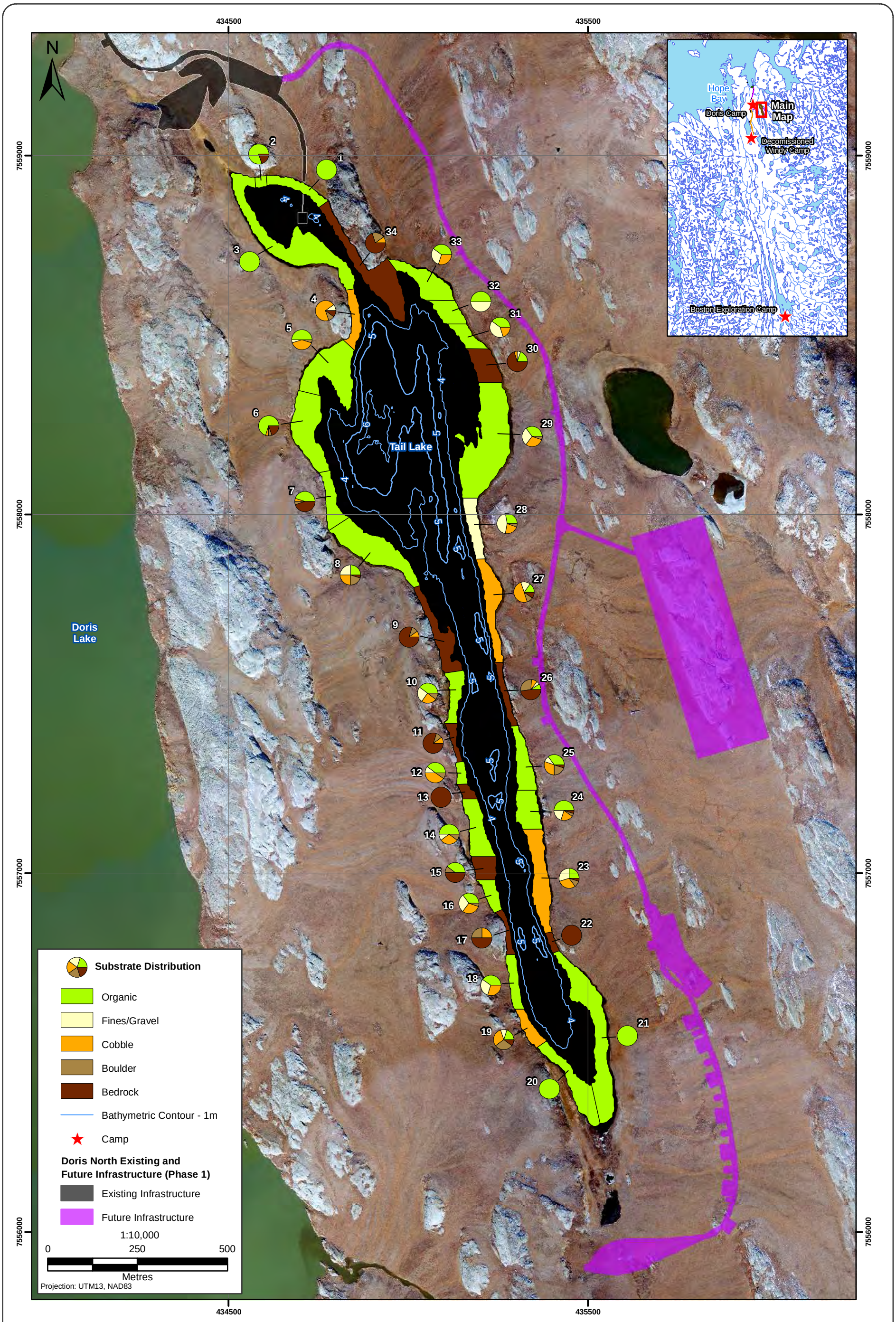

Figure 3.5-1

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Fish Habitat Map of the Tail Lake Littoral Zone, Doris North Project, 2011

Figure 3.5-1

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Table 3.5-1. Substrate Composition of Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Habitat Unit	Depth (m)	Area (m^2)	Percent Substrate Composition					Substrate Composition (m^2)					Total
			Bedrock	Boulder	Cobble	Gravel and Fines	Organic	Bedrock	Boulder	Cobble	Gravel and Fines	Organic	
1	1	4,551	0	0	0	0	100	0	0	0	0	4,551	**4,551**
2	1.5	946	20	0	0	0	80	189	0	0	0	757	**946**
3	1	22,054	0	0	0	0	100	0	0	0	0	22,054	**22,054**
4	1.5	4,208	10	10	70	10	0	421	421	2,946	421	0	**4,208**
5	2	15,922	0	5	40	5	50	0	796	6,369	796	7,961	**15,922**
6	2.5	13,993	20	5	5	0	70	2,799	700	700	0	9,795	**13,993**
7	2	5,334	45	5	5	0	45	2,400	267	267	0	2,400	**5,334**
8	1.5	15,687	5	20	25	25	25	784	3,137	3,922	3,922	3,922	**15,687**
9	2	8,195	80	10	10	0	0	6,556	820	820	0	0	**8,195**
10	1	4,881	0	10	25	25	40	0	488	1,220	1,220	1,953	**4,881**
11	2	1,942	80	10	10	0	0	1,554	194	194	0	0	**1,942**
12	1	1,627	0	10	40	10	40	0	163	651	163	651	**1,627**
13	2	1,468	100	0	0	0	0	1,468	0	0	0	0	**1,468**
14	1	7,926	0	10	30	10	50	0	793	2,378	793	3,963	**7,926**
15	2	3,952	50	10	0	0	40	1,976	395	0	0	1,581	**3,952**
16	1	3,254	0	5	30	30	35	0	163	976	976	1,139	**3,254**
17	1.5	1,944	50	25	25	0	0	972	486	486	0	0	**1,944**
18	1.5	4,151	0	0	30	30	40	0	0	1,245	1,245	1,660	**4,151**
19	2	3,426	10	30	30	10	20	343	1,028	1,028	343	685	**3,426**
20	1	10,000	0	0	0	0	100	0	0	0	0	10,000	**10,000**
21	1	21,756	0	0	0	0	100	0	0	0	0	21,756	**21,756**
22	1	1,093	100	0	0	0	0	1,093	0	0	0	0	**1,093**
23	1	11,376	5	10	30	30	25	569	1,138	3,413	3,413	2,844	**11,376**
24	2	6,628	5	5	20	20	50	331	331	1,326	1,326	3,314	**6,628**
25	2	6,688	5	20	30	10	35	334	1,338	2,006	669	2,341	**6,688**
26	3	3,115	50	30	10	5	10	1,558	935	312	156	312	**3,271**
27	1	9,139	10	10	50	15	15	914	914	4,570	1,371	1,371	**9,139**
28	1	5,395	0	5	20	40	25	0	270	1,079	2,158	1,349	**4,856**
29	1	29,427	0	5	30	30	35	0	1,471	8,828	8,828	10,299	**29,427**
30	1.5	6,281	70	0	5	5	20	4,397	0	314	314	1,256	**6,281**
31	1	3,474	0	0	20	40	40	0	0	695	1,390	1,390	**3,474**
32	1	4,546	0	0	0	50	50	0	0	0	2,273	2,273	**4,546**
33	1	8,522	0	0	30	30	40	0	0	2,557	2,557	3,409	**8,522**
34	3	16,063	70	20	10	0	0	0	0	0	0	0	**0**
Totals							**Total**	**28,657**	**16,246**	**48,299**	**34,332**	**124,984**	**252,518**
							Percent	**11**	**6**	**19**	**14**	**49**	**100**

Seven models were used to predict fish yield (annual harvest [kg/ha] from fisheries catch data for subsequent conversion to fish biomass, they included:

- Model 3: logFY = 0.487 logM – 0.580 (Hanson and Leggett 1982), where FY is average fish yield (kg/ha yr^{-1}) and M is macrobenthos biomass (kg/ha, wet weight).
- Model 4: FY = 0.007 M + 0.018 TDS – 0.053 z + 0.00007 Ao + 0.793 (Hanson and Leggett 1982), where FY and M are as described earlier, TDS is total dissolved solids (mg/L), z is mean depth (m), and Ao is lake surface area (km^2).
- Model 5: logFY = 1.021 log TP – 1.148 (Hanson and Leggett 1982), where TP is total phosphorus (µg/L) and all parameters are log-transformed.
- Model 6: FY = 0.091 TDS – 1.161 (Hanson and Leggett 1982)
- Model 7: FY = 0.066 TP + 0.141 z + 0.013 TDS – 1.513 (Hanson and Leggett 1982)
- Model 8: logFY = 1.17 log*Chla* – 1.92 (Hanson and Leggett 1982), where FY is fish yield ($g/m^2\ y^{-1}$ dry weight) and *Chla* is chlorophyll-*a* (mg/m^3).
- Model 9: logFY = 0.446 logMEI + 0.168 (Ryder 1965; Downing et al. 1990), where FY is fish yield (kg/ha yr^{-1}) and MEI is the morphoedaphic index (TDS [mg/L]/mean depth [m]).

One model was used to predict fish production (net fish community production in kg/ha yr^{-1}) for subsequent conversion to fish biomass, it was:

- Model 10: logFP = 0.531 logTP + 0.332 (Downing et al. 1990), where FP is net fish community production (kg/ha yr-1) and TP is total phosphorus (µg/L). All parameters are log-transformed.

To convert model predictions of fish yield (model numbers 3 through 9) to fish production (model 10), fish production to fish biomass the following equations supplied by Downing et al. (1990):

$$FP = 10 \times FY$$

where, FP is fish production (kg/ha yr^{-1}) and FY is fish yield (kg/ha yr^{-1}).

Fish production (kg/ha yr^{-1}) was then converted to fish biomass (kg/ha wet weight) using the equation:

$$logFB = (logFP + 0.42)/1.084$$

To solve for fish biomass models 3 through 9 required the use of both conversions (1) and (2), while Model 10 only required the use of conversion (2). Models 1 and 2 did not require the use of conversions because the models directly estimate fish biomass in the appropriate units (kg/ha, wet weight).

3.6.2 Abiotic and Biotic Characteristics of Tail Lake

As described in the models listed above, several key morphological characteristics, water quality variables, and benthos biomass are required to estimate fish biomass. A summary of the morphological characteristics of Tail Lake are shown in Table 3.6-1. Table 3.6-2 lists the means of key water quality variables and morphoedaphic index, while Table 3.6-3 shows the benthic community biomass within 2 m depth intervals of Tail Lake. Morphological characteristics were derived from previous lake bathymetry studies. All means of key water quality variables were derived from aquatic sampling previously reported in the present study. Mean benthic community biomass is reported as the mean biomass per 2 m depth zone and converted to an area weighted (by each depth zone area) mean in g/m^2 wet weight. This area weighted mean was then converted to kg/ha wet weight.

Table 3.6-1. Morphological Characteristics of Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Volume (m^3)	Surface Area (ha)	Mean Depth (m)	Maximum Depth (m)	Proportion of Area within Depth Zones			
				0-2 m	2-4 m	4-6 m	6-8 m
2,380,000	76.64	3.1	7.1	0.44	0.36	0.19	0.01

Table 3.6-2. Key Water Quality Variables and Morphoedaphic Index for Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Sample Month	Total Phosphorus (µg/L)	Total Dissolved Solids (mg/L)	Chlorophyll-*a*\ (µg/L)	Morphoedaphic Index (MEI*; mg/L m^{-1})
July	17	79	0.604	25.5
August	12.1	81	1.001	26.2
September	9.7	88	—	28.5
Study Mean	12.9	84	0.082	27.1

Notes:
Dashes indicate data not available.
**Mean MEI calculated using mean TDS (above) and the mean depth (3.1 m) of Tail Lake.*

Table 3.6-3. Benthic Community Biomass within 2 m Depth Intervals of Tail Lake, Tail Lake Fish-out, Doris North Project, 2011

Mean Biomass per Depth Zones (g/m^2 ww)				Mean Area-Weighted Biomass (g/m^2 ww)	Converted Biomass (kg/ha ww)
0-2 m	2-4 m	4-6 m	6-8 m		
1.753	6.217	5.771	4.964	4.156	41.56

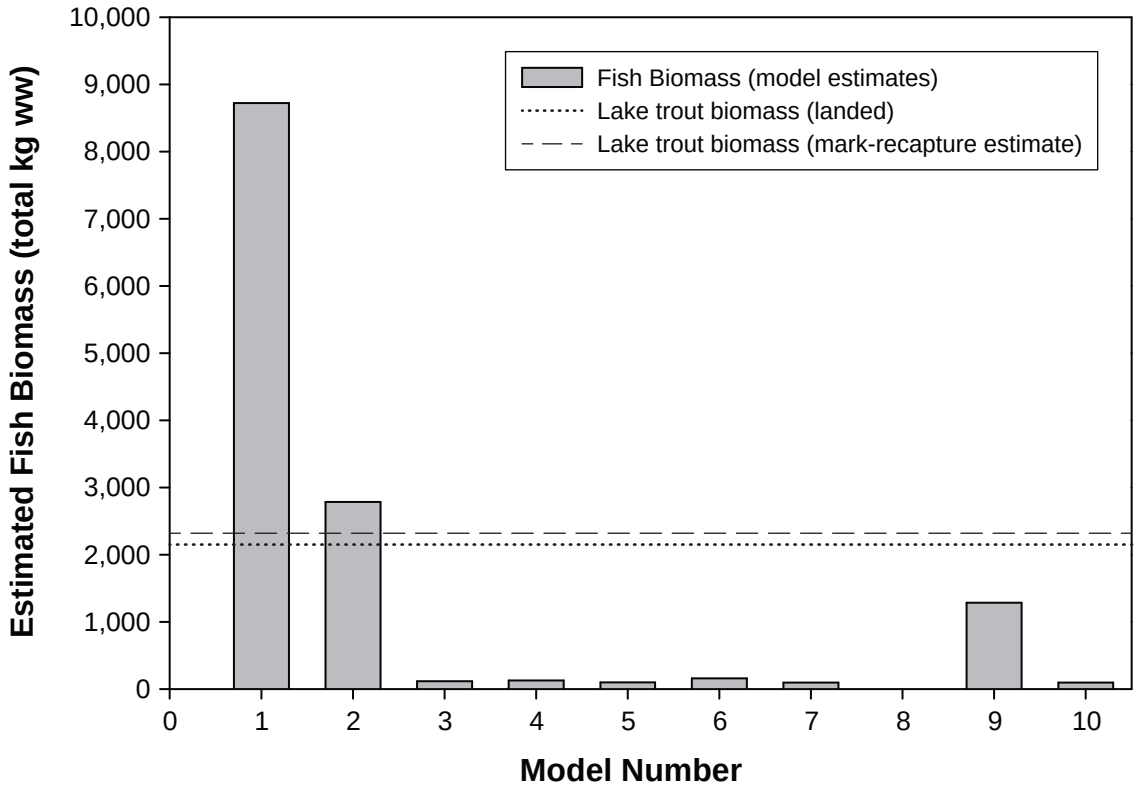
Notes:
ww = wet weight (g).

3.6.3 Model Estimates of Biomass Compared to Fish-out Biomass

Model outputs are shown in Table 3.6-4. This table shows the initial output result for each model and the conversions required to standardize each estimate to fish biomass (kg/ha, wet weight). Figure 3.6-1 illustrates the estimated fish biomass (total kg ww) for each of the ten models. Figure 3.6-1 also illustrates the model biomass estimates compared with the landed lake trout biomass removed from Tail Lake during the fish-out program and the estimated lake trout biomass based upon the Bayesian Maximum Likelihood mark-recapture estimate discussed in Section 3.1-2. The estimated mark-recapture biomass uses the fish-out mean lake trout wet weight (1,443 g or 1.443 kg wet weight) multiplied by the upper 95% CI of the Bayesian lake trout population estimate (1,607 lake trout) to yield a maximum lake trout biomass estimate in kg wet weight. As shown in Figure 3.6-1, the total landed lake trout biomass for the fish-out program was 2,150 kg, while the maximum mark-recapture lake trout population biomass estimate was 2,318 kg.

Modeled biomass estimates ranged from zero (Model 8) to 8,723 kg (Model 1). Overall, the model estimates seemed to consistently underestimate fish biomass of Tail Lake, especially those models designed to predict yield. These model estimates were grossly inaccurate, with most predictions underestimating the landed lake trout biomass by a factor of 20. Additional general observations relating to the various models include:

- Model 2 (which used total phosphorus) was the best predictor of fish biomass relative to landed and mark-recapture estimated lake trout biomass.



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Modeled Fish Biomass Estimates for Tail Lake Compared to Fish-out Lake Trout Biomass, Tail Lake Fish-out, Doris North Project, 2011

Figure 3.6-1

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- Model 1 (macrobenthos crop) overestimated fish biomass both at Meadowbank (Azimuth 2009) and Tail Lake. The bottom type may affect the macrobenthos estimate (e.g., it is easier to collect macrobenthos via grab in soft sediment than to collect macrobenthos from hard bottoms). Therefore lakes with primarily silt bottoms may yield higher macrobenthos estimates, causing the model to predict higher fish biomass. Alternatively, the fact that high macrobenthos biomass is ephemeral, occurring mainly in the summer months, may explain why summer estimates of macrobenthos biomass produce unrealistically high fish biomass estimates, as fish in Arctic lakes would not feed as heavily on macrobenthos outside the summer months.
- Models 3 through 9 (models based on fishery yield) all greatly underestimated fish biomass. The results of Model 9 suggest that morphoedaphic index was the best predictor of fishery yield among models using lake morphometrics and water quality variables to predict fish yield. However, the results of these models suggest caution when using fishery yield as a proxy for biomass or production. The conversion of fishery yield to production by simply multiplying by 10 is a gross generalization and may not apply to Arctic lakes which are oligotrophic, support very few species, and are usually un-fished and unmanaged. The conversion of fish yield to production and biomass appears to be a source of error or uncertainty.
- Despite using total phosphorus (similar to Model 2) as a biomass predictor, Model 10 greatly underestimated fish biomass. This may suggest that total phosphorus is a better predictor of the standing crop of fish than of production per se.

Table 3.6-4. Fish Biomass Estimates for Tail Lake Using Selected Models of Fish Yield, Production and Biomass, Tail Lake Fish-out, Doris North Project, 2011

Model	Model Type	Key Variables	Value	Initial Model Output Units	Conversions Used	Fish Biomass Estimates	
						(kg/ha, ww)	(total kg ww)
1	Fish Biomass	M,z	114	kg/ha, ww	0	114	8,723
2	Fish Biomass	TP	2	kg/ha, ww	0	36	2,784
3	Fish Yield	M	0.23	kg/ha/yr, ww	1,2	2	116
4	Fish Yield	M, TDS, z, Ao	2.47	kg/ha/yr, ww	1,2	2	128
5	Fish Yield	TP	-0.01	kg/ha/yr, ww	1,2	1	100
6	Fish Yield	TDS	6.48	kg/ha/yr, ww	1,2	2	158
7	Fish Yield	TP, z, TDS	0.87	kg/ha/yr, ww	1,2	1	96
8	Fish Yield	Chlr-*a*	-3.1896	$g/m^2/yr$, dw	n/a	n/a	n/a
9	Fish Yield	MEI	0.8	kg/ha/yr, ww	1,2	17	1,284
10	Fish Production	TP	0.9	kg/ha/yr, ww	2	1	95

Notes:
Key Variables:
M = macrobenthos
z = mean depth
TP = total phosphorus
TDS = total dissolved solids
Chl-a = chlorophyll-a
MEI = morphoedaphic index
Ao = surface area
Conversions Used:
1 = yield to production
2 = production to biomass
0 = none
ww = wet weight
n/a = data not available due to negative value.

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Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

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Appendix 2.1-1

General Fish-out Protocol for Lakes and Impoundments in the Northwest Territories and Nunavut

Rescan™
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General Fish-out Protocol for Lakes and Impoundments in the Northwest Territories and Nunavut

J.D. Tyson, W.M. Tonn, S. Boss, and B.W. Hanna

Central and Arctic Region
Fisheries and Oceans Canada
Yellowknife, NT X1A 1E2

2011

Canadian Technical Report of Fisheries and Aquatic Sciences 2935

Canadian Technical Report of
Fisheries and Aquatic Sciences

Technical reports contain scientific and technical information that contributes to existing knowledge but which is not normally appropriate for primary literature. Technical reports are directed primarily toward a worldwide audience and have an international distribution. No restriction is placed on subject matter and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

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Les rapports techniques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur don't le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Technical Report of

Fisheries and Aquatic Sciences 2935

2011

General Fish-out Protocol for Lakes and Impoundments in the Northwest Territories and Nunavut

by

J.D. Tyson[1], W.M. Tonn[2], S. Boss[2,3], and B.W. Hanna[4]

[1]Tetra Tech, 400 – 161 Portage Avenue East, Winnipeg, MB R3B 0Y4

[2]Department of Biological Sciences CW 405, Biological Sciences Bldg.
University of Alberta, Edmonton, AB T6G 2E9

[3]Environment Canada Prairie and Northern Region
Rm 200 4999 98 Avenue, Edmonton, AB T6B 2X3

[4]Fisheries and Oceans Canada, Suite 301 5204 - 50th Avenue,
Yellowknife, NT X1A 1E2

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ABSTRACT

Tyson, J.D., W.M. Tonn, S. Boss, and B.W. Hanna. 2011. General fish-out protocol for lakes and impoundments in the Northwest Territories and Nunavut. Can. Tech. Rep. Fish. Aquat. Sci. 2935: v + 34 p.

Some development activities in northern Canada will result in unavoidable whole or partial lake destruction. If such a development is approved by Fisheries and Oceans Canada (DFO), the requirement for a fish-out program is included as a component of the *Fisheries Act* s.35(2) authorization. The guiding principle of the fish-out program is to ensure that both the ecological data and fish specimens that are collected can be used to their fullest extent. This can be achieved by recovering and distributing fish to local communities and by properly collecting, recording, and archiving the data from the fish-out program. Whole lake studies, including fish-out programs, can provide exceptional data on fish populations and fish – environmental relationships in the North. This information is useful for assessing patterns and relationships between fish community composition and the habitat characteristics of barrenland lakes. A database has been created that includes information collected on fish species composition and biological, limnological, and habitat characteristics from the lakes that have been fished out in the Northwest Territories. The purpose of this document is to provide a consistent and standardized protocol for proponents to follow when developing a fish-out program.

RÉSUMÉ

Tyson, J.D., W.M. Tonn, S. Boss, and B.W. Hanna. 2011. General fish-out protocol for lakes and impoundments in the Northwest Territories and Nunavut. Can. Tech. Rep. Fish. Aquat. Sci. 2935: v + 34 p.

Certaines activités de développement menées dans le nord du Canada conduiront à la destruction inévitable, complète ou partielle, de lacs. Si des activités de développement de ce type sont approuvées par le ministère des Pêches et des Océans, (MPO), l'exigence d'un programme de pêche-sur-place est reprise en tant qu'élément de l'autorisation en vertu de l'article 35 (2) de la *Loi sur les pêches.* Le principe Pour ce faire, il faut récupérer le poisson et le distribuer aux collectivités locales et collecter, consigner et archiver, comme il se doit, les données tirées du programme de pêche-sur-place. Les études portant sur l'ensemble des lacs, y compris les programmes de pêche-sur-place, peuvent fournir des renseignements de nature exceptionnelle sur les populations de poissons et sur les liens qui prévalent entre l'environnement et les poissons, dans le Nord. Ces données sont utiles pour faire l'évaluation des modèles et des relations entre la composition des communautés de poissons et les caractéristiques sur l'habitat des lacs situés en terres stériles. Une base de données a été mise sur pied; elle comporte les renseignements collectés sur la composition des espèces de poissons et sur les caractéristiques biologiques, limnologiques et sur l'habitat des lacs qui ont fait l'objet de la pêche dans les Territoires du Nord-Ouest. Ce document vise à fournir aux promoteurs de projets un protocole uniforme et normalisé à suivre lors de l'élaboration d'un programme de pêche-sur-place.

INTRODUCTION

BACKGROUND

The need for a fish-out protocol for the Northwest Territories and Nunavut originated in the permitting and construction of diamond mines in the mid-1990s. Kimberlite pipes, one form of the ore-bearing geological structures containing diamonds, are often found to occur under lakes. In order to access these pipes for mining, the overlying lakes need to be dewatered in whole or in part. BHP Billiton's (BHPB) EKATI Diamond Mine, located on the barrens, 300 km northeast of Yellowknife, NT, was the first diamond mine to be permitted in Canada. As a condition of the *Fisheries Act* s.35(2) authorization issued by Fisheries and Oceans Canada (DFO), BHPB was required to recover the fishes from the authorized lakes.

DFO recognized during the development of the authorization that the dewatering of entire lakes at EKATI provided a unique opportunity to acquire a detailed data set on the fish communities and environmental characteristics of several small tundra lakes. A research plan was initiated by DFO Science to conduct the field studies, however, the field tasks were eventually turned over to BHPB. As a result, the following conditions were included in the authorization:

1. Water chemistry and chlorophyll levels would be monitored during the open water season;
2. Benthic invertebrate population densities would be determined;
3. Standardized sampling of fish populations would provide catch-per-unit-effort data;
4. Fish population size estimates would be determined using mark-recapture methods;
5. Fish population size estimates would be determined using hydroacoustic methods;
6. Fish would be batch-marked, by size-class and species, to determine proportional recovery by species and size-class after drainage;
7. A complete census of fish populations, including lengths and weights, would be taken and ageing structures from a subsample of each species would be collected and analyzed; and
8. Data summary reports would be provided to DFO within one year of the field work.

BHPB engaged local communities to staff the fishing crews and prepare the harvested fishes for traditional community uses.

As additional mines completed permitting, fish-out conditions were included in the *Fisheries Act* s.35(2) authorizations. However, the diversity of development activities resulted in an increasing variety of waterbodies to be fished-out. Because there was no established protocol, there were inconsistencies in the way the fish-out programs were

conducted which, in turn, affected the confidence in the resulting data and comparability among lakes (Dillon 2002; Thistle and Tonn 2007).

PROTOCOL DEVELOPMENT

The initial fish-out programs provided a number of lessons learned about the practicality of a complete census of fish populations. As well, a need was identified for a common framework and set of objectives to ensure that data acquired through fish-out programs would be collected in a consistent manner. Subsequently, projects were conducted to examine data collected during fish community baseline studies at the various development sites (Dillon 2002) and to establish a database for fish-out data (Tonn 2006). Collected data was also examined to determine whether patterns could be observed among fish communities in barrenland lakes using the baseline and fish-out datasets (Thistle and Tonn 2007).

Lessons Learned

Once the fish-out programs were put into practice, it became evident that a complete census of the fish communities was rarely practical. Even with multiple gear types and an almost complete saturation of the lakes with fishing gear, low rates of fish captures continued for an extended period. Simultaneous lake dewatering concentrated the remaining fishes into ever decreasing basins however, there were no safe methods to recover all the remaining fishes (Tyson 1998a, 1998b; Tyson 1998c; Tyson 1998d; Tyson and McCarthy 1997). The exposed lake bed did not provide a suitable wading substrate for seining or backpack electrofishing. Adding to this, as water levels declined in dewatered lakes (e.g. Panda, Koala, and Airstrip lakes at EKATI), wave action re-suspended sediments resulting in high turbidity. The complete census objective was therefore modified to an intensive cumulative catch per unit effort population estimate. Other lessons are included in the Field Methodology section.

Data Consistency

Given the need for research to further the understanding of fish-habitat relationships in barrenland lakes and that there is a potential for fish-out programs to provide reference data that could be used in such research, it was recognized that a necessary step would be to compile and organize these data into a reference database. These data could contribute to research that would help provide more precise tools for habitat biologists to use in future habitat management decisions. Despite the recognized value of a reference database developed from the fish-out and related projects, major problems were encountered initially. A preliminary assessment (Dillon 2002) concluded that the data were not in a form that was readily useable.

DFO, with financial assistance of BHP-Billiton Diamonds, Inc. and Diavik Diamond Mines Inc., contracted W. Tonn at the University of Alberta to see if the data problems could be overcome. The project had the following objectives:

1. develop a reference database;

2. assess the suitability of the fish population sampling methods and from this assessment, provide methodological recommendations for future baseline fisheries studies; and
3. if possible, quantify fish production, and productivity of lower trophic levels in barrenlands lakes.

The project results were presented in Tonn (2006) and Thistle and Tonn (2007). Problems encountered included inconsistencies in data integrity, data errors and the absence (or loss) of much data in useable digital format. Recommendations for standardizing data recording based on the database design were provided.

Given the variety of lake sizes, fish communities, and logistical considerations in the Northwest Territories and Nunavut, one detailed protocol is not practical for every potential application. A general protocol has therefore been developed with the expectation that more detailed, site-specific work plans would be drafted that incorporated objectives for each application yet still provided consistency with the general fish-out framework. This protocol incorporates the lessons learned from past fish-out programs as well as the recommendations from the data reviews and is presented in the following sections:

- Program Objectives – overall and guiding objectives of the program
- Project Management – roles and responsibilities of organizations and personnel
- Components – core components plus optional studies and applications
- Field Methodology – field components and equipment specifications and deployment
- Deliverables – sample and data analysis, data management, and reporting.

PROGRAM OBJECTIVES

The guiding principle of the fish-out program is to ensure that fish stocks in the waterbodies are fully utilized. Following this principle, value can be obtained from the fish stocks for both local traditional resource users as well as those agencies responsible for managing the stocks. Harvested fishes can be delivered to the communities for traditional uses while data of the kind not normally available can be collected during the fish-out for resource managers. In a few cases, fish stocks may be transferred from one waterbody to another or from an isolated area of a waterbody to the main waterbody (e.g. from Diavik's A154 pit into Lac de Gras). The program objectives are therefore:

1. To engage local communities and ensure that fish harvested during the fish-out are fully utilized by traditional resource users; and
2. To collect ecological information (biological, limnological, and habitat) on Arctic lakes in the Northwest Territories and Nunavut.

Full utilization of harvested fish can be achieved by engaging local communities. Most northern communities maintain a domestic fishery to supply fish for human consumption

and dog food. Community members can be engaged to harvest, sort, dress, and deliver fishes to the communities. Material not prepared for human consumption, such as rough fishes, small-body fishes, and offal, can be frozen and delivered to the communities as dog food. The fish-out programs can have an added benefit within the communities in that fishing pressure on the usual domestic stocks can be offset by the amount of fish recovered from the fish-out.

Scientific data collection can be integrated with the fish harvesting by community members. The fishing crews can be trained and directed by biologists to record fishing effort and biological data. Biologists can also provide training and supervision for the harvest of ageing structures, fish stomachs, and any other biological samples, as well as the collection of water quality data. Data collected through the fish-outs will provide important information on the ecology of waterbodies in the Northwest Territories and Nunavut. As noted in the Introduction, fish-out programs can provide invaluable data for both fisheries and habitat managers. All data collected will be maintained in a database and be available for researchers and managers upon request.

A fish transfer is usually the least preferred method of fish disposal and should only be considered when fishes are transferred from a smaller, isolated portion of a lake to a larger main waterbody. Generally, barrenland lakes are oligotrophic with productivity limited by low levels of phosphorus and nitrogen and with a commensurately low standing stock of fish (Wetzel 2001). Though the small stocks might suggest that receiving lakes could easily assimilate the transferred fishes, the receiving lakes are likely already near their carrying capacity. Therefore, transferring fishes from one lake to another lake of similar size is not likely to enhance stocks but more likely to disrupt the fish community in the receiving lake by pushing the standing stock over the carrying capacity. As a result, fish condition in the receiving lake is likely to decline through competition for limited resources (Matthews 1998). The fish biomass of the lake receiving stocking will likely decline to the pre-transfer carrying capacity and result in no net increase in standing stock. The condition under which a transfer may succeed (and not cause damage) is when a small area of a large lake is isolated for dewatering. Less ideal would be if the fish community from a small lake is transferred to an adjacent and much larger lake to which there is good connectivity and significant fish movement. However, an estimate of productivity in the receiving lake should be undertaken to determine if the receiving waterbody has the capacity to absorb the additional stock with minimal impacts.

Other difficulties with stock transfers include fish handling mortalities, disruption of natural community composition, and locally adapted gene pools, and a reduction in the quality of scientific data. Though species such as Lake Trout (*Salvelinus namaycush*) are more robust and may have low mortality rates during transfer, coregonids such as ciscoes and whitefishes (*Coregonus* spp. and *Prosopium* spp.), as well as juveniles of other species, are sensitive to most capture and handling techniques and have high mortality rates. Data collected during fish transfers may not be directly relatable to data collected during a fish-out program. Because the priority during fish transfers is to minimize fish mortality, the unit of effort will likely differ from that of a fish-out. For example, in a

fish transfer, short-term gill net sets may be used to capture fishes. As these nets are run several times a day and not set overnight, the unit of effort, even if expressed on a per-hour basis, will not be comparable to the overnight (18-24 hr) sets recommended for a fish-out program. Fish transfer therefore has limited applications and should be carefully considered prior to any decision to use this method.

PROJECT MANAGEMENT

The three stakeholders that manage or contribute to the project are: DFO, the proponent, and the local communities. It is the responsibility of the proponent to engage the local communities. There is nothing that precludes DFO participating as a research partner in the ecological and biological data collection. However, if DFO is to participate, the roles and responsibilities of DFO and the proponent should be clearly identified in the work plan. The protocols contained herein assume that DFO is not participating as a research partner and that the proponent will be conducting the fish-out program. An example of a fish-out program organizational chart is presented in Figure 1.

ROLES AND RESPONSIBILITIES

The DFO habitat biologist responsible for the project referral will be the principal contact with the project proponent. During the development of the work plan the habitat biologist will be responsible for seeking input from DFO Science, when required and providing timely communications and advice (technical and regulatory) to the proponent. Timely communications between the proponent and the DFO habitat biologist (or designate) should continue once the fish-out is underway. Following the fish-out program, it will be the responsibility of the habitat biologist to receive the deliverables from the project proponent, review the fish-out report, and coordinate with DFO Science to ensure the data are entered into the Arctic aquatic database. Compliance with the terms of the *Fisheries Act* s.35(2) authorization should also be noted in the referral file.

The project manager is the proponent's representative and has the responsibility of managing the fish-out program including developing the work plan, schedule and budget, staffing, communicating with DFO, and providing the deliverables (e.g. work plan, data, reports, etc.). The project manager may designate the project biologist to communicate directly with DFO during the fish-out.

The project biologist is the key technical position during the fish-out. The project biologist is responsible for meeting the technical requirements of the fish-out program; therefore, this position should be staffed by a qualified and experienced biologist. The project biologist should participate in the development of the work plan. The project biologist will be responsible for training field staff, supervising field activities and data collection, quality assurance/quality control, conducting data analysis, and preparing deliverables.

The field technicians will conduct the fish-out and data collection under the supervision and guidance of the project biologist. If possible, these positions should be staffed by

members of the local communities with experience in operating boats, using gill nets, and handling fishes. Community members provide a valuable source of traditional knowledge and field skills. Field technicians will also record biological data, collect tissue samples, and sort and prepare fishes for community use.

WORK PLAN

The work plan is the document that clearly lays out how the particular fish-out project will be conducted, incorporating both the guiding principle and objectives of the fish-out program and any specific understandings agreed to by DFO and the proponent of the particular fish-out program. The work plan should include the following:

Objectives

The overall objectives of the fish-out should be clearly stated. This should also include specific study objectives of each component included in the project.

Project Management

The management plan for the project should be clearly detailed with roles and personnel identified. Lines of communication and decision makers should also be identified.

Components

The components to be included in the fish-out program should be identified as well as the goals of each. Decision criteria for proceeding from one phase to the next should be clearly identified. Existing data for the lake, particularly data used to estimate crew and equipment requirements, should also be identified and, if unpublished, included in the plan.

Field Methodology

The field methodology should include methods for fishing during each phase, biological data collection, aquatic biology/physical limnology, habitat assessment (if applicable), and any laboratory analyses. This section should also include estimates of crew and equipment required for each component and phase of the program.

Deliverables

The deliverables should be clearly stated. This should include the format and extent of analyses in the report as well as any samples and electronic data.

COMPONENTS

The core components of the fish-out program, as derived from the program objectives, are:

a) the recovery of fishes;

b) the distribution of fishes to communities; and

c) the collection of basic fish and fish habitat data.

A lake fish-out provides a rare opportunity to conduct intensive multidisciplinary research that can provide resource managers in the Northwest Territories and Nunavut with information that would otherwise be unavailable. In particular, a lake fish-out provides the opportunity to investigate linkages between fish community structure, composition, and productivity and fish habitat via whole-lake sampling. Given this opportunity, other components, such as a mark-recapture study, can be added to the fish-out program.

The basic program is divided into three general components:

1. Fish Community
2. Aquatic Biology/Limnology
3. Physical Habitat Inventory.

Baseline information for each of the above components should already exist prior to the development of the fish-out work plan. To reach the stage where a *Fisheries Act* s.35(2) authorization has been issued with the requirement for a fish-out, productivity in the candidate lake must have been previously evaluated. An example of a project schedule where all components, including a mark-recapture study, are conducted within the same open water season is presented in Figure 2.

FISH COMMUNITY

The fish community component is composed of (a) the CPUE phase, and (b) the final removal phase. The lake or waterbody should be isolated prior to the initiation of the CPUE phase and should remain so until the end of final removal phase to prevent immigration and emigration of fishes. As well, the CPUE and final removal phases should be conducted within the same open-water season to avoid the changes in growth, mortality, and recruitment resulting from reduced competition and predation (Tyson 2008; Tyson 1999a). An optional mark-recapture study, however, may require the marking phase in the year prior to the fish-out program to ensure dispersal of marked fishes and adequate time for the fish-out.

CPUE Phase

The objective of the CPUE phase is to collect fish community catch-per-unit-effort data for each population in the lake. These data will then be used to estimate the fish populations. Variously, this method of population estimation has been referred to as

fishing success (Ricker 1975), removal (Kelso and Shuter 1989), and catch-effort (Gould and Pollack 1997) methods for estimating populations. Ordinary least squares (OLS) methods regressing CPUE with cumulative catch (Leslie method) and cumulative effort (DeLury method) are commonly used to estimate fish populations (Hayes et al. 2007). More recently, increasing computer capabilities have led to the development of computer programs allowing for maximum-likelihood estimators for catchability and population size.

The removal method has a number of assumptions most notably that of a constant catchability coefficient relating effort to catch and the probability of capture being equal among fish (Knight and Cooper 2008). Departure from these assumptions can result in an underestimation of the original population (Kelso and Shuter 1989). A number of studies have sought to address the bias (e.g. Akamine et al. 1992; Gould and Pollack 1997; Mantyiemi et al. 2005) during data analysis. Schwarz and Seber (1999) provide a review of recent analytical applications to the removal method. Gould and Pollack (1997) simulated population estimates under different population sizes and catchability coefficients for the Leslie, DeLury and maximum-likelihood methods. They found that the maximum-likelihood method consistently provided less biased and more precise estimates than the OLS methods.

It is critical that the standard unit of effort remain unchanged for the duration of the CPUE phase. Equipment type, fishing methods, and fishing periods must remain unchanged throughout the CPUE phase. For example, if trap nets are used at the start of the CPUE phase then the use of trap nets must be continued through the duration of the CPUE phase and not removed in later stages to make room for additional gill nets. Likewise, if trap nets are not deployed at the start of the CPUE phase, traps should not be added later in the phase. The only variable that will change will be the number units of effort. As CPUE declines, it is permissible to increase the unit of effort. For example, if five gangs of gill nets are being fished in a lake and the daily CPUE begins to decline, additional gangs may be added provided all other variables (e.g. fishing periods) remain the same.

The lake should remain physically and chemically unchanged during the CPUE phase. That is, no development activities, such as water transfers in or out of the lake should occur and seasonal changes to the environment and/or fish populations should be minimized. Dewatering has been observed to alter fish distribution through changes to available habitat while the re-suspension of sediments affects fish catchability (Tyson 1998a; Tyson 1998c; Tyson 1998d; Tyson and MacCarthy 1997). The CPUE phase should continue until the CPUE objective is met.

The ideal CPUE objective is achieved when no fish are captured for 24-48 hr of continuous netting, nets are removed for 48 hr, nets are then re-deployed for 24-48 hr of netting and fish are still not captured. In practice, this ideal should be weighed against the time required to achieve this, given the seasonal changes (e.g. water temperature and fish activities) that should be minimized, together with changes in catchability following intensive harvesting. At this point, the CPUE phase should be suspended. If the lake will

be dewatered, this would be a time to begin, proceeding to a point where the remaining fish are sufficiently concentrated. The program may then continue with the final removal Phase.

Final Removal Phase

The transition from CPUE phase to final removal phase will be triggered when the lake has reached gear saturation and there have been no (or virtually no) fish captured for 48 hr. The objective of the final removal phase is to capture all remaining fishes in the lake to provide as complete a fish community census as conditions will allow. This can include using all available fish capture techniques, including methods not used in the CPUE phase, altering the distribution of mesh sizes that are fished, or even the development of new capture techniques. Lake dewatering can be initiated during the final removal phase and may assist by concentrating fishes into an ever decreasing lake volume. However, precautions should be taken to properly screen the intakes to avoid losses to pump entrainment (Tyson 1998a; Tyson 1998c; Tyson 1998d; Tyson and McCarthy 1997; DFO 1995).

The final removal phase can also be used as an extension of the CPUE phase. This would be done by adjusting the unit of effort to focus the numerically strongest size classes of the fish populations and then stratifying the effort accordingly during data analysis. Typically, larger fishes are removed most rapidly from the lake as they are susceptible to both the large meshes and, to a lesser degree, the smaller mesh sizes (e.g. Tyson 1999). As a result, even at gear saturation, the majority of the lake can be occupied by gear that will no longer catch fishes. By swapping out panels of mesh sizes that have the lowest CPUE for panels of mesh sizes that have the highest CPUE, fishing effort is concentrated on the remaining fish size classes. For example, if no fishes have been captured in the 4” panels for a week whereas the 1.5” panels were found to have captured the most fishes during the CPUE phase, most of the 4” panels can be swapped out for 1.5” panels. In order to allow for stratification of unit effort, it is important to continue fishing a few panels of each mesh size throughout the duration of the final removal phase.

Mark-Recapture Study (Optional)

A mark-recapture study can be included in the fish-out program. The study would include a marking period prior to the fish-out. The CPUE phase would then be used as the recapture period. Because Arctic summer fishing periods are short, the marking phase might need to be conducted during the previous year to allow for marking of an adequate number of individuals. This would avoid a potential encroachment on the time available for a fish-out and reduce the risk of an incomplete fish-out. Caution should be used in developing a mark-recapture study as handling mortality, especially amongst coregonids, may affect recovery during the CPUE phase, resulting in an underestimation of the original fish community populations (Tyson 1998c).

AQUATIC BIOLOGY/LIMNOLOGY

Basic aquatic biology and limnology information for the lake should already exist prior to the fish-out, but more detailed and/or updated sampling may be desirable to provide supporting data for the fish-out. Because the lower trophic levels of the lake community may be affected by the removal of fishes (Kitchell and Carpenter 1993), sampling should be conducted during the mark-recapture or early CPUE phase or during the prior open-water season.

HABITAT INVENTORY

A habitat inventory of the lake should also already exist prior to the fish-out, as habitat is often used as a surrogate for estimating productive capacity in the development a *Fisheries Act* s.35(2) authorization. A habitat inventory map will be used to ensure all habitats are fished adequately during the CPUE phase (e.g. using a stratified-random sampling design). A habitat inventory can also be conducted shortly before the CPUE phase. A habitat confirmation survey could also be conducted once the lake has been partially drained and the littoral areas have been exposed. Its goal would be to confirm the physical habitat features delineated during the initial habitat survey.

FISH TRANSFER

A fish transfer is a special situation where fish can be captured and transferred from one waterbody to another. This should only be conducted if there is no reasonable expectation for there to be significant effects on the fish community in the receiving waterbody. The species of fish being transferred must occur in both the donor and receiving waterbodies. Following are cases in which fish transfers might be considered worth the additional effort: (1) the fish community in a small portion of a large lake that has been isolated for dewatering can be captured and transferred to the main lake; (2) the small-body fish community from a small lake could be captured and transferred to a much larger lake (>1,000 ha) with few effects on the receiving lake, where both lakes support all species considered for transfer. In the case of the latter smaller lake transfer, all components of the fish-out program should be conducted. In the case of the transfer of fishes from an isolated portion of a lake, the emphasis should be on minimizing capture and handling mortality. Because it is likely that the habitat has already been disturbed and the fish community may have been altered during the process of isolation, the aquatic biology/limnology and habitat inventory components would not be required. The biological and CPUE information on the fish, however, may still be collected.

FIELD METHODOLOGY

Ideally, the fish-out methodology should be consistent with the methodology used during the lake assessment. The Northwest Territories and Nunavut, however, do not have standard fish community survey or biological sampling protocols; rather, a variety of lake assessment methodologies are currently used, depending upon the choice of the lead investigator. A recent project to construct a database from a number of lake assessment

and fish-out projects encountered significant challenges due to the variable quality of data and inconsistencies in methodologies (Tonn 2006). Various jurisdictions in Canada and abroad have sought to address similar challenges by developing standard sampling methods for fish community characterization and assessment (e.g. Cavanagh et al. 1997; Appelberg 2000; Environment Canada 2002; Morgan and Snucins 2005; Sandstrom et al. 2008; Beauchamp et al. 2009; Lester et al. 2009). The development of standard sampling methods is beyond the scope of this document, therefore, the methods developed during the initial fish-out programs will be continued herein. Ideally, if a proponent (or DFO) wants to adopt one of the 'standard' protocols from other jurisdictions, both the 'original' and 'new' protocols should be used side-by-side, at least initially, to allow for the conversion of one protocol to the other and thus insure continuity and consistency in the accumulating data base.

PROJECT TIMING

Unless specified otherwise, all components should be conducted during the same open-water season. The one exception could be that the marking phase of a mark-recapture component might be conducted during the previous open-water season. Because the open-water season in the Northwest Territories can be very short, preparations should be made to have sufficient crews and gear to provide a high level of effort to the fish-out program. Consideration must also be given to selecting fishing gear that provides high rates of capture (Tyson 1998a; Tyson 1998c). For example, trap nets tend to have lower rates of capture per unit area fished than gill nets; therefore trap nets may not provide sufficient captures to complete a fish-out during one open-water season. Winter fishing should not be conducted. Winter fishing is logistically difficult, labour intensive and, because of the thick surface ice, does not allow fishing of the shallower littoral areas. In addition, CPUE during winter fishing is lower than and not comparable to open-water fishing (Tyson and McCarthy 1997).

FISH COMMUNITY

The goal of the fish community component is to provide an accurate description of the fish community, including population estimates, size distributions, and age structures of its component populations. Fishing methods will depend on the size of the lake.

Fishing Gear

Gill nets are the primary gear type to be used to capture fishes during the fish-out. Gill nets can be readily standardized, provide good rates of success in a variety of habitats, catch a wide variety of fishes and fish sizes, and are easy to transport and use. Trap nets can also be used but because of lower CPUEs when compared with gill nets (except during lake dewatering after littoral habitat has been exposed; Tyson 1998a, Tyson 1998c), trap nets generally require longer periods of deployment which are not always available during the short Arctic summers. As a rule of thumb, gill nets should be used exclusively to fish-out lakes with large-body fishes while trap nets and Gee minnow traps can be used with small-mesh gill nets for lakes with only small-body fish species.

Standardized gill nets should be used to capture fishes during the CPUE phase while additional gear types may be used during the final removal phase. Gear should be checked daily for damage. Small tears in gill nets can be repaired using monofilament line, however, panels with large or numerous holes should be replaced. A sufficient stock of equipment should be available prior to the start of fishing to provide replacement panels as required due to wear and tear, as well as to ensure gear saturation during the late CPUE and final removal phases.

Gill Nets – All nets should be bottom setting and constructed of monofilament. Stretched mesh-sizes to be used are 102 mm (4”), 76 mm (3”), 51 mm (2”), 38 mm (1½”), 25 mm (1”), and 13 mm (0.5”). Standard single-mesh panels are 45 m (150’) long by 2.4 m (8’) deep. Panel lengths may be increased or decreased depending upon the size of the lake, however, panels used in any lake should all be the same dimensions and dimensions of all nets must be clearly recorded on data sheets.

Trap Nets – Where appropriate (e.g. small lakes dominated by small-body fish species), small-mesh trap nets can be used for all phases of a fish-out program. The traps should be constructed of 6 mm square mesh with a house of 1.23 x 1.23 x 1.23 m. The leads should measure 61 m in length and 1.83 m in depth.

Gee Minnow Traps – Minnow traps can be used for fish-outs of small lakes or ponds that are dominated by small-bodied fish. Standard traps are constructed of 1/4" (6.4 mm) square galvanized wire mesh and measure 16" (42 cm) long and 9" (23 cm) wide with a 7/8" (22 mm) entrance hole. Bait can be used in the minnow traps but the use of bait and bait type should remain consistent through out the CPUE phase.

Other gear – During the final removal phase, additional gear types may be used in order to conduct a complete census of the fish community. Active fishing methods, such as electrofishing and seining, can be effective at capturing benthic and/or less-active species but only if the substrate conditions allow. Baited set lines or baited traps may be effective for catching burbot.

Gear Deployment

Gill net, trap net, and minnow trap sites and identifications should be drawn on a map of the lake and GPS coordinates (easting/northing) recorded on the field data sheet. Date, time of setting (24 hour clock), and time of retrieval should also be recorded for each net and trap. Water depths at the start and finish of the gill nets and trap net leads are to be recorded, based on field measurements (e.g. fish finder) or from a bathymetric map. Mesh sizes (gill nets) and lengths and heights (trap net leads, gill nets) are also to be recorded. Gill net panels should each have a unique identity code attached to allow quick identification and data recording in the field. A master list with codes, mesh sizes, and dimensions should be maintained onshore.

The trap leads should be anchored to shore and set perpendicular to the shoreline. Trap nets must be moved regularly (every 2-3 days) around the shoreline to ensure full coverage of the available habitat in the lake.

Net checks could initially be conducted once per day. Nets should be moved daily such that all available habitats are fished and avoidance behaviour minimized. However, since fish abundance and biomass are generally highest in the littoral zone, fishing effort should be more intense in (but not exclusive to) shallower depths. Daily gear redeployment will also serve to rotate of panels and mesh sizes through any given patch of habitat. As catch decreases, effort (amount of gear) should be increased. Eventually, the lake will become saturated with gear.

Field Crews

Generally, crews setting and picking gear also conduct the biological data collection from the catch. Care should be taken to balance the amount of gear being fished and the capacity of the crews to pick and move nets and to record biological data. Catches at the start of the CPUE will be highest and setting too much gear at that time can overwhelm the crews. The majority of the larger fishes tend to be removed early, therefore it is preferable that sufficient personnel should be available at the start of the CPUE phase to ensure all large-body and adult fishes can be processed without the risk of sub-sampling. As the fish-out continues, the majority of the later catches will be juveniles, which can then be sub-sampled.

At the start of the CPUE phase, one crew of three (boat operator, net picker, and data recorder/helper) can manage at least one and perhaps two complete standard gangs. This includes picking and moving nets as well as processing the catch for biological information. As CPUE declines, more gangs can be deployed. If sub-sampling of the juvenile and small-body fishes is being conducted then the proportion of time crews spend picking and moving nets increases while the proportion of time spent processing the catch decreases. Preparations should therefore be made to adjust the crew complement to meet the fishing and data collection needs as required. Preparations should also be made to rotate crews offsite and fresh crews onsite without interruption to the program.

CPUE Phase

During the CPUE phase, gear types, including mesh-sizes and lengths of individual nets, should remain constant such that a standard “unit of effort” can be defined. However, additional units may be required as stocks, and hence catch rate, decrease. The full range of gill net mesh-sizes must be fished at all times; there should also be a consistent proportion of the different panels used for each set during the CPUE phase. The total number of sets should be increased as CPUE decreases.

It is critical that all fishing methods that make up the standard unit of effort be held constant during the CPUE phase. For example, if trap nets are used at the start of the

CPUE phase, then trap nets should be continued to be fished through the duration of the CPUE phase and not removed in later stages to make room for additional gill nets. Likewise, if minnow traps are used in a pond fish-out, they should be continued throughout the CPUE phase and seining and electrofishing held off until the final removal phase.

Final Removal Phase

To assess the accuracy of the population estimates, as well as to achieve the program objective of removing all fish from the lake, a total census of the lake's fish community must be completed. Every effort should be made to capture every fish in the lake. During the CPUE phase, the goal is to capture and remove as many fish as possible while keeping the gear types constant and effort standardized. During the Final Removal Phase, *every* effort will be made to capture *all* remaining fish in the lakes, thus, additional capture methods may be added (see "Other gear", above) and the number of gill-net panels of each mesh size may be increased disproportionately, e.g. to favour mesh sizes that continue to catch fish. Proposed methods will be presented to, and reviewed by, DFO.

After the lake volume has been sufficiently reduced for lakes being 'de-watered' (possibly during the winter) the fish-out will resume. The final removal phase will continue until the removal objective is met. This objective should be presented to, and reviewed by, DFO prior to the start of the field work. Possible benchmarks could include the capture and removal of marked fish (fin clips and/or numbered tags) that exceed a certain percentage (e.g. >99%) of all fish marked by that method. Another objective could be based on CPUE, e.g. no fishes are captured for 48 hr of continuous sampling (with sufficient effort), sampling is halted for 48 hr, sampling then resumes for 48 hr and fish are still not captured.

Captured and removed fish should be treated as in the CPUE phase: counted and classified, biological data (and tissues) extracted, fish sacrificed, and/or distributed, in accordance with agreements.

Mark-recapture (Optional)

The fish-out program can be used to conduct a mark-recapture population estimate to complement the CPUE estimates. The mark-recapture phase of the program requires a period of catch and marking (marking phase) followed by a period of dispersal prior to the CPUE (recapture phase) and final removal (Figure 2).

For the mark-recapture phase, the goal is to release fish back to the lake alive, therefore either trap nets or short-set small-mesh gill nets (e.g. 38 mm stretched mesh, set for 30 to 60 min) should be used to minimize mortalities. If the marking phase is during the same open-water season as the fish-out phases, marking should commence soon after ice out and before surface water temperatures above 10°C increase the risk of capture mortality. Detailed set data should be recorded for each net and trap and full biological data (see

below) should be collected from fish mortalities. Due to low survival rates of whitefishes during netting and marking procedures, the use of a mark-recapture component should be carefully considered with respect to program goals before being included. Small-mesh trap nets and minnow traps could also be used if there are substantial numbers of small fish present and the schedule allows.

Partial fin clips, removing ⅓ to ½ of a fin, can be used to mark fish. It is important to minimize stress on fish and to return the marked fish to the water as soon as possible. However, live wells/holding tanks should be available during the marking phase, as needed, to allow stressed fish some recovery time before being returned to the lake. If anaesthetic is being used, fish must be held until they have recovered from the anaesthesia.

Record the counts of all fish captured during this phase by species and fate category (see Fish count record form). Based on prior information about the fish populations, separate mark-recapture estimates could be made on different size/age-classes (e.g. juveniles vs. adults) or sexes within (some) species. If so, clip different fins to avoid confusion and record the distinction. As the phase progresses, more and more of the fish being captured will already have been marked (i.e. will be recaptures). Although marking and recapturing a greater proportion of fish in a population will produce more precise estimates of abundance (see Ricker 1975 or Krebs 1999), it is often not practical to maximize precision for all species in a lake. The work plan for the fish-out program should indicate *a priori* the recapture rate (e.g. 10%) that will be used as the target objective for the mark-recapture phase and whether the phase will be terminated when all, half, or some other proportion of species reach that target objective.

Note: If a substantial time gap is anticipated between any of the three phases of the fish-out program, then a sizeable number of fish should be given more permanent marks such as tags or adipose fin clips during the marking phase. These can subsequently be used to assess the effectiveness of the complete censuses during the CPUE and final removal phases.

Fish Transfer

If fish are to be transferred to another waterbody (but see earlier discussion and caveats), the goal is to release fishes alive, similar to the marking phase of the optional mark-recapture component. Care must therefore be taken to minimize capture, handling, and transportation mortality. Capture and handling methods should follow the methods above described for catching and marking fishes. The receiving waterbody should be adjacent to the source lake and there should be easy access between the two. If fishes cannot be reliably captured and transferred with minimum fish mortality then a fish-out should be considered.

Biological Data Collection

All fishes must be removed from the lake, sacrificed, and distributed in accordance with any agreements between the proponent and the communities. A count of all captured fish, by species (and size-class, if appropriate), must be made and recorded, along with their "fate" or category, e.g. whether the fish had previously been marked or not, and whether it was removed or escaped. The proportion of marked fish (from the optional marking phase) that was captured and removed during the CPUE phase can be used as an index of the proportion of all fish in a population captured and removed. Biological data (see "Fish sample record" form) should be taken on every fish or on a substantial sub-sample as noted below.

Data codes and sample data sheets are provided in Appendix A. Biological data collection procedures should be developed prior to the field program and should include QA/QC procedures. Data collection procedures should follow established procedures (e.g. Cavanagh et al. 1997; EC 2002; and Sandstrom et al. 2008).

During the optional marking phase of the program, fish stress and mortality must be minimized. For fishes marked with unique identifiers (e.g. Floy tags), the following data should be recorded:

- Species
- Length
- Weight
- Tag number
- Mark type

Batch-marked fishes should only be marked and/or examined for marks before being released. Full biological data should be taken from any mortalities. For each fish species or category (which may be a size-, age-, or sex-class of a species), record only the number and category ("fate") of all fish captured in each trap or net (see "fish count record" data form, Appendix A).

During the CPUE and final removal phases, biological data and/or samples should be collected for each fish captured. The following data should be recorded from a sub-sample of the smaller, younger fishes and all of the larger, older fishes (see "fish sample record" data form, Appendix A):

- Species
- Unique fish number
- Weight (to the nearest 0.1 g)
- Length (fork or total length; to the nearest mm)
- Sex
- Maturity
- Reproductive status
- Ageing structure (s) taken
- Biological tissues collected (e.g. muscle tissue, stomachs, whole carcass)

- Marks
- Tag number

Fish dissections should be conducted in the field at the time of collection.

Ageing Structures

Ageing structures should be removed from a sub-sample of the smaller, younger fishes and all of the larger, older fishes. A list of the appropriate structures by group is provided in Table 1. Methods for the collection, storage, and reading of ageing structures can be found in Mackay et al. (1990) and Mann (2004). Procedures should be part of the Project Biologist's QA/AC procedures.

AQUATIC BIOLOGY/PHYSICAL LIMNOLOGY

One of the principal goals of the fish-out program is to identify fish and fish habitat relationships. Therefore, information about lake ecosystem components other than the fish community must be collected. Generally, this information is collected during the fish and fish habitat assessment of the lake prior to the development of a fish habitat compensation plan. In the event that this information has not been collected, an aquatic biology/physical limnology program should be conducted prior to the fish-out field work. The Northwest Territories and Nunavut do not have standard biological sampling procedures, however, a number of other jurisdictions do provide manuals that may be used as references when designing a sampling program (e.g. Cavanagh et al. 1997; EC 2002; USEPA 2007).

The aquatic biology/physical limnology program should include the following:

- Physical Limnology
- Water Quality/Nutrients
- Chlorophyll *a*
- Zooplankton
- Benthos
- Habitat Mapping

Ecosystem sampling should be conducted during the open water-season. Permanent survey sites should be established at the deepest portions of each basin within each lake (e.g. a lake with three basins will have three survey sites for physical limnology, water quality/nutrients, chlorophyll *a*, and zooplankton). Samples from these sites will be considered representative of the basin. Except for benthos, sampling surveys should be carried out at each site during three, equally spaced sampling visits. The benthos survey should be conducted once, during the late summer or fall.

Physical Limnology

Record wind (direction and speed), cloud cover, air temperature, and surface water temperature in the field notebook and data form comments box during *every* visit to the lake.

The following components will be carried out at each site during each of the three limnological sampling visits:

- Dissolved oxygen and temperature profiles (1-2 m intervals)
- Secchi depth.

Water Quality/Nutrients

A minimum of two water samples should be taken: (a) at a depth of one metre (or from the epilimnion with an integrated tube sampler), and (b) at a depth below the thermocline (in stratified lakes) or at a depth three-quarters of the maximum depth in fully mixed lakes. Samples should be analyzed for:

- Total phosphorus
- Total nitrogen
- Total dissolved solids
- Dissolved nutrients – ammonia, nitrate, nitrite, ortho-phosphate, silica
- Total dissolved nitrogen
- Total dissolved organic carbon

***Chlorophyll* a –** Samples for chlorophyll *a*, as an index of primary productivity, should be taken from each of the water quality/nutrient sampling locations. Samples will be handled and analyzed following standard protocols.

Zooplankton – Zooplankton is the dominant group of primary consumers in the pelagic zone and an important component of the diets of fish inhabiting that zone. Zooplankton sampling should be conducted during the water quality/nutrient sampling periods. Sampling should consist of four hauls per station, from about one metre off the bottom to the surface (recording the total length of the haul), using a 25-30 cm diameter net with 70 to 100 micron mesh. Samples should be preserved and analyzed for total biomass and taxonomic composition using standard procedures.

Benthos – Macroinvertebrates are dominant consumers in the littoral and profundal zones of a lake and important components of fish diets. Benthos samples should be taken once during late summer. A total of 21 dredge hauls should be taken below 5 m in each basin, in areas of softer sediments, distributed amongst the following depth intervals: six between 5-10 m; four between 10-15 m; three between 15-20 m; one between 20-25 m; and two deeper than 25 m. Dredge samples should initially be washed through a 250 or 500 μm mesh and preserved. One dredge haul from each depth interval should be analyzed for taxonomic composition, whereas the remaining 15 hauls should be used for biomass determinations.

Habitat Mapping

The Northwest Territories and Nunavut do not have standard fish habitat inventory protocols but rather a variety of inventory methodologies are currently used, depending upon the choice of the proponent project manager. Some jurisdictions in Canada have developed locally applicable standard inventory methods (see Resource Inventory Standards Committee for British Columbia and Bradbury et al. 2001 for Newfoundland and Labrador) which may be adapted for use in the Territories. Armantrout (1998) provides a glossary of habitat inventory terminology.

DELIVERABLES

SAMPLE ANALYSIS AND DATA MANAGEMENT

The analyses of all samples, from water quality to aging structures, are the responsibility of the proponent. All sample analyses will be conducted by qualified laboratories/ personnel. QA/QC results and analysis should be included.

DFO will provide the MS Access data entry template to the proponent. Field data forms, designed to be consistent with the fish-out database, are provided in the Appendix for gear-set data, fish counts, and fish biological data, along with a page of codes for these forms. Data should be entered from these field sheets directly into the MS Access database forms.

REPORTING

A daily CPUE report should be submitted electronically to DFO during the CPUE and final fish-out phases. Data should be in the form of a total daily fish count and the amount of fishing effort (e.g. number of gill nets). This information will be used by DFO to determine when to transition from CPUE to final fish-out phases as well as the end point to the final fish-out phase.

At the conclusion of the fish-out program, the proponent will provide the data in a summary data report that should present and discuss the data in relation to the objectives of the fish-out program. In addition to the biological and survey data, sample analyses of results will be provided that demonstrate the suitability, precision, and accuracy of the

data. The report will also include mark-recapture and CPUE population estimates and comparisons to baseline data, assessments, and predictions. QA/QC results, analysis, and discussion should be included in the report.

In addition to the report, the proponent will supply DFO with:

- Photocopies of all field data/notes
- Copies of photographs
- An electronic database in Microsoft Access of all data collected, including the results of all sample analyses.

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Table 1: Ageing structures to be collected by species group and listed in order of reliability (after EC 2002 and Mann 2004).

Species	Structure
Lake Trout and other salmonids	a) ototliths b) 1st four leading pectoral rays c) scales
Whitefish and other coregonids	a) ototliths b) 1st four leading pectoral rays c) scales
Smelt	a) ototliths b) 1st four leading pectoral rays c) scales
Northern Pike	a) cleithrum b) scales
Burbot	otoliths
Suckers	a) ototliths b) 1st four leading pectoral rays c) scales
Cyprinids	a) otoliths b) scales
Sticklebacks	otoliths
Sculpins	otoliths
Walleye and other percids	a) ototliths b) 1st three dorsal spines c) opercules d) scales

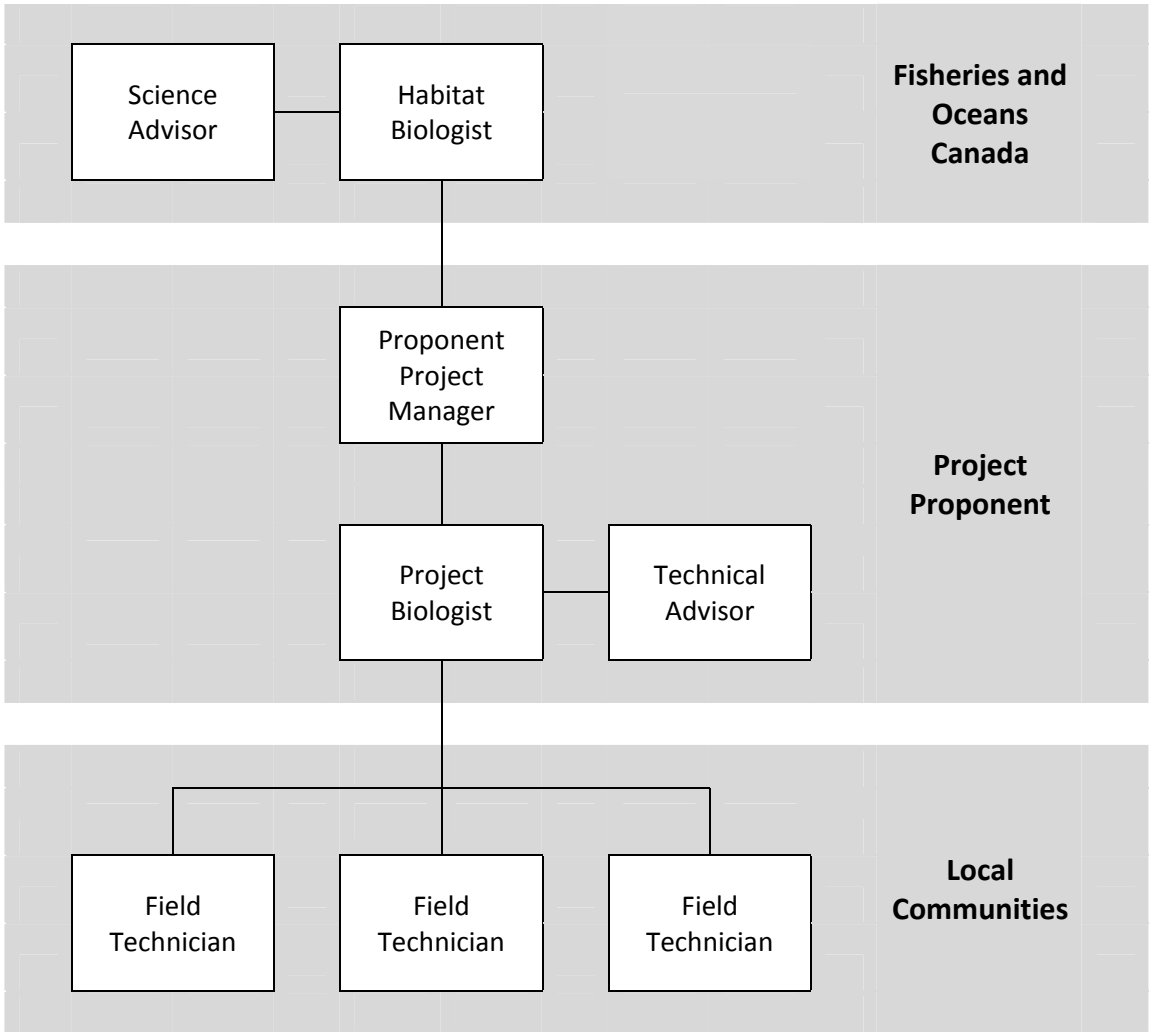

Figure 1: Example of a fish-out program organizational chart.

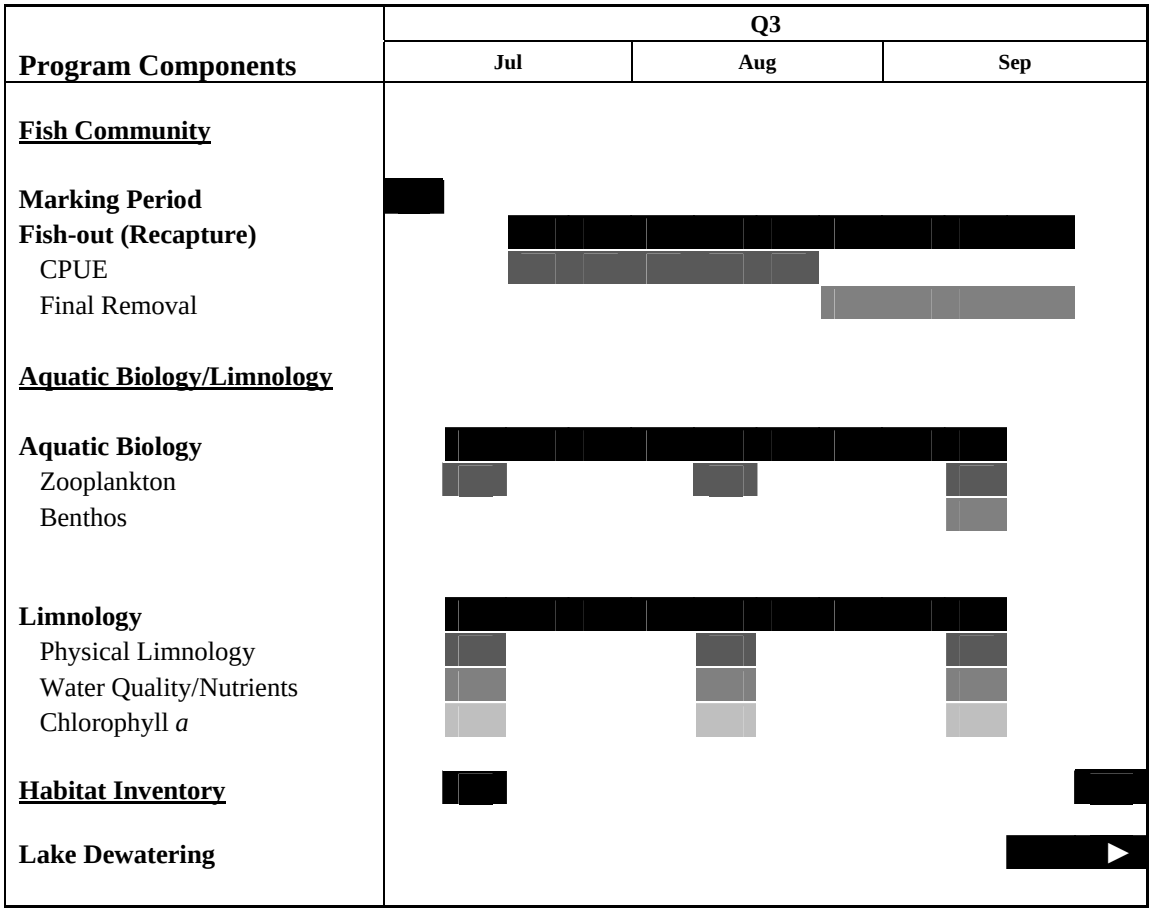

Figure 2: Example of a fish-out program field schedule where the fish-out, aquatic biology, physical limnology, and habitat assessment occur during the same year and dewatering begins following the conclusion of the fish-out program.

APPENDIX A

DATA CODES

Appendix A.1: Species codes for freshwater and anadromous fishes in the Northwest Territories and Nunavut, Canada (after Sawatzky et al. 2007).

Species Code	Scientific Name	Common Name
ARLM	*Lampetra camtschatica*	Arctic Lamprey
GOLD	*Hiodon alosoides*	Goldeye
PNSL	*Oncorhynchus gorbuscha*	Pink Salmon
CHSL	*Oncorhynchus keta*	Chum Salmon
COSL	*Oncorhynchus kisutch*	Coho Salmon
RNTR	*Oncorhynchus mykiss*	Rainbow Trout
SCSL	*Oncorhynchus nerka*	Sockeye Salmon
CNSL	*Oncorhynchus tshawytscha*	Chinook Salmon
ARCH	*Salvelinus alpinus*	Arctic Char
BLTR	*Salvelinus confluentus*	Bull Trout
DLVR	*Salvelinus malma*	Dolly Varden
LKTR	*Salvelinus namaycush*	Lake Trout
CISC	*Coregonus artedi*	Cisco
ARCS	*Coregonus autumnalis*	Arctic Cisco
LSCS	*Coregonus sardinella*	Least Cisco
SHCS	*Coregonus zenithicus*	Shortjaw Cisco
LKWH	*Coregonus clupeaformis*	Lake Whitefish
BRWH	*Coregonus nasus*	Broad Whitefish
PGWH	*Prosopium coulterii*	Pygmy Whitefish
RNWH	*Prosopium cylindraceum*	Round Whitefish
MNWH	*Prosopium williamsoni*	Mountain Whitefish
INCO	*Stenodus leucichthys*	Inconnu
ARGR	*Thymallus arcticus*	Arctic Grayling
PDSM	*Hypomesus olidus*	Pond Smelt
RNSM	*Osmerus mordax*	Rainbow Smelt
NRPK	*Esox lucius*	Northern Pike
LNSC	*Catostomus catostomus*	Longnose Sucker
WHSC	*Catostomus commersoni*	White Sucker
LKCH	*Couesius plumbeus*	Lake Chub
PRDC	*Margariscus margarita*	Pearl Dace
PEAM	*Mylocheilius caurinus*	Peamouth
EMSH	*Notropis atherinoides*	Emerald Shiner
SPSH	*Notropis hudsonius*	Spottail Shiner
NRDC	*Phoxinus eos*	Northern Redbelly Dace
FNDC	*Phoxinus neogaeus*	Finescale Dace
FTMN	*Pimephales promelas*	Fathead Minnow
FLCH	*Platygobio gracilis*	Flathead Chub
LNDC	*Rhinichthys cataractae*	Longnose Dace
TRPR	*Percopsis omyscomacus*	Trout-Perch
BURB	*Lota lota*	Burbot
BRST	*Culaea inconstans*	Brook Stickleback
THST	*Gasterosteus aculeatus*	Threespine Stickleback
NNST	*Pungitus pungitus*	Ninespine Stickleback
SLSC	*Cottus cognatus*	Slimy Sculpin
SPSC	*Cottus ricei*	Spoonhead Sculpin
DPSC	*Myoxocephalus thompsonii*	Deepwater Sculpin
IWDR	*Ethiostoma exile*	Iowa Darter
YLPR	*Perca flavescens*	Yeloow Perch
WALL	*Sander vitreus*	Walleye

Appendix A.2: Biological data codes to be used with the field data sheets.

Assess Code	Assessment Type
FO-MR	Fish-out: Mark-Recapture phase
FO-CPUE	Fish-out: CPUE/Removal phase
FO-FREM	Fish-out: Final Removal phase
B-line	Base line sampling
AEMP	Aquatic Effects Monitoring Program

Gear Code	Gear Type
AN	Angling
BS	Beach seine
DN	Dipnet
EF	Electrofisher
GN	Gill net
MN	Minnow trap
TN	Trap net
OT	Other

Length Code	Length
F	Fork
T	Total

Sex Code	Sex
F	Female
M	Male
U	Unknown

Maturity Code	Maturity
IM	Immature
MA	Mature
SD	Seasonal development
UN	Unknown

Reprod Code	Reprod Status
GR	Green
RI	Ripe
RU	Running
SP	Spent
UD	Undeveloped
UN	Unknown

AgeStruct Code	Aging Structure
FR	Finray
OT	Otilith
SC	Scale
NO	None
CL	Cleithrum
OP	Operculum bone

Fate Code	Fate
NR	New, released marked
NM	New, mortality
RR	Recapture, released
RM	Recapture, mortality
E	Escaped unmarked

Tissue Code	Tissue Sample
ST	Stomach
MU	Muscle
LV	Liver
EG	Eggs
GO	Gonad
NO	None

Fin Code	Fin Clip
AD	Adipose
LPc	Left Pectoral
RPc	Right Pectoral
LPv	Left Pelvic
RPv	Right Pelvic
DO	Dorsal
AN	Anal
UC	Upper Caudal
LC	Lower Caudal

APPENDIX B

FIELD DATA SHEETS

Gear set data and fish sample record

Page___of___

Lake:	Set date:	Net Length (m):	Recorder:
Assessment type:	Set time:	Net Height (m):	Comments:
Gear type:	Lift date:	Net depth (m): /	
Site ID:	Lift time:	Surface temp:	
Easting:		Mesh size(s):	
Northing:	NAD: 83 27		

Species Code	Sample No.	Mesh Size (cm)	Length (mm)* F or T	Weight (g)	Sex	Maturity Code	Reprod Status Code	Aging Struct Code	Fin Clip	Fate Code	Tissue Sample Code	Liver Weight (g)	Gonad Weight (g)	Comments

*Total length (T) for burbot, sculpin, Stickleback sp.; Fork length (F) for all others.

Gear set data and fish sample record Page___of___

Lake:				Set date:			Net Length (m):				Recorder:			
Assessment type:				Set time:			Net Height (m):				Comments:			
Gear type:				Lift date:			Net depth (m): /							
Site ID:				Lift time:			Surface temp:							
Easting:							Mesh size(s):							
Northing:				NAD: 83 27										
Species Code	Sample No.	Mesh Size (cm)	Length (mm)* F or T	Weight (g)	Sex	Maturity Code	Reprod Status Code	Aging Struct Code	Fin Clip	Fate Code	Tissue Sample Code	Liver Weight (g)	Gonad Weight (g)	Comments

				Set date:			Net Length (m):				Recorder:			
Assessment type:				Set time:			Net Height (m):				Comments:			
Gear type:				Lift date:			Net depth (m): /							
Site ID:				Lift time:			Mesh size(s):							
Easting:				Northing:			NAD: 83 27							

				Set date:			Net Length (m):				Recorder:			
Assessment type:				Set time:			Net Height (m):				Comments:			
Gear type:				Lift date:			Net depth (m): /							
Site ID:				Lift time:			Mesh size(s):							
Easting:				Northing:			NAD: 83 27							

*Total length (T) for burbot, sculpin, Stickleback sp.; Fork length (F) for all others.

Gear set data and fish count record

Page___of___

Lake:	Set date:	Net Length (m):	Recorder:
Assessment type:	Set time:	Net Height (m):	Comments:
Gear type:	Lift date:	Net depth (m): /	
Site ID:	Lift time:	Surface temp:	
Easting:		Mesh size(s):	
Northing:	NAD: 83 27		

Species	Number Captured							Comments
Code	Fin clip	New, released marked	New, mortality	Recapture, released	Recapture, mortality	Escaped, unmarked	Total	

Biological data for some/all fish have been recorded on Fish Sample Record. Yes___ No___

Gear set data and fish count record

Page___of___

Lake:	Set date:	Net Length (m):	Recorder:
Assessment type:	Set time:	Net Height (m):	Comments:
Gear type:	Lift date:	Net depth (m): /	
Site ID:	Lift time:	Surface temp:	
Easting:		Mesh size(s):	
Northing:	NAD: 83 27		

Species	Number Captured							Comments
Code	Fin clip	New, released marked	New, mortality	Recapture, released	Recapture, mortality	Escaped, unmarked	Total	

Biological data for some/all fish have been recorded on Fish Sample Record. Yes___ No___

	Set date:	Net Length (m):	Recorder:
Assessment type:	Set time:	Net Height (m):	Comments:
Gear type:	Lift date:	Net depth (m): /	
Site ID:	Lift time:	Mesh size(s):	
Easting:	Northing:	NAD: 83 27	

Species	Number Captured							Comments
Code	Fin clip	New, released marked	New, mortality	Recapture, released	Recapture, mortality	Escaped, unmarked	Total	

Biological data for some/all fish have been recorded on Fish Sample Record. Yes___ No___

Appendix 2.2-1

Quality Control Tests of Fish Tissue Metal Concentrations from Tail Lake, Doris North Project, 2011

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Appendix 2.2-1. Quality Control Tests of Fish Tissue Metal Concentrations from Tail Lake, Doris North Project, 2011

Matrix	QC Type	Analyte	QC Spl. No.	Reference	Result	Target	Units	%	Limits	Qualifier
Tissue	CRM	Arsenic (As)-Total	WG1319603-4	VA-NRC-TORT2	23.3	21.6	mg/kg wwt	108	70-130	-
Tissue	CRM	Cadmium (Cd)-Total	WG1319603-4	VA-NRC-TORT2	29.0	26.7	mg/kg wwt	109	70-130	-
Tissue	CRM	Chromium (Cr)-Total	WG1319603-4	VA-NRC-TORT2	1.37	0.77	mg/kg wwt	1.37	0-1.77	-
Tissue	CRM	Cobalt (Co)-Total	WG1319603-4	VA-NRC-TORT2	0.566	0.510	mg/kg wwt	111	70-130	-
Tissue	CRM	Copper (Cu)-Total	WG1319603-4	VA-NRC-TORT2	97.8	106	mg/kg wwt	97.8	70-130	-
Tissue	CRM	Lead (Pb)-Total	WG1319603-4	VA-NRC-TORT2	0.303	0.350	mg/kg wwt	0.303	.15-.55	-
Tissue	CRM	Manganese (Mn)-Total	WG1319603-4	VA-NRC-TORT2	13.7	13.6	mg/kg wwt	100	70-130	-
Tissue	CRM	Mercury (Hg)-Total	WG1319603-4	VA-NRC-TORT2	0.220	0.270	mg/kg wwt	82	70-130	-
Tissue	CRM	Molybdenum (Mo)-Total	WG1319603-4	VA-NRC-TORT2	1.07	0.950	mg/kg wwt	112	70-130	-
Tissue	CRM	Nickel (Ni)-Total	WG1319603-4	VA-NRC-TORT2	2.37	2.50	mg/kg wwt	95	70-130	-
Tissue	CRM	Selenium (Se)-Total	WG1319603-4	VA-NRC-TORT2	6.54	5.63	mg/kg wwt	116	70-130	-
Tissue	CRM	Strontium (Sr)-Total	WG1319603-4	VA-NRC-TORT2	42.1	45.2	mg/kg wwt	93	70-130	-
Tissue	CRM	Vanadium (V)-Total	WG1319603-4	VA-NRC-TORT2	1.88	1.64	mg/kg wwt	1.88	.64-2.64	-
Tissue	CRM	Zinc (Zn)-Total	WG1319603-4	VA-NRC-TORT2	186	180	mg/kg wwt	103	70-130	-
Tissue	CRM	Arsenic (As)-Total	WG1319603-5	VA-NRC-DOLT4	9.66	9.66	mg/kg wwt	100	70-130	-
Tissue	CRM	Cadmium (Cd)-Total	WG1319603-5	VA-NRC-DOLT4	24.2	24.3	mg/kg wwt	99	70-130	-
Tissue	CRM	Copper (Cu)-Total	WG1319603-5	VA-NRC-DOLT4	31.6	31.2	mg/kg wwt	101	70-130	-
Tissue	CRM	Lead (Pb)-Total	WG1319603-5	VA-NRC-DOLT4	0.147	0.160	mg/kg wwt	0.147	.06-.26	-
Tissue	CRM	Mercury (Hg)-Total	WG1319603-5	VA-NRC-DOLT4	2.30	2.58	mg/kg wwt	89	70-130	-
Tissue	CRM	Nickel (Ni)-Total	WG1319603-5	VA-NRC-DOLT4	0.95	0.97	mg/kg wwt	0.95	.47-1.47	-
Tissue	CRM	Selenium (Se)-Total	WG1319603-5	VA-NRC-DOLT4	9.76	8.30	mg/kg wwt	118	70-130	-
Tissue	CRM	Zinc (Zn)-Total	WG1319603-5	VA-NRC-DOLT4	120	116	mg/kg wwt	104	70-130	-
Tissue	MB	Aluminum (Al)-Total	WG1319603-1	-	<2.0	<2	mg/kg wwt	-	2	-
Tissue	MB	Antimony (Sb)-Total	WG1319603-1	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Arsenic (As)-Total	WG1319603-1	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Barium (Ba)-Total	WG1319603-1	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Beryllium (Be)-Total	WG1319603-1	-	<0.30	<0.3	mg/kg wwt	-	0.3	-
Tissue	MB	Bismuth (Bi)-Total	WG1319603-1	-	<0.030	<0.03	mg/kg wwt	-	0.03	-
Tissue	MB	Cadmium (Cd)-Total	WG1319603-1	-	<0.0050	<0.005	mg/kg wwt	-	0.005	-
Tissue	MB	Calcium (Ca)-Total	WG1319603-1	-	<2.0	<2	mg/kg wwt	-	2	-
Tissue	MB	Chromium (Cr)-Total	WG1319603-1	-	<0.10	<0.1	mg/kg wwt	-	0.1	-
Tissue	MB	Cobalt (Co)-Total	WG1319603-1	-	<0.020	<0.02	mg/kg wwt	-	0.02	-
Tissue	MB	Copper (Cu)-Total	WG1319603-1	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Lead (Pb)-Total	WG1319603-1	-	<0.020	<0.02	mg/kg wwt	-	0.02	-
Tissue	MB	Lithium (Li)-Total	WG1319603-1	-	<0.30	<0.3	mg/kg wwt	-	0.3	-
Tissue	MB	Magnesium (Mg)-Total	WG1319603-1	-	<1.0	<1	mg/kg wwt	-	1	-
Tissue	MB	Manganese (Mn)-Total	WG1319603-1	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Mercury (Hg)-Total	WG1319603-1	-	<0.0010	<0.001	mg/kg wwt	-	0.005	-
Tissue	MB	Molybdenum (Mo)-Total	WG1319603-1	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Nickel (Ni)-Total	WG1319603-1	-	<0.10	<0.1	mg/kg wwt	-	0.1	-
Tissue	MB	Selenium (Se)-Total	WG1319603-1	-	<0.20	<0.2	mg/kg wwt	-	0.2	-
Tissue	MB	Strontium (Sr)-Total	WG1319603-1	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Thallium (Tl)-Total	WG1319603-1	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Tin (Sn)-Total	WG1319603-1	-	<0.050	<0.05	mg/kg wwt	-	0.05	-
Tissue	MB	Uranium (U)-Total	WG1319603-1	-	<0.0020	<0.002	mg/kg wwt	-	0.002	-
Tissue	MB	Vanadium (V)-Total	WG1319603-1	-	<0.10	<0.1	mg/kg wwt	-	0.1	-
Tissue	MB	Zinc (Zn)-Total	WG1319603-1	-	<0.10	<0.1	mg/kg wwt	-	0.1	-
Tissue	MB	Aluminum (Al)-Total	WG1319603-2	-	<2.0	<2	mg/kg wwt	-	2	-
Tissue	MB	Antimony (Sb)-Total	WG1319603-2	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Arsenic (As)-Total	WG1319603-2	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Barium (Ba)-Total	WG1319603-2	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Beryllium (Be)-Total	WG1319603-2	-	<0.30	<0.3	mg/kg wwt	-	0.3	-
Tissue	MB	Bismuth (Bi)-Total	WG1319603-2	-	<0.030	<0.03	mg/kg wwt	-	0.03	-
Tissue	MB	Cadmium (Cd)-Total	WG1319603-2	-	<0.0050	<0.005	mg/kg wwt	-	0.005	-
Tissue	MB	Calcium (Ca)-Total	WG1319603-2	-	<2.0	<2	mg/kg wwt	-	2	-
Tissue	MB	Chromium (Cr)-Total	WG1319603-2	-	<0.10	<0.1	mg/kg wwt	-	0.1	-
Tissue	MB	Cobalt (Co)-Total	WG1319603-2	-	<0.020	<0.02	mg/kg wwt	-	0.02	-
Tissue	MB	Copper (Cu)-Total	WG1319603-2	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Lead (Pb)-Total	WG1319603-2	-	<0.020	<0.02	mg/kg wwt	-	0.02	-
Tissue	MB	Lithium (Li)-Total	WG1319603-2	-	<0.30	<0.3	mg/kg wwt	-	0.3	-
Tissue	MB	Magnesium (Mg)-Total	WG1319603-2	-	<1.0	<1	mg/kg wwt	-	1	-

Appendix 2.2-1. Quality Control Tests of Fish Tissue Metal Concentrations from Tail Lake, Doris North Project, 2011

Matrix	QC Type	Analyte	QC Spl. No.	Reference	Result	Target	Units	%	Limits	Qualifier
Tissue	MB	Manganese (Mn)-Total	WG1319603-2	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Mercury (Hg)-Total	WG1319603-2	-	<0.0010	<0.001	mg/kg wwt	-	0.005	-
Tissue	MB	Molybdenum (Mo)-Total	WG1319603-2	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Nickel (Ni)-Total	WG1319603-2	-	<0.10	<0.1	mg/kg wwt	-	0.1	-
Tissue	MB	Selenium (Se)-Total	WG1319603-2	-	<0.20	<0.2	mg/kg wwt	-	0.2	-
Tissue	MB	Strontium (Sr)-Total	WG1319603-2	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Thallium (Tl)-Total	WG1319603-2	-	<0.010	<0.01	mg/kg wwt	-	0.01	-
Tissue	MB	Tin (Sn)-Total	WG1319603-2	-	<0.050	<0.05	mg/kg wwt	-	0.05	-
Tissue	MB	Uranium (U)-Total	WG1319603-2	-	<0.0020	<0.002	mg/kg wwt	-	0.002	-
Tissue	MB	Vanadium (V)-Total	WG1319603-2	-	<0.10	<0.1	mg/kg wwt	-	0.1	-
Tissue	MB	Zinc (Zn)-Total	WG1319603-2	-	<0.10	<0.1	mg/kg wwt	-	0.1	-

Appendix 2.2-2

Fish Tissue Replicate Metals Concentrations from Tail Lake, Doris North Project, 2011

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Appendix 2.2-2. Fish Tissue Replicate Metals Concentrations from Tail Lake, Doris North Project, 2011

Sample ID	Matrix	ALS ID	Analyte	Replicate 1	Replicate 2	Units	RPD	RPD Limit	Diff	Diff Limit	Qualifier
L1035342-14	Tissue	WG1319603-3	Aluminum (Al)-Total	<2.0	<2.0	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Antimony (Sb)-Total	<0.010	<0.010	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Arsenic (As)-Total	0.036	0.036	mg/kg wwt	0.62	30	-	-	-
L1035342-14	Tissue	WG1319603-3	Barium (Ba)-Total	<0.010	<0.010	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Beryllium (Be)-Total	<0.30	<0.30	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Bismuth (Bi)-Total	<0.030	<0.030	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Cadmium (Cd)-Total	<0.0050	<0.0050	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Calcium (Ca)-Total	108	111	mg/kg wwt	2.5	50	-	-	-
L1035342-14	Tissue	WG1319603-3	Chromium (Cr)-Total	0.22	0.25	mg/kg wwt	15	30	-	-	-
L1035342-14	Tissue	WG1319603-3	Cobalt (Co)-Total	<0.020	<0.020	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Copper (Cu)-Total	0.163	0.158	mg/kg wwt	3.3	30	-	-	-
L1035342-14	Tissue	WG1319603-3	Lead (Pb)-Total	<0.020	<0.020	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Lithium (Li)-Total	<0.30	<0.30	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Magnesium (Mg)-Total	288	280	mg/kg wwt	2.6	30	-	-	-
L1035342-14	Tissue	WG1319603-3	Manganese (Mn)-Total	0.166	0.165	mg/kg wwt	0.18	30	-	-	-
L1035342-14	Tissue	WG1319603-3	Mercury (Hg)-Total	0.116	0.119	mg/kg wwt	2.1	30	-	-	-
L1035342-14	Tissue	WG1319603-3	Molybdenum (Mo)-Total	<0.010	<0.010	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Nickel (Ni)-Total	<0.10	<0.10	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Selenium (Se)-Total	<0.20	<0.20	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Strontium (Sr)-Total	0.069	0.069	mg/kg wwt	0.87	50	-	-	-
L1035342-14	Tissue	WG1319603-3	Thallium (Tl)-Total	<0.010	<0.010	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Tin (Sn)-Total	<0.050	<0.050	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Uranium (U)-Total	<0.0020	<0.0020	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Vanadium (V)-Total	<0.10	<0.10	mg/kg wwt	N/A	30	-	-	RPD-NA
L1035342-14	Tissue	WG1319603-3	Zinc (Zn)-Total	2.64	2.59	mg/kg wwt	2.1	30	-	-	-

Appendix 3.1-1

Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Table Legend

Assessment Code: FO-CPUE = Fish-out CPUE/Removal Phase, FO-FREM = Fish-out Final Removal Phase
Site ID = gillnet set identification number
Species: LKTR = lake trout, NSSB = ninespine stickleback
Sample = unique fish sample number
Gear Code: AN = angling, GN = gillnet
Length Code: F = fork length (mm)
Sex Code: F = female, M = male, U = unknown
Maturity Code: IM = immature, MA = mature, SD = seasonal development, UN = unknown
Reproductive Code: GR = green, RI = ripe, RU = running, SP = spent, UD = undeveloped, UN = unknown
Agestruct Code: FR = fin ray, OT = otolith, SC = scale
Fate Code: NR = new, released marked; NM = new, mortality; RR = recapture, released; RM = recapture, mortality; E = escaped unmarked
Fin Code: AD = adipose, PEC = pectoral, PV = pelvic
Tissue Code: ST = stomach, MU = muscle, LV = liver, EG = eggs, GO = gonads
Blank cells indicated no data collected

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		561									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN											NM	AD					mortality	died after 2nd capture
FO-MR		LKTR		AN		505									NR	AD						
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN		595									NM	AD					bleeding from gills	
FO-MR		LKTR		AN		505									NR	AD						
FO-MR		LKTR		GN		578									NR	AD						
FO-MR		LKTR		AN		320									NR	AD						
FO-MR		LKTR		AN		520									NR	AD						
FO-MR		LKTR		AN		521									NR	AD						
FO-MR		LKTR		GN		583									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		GN		535									NR	AD						
FO-MR		LKTR		AN		520									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		GN		560									NR	AD						
FO-MR		LKTR		GN		545									NR	AD					RLL 2165	
FO-MR		LKTR		AN		550									NR	AD					RLL2165	
FO-MR		LKTR		AN		520									NR	AD						
FO-MR		LKTR		GN		329									NR	AD						
FO-MR		LKTR		AN		440									NR	AD						
FO-MR		LKTR		AN		564									NR	AD						
FO-MR		LKTR		AN		505									NR	AD						
FO-MR		LKTR		AN		535									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		470									NR	AD						
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		470									NR	AD						
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		550									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		550									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		AN		570									NR	AD					mild bleeding	
FO-MR		LKTR		AN		540									NR	AD					missing eye	
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN		530									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		530									NR	AD					previous AD clip but no tag	
FO-MR		LKTR		AN		590									NR	AD					RLL 2537	
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN		570									NR	AD					mild bleeding	
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		579									NR	AD						
FO-MR		LKTR		AN		591									NR	AD						
FO-MR		LKTR		AN		618									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		551									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		630									NR	AD						
FO-MR		LKTR		AN		625									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		550									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		535									NR	AD						
FO-MR		LKTR		AN		610									NR	AD						

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-MR		LKTR		AN		585									NR	AD						
FO-MR		LKTR		AN		635									NR	AD						
FO-MR		LKTR		AN		574									NR	AD						
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		550									NR	AD						
FO-MR		LKTR		AN		350									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		570									NM	AD					bleeding from gills, mortality	
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		570									NR	AD					old AD clip but no old tag	
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		GN		580									NR	AD					RLL 2123	
FO-MR		LKTR		GN		520									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		GN		580									NR	AD					some bleeding, released	
FO-MR		LKTR		AN		510									NR	AD						
FO-MR		LKTR		AN		380									NR	AD						
FO-MR		LKTR		AN		340									NR	AD						
FO-MR		LKTR		AN		625									NR	AD					emaciated	
FO-MR		LKTR		AN		580									NR	AD					mild bleeding	
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		586									NR	AD						
FO-MR		LKTR		AN		521									NR	AD						
FO-MR		LKTR		AN		572									NR	AD						
FO-MR		LKTR		AN		529									NR	AD						
FO-MR		LKTR		AN		520									NR	AD					GOLDER 738	
FO-MR		LKTR		AN		485									NR	AD						
FO-MR		LKTR		AN		568									NR	AD					RLL 2559	
FO-MR		LKTR		AN		584									NR	AD						
FO-MR		LKTR		AN		574									NR	AD						
FO-MR		LKTR		AN		533									NR	AD						
FO-MR		LKTR		AN		588									NR	AD						
FO-MR		LKTR		AN		530									NR	AD						
FO-MR		LKTR		AN		588									NR	AD					golder 796	
FO-MR		LKTR		AN		645									NR	AD					Golder 984	
FO-MR		LKTR		AN		524									NR	AD						
FO-MR		LKTR		AN		524									NR	AD						
FO-MR		LKTR		AN		555									NR	AD					RLL 2580	
FO-MR		LKTR		AN		647									NR	AD						
FO-MR		LKTR		AN		558									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		595									NR	AD						
FO-MR		LKTR		AN		510									NR	AD						
FO-MR		LKTR		AN		510									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		545									NR	AD						
FO-MR		LKTR		AN		615									NR	AD						
FO-MR		LKTR		AN		588									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		555									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		595									NR	AD						
FO-MR		LKTR		AN		612									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		615									NR	AD						
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		AN		533									NR	AD						
FO-MR		LKTR		AN		602									NR	AD						

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-MR		LKTR		AN		520									NR	AD					old AD clip but no tag	
FO-MR		LKTR		AN		592									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		620									NR	AD					RLL 2195	
FO-MR		LKTR		AN		595									NR	AD						
FO-MR		LKTR		AN		607									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		AN		545									NR	AD						
FO-MR		LKTR		AN		602									NR	AD						
FO-MR		LKTR		AN		548									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		535									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		606									NR	AD						
FO-MR		LKTR		AN		615									NR	AD						
FO-MR		LKTR		AN		585									NR	AD					GOLDER 0980	
FO-MR		LKTR		AN		535									NR	AD						
FO-MR		LKTR		AN		592									NR	AD					RLL but number missing	
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		550									NR	AD						
FO-MR		LKTR		AN		591									NR	AD						
FO-MR		LKTR		AN		610									NR	AD						
FO-MR		LKTR		AN		555									NR	AD					RLL 2528	
FO-MR		LKTR		AN		565									NR	AD						
FO-MR		LKTR		AN		575									NR	AD					GOLDER 0956	
FO-MR		LKTR		AN		510									NR	AD						
FO-MR		LKTR		AN		570									NR	AD					RLL 2163	
FO-MR		LKTR		AN		557									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN		528									NR	AD						
FO-MR		LKTR		AN		382									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		528									NR	AD						
FO-MR		LKTR		AN		382									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		563									NR	AD						
FO-MR		LKTR		AN		520									NR	AD						
FO-MR		LKTR		AN		455									NR	AD						
FO-MR		LKTR		AN		572									NR	AD						
FO-MR		LKTR		AN		420									NR	AD						
FO-MR		LKTR		AN		511									NR	AD						
FO-MR		LKTR		AN		510									NR	AD						
FO-MR		LKTR		AN		550									NR	AD						
FO-MR		LKTR		AN		585									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		550									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		550									NR	AD						
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN		555									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		584									NR	AD						
FO-MR		LKTR		AN		520									NR	AD						
FO-MR		LKTR		AN		586									NR	AD						
FO-MR		LKTR		AN		522									NR	AD					RLL2204	
FO-MR		LKTR		AN		583									NR	AD					RLL2591	
FO-MR		LKTR		AN		596									NR	AD					GOLDER 0792	
FO-MR		LKTR		AN		572									NR	AD						
FO-MR		LKTR		AN		519									NR	AD					RLL2558	
FO-MR		LKTR		AN		583									NR	AD						
FO-MR		LKTR		AN		558									NR	AD						
FO-MR		LKTR		AN		561									NR	AD						

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-MR		LKTR		AN		551									NR	AD						
FO-MR		LKTR		AN		556									NR	AD						
FO-MR		LKTR		AN		484									NR	AD						
FO-MR		LKTR		AN		537									NR	AD						
FO-MR		LKTR		AN		554									NR	AD						
FO-MR		LKTR		AN		625									NR	AD						
FO-MR		LKTR		AN		371									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		GN		551									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		GN		550									NR	AD						
FO-MR		LKTR		AN		550									RR	AD					recapture	
FO-MR		LKTR		AN		510									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		AN		625									NR	AD						
FO-MR		LKTR		AN		562									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		GN		510									NR	AD						
FO-MR		LKTR		AN		585									NR	AD						
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN		572									NR	AD						
FO-MR		LKTR		AN		575									NR	AD					RLL 2154	
FO-MR		LKTR		AN		455									NR	AD						
FO-MR		LKTR		AN		370									NR	AD						
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN		572									NR	AD						
FO-MR		LKTR		AN		591									NR	AD						
FO-MR		LKTR		AN		575									NR	AD						
FO-MR		LKTR		AN		542									NR	AD						
FO-MR		LKTR		AN		520									NR	AD						
FO-MR		LKTR		AN		324									NR	AD						
FO-MR		LKTR		AN		341									NR	AD						
FO-MR		LKTR		AN		546									NR	AD						
FO-MR		LKTR		AN		521									NR	AD						
FO-MR		LKTR		AN		559									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		445									NR	AD						
FO-MR		LKTR		AN		565									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		604									NR	AD						
FO-MR		LKTR		AN		554									NR	AD						
FO-MR		LKTR		AN		585									NR	AD						
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		508									NR	AD						
FO-MR		LKTR		AN		574									NR	AD						
FO-MR		LKTR		AN		564									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		576									NR	AD						
FO-MR		LKTR		AN		535									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		554									NR	AD						
FO-MR		LKTR		AN		566									NR	AD						
FO-MR		LKTR		AN		695									NR	AD						
FO-MR		LKTR		AN		553									NR	AD						
FO-MR		LKTR		AN		555									NR	AD						
FO-MR		LKTR		AN		578									NR	AD						
FO-MR		LKTR		AN		500									NR	AD						
FO-MR		LKTR		AN		530									NR	AD						
FO-MR		LKTR		AN		533									NR	AD						photo 377 and 378
FO-MR		LKTR		AN		434									NR	AD						
FO-MR		LKTR		GN		558									NR	AD						
FO-MR		LKTR		GN		386									NR	AD						
FO-MR		LKTR		GN		548									NR	AD						
FO-MR		LKTR		AN		566									NR	AD						

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-MR		LKTR		AN		525									NR	AD						
FO-MR		LKTR		GN		553									NR	AD						
FO-MR		LKTR		GN		563									NR	AD						
FO-MR		LKTR		AN		556									NR	AD						
FO-MR		LKTR		AN		585									NR	AD						
FO-MR		LKTR		AN		545									NR	AD						
FO-MR		LKTR		AN		528									NR	AD						
FO-MR		LKTR		AN		562									NR	AD					RLL 2122	
FO-MR		LKTR		AN		575									NR	AD					RLL 0976	
FO-MR		LKTR		AN		328									NR	AD						
FO-MR		LKTR		GN		538									NR	AD						
FO-MR		LKTR		AN		547									NR	AD						
FO-MR		LKTR		AN		615									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		450									NR	AD						
FO-MR		LKTR		AN		548									NR	AD						
FO-MR		LKTR		AN		583									NR	AD						
FO-MR		LKTR		AN		675									NR	AD						
FO-MR		LKTR		AN		600									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		704									NR	AD						
FO-MR		LKTR		AN		565									NR	AD						
FO-MR		LKTR		AN		598									NR	AD						
FO-MR		LKTR		AN		558									NR	AD						
FO-MR		LKTR		AN		568									NR	AD						
FO-MR		LKTR		AN		565									NR	AD						
FO-MR		LKTR		AN		558									NR	AD						
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		568									NR	AD						
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		556									NR	AD						
FO-MR		LKTR		AN		574									NR	AD						
FO-MR		LKTR		AN		627									NR	AD						
FO-MR		LKTR		AN		471									NR	AD						
FO-MR		LKTR		AN		616									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		529									NR	AD						
FO-MR		LKTR		AN		539									NR	AD						
FO-MR		LKTR		AN		558									NR	AD						
FO-MR		LKTR		AN		562									NR	AD						
FO-MR		LKTR		AN		567									NR	AD						
FO-MR		LKTR		AN		538									NR	AD						
FO-MR		LKTR		AN		546									NR	AD						
FO-MR		LKTR		AN		578									NR	AD						
FO-MR		LKTR		AN		587									NR	AD						
FO-MR		LKTR		AN		554									NR	AD						
FO-MR		LKTR		AN		557									NR	AD						
FO-MR		LKTR		AN		522									NR	AD						
FO-MR		LKTR		AN		554									NR	AD						
FO-MR		LKTR		AN		549									NR	AD						
FO-MR		LKTR		AN		554									NR	AD					RLL 2197	
FO-MR		LKTR		AN		652									NR	AD					RLL 2126	
FO-MR		LKTR		AN		582									NR	AD						
FO-MR		LKTR		AN		621									NR	AD					some bleeding	
FO-MR		LKTR		AN		551									NR	AD						
FO-MR		LKTR		AN		578									NR	AD						
FO-MR		LKTR		AN		557									NR	AD						
FO-MR		LKTR		AN		539									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		615									NR	AD					old tag 0793	

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-MR		LKTR		AN		525									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		552									NR	AD						
FO-MR		LKTR		AN		573									NR	AD						
FO-MR		LKTR		AN		563									NR	AD						
FO-MR		LKTR		AN		655									NR	AD						
FO-MR		LKTR		AN		536									NR	AD						
FO-MR		LKTR		AN		545									NR	AD					old tag 0745	
FO-MR		LKTR		AN		562									NR	AD						
FO-MR		LKTR		AN		544									NR	AD					RLL 2140	
FO-MR		LKTR		AN		538									NR	AD						
FO-MR		LKTR		AN		540									NR	AD					old tag 0945	
FO-MR		LKTR		AN		620									NR	AD						
FO-MR		LKTR		AN		562									NR	AD						
FO-MR		LKTR		AN		524									NR	AD						
FO-MR		LKTR		AN		578									NR	AD						
FO-MR		LKTR		AN		551									NR	AD						
FO-MR		LKTR		AN		615									NR	AD						
FO-MR		LKTR		AN		568									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		554									NR	AD						
FO-MR		LKTR		AN		577									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		608									NR	AD						
FO-MR		LKTR		AN		538									NR	AD						
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		560									NR	AD					GOLDER 0971	
FO-MR		LKTR		AN		530									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		520									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		530									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		530									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		GN		536									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		530									NR	AD						
FO-MR		LKTR		AN		580									NM	AD					mortality	
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		490									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		330									NR	AD						
FO-MR		LKTR		GN		540									NR	AD					emiaciated	
FO-MR		LKTR		GN		550									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		570									NR	AD					RLL2153	
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN											RR	AD					recapture	
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		GN		570									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		590									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		605									NR	AD						
FO-MR		LKTR		AN		540									NR	AD						

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		580									NR	AD						
FO-MR		LKTR		AN		560									NR	AD					GOLDER 0959	
FO-MR		LKTR		AN		595									NR	AD						
FO-MR		LKTR		AN		565									NR	AD					RLL 2134	
FO-MR		LKTR		AN		570									NR	AD						
FO-MR		LKTR		AN		560									NR	AD						
FO-MR		LKTR		AN		540									NR	AD						
FO-MR		LKTR		AN		558									NM						released unmarked	hook wound bleeding
FO-MR		LKTR		AN		565									NM						released unmarked	hook wound bleeding
FO-MR		LKTR		AN		517									NM						released unmarked	hook wound bleeding
FO-MR		LKTR		AN		615									NM							
FO-MR		LKTR		AN		580									NM							
FO-MR		LKTR		AN		552									NM							
FO-MR		LKTR		AN		540									NM							
FO-MR		LKTR		AN		590									NM							
FO-MR		LKTR		AN		546									NM	AD					Golder 0896	bleeding from hooking
FO-MR		LKTR		AN		579									E	AD					Golder 951	gilled but probably survive not marked
FO-MR		LKTR		AN		562									NM							
FO-MR		LKTR		AN		590									NM							
FO-MR		LKTR		AN		565									NM						mortality	
FO-MR		LKTR		AN		581									E						old tag 0781	not tagged unknown reason
FO-CPUE	2	LKTR	1	GN	0.5	531	1852	1.24	F	MA	GR	FR/SC	25	OT	RM	AD	308		19	106	308	
FO-CPUE	2	LKTR	2	GN	0.5	580	1476	0.76	F	IM	GR	FR/SC			RM	AD	150		13	0	150	
FO-CPUE	2	LKTR	3	GN	1	511	1492	1.12	M	MA	GR	FR/SC	21	OT	NM				10	52		
FO-CPUE	2	LKTR	4	GN	1	520	1330	0.95	F	IM	GR	FR/SC	41	OT	NM				9	0		
FO-CPUE	2	LKTR	5	GN	1	560	1820	1.04	M	MA	GR	FR/SC	25	OT	RM	AD	132		10	68	132	
FO-CPUE	2	LKTR	6	GN	1.5	495	1245	1.03	M	MA	GR	FR/SC	11	FR	NM				13	44		
FO-CPUE	2	LKTR	7	GN	1.5	575	2188	1.15	F	MA	GR	FR/SC	44	OT	NM				35	232		
FO-CPUE	2	LKTR	8	GN	1.5	544	1895	1.18	M	MA	GR	FR/SC	53	OT	RM	AD	432		17	45	432	
FO-CPUE	2	LKTR	9	GN	1.5	578	1764	0.91	M	MA	GR	FR/SC	29	OT	RM	AD	24		21	93	024	
FO-CPUE	2	LKTR	10	GN	1.5	555	1271	0.74	M	IM	UD	FR/SC	14	OT	RM	AD	158		14	0	158	
FO-CPUE	2	LKTR	11	GN	1.5	556	1833	1.07	F	MA	GR	FR/SC	41	OT	NM				15	139		
FO-CPUE	2	LKTR	12	GN	1.5	546	1400	0.86	M	MA	GR	FR/SC	25	OT	NM				13	35		
FO-CPUE	2	LKTR	13	GN	2	545	1700	1.05	F	MA	GR	FR/SC	20	OT	NM				16	130		Golder 797
FO-CPUE	2	LKTR	14	GN	2	560	1550	0.88	M	MA	GR	FR/SC			RM	AD	?		12	33		lost tag
FO-CPUE	2	LKTR	15	GN	2	526	1622	1.11	M	MA	GR	FR/SC	25	OT	RM		223		10	52	223	
FO-CPUE	2	LKTR	16	GN	2	598	1680	0.79	M	IM	UD	FR/SC			NM				15	0		
FO-CPUE	2	LKTR	17	GN	2	552	1625	0.97	M	MA	GR	FR/SC			NM				11	33		
FO-CPUE	2	LKTR	18	GN	2	560	1772	1.01	M	MA	GR	FR/SC			NM				9	40		
FO-CPUE	2	LKTR	19	GN	2	500	1401	1.12	F	IM	UD	FR/SC	12	FR	NM				13	26		
FO-CPUE	2	LKTR	20	GN	2	550	2076	1.25	F	IM	UD	FR/SC			NM				16	133		
FO-CPUE	2	LKTR	21	GN	2	534	1702	1.12	M	MA	GR	FR/SC			NM				14	62		
FO-CPUE	2	LKTR	22	GN	2	565	1729	0.96	M	MA	GR	FR/SC			NM				13	56		
FO-CPUE	2	LKTR	23	GN	2	569	1609	0.87	M	MA	GR	FR/SC			NM				9	43		
FO-CPUE	2	LKTR	24	GN	2	580	1655	0.85	F	IM	UD	FR/SC			RM	AD	149		12	21	149	
FO-CPUE	2	LKTR	25.1	GN	2	556	1913	1.11	F	IM	UD	FR/SC			RM	AD	483		15	18	483	
FO-CPUE	2	LKTR	25.2	GN	3	540	1609	1.02	M	MA	GR	FR/SC			NM				12	49		
FO-CPUE	2	LKTR	26	GN	3	590	1704	0.83	F	MA	GR	FR/SC			NM				28	101		
FO-CPUE	2	LKTR	27	GN	3	544	1657	1.03	F	IM	UD	FR/SC			RM		499		21	21	499	
FO-CPUE	2	LKTR	28	GN	3	540	1400	0.89	M	MA	GR	FR/SC			NM				13	24		Golder 4018
FO-CPUE	2	LKTR	29	GN	3	561	1707	0.97	M	MA	GR	FR/SC			RM		466		15	30	466	
FO-CPUE	2	LKTR	30	GN	3	514	1750	1.29	F	IM	UD	FR/SC	16	FR	NM				12	32		
FO-CPUE	2	LKTR	31	GN	3	491	1185	1.00	F	IM	UD	FR/SC	6	FR	RM	AD	?		7	0		lost tag?
FO-CPUE	2	LKTR	32	GN	3	608	1830	0.81	F	IM	UD	FR/SC	8	FR	NM	AD			15	19		RL&L 2108
FO-CPUE	2	LKTR	33	GN	3	470	1056	1.02	M	MA	GR	FR/SC			NM				10	16		
FO-CPUE	2	LKTR	34	GN	3	557	1704	0.99	M	MA	GR	FR/SC			NM				12	49		
FO-CPUE	2	LKTR	35	GN	3	473	1140	1.08	F	IM	UD	FR/SC	9	FR	NM				7	0		
FO-CPUE	2	LKTR	36	GN	3	545	1184	0.73	M	IM	UD	FR/SC			NM				9	0		
FO-CPUE	2	LKTR	37	GN	3	570	1800	0.97	F	IM	UD	FR/SC			NM				17	25		RL&L 2546
FO-CPUE	2	LKTR	38	GN	4	575	1458	0.77	F	IM	UD	FR/SC			RM	AD	352		13	9	352	
FO-CPUE	2	LKTR	39	GN	4	570	1363	0.74	F	IM	UD	FR/SC			NM				9	17		
FO-CPUE	2	LKTR	40	GN	4	555	1461	0.85	F	IM	UD	FR/SC			NM				12	23		
FO-CPUE	2	LKTR	41	GN	4	602	2339	1.07	M	MA	GR	FR/SC			NM				20	83		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	2	LKTR	42	GN	4	560	1635	0.93	F	MA	GR	FR/SC			NM				16	85		
FO-CPUE	2	LKTR	43	GN	4	532	1543	1.02	M	MA	GR	FR/SC			NM				15	52		
FO-CPUE	2	LKTR	44	GN	4	530	1316	0.88	M	MA	GR	FR/SC			RM	AD	436		14	23	436	
FO-CPUE	2	LKTR	45	GN	4	580	2152	1.10	M	MA	GR	FR/SC			RM	AD	484		19	60	484	
FO-CPUE	2	LKTR	46	GN	4	547	1300	0.79	M	MA	GR	FR/SC			NM				8	34		
FO-CPUE	2	LKTR	47	GN	4	571	1688	0.91	M	MA	GR	FR/SC			NM				15	44		
FO-CPUE	2	LKTR	48	GN	4	560	2120	1.21	F	MA	GR	FR/SC			NM				34	69		
FO-CPUE	2	LKTR	49	GN	4	545	1409	0.87	M	IM	UD	FR/SC			RM	AD	351		9	0	351	
FO-CPUE	2	LKTR	50	GN	4	546	1402	0.86	M	MA	GR	FR/SC			NM				13	21		
FO-CPUE	2	LKTR	51	GN	4	600	1444	0.67	F	IM	UD	FR/SC			NM				15	0		
FO-CPUE	2	LKTR	52	GN	4	433	1440	1.77	M	MA	GR	FR/SC	13	FR	NM				12	52		
FO-CPUE	2	LKTR	53	GN	4	555	1753	1.03	F	MA	GR	FR/SC			NM				23	128		
FO-CPUE	2	LKTR	54	GN	4	605	2200	0.99	F	MA	RI	FR/SC			NM				23	195		
FO-CPUE	2	LKTR	55	GN	4	549	1655	1.00	F	MA	RI	FR/SC			NM				29	132		
FO-CPUE	2	LKTR	56	GN	4	559	1510	0.86	M	MA	GR	FR/SC			NM				9	53		
FO-CPUE	2	LKTR	57	GN	4	631	2147	0.85	M	MA	GR	FR/SC			NM				15	66		
FO-CPUE	2	LKTR	58	GN	4	541	1354	0.86	M	MA	GR	FR/SC			RM	AD	495		8	6	Y-0495	
FO-CPUE	2	LKTR	59	GN	4	556	1846	1.07	M	MA	GR	FR/SC			NM	AD	405		17	64	405	
FO-CPUE	3	LKTR	60	GN	1.5	385	590	1.03	F	IM	UD	FR/SC	5	FR	NM				12	0		
FO-CPUE	3	LKTR	61	GN	2	539	2680	1.71	M	MA	GR	FR/SC			NM				19	64		
FO-CPUE	3	LKTR	62	GN	2	600	1594	0.74	F	MA	GR	FR/SC			NM				12	18		
FO-CPUE	3	LKTR	63	GN	3	589	1821	0.89	F	MA	GR	FR/SC			NM				12	58		
FO-CPUE	3	LKTR	64	GN	3	550	863	0.52	M	IM	UD	FR/SC			NM				6	0		
FO-CPUE	3	LKTR	65	GN	4	595	1190	0.56	F	IM	UD	FR/SC			NM				11	13		
FO-CPUE	3	LKTR	66	GN	4	600	1206	0.56	F	MA	RI	FR/SC			NM				18	91		
FO-CPUE	4	LKTR	70	GN	1	592	2026	0.98	F	MA	GR	FR/SC			RM	AD	46		18.5	26.7	Y0046	
FO-CPUE	4	LKTR	71	GN	1.5	590	2123	1.03	F	MA	RI	FR/SC	16	FR	RM	AD	476		31.8	138		
FO-CPUE	4	LKTR	73	GN	1.5	556	1825	1.06	F	MA	RI	FR/SC			NM				27	116		
FO-CPUE	4	LKTR	74	GN	1.5	560	1648	0.94	M	MA	GR	FR/SC			NM				13.5	36		
FO-CPUE	4	LKTR	75	GN	1.5	365	502	1.03	M	IM	UD	FR/SC	6	FR	NM				5	0		
FO-CPUE	4	LKTR	76	GN	2	420	730	0.99	M	IM	UD	FR/SC	7	FR	NM				3.5	0		
FO-CPUE	4	LKTR	77	GN	2	555	1605	0.94	M	MA	GR	FR/SC			NM				13	39		
FO-CPUE	4	LKTR	78	GN	2	510	1498	1.13	M	MA	GR	FR/SC			NM				12.8	58		
FO-CPUE	4	LKTR	79	GN	2	550	1936	1.16	M	MA	GR	FR/SC			NM				10.8	57		
FO-CPUE	4	LKTR	80	GN	3	575	1896	1.00	F	IM	UD	FR/SC			NM				20	29		
FO-CPUE	4	LKTR	81	GN	3	603	1901	0.87	F	IM	UD	FR/SC			NM				15	23	RL&L 2160	
FO-CPUE	4	LKTR	82	GN	3	548	1768	1.07	M	MA	GR	FR/SC			NM				14	54		
FO-CPUE	4	LKTR	83	GN	3	422	778	1.04	F	IM	UD	FR/SC	7	FR	NM				11	0		
FO-CPUE	4	LKTR	84	GN	3	555	1511	0.88	M	MA	GR	FR/SC			NM				13.5	49		
FO-CPUE	4	LKTR	85	GN	3	610	2211	0.97	F	MA	RI	FR/SC			NM				37.8	118		
FO-CPUE	4	LKTR	86	GN	3	590	1888	0.92	F	MA	RI	FR/SC			NM				28	122		
FO-CPUE	4	LKTR	87	GN	3	585	1573	0.79	F	IM	UD	FR/SC			NM				14	22		
FO-CPUE	4	LKTR	88	GN	3	580	1560	0.80	F	SD	UN	FR/SC			NM				15.5	42		
FO-CPUE	4	LKTR	89	GN	3	380	555	1.01	F	IM	UD	OT/FR/SC	6	FR	NM				6.6	0		
FO-CPUE	4	LKTR	90	GN	4	565	1799	1.00	M	MA	GR	FR/SC			RM	AD	482		16	76		
FO-CPUE	4	LKTR	91	GN	4	555	1542	0.90	M	MA	GR	FR/SC			NM				11	42		
FO-CPUE	4	LKTR	92	GN	4	583	1728	0.87	F	MA	GR	FR/SC			RM	AD	359		21	115		
FO-CPUE	4	LKTR	93	GN	4	555	1722	1.01	F	MA	RI	FR/SC			NM				27	155		
FO-CPUE	4	LKTR	94	GN	4	455	990	1.05	F	IM	UD	OT/FR/SC			NM				8	0		
FO-CPUE	4	LKTR	95	GN	4	600	1813	0.84	F	SD	UN	FR/SC			RM	AD	27		15	33		
FO-CPUE	4	LKTR	96	GN	4	577	1675	0.87	F	IM	UD	FR/SC			RM	AD	268		18	25		
FO-CPUE	4	LKTR	97	GN	4	572	1732	0.93	M	MA	GR	FR/SC			RM	AD	442		16	64		
FO-CPUE	4	LKTR	98	GN	4	564	1744	0.97	M	MA	GR	FR/SC			NM				18	51		
FO-CPUE	4	LKTR	99	GN	4	530	1770	1.19	F	SD	UN	FR/SC			NM				22	99		
FO-CPUE	4	LKTR	100	GN	4	579	1480	0.76	F	MA	GR	FR/SC			NM				23	74		
FO-CPUE	5	LKTR	101	GN	3	561	2162	1.22	F	MA	RI	FR/SC			RM	AD	63		24	150		
FO-CPUE	5	LKTR	102	GN	3	560	1517	0.86	M	SD	UD	FR/SC			NM				10	18		
FO-CPUE	5	LKTR	103	GN	3	563	1688	0.95	F	MA	RI	FR/SC			NM				16	114		
FO-CPUE	5	LKTR	104	GN	3	520	1646	1.17	M	MA	GR	FR/SC			NM				15	55		
FO-CPUE	5	LKTR	105	GN	3	605	2091	0.94	F	SD	UN	FR/SC			NM				18	31		
FO-CPUE	5	LKTR	106	GN	1	565	1620	0.90	M	MA	GR	FR/SC			RM	AD	374		12	43		
FO-CPUE	5	LKTR	107	GN	1	556	1685	0.98	M	MA	GR	FR/SC			NM				13	42		
FO-CPUE	5	LKTR	108	GN	1	420	723	0.98	F	IM	UD	OT/FR/SC			NM				7	0		
FO-CPUE	5	LKTR	109	GN	4	570	1580	0.85	M	MA	GR	FR/SC			RM	AD	136		14	75		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	5	LKTR	110	GN	4	565	1744	0.97	M	MA	GR	FR/SC			NM				18	40		
FO-CPUE	5	LKTR	111	GN	4	586	2085	1.04	F	MA	GR	FR/SC			NM				36	188		
FO-CPUE	5	LKTR	112	GN	4	565	1570	0.87	M	MA	GR	FR/SC			RM	AD	126		9	33		
FO-CPUE	5	LKTR	113	GN	4	557	1167	0.68	M	IM	UD	FR/SC			RM	AD	221		7	0		
FO-CPUE	5	LKTR	114	GN	4	640	1792	0.68	F	SD	UN	FR/SC			NM				20.9	26		
FO-CPUE	5	LKTR	115	GN	4	630	1521	0.61	F	SD	UN	FR/SC			NM				15	0		
FO-CPUE	5	LKTR	116	GN	4	532	1135	0.75	M	IM	UD	FR/SC			RM	AD	286		8	0		
FO-CPUE	5	LKTR	117	GN	4	561	1355	0.77	F	MA	GR	FR/SC			RM	AD	323		17	29		
FO-CPUE	5	LKTR	118	GN	4	540	1645	1.04	F	SD	UN	FR/SC			RM	AD	434		13	43		
FO-CPUE	5	LKTR	119	GN	4	578	1576	0.82	F	IM	UD	FR/SC			NM				11	2.7		
FO-CPUE	5	LKTR	120	GN	4	617	1515	0.64	M	SD	UD	FR/SC	12	FR	RM	AD	117		36	43		
FO-CPUE	5	LKTR	121	GN	4	590	1509	0.73	F	IM	UD	FR/SC			NM				12	2.9		
FO-CPUE	5	LKTR	122	GN	4	580	1768	0.91	M	MA	GR	FR/SC			RM	AD	316		17	66		
FO-CPUE	5	LKTR	123	GN	4	595	1437	0.68	F	IM	UD	FR/SC			NM				18	14		
FO-CPUE	5	LKTR	124	GN	4	579	1398	0.72	F	IM	UD	FR/SC			NM				17	19		
FO-CPUE	6	LKTR	125	GN	2	565	1625	0.90	F	IM	UD	FR/SC			NM				11.5	23.5		
FO-CPUE	6	LKTR	126	GN	2	564	1573	0.88	F	MA	RI	FR/SC			NM				27.3	136.4		
FO-CPUE	6	LKTR	127	GN	2	577	1898	0.99	F	MA	RI	FR/SC			RM	AD	290		28	130		
FO-CPUE	6	LKTR	128	GN	2	541	1584	1.00	M	MA	GR	FR/SC			NM				13	50		
FO-CPUE	6	LKTR	129	GN	2	503	1116	0.88	F	IM	UD	FR/SC	11	FR	NM				7	14.8		
FO-CPUE	6	LKTR	130	GN	2	580	1590	0.81	M	MA	GR	FR/SC			NM				19.3	51		
FO-CPUE	6	LKTR	131	GN	2	568	1349	0.74	M	SD	UD	FR/SC			NM				13.5	11		
FO-CPUE	6	LKTR	132	GN	2	594	1550	0.74	F	IM	UD	FR/SC			RM	AD	252		13.4	16.2		
FO-CPUE	6	LKTR	133	GN	2	583	2032	1.03	F	IM	UD	FR/SC			NM				19	19.9		
FO-CPUE	6	LKTR	134	GN	2	610	2048	0.90	F	IM	UD	OT/FR/SC	40	OT	RM	AD	367		17.5	31		
FO-CPUE	6	LKTR	135	GN	2	552	1180	0.70	M	MA	GR	FR/SC			NM				14.5	69.5		
FO-CPUE	6	LKTR	136	GN	2	559	1488	0.85	M	MA	GR	FR/SC			RM	AD	210		11.6	30		
FO-CPUE	6	LKTR	137	GN	2	538	1700	1.09	M	MA	GR	FR/SC			RM	AD	?		13.3	39.9		
FO-CPUE	6	LKTR	138	GN	2	603	2050	0.93	F	MA	RI	OT/FR/SC			NM				31.7	153		
FO-CPUE	6	LKTR	139	GN	2	591	2053	0.99	M	MA	GR	FR/SC			NM				19.4	92		
FO-CPUE	6	LKTR	140	GN	2	660	1865	0.65	F	IM	UD	FR/SC			NM				19.1	61.7		
FO-CPUE	6	LKTR	141	GN	2	560	1725	0.98	F	MA	GR	FR/SC			NM				25.4	99.1		
FO-CPUE	6	LKTR	142	GN	2	548	1329	0.81	M	MA	GR	FR/SC			NM				13	23.1		
FO-CPUE	6	LKTR	143	GN	2	555	1339	0.78	M	MA	GR	FR/SC			RM	AD	34		13.4	33.7		
FO-CPUE	6	LKTR	144	GN	2	391	658	1.10	M	IM	UD	OT/FR/SC	9	OT	NM				7.9	0.3		
FO-CPUE	6	LKTR	145	GN	2	249	142	0.92	M	IM	UD	OT/FR/SC	5	OT	NM				1.8	0		
FO-CPUE	6	LKTR	146	GN	3	560	2006	1.14	F	MA	GR	FR/SC			RM	AD	479		31.2	116.9		
FO-CPUE	6	LKTR	150	GN	4	615	2174	0.93	F	IM	UD	FR/SC	14	FR	NM				22	23		
FO-CPUE	6	LKTR	151	GN	4	534	1568	1.03	M	MA	GR	FR/SC			NM				12	57		
FO-CPUE	6	LKTR	152	GN	4	418	760	1.04	F	IM	UD	FR/SC	9	FR	NM				8	1.5		
FO-CPUE	6	LKTR	153	GN	4	535	1616	1.06	M	MA	GR	FR/SC			RM	AD	85		10.2	64		
FO-CPUE	6	LKTR	154	GN	4	570	1658	0.90	F	MA	GR	FR/SC			NM				21	80		
FO-CPUE	6	LKTR	155	GN	4	543	1632	1.02	F	MA	RI	FR/SC			NM				17	168		
FO-CPUE	6	LKTR	156	GN	4	604	1475	0.67	M	IM	UD	FR/SC			NM				6.5	2.6		
FO-CPUE	6	LKTR	157	GN	4	520	1564	1.11	M	MA	GR	FR/SC			NM				12	62		
FO-CPUE	6	LKTR	158	GN	4	694	2775	0.83	M	SD	UD	OT/FR/SC	45	OT	RM	AD	336		17.5	0.5		
FO-CPUE	6	LKTR	159	GN	4	555	1412	0.83	M	MA	GR	FR/SC			RM	AD	224		7	41		
FO-CPUE	6	LKTR	160	GN	4	626	2182	0.89	F	MA	RI	OT/FR/SC	30	OT	NM				34	154		
FO-CPUE	6	LKTR	161	GN	4	585	2042	1.02	F	SD	UN	OT/FR/SC			RM	AD	225		20	31		
FO-CPUE	6	LKTR	162	GN	4	530	1752	1.18	M	MA	GR	FR/SC			NM				12	67		
FO-CPUE	6	LKTR	163	GN	4	549	1733	1.05	F	MA	RI	FR/SC			NM				17	117		
FO-CPUE	6	LKTR	164	GN	4	505	1344	1.04	M	MA	GR	FR/SC			NM				16	31		
FO-CPUE	6	LKTR	165	GN	4	556	1666	0.97	M	MA	GR	FR/SC			NM				17	51		
FO-CPUE	6	LKTR	166	GN	4	580	1311	0.67	F	IM	UD	FR/SC			NM				13.1	2.9		
FO-CPUE	6	LKTR	167	GN	4	566	1560	0.86	M	MA	GR	FR/SC			NM				11	59		
FO-CPUE	6	LKTR	168	GN	4	559	1603	0.92	M	MA	GR	FR/SC			NM				12	43		
FO-CPUE	6	LKTR	169	GN	4	561	1188	0.67	F	IM	UD	FR/SC			NM				10	17		
FO-CPUE	500	LKTR	170	GN	2	618	1984	0.84	F	MA	GR	FR/SC			NM				27	167		
FO-CPUE	500	LKTR	171	GN	1	560	1574	0.90	F	IM	UD	FR/SC			NM				17	19		
FO-CPUE	500	LKTR	172	GN	4	545	1275	0.79	F	IM	UD	FR/SC			NM				13	16		
FO-CPUE	501	LKTR	173	GN	4	569	1786	0.97	F	IM	UD	FR/SC			RM	AD	267		9	15		
FO-CPUE	501	LKTR	174	GN	4	593	1664	0.80	F	SD	UN	FR/SC			NM				12	30.2		
FO-CPUE	501	LKTR	175	GN	4	502	1225	0.97	F	MA	RI	FR/SC			RM	AD	279		26.5	121		
FO-CPUE	501	LKTR	176	GN	4	450	1715	1.88	F	SD	UN	FR/SC			NM				9.6	31.7		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	501	LKTR	177	GN	1.5	544	1890	1.17	F	MA	RI	FR/SC			NM				24.7	159.8		
FO-CPUE	501	LKTR	178	GN	1.5	195	46	0.62	U	IM	UD	FR/SC	3	FR	NM							
FO-CPUE	505	LKTR	300	GN	4	556	1029	0.60	M	IM	UD	FR/SC			NM				8.3	15.5		
FO-CPUE	505	LKTR	301	GN	4	524	1372	0.95	M	MA	GR	FR/SC			NM				12.2	52.4		
FO-CPUE	505	LKTR	302	GN	2	298	290	1.10	F	IM	UD	OT/FR/SC	7	OT	NM				3.2	0.3		
FO-CPUE	505	LKTR	303	GN	3	558	1632	0.94	M	MA	GR	FR/SC			NM				13.7	61.4		
FO-CPUE	505	LKTR	304	GN	3	560	1404	0.80	F	IM	UD	FR/SC			NM				16.3	25		
FO-CPUE	505	LKTR	305	GN	3	501	1358	1.08	M	MA	GR	FR/SC			NM				10.9	36		
FO-CPUE	505	LKTR	306	GN	3	561	1626	0.92	F	MA	RI	FR/SC			NM				19.9	109		
FO-CPUE	505	LKTR	307	GN	3	555	1547	0.90	F	MA	GR	FR/SC			NM					21.4		
FO-CPUE	505	LKTR	308	GN	1	299	796	2.98	F	IM	UD	OT/FR/SC	10	OT	NM				0.4	1.6		
FO-CPUE	505	LKTR	309	GN	1.5	186	72	1.12	U	IM	UD	FR/SC	2	FR	NM				0.8	0		
FO-CPUE	505	LKTR	310	GN	1.5	204	88	1.04	U	IM	UD	FR/SC	2	FR	NM				1.3	0		
FO-CPUE	10	LKTR	311	GN	4	549	1491	0.90	M	MA	GR	FR/SC			NM				11	30.3	RL&L 2548	
FO-CPUE	10	LKTR	312	GN	4	558	1699	0.98	M	MA	GR	FR/SC			NM				19.1	74.7		
FO-CPUE	10	LKTR	313	GN	4	590	2198	1.07	M	MA	GR	FR/SC			RM	AD	204		21.8	54.3	Y-0204	
FO-CPUE	10	LKTR	314	GN	4	509	1351	1.02	F	SD	UN	FR/SC			NM				10.2	24.8		
FO-CPUE	10	LKTR	315	GN	4	557	1571	0.91	M	MA	GR	FR/SC			RM	AD	310		9.2	56.7	Y-0310	
FO-CPUE	10	LKTR	316	GN	4	557	2023	1.17	F	MA	GR	FR/SC			RM	AD	284		27.7	164.3	Y-0284	
FO-CPUE	10	LKTR	317	GN	1	552	1603	0.95	M	MA	GR	FR/SC			RM	AD	78		12.2	43.9	Y-0078	
FO-CPUE	10	LKTR	318	GN	2	602	1729	0.79	F	SD	UN	FR/SC			NM				12.5	22		
FO-CPUE	10	LKTR	319	GN	2	610	1980	0.87	F	MA	GR	FR/SC			NM				29.7	132.9		
FO-CPUE	10	LKTR	320	GN	2	540	1643	1.04	M	MA	GR	FR/SC			NM				9.2	43.8		
FO-CPUE	10	LKTR	321	GN	2	534	1690	1.11	M	MA	GR	FR/SC			RM	AD	140		12.9	37.8	Y-0140	
FO-CPUE	10	LKTR	322	GN	2	543	1786	1.12	M	MA	GR	FR/SC			NM				19.7	63.5		
FO-CPUE	10	LKTR	323	GN	2	535	1535	1.00	F	SD	UN	FR/SC			NM				12.5	15.2		
FO-CPUE	10	LKTR	324	GN	2	556	1492	0.87	M	MA	GR	FR/SC			RM	AD	102		13.4	53.5	Y-0102	
FO-CPUE	10	LKTR	325	GN	2	550	951	0.57	F	IM	UD	FR/SC			NM				11.1	2.5		
FO-CPUE	10	LKTR	326	GN	2	421	779	1.04	F	IM	UD	FR/SC	6	FR	NM				9.4	1.1		
FO-CPUE	10	LKTR	327	GN	2	571	1854	1.00	F	MA	GR	FR/SC			RM	AD	461		28	157.8	Y-0461	
FO-CPUE	10	LKTR	328	GN	2	566	1534	0.85	F	MA	GR	FR/SC			NM				25.7	144.9		
FO-CPUE	10	LKTR	329	GN	2	574	1772	0.94	F	MA	GR	FR/SC			RM	AD	201		22.7	105.1	Y-0201	
FO-CPUE	10	LKTR	330	GN	2	480	1164	1.05	F	IM	UD	FR/SC	10	FR	NM				9.2	3.8		
FO-CPUE	10	LKTR	331	GN	3	583	1905	0.96	F	SD	UN	FR/SC			RM	AD	45		19.6	32.1	Y-0045	
FO-CPUE	10	LKTR	332	GN	3	566	1861	1.03	M	MA	GR	FR/SC			NM				17.4	95		
FO-CPUE	10	LKTR	333	GN	3	566	1647	0.91	F	MA	GR	FR/SC			RM	AD	107		27.4	114.6	Y-0107	
FO-CPUE	10	LKTR	334	GN	3	571	1711	0.92	M	MA	GR	FR/SC			RM	AD	307		12.7	59.3	Y-0307	
FO-CPUE	10	LKTR	335	GN	3	582	1511	0.77	F	MA	GR	FR/SC			RM	AD	57		11.1	28.2	Y-0057	
FO-CPUE	10	LKTR	336	GN	3	549	1315	0.79	M	MA	GR	FR/SC			RM	AD	297		11.4	35.4	Y-0297	
FO-CPUE	10	LKTR	337	GN	3	559	1690	0.97	M	MA	GR	FR/SC			RM	AD	406		15.1	54.8	Y-0406	
FO-CPUE	10	LKTR	338	GN	3	539	1479	0.94	M	MA	GR	FR/SC			NM				12	63.2		
FO-CPUE	10	LKTR	339	GN	3	551	1309	0.78	M	MA	GR	FR/SC			NM				10	8.3		
FO-CPUE	10	LKTR	340	GN	1.5	340	389	0.99	M	IM	UD	OT/FR/SC	8	OT	NM				4.6	0.1		
FO-CPUE	10	LKTR	341	GN	1.5	369	482	0.96	F	IM	UD	OT/FR/SC	9	OT	NM				5	0.4		
FO-CPUE	10	LKTR	342	GN	1.5	544	1512	0.94	F	MA	GR	FR/SC			NM				16	7.7		
FO-CPUE	10	LKTR	343	GN	1.5	340	385	0.98	F	IM	UD	FR/SC	6	FR	NM				6.5	0.1		
FO-CPUE	10	LKTR	344	GN	1.5	359	516	1.12	F	IM	UD	OT/FR/SC	4	FR	NM				7.5	1.6		
FO-CPUE	10	LKTR	345	GN	1.5	374	577	1.10	F	IM	UD	OT/FR/SC	5	FR	NM				8.3	0.9		
FO-CPUE	10	LKTR	346	GN	1.5	586	1603	0.80	M	MA	GR	OT/FR/SC			NM				14.6	39.3		
FO-CPUE	503	LKTR	347	GN	2	520	1329	0.95	M	MA	GR	FR/SC			NM				8.2	35.3		
FO-CPUE	503	LKTR	348	GN	2	574	2034	1.08	M	MA	GR	FR/SC			NM				15.8	64.8	RL&L 2117	
FO-CPUE	503	LKTR	349	GN	2	553	1277	0.76	M	MA	GR	FR/SC			RM	AD	245		14.1	24.2	Y-0245	
FO-CPUE	503	LKTR	350	GN	4	530	1322	0.89	M	MA	GR	FR/SC			NM				9.7	11.8		
FO-CPUE	503	LKTR	351	GN	4	633	1861	0.73	M	IM	UD	OT/FR/SC	49	OT	RM	AD	83		15.3	4.9	Y-0083	
FO-CPUE	503	LKTR	352	GN	4	610	2431	1.07	F	MA	GR	FR/SC			NM				36.2	135.4		
FO-CPUE	503	LKTR	353	GN	4	560	1508	0.86	F	MA	GR	FR/SC			NM				14.8	96		
FO-CPUE	503	LKTR	354	GN	4	580	1874	0.96	F	MA	GR	FR/SC			NM				26	18.6		
FO-CPUE	503	LKTR	355	GN	4	571	1617	0.87	M	MA	GR	FR/SC			RM	AD	288		18.5	14.8	Y-0288	
FO-CPUE	503	LKTR	356	GN	4	532	1199	0.80	M	MA	GR	FR/SC			RM	AD	35		11.4	29.5	Y-0035	
FO-CPUE	503	LKTR	357	GN	4	530	1692	1.14	F	SD	UN	FR/SC			NM				19.3	23.3		
FO-CPUE	503	LKTR	358	GN	4	592	1979	0.95	M	MA	GR	FR/SC	15	FR	NM				16	57.6		
FO-CPUE	503	LKTR	359	GN	4	564	1406	0.78	M	MA	GR	FR/SC			NM				17.9	17.1		
FO-CPUE	503	LKTR	360	GN	4	581	1622	0.83	F	IM	UD	FR/SC			NM				12.9	14.6		
FO-CPUE	503	LKTR	361	GN	4	554	1689	0.99	F	MA	GR	FR/SC			NM				14	58.6		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	503	LKTR	362	GN	4	564	1578	0.88	F	IM	UD	FR/SC			NM				19.1	16.5		
FO-CPUE	503	LKTR	363	GN	4	615	1829	0.79	F	SD	UN	FR/SC			RM	AD	237		12.5	23.5	Y-0237	
FO-CPUE	503	LKTR	364	GN	4	545	1356	0.84	F	MA	RI	FR/SC			NM				17.3	90.8		
FO-CPUE	503	LKTR	365	GN	1.5	566	1583	0.87	F	SD	UN	FR/SC			NM				18.1	18.2	RL&L 2145	
FO-CPUE	503	LKTR	366	GN	1.5	409	1766	2.58	M	IM	UD	OT/FR/SC	11	OT	NM				7.3	0.4		
FO-CPUE	503	LKTR	367	GN	1	395	690	1.12	F	IM	UD	OT/FR/SC	7	FR	NM				4.1	1.1		
FO-CPUE	520	LKTR	368	GN	4	561	1805	1.02	F	MA	GR	FR/SC			NM				14.7	54.5		
FO-CPUE	520	LKTR	369	GN	4	500	1227	0.98	M	MA	GR	FR/SC	9	FR	RM				11.9	18.6	Y-0005 PHOTO 189-190	
FO-CPUE	521	LKTR	370	GN	1.5	574	1983	1.05	F	MA	GR	FR/SC			NM				15.8	20.7		
FO-CPUE	521	LKTR	371	GN	2	561	1842	1.04	F	MA	GR	FR/SC			NM				162.5	23.2		
FO-CPUE	521	LKTR	372	GN	4	544	1621	1.01	F	MA	GR	FR/SC			RM	AD	33		13.2	24.6	Y-0033	
FO-CPUE	524	LKTR	373	GN	1.5	610	2561	1.13	F	MA	RI	OT/FR/SC			RM	AD	167		47.9	246.4	Y-0167	
FO-CPUE	524	LKTR	374	GN	1.5	531	1459	0.97	M	MA	GR	FR/SC			RM	AD	301		9.4	50.9	Y-0301	
FO-CPUE	524	LKTR	375	GN	1.5	388	600	1.03	M	IM	UD	OT/FR/SC	8	OT	NM				7.8	0.2		
FO-CPUE	524	LKTR	376	GN	1.5	287	235	0.99	F	IM	UD	OT/FR/SC	7	OT	NM				2.3	0.4		
FO-CPUE	524	LKTR	377	GN	2	558	1804	1.04	F	SD	UN	FR/SC			RM	AD	289		17.9	21.2	Y-0289	
FO-CPUE	524	LKTR	378	GN	2	460	1011	1.04	M	IM	UD	OT/FR/SC	10	OT	NM				8.5	0.7		
FO-CPUE	524	LKTR	379	GN	2	603	2117	0.97	F	MA	RI	OT/FR/SC	10	OT	NM				40.9	152.1		
FO-CPUE	524	LKTR	380	GN	2	571	1807	0.97	F	SD	UN	FR/SC			NM				18.9	33.9		
FO-CPUE	524	LKTR	381	GN	2	495	1270	1.05	M	MA	GR	FR/SC	12	FR	NM				8.3	59.5		
FO-CPUE	524	LKTR	382	GN	2	523	1271	0.89	M	MA	GR	FR/SC			RM	AD	314		8.3	47.8	Y-0314	
FO-CPUE	524	LKTR	383	GN	2	358	479	1.04	M	IM	UD	OT/FR/SC	8	OT	NM				5.7	0.1		
FO-CPUE	524	LKTR	384	GN	2	316	321	1.02	F	IM	UD	OT/FR/SC	7	OT	NM				3.6	0.6	PHOTO 191, 192	
FO-CPUE	524	LKTR	385	GN	3	539	1544	0.99	F	MA	RI	FR/SC			NM				18.8	93.4		
FO-CPUE	524	LKTR	386	GN	3	531	1470	0.98	M	MA	GR	FR/SC			NM				10.8	43.5		
FO-CPUE	524	LKTR	387	GN	3	585	1762	0.88	F	SD	UN	FR/SC			NM				14.8	13.7		
FO-CPUE	524	LKTR	388	GN	3	590	1985	0.97	F	MA	RI	FR/SC			RM	AD	112		26	132.1	Y-0112	
FO-CPUE	524	LKTR	389	GN	3	568	1360	0.74	M	IM	UD	FR/SC			NM				9	2.2	PHOTO 193	
FO-CPUE	524	LKTR	390	GN	3	441	910	1.06	F	IM	UD	OT/FR/SC	11	OT	RM	AD	22		9.9	1.7	Y-0022	
FO-CPUE	524	LKTR	391	GN	3	435	971	1.18	M	MA	GR	OT/FR/SC	13	OT	NM				8.4	20.3		
FO-CPUE	524	LKTR	392	GN	3	362	525	1.11	F	IM	UD	OT/FR/SC	7	OT	NM				4.8	0.8		
FO-CPUE	524	LKTR	393	GN	1	351	446	1.03	F	IM	UD	OT/FR/SC	8	OT	NM				3.8	0.7		
FO-CPUE	524	LKTR	394	GN	4	590	1540	0.75	F	SD	UN	OT/FR/SC			NM				16.6	28.8		
FO-CPUE	524	LKTR	395	GN	4	615	2201	0.95	M	MA	GR	OT/FR/SC	56	OT	RM	AD	180		30	77.8	Y-0180	
FO-CPUE	524	LKTR	396	GN	4	518	1295	0.93	M	MA	GR	FR/SC			NM				11.8	33.8		
FO-CPUE	522	LKTR	397	GN	4	444	888	1.01	F	IM	UD	OT/FR/SC			NM				7.8	1.6		
FO-CPUE	522	LKTR	398	GN	4	406	747	1.12	F	IM	UD	OT/FR/SC	8	OT	NM				7.9	1.1		
FO-CPUE	522	LKTR	399	GN	4	374	556	1.06	M	IM	UD	OT/FR/SC	8	OT	NM				5.7	0.3		
FO-CPUE	522	LKTR	400	GN	4	491	1243	1.05	M	MA	GR	FR/SC	15	FR	NM				11.4	42.5		
FO-CPUE	522	LKTR	401	GN	4	570	1867	1.01	F	MA	GR	FR/SC			NM				26	128.5	RL&L 2138	
FO-CPUE	522	LKTR	402	GN	4	577	1857	0.97	F	MA	RI	FR/SC			NM				21.7	122.6		
FO-CPUE	522	LKTR	403	GN	4	529	1545	1.04	M	MA	GR	FR/SC	17	FR	NM				16.8	30.2	RL&L 2572	
FO-CPUE	522	LKTR	404	GN	4	409	744	1.09	M	IM	UD	FR/SC	7	FR	NM				6.9	0.9		
FO-CPUE	522	LKTR	405	GN	3	416	656	0.91	M	IM	UD	OT/FR/SC	9	OT	NM				5.1	0.3		
FO-CPUE	522	LKTR	406	GN	2	527	1524	1.04	M	MA	GR	FR/SC			NM				13.8	52		
FO-CPUE	522	LKTR	407	GN	2	495	1522	1.25	M	MA	GR	FR/SC	12	FR	NM				10.9	55.9		
FO-CPUE	522	LKTR	408	GN	1.5	430	824	1.04	M	IM	UD	OT/FR/SC	13	OT	NM				6	0.2		
FO-CPUE	522	LKTR	409	GN	1	390	655	1.10	M	IM	UD	OT/FR/SC	7	OT	NM				7.6	0.1		
FO-CPUE	523	LKTR	411	GN	4	541	1988	1.26	F	MA	RI	FR/SC			NM				27.1	127.8		
FO-CPUE	523	LKTR	412	GN	4	485	1966	1.72	M	MA	GR	FR/SC	17	FR	RM	AD	220		7.2	139.1	Y -0220	
FO-CPUE	523	LKTR	413	GN	4	576	1993	1.04	F	MA	GR	FR/SC			NM				24.4			
FO-CPUE	523	LKTR	414	GN	4	565	1458	0.81	M	MA	GR	FR/SC			NM				12.5	41.6		
FO-CPUE	523	LKTR	415	GN	4	525	1505	1.04	M	MA	GR	FR/SC			NM				9.4	59		
FO-CPUE	523	LKTR	416	GN	4	545	1623	1.00	M	MA	GR	FR/SC			NM				13.6	44.7		
FO-CPUE	523	LKTR	417	GN	4	544	1381	0.86	M	MA	GR	FR/SC			NM				8.9	38.2		
FO-CPUE	523	LKTR	418	GN	4	540	1630	1.04	M	MA	GR	FR/SC			NM				13.2	62.7		
FO-CPUE	523	LKTR	419	GN	4	563	1541	0.86	M	MA	GR	FR/SC			NM				16	37.1		
FO-CPUE	523	LKTR	420	GN	1.5	591	2273	1.10	F	SD	UN	FR/SC	16	FR	NM				23.3	39.4		
FO-CPUE	523	LKTR	421	GN	1.5	390	628	1.06	M	IM	UD	OT/FR/SC	7	FR	NM				4.7	0.1		
FO-CPUE	523	LKTR	422	GN	1.5	342	442	1.10	F	IM	UD	OT/FR/SC	4	FR	NM				5.2	0.4		
FO-CPUE	523	LKTR	423	GN	1.5	201	88	1.08	M	IM	UD	OT/FR/SC	3	FR	NM				0.8			
FO-CPUE	523	LKTR	424	GN	1.5	210	90	0.97	U	IM	UD	OT/FR/SC	5	OT	NM				0.4			
FO-CPUE	523	LKTR	425	GN	1.5	193	80	1.11	F	IM	UD	OT/FR/SC	3	FR	NM				1.2	0.7		
FO-CPUE	523	LKTR	426	GN	3	352	483	1.11	M	IM	UD	OT/FR/SC	6	FR	NM				5.5	0.1		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	523	LKTR	427	GN	3	371	597	1.17	F	IM	UD	OT/FR/SC	8	OT	NM				6.6	0.8		
FO-CPUE	523	LKTR	428	GN	3	541	1402	0.89	M	MA	GR	OT/FR/SC			RM	AD	440		9.6	44.6	Y-0440	
FO-CPUE	523	LKTR	429	GN	3	381	523	0.95	F	IM	UD	OT/FR/SC	5	FR	RM	AD	250		5.2	0.2	Y-0250	
FO-CPUE	523	LKTR	430	GN	3	371	516	1.01	F	IM	UD	OT/FR/SC	7	FR	NM				5	0.9		
FO-CPUE	523	LKTR	431	GN	3	530	1405	0.94	M	MA	GR	FR/SC			NM				8.4	56.7	Golder 0768	
FO-CPUE	523	LKTR	432	GN	3	385	584	1.02	F	IM	UD	OT/FR/SC	5	FR	NM				5.2	1.8		
FO-CPUE	523	LKTR	433	GN	2	570	585	0.32	F	SD	UN	OT/FR/SC	10	OT	NM				6	4.3	Golder 0788	
FO-CPUE	523	LKTR	434	GN	2	510	1482	1.12	F	MA	GR	OT/FR/SC	12	FR	NM				15.2	91.3		
FO-CPUE	523	LKTR	435	GN	3	381	568	1.03	F	IM	UD	OT/FR/SC	6	FR	NM				6.7	0.3		
FO-CPUE	523	LKTR	436	GN	2	378	534	0.99	F	IM	UD	OT/FR/SC	7	OT	NM				5.1	1		
FO-CPUE	523	LKTR	437	GN	2	565	1540	0.85	F	MA	GR	OT/FR/SC			NM				15.2	13.3		
FO-CPUE	523	LKTR	438	GN	2	426	816	1.06	F	IM	UD	OT/FR/SC	9	OT	NM				8.2	1.6		
FO-CPUE	523	LKTR	439	GN	2	376	573	1.08	M	IM	UD	OT/FR/SC	5	FR	NM				8	0.2		
FO-CPUE	523	LKTR	440	GN	2	460	1010	1.04	F	IM	UD	OT/FR/SC	11	OT	NM				5	3.6		
FO-CPUE	523	LKTR	441	GN	2	421	754	1.01	M	IM	UD	OT/FR/SC	10	OT	NM				7.5	0.9		
FO-CPUE	523	LKTR	442	GN	2	298	271	1.02	F	IM	UD	OT/FR/SC	5	FR	NM				2	1.1		
FO-CPUE	523	NSST	443	GN	0.5	58	1	0.51	U	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	527	LKTR	444	GN	4	556	1353	0.79	M	MA	GR	FR/SC			NM				10.9	26.2		
FO-CPUE	527	LKTR	445	GN	3	555	1372	0.80	M	MA	GR	FR/SC			NM				8.6	28.1		
FO-CPUE	528	LKTR	446	GN	1	591	2085	1.01	M	MA	GR	OT/FR/SC	29	OT	NM				17.7	77.2	GOLDER 0733	
FO-CPUE	528	LKTR	447	GN	4	576	1775	0.93	F	MA	GR	OT/FR/SC			RM				11.2	38.5	Y-0238	
FO-CPUE	528	LKTR	448	GN	4	572	1831	0.98	F	MA	GR	OT/FR/SC	9	FR	NM				21.4	90.1		
FO-CPUE	528	LKTR	449	GN	4	376	522	0.98	F	IM	UD	FR/SC	7	FR	NM				4.4	0.8		
FO-CPUE	528	LKTR	450	GN	1.5	338	396	1.03	F	IM	UD	OT/FR/SC	7	OT	NM				4.3	0.6		
FO-CPUE	528	LKTR	451	GN	1.5	187	59	0.90	U	IM	UD	OT/FR/SC	3	FR	NM				0.7	0.1		
FO-CPUE	530	LKTR	452	GN	1.5	259	176	1.01	F	IM	UD	OT/FR/SC	3	FR	NM				2.1	0.5		
FO-CPUE	530	LKTR	453	GN	2	326	353	1.02	F	IM	UD	OT/FR/SC	6	FR	NM				4.6	0.2		
FO-CPUE	530	LKTR	454	GN	2	581	1660	0.85	M	MA	GR	OT/FR/SC	48	OT	RM				11.1	46.2	Y-0141 AND GOLDER 0796	
FO-CPUE	530	LKTR	455	GN	2	587	1560	0.77	F	MA	GR	OT/FR/SC			NM				12.9	25.7		
FO-CPUE	530	LKTR	456	GN	2	279	235	1.08	F	IM	UD	OT/FR/SC			NM				2.4	0.3		
FO-CPUE	530	LKTR	457	GN	2	324	364	1.07	F	IM	UD	OT/FR/SC	5	FR	NM				2.7	0.1		
FO-CPUE	530	LKTR	458	GN	2	300	246	0.91	M	IM	UD	OT/FR/SC	5	FR	NM				2	0.1		
FO-CPUE	530	LKTR	459	GN	3	454	1017	1.09	F	MA	GR	OT/FR/SC	10	OT	RM		325		13.8	3.3	Y-0325	
FO-CPUE	530	LKTR	460	GN	3	466	1508	1.49	M	MA	GR	OT/FR/SC	26	OT	NM				9.4	50.9	GOLDER 0979	
FO-CPUE	530	LKTR	461	GN	3	400	631	0.99	F	IM	UD	OT/FR/SC	10	OT	NM				7.1	1.7		
FO-CPUE	530	LKTR	462	GN	3	357	481	1.06	F	IM	UD	OT/FR/SC	5	FR	NM				5.1	0.7		
FO-CPUE	530	LKTR	463	GN	4	568	1520	0.83	F	MA	GR	FR/SC			NM				11.7	18.7		
FO-CPUE	530	LKTR	464	GN	4	575	1977	1.04	F	MA	GR	FR/SC			NM				16.2	27.5		
FO-CPUE	529	LKTR	465	GN	2	376	591	1.11	F	IM	UD	FR/SC	5	FR	NM				6.5	0.1		
FO-CPUE	529	LKTR	466	GN	2	519	567	0.41	M	MA	GR	OT/FR/SC	14	FR	NM				12.2	54.3		
FO-CPUE	529	LKTR	467	GN	3	648	2333	0.86	F	MA	GR	OT/FR/SC	50	OT	RM		146		22.3	37.4	Y-0146	
FO-CPUE	529	LKTR	468	GN	3	401	595	0.92	F	SD	UN	OT/FR/SC	7	FR	NM				5.5	1.1		
FO-CPUE	529	LKTR	469	GN	4	561	1795	1.02	F	MA	GR	FR/SC			RM		84		12.4	30	Y-0084	
FO-CPUE	529	LKTR	470	GN	4	580	1714	0.88	F	MA	GR	OT/FR/SC			NM				17.6	31.6		
FO-CPUE	529	LKTR	471	GN	4	521	1064	0.75	M	MA	GR	OT/FR/SC			NM				10	2.2		
FO-CPUE	531	LKTR	472	GN	4	611	1693	0.74	F	SD	UN	OT/FR/SC			NM	PV		ST	13	15.3		
FO-CPUE	531	LKTR	473	GN	1.5	429	762	0.97	M	IM	UD	OT/FR/SC	7	FR	NM				6.6	0.8		
FO-CPUE	532	LKTR	474	GN	4	544	1828	1.14	M	MA	GR	OT/FR/SC	16	FR	NM			ST	16	70		
FO-CPUE	532	LKTR	475	GN	4	565	1494	0.83	F	SD	UN	OT/FR/SC			NM			ST	16.5	17		
FO-CPUE	532	LKTR	476	GN	1.5	183	65	1.06	M	IM	UD	OT/FR/SC			NM			ST	0.3			
FO-CPUE	532	LKTR	477	GN	2	579	1634	0.84	M	MA	GR	OT/FR/SC			NM				17.7	73.1		
FO-CPUE	532	LKTR	478	GN	2	587	1858	0.92	M	MA	GR	OT/FR/SC	13	FR	RM	AD	11		13.4	24		
FO-CPUE	532	LKTR	479	GN	2	543	1540	0.96	F	SD	UN	OT/FR/SC			NM				11.9	28.5		
FO-CPUE	532	LKTR	480	GN	2	329	348	0.98	F	IM	UD	OT/FR/SC	7	OT	NM			ST	4	0.3		
FO-CPUE	533	LKTR	481	GN	4	560	1836	1.05	F	SD	UN	OT/FR/SC	18	FR	NM			ST	11.4	22		
FO-CPUE	533	LKTR	482	GN	3	579	1973	1.02	M	MA	GR	OT/FR/SC	19	FR	RM	AD	427	ST	12	82.9		
FO-CPUE	533	LKTR	483	GN	3	620	2116	0.89	F	SD	UN	OT/FR/SC			RM	AD	255		20.2	18.2		
FO-CPUE	533	LKTR	484	GN	3	581	1998	1.02	F	MA	RI	OT/FR/SC			NM				35.3	147.2		
FO-CPUE	533	LKTR	485	GN	1.5	196	70	0.93	M	IM	UD	OT/FR/SC	3	FR	NM				0.7			
FO-CPUE	534	LKTR	486	GN	4	394	610	1.00	F	IM	UD	OT/FR/SC	8	OT	NM			ST	4.7	0.1	pelvic	
FO-CPUE	536	LKTR	487	GN	4	435	1661	2.02	M	MA	GR	OT/FR/SC			NM				9	61.6	pelvic	
FO-CPUE	536	LKTR	488	GN	1.5	187	70	1.07	M	IM	UD	OT/FR/SC	5	OT	NM				0.8	N/A	pelvic	
FO-CPUE	536	LKTR	489	GN	1.5	234	125	0.98	F	IM	UD	OT/FR/SC	5	OT	NM				0.7	0.1	pelvic	
FO-CPUE	536	LKTR	490	GN	1.5	204	88	1.04	F	IM	UD	OT/FR/SC	6	OT	NM				0.4	0.1	pelvic	

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	536	LKTR	491	GN	1.5	187	75	1.15	F	IM	UD	OT/FR/SC	5	OT	NM			ST	1	0.1	pelvic	
FO-CPUE	535	LKTR	492	GN	2	553	1499	0.89	M	MA	GR	OT/FR/SC	30	OT	RM	AD	472		9.1	21.3	pelvic	
FO-CPUE	535	LKTR	493	GN	2	603	1683	0.77	F	MA	GR	OT/FR/SC	47	OT	NM	PV			17.3	11.7	Golder 0954	pelvic
FO-CPUE	535	LKTR	494	GN	1.5	184	64	1.03	M	IM	UD	OT/FR/SC	3	OT	NM				0.5	0.1	pelvic	
FO-CPUE	535	LKTR	495	GN	1	131	26.3	1.17	U	IM	UD	OT/FR/SC	3	OT	NM			ST	0.3	0.1	pelvic	
FO-CPUE	535	LKTR	496	GN	4	564	1817	1.01	F	MA	RI	OT/FR/SC			NM				27.2	186.9	pelvic	
FO-CPUE	1	LKTR	497	GN	1.5	189	77	1.14	M	IM	UD	OT/FR/SC	4	OT	NM				1.1	N/A	pelvic	
FO-CPUE	1	LKTR	498	GN	4	560	1810	1.03	F	MA	GR	OT/FR/SC	25	OT	NM				15.5	20.1	pelvic	
FO-CPUE	1	NSST	499	GN	0.5	55	1.4	0.84	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	4	LKTR	500	GN	2	562	1537	0.87	M	MA	GR	OT/FR/SC			NM	PV		ST	10	38.7	RLL 2176	
FO-CPUE	4	LKTR	501	GN	2	560	1815	1.03	F	MA	GR	FR/SC			RM	AD	192		28.8	117.2	Y0192	
FO-CPUE	4	LKTR	502	GN	2	290	229	0.94	M	IM	UD	OT/FR/SC	7	OT	NM				2.7	0.1		
FO-CPUE	4	LKTR	503	GN	2	309	266	0.90	F	IM	UD	FR/SC			NM				2.8	0.2		
FO-CPUE	4	LKTR	504	GN	2	244	155	1.07	M	IM	UD	FR/SC	4	FR	NM				1.2	N/A		
FO-CPUE	4	LKTR	505	GN	4	574	1906	1.01	F	MA	RI	FR/SC			RM	AD	155		25.5	177.7	Y0155	
FO-CPUE	4	LKTR	506	GN	4	523	1519	1.06	M	MA	GR	OT/FR/SC	10	FR	RM	AD	137		12.3	53.7	Y0137	
FO-CPUE	4	LKTR	507	GN	4	580	1907	0.98	F	MA	GR	FR/SC			NM				21	33.9		
FO-CPUE	2	LKTR	508	GN	2	330	386	1.07	M	IM	UD	OT/FR/SC	7	FR	NM				3.9	N/A		
FO-CPUE	537	LKTR	509	GN	3	600	2017	0.93	F	SD	UN	FR/SC			RM	AD	184		19	18.7	Y0184	
FO-CPUE	537	LKTR	510	GN	3	590	1716	0.84	M	MA	GR	FR/SC			RM	AD	407		12.2	39	Y0407	
FO-CPUE	537	LKTR	511	GN	3	545	1775	1.10	F	MA	GR	FR/SC			NM				20.7	118.3		
FO-CPUE	3	LKTR	512	GN	4	575	1855	0.98	F	MA	RI	FR/SC			NM				21.1	140		
FO-CPUE	3	LKTR	513	GN	4	552	1621	0.96	F	MA	GR	FR/SC			RM	AD	179		20.2	118.7	Y0179	
FO-CPUE	3	LKTR	514	GN	4	542	1608	1.01	M	MA	GR	FR/SC			NM				16.9	63.1		
FO-CPUE	3	LKTR	515	GN	3	566	2068	1.14	F	MA	GR	FR/SC			RM	AD	159		16.8	25.6	Y0159	
FO-CPUE	3	LKTR	516	GN	3	546	1227	0.75	M	IM	UD	FR/SC			RM	AD	274		14.1	2.2	Y0274	
FO-CPUE	3	LKTR	517	GN	3	405	730	1.10	F	IM	UD	FR/SC	7	FR	NM				8.6	0.1		
FO-CPUE	3	LKTR	518	GN	3	360	544	1.17	M	IM	UD	FR/SC	5	FR	NM				5.4	0.1		
FO-CPUE	3	LKTR	519	GN	2	532	1672	1.11	M	MA	GR	FR/SC			NM				13.2	50		
FO-CPUE	3	LKTR	520	GN	2	590	1558	0.76	F	SD	UN	FR/SC			NM				10.2	13.9		
FO-CPUE	3	LKTR	521	GN	1.5	615	1815	0.78	F	SD	UN	FR/SC			NM				15.1	14.7		
FO-CPUE	541	LKTR	522	GN	4	555	1999	1.17	F	MA	GR	OT/FR/SC			RM	AD	414	ST	33.5	124.8	Y0414	RLL 2197
FO-CPUE	541	LKTR	523	GN	4	491	1218	1.03	F	IM	UD	OT/FR/SC	12	OT	NM				9.9	5.5		
FO-CPUE	541	LKTR	524	GN	1	175	64	1.19	M	IM	UD	OT/FR/SC	5	OT	NM				0.9	0.1		
FO-CPUE	541	LKTR	525	GN	3	560	1399	0.80	M	MA	GR	FR/SC			RM	AD	23		10.4	31	Y0023	
FO-CPUE	541	LKTR	526	GN	3	549	1713	1.04	M	MA	GR	FR/SC			NM				15.2	57.8		
FO-CPUE	541	LKTR	527	GN	3	431	785	0.98	F	IM	UD	FR/SC	7	FR	NM				8.1	1.5		
FO-CPUE	541	LKTR	528	GN	2	305	265	0.93	M	IM	UD	OT/FR/SC	7	OT	NM				2.3	0.1		
FO-CPUE	539	LKTR	529	GN	4	556	1860	1.08	F	MA	RI	FR/SC			RM	AD	492		33.7	148.1	Y0492	
FO-CPUE	539	LKTR	530	GN	4	525	1608	1.11	F	MA	GR	FR/SC	10	FR	NM				18.4	28.1		
FO-CPUE	539	LKTR	531	GN	4	527	1698	1.16	M	MA	GR	FR/SC			NM				16.8	62.2		
FO-CPUE	539	LKTR	532	GN	1.5	537	1449	0.94	F	SD	UN	FR/SC			NM				9	20.2		
FO-CPUE	539	LKTR	533	GN	2	590	1705	0.83	F	MA	GR	FR/SC			RM	AD	235		25.4	96.5	Y0235	no fork in tail
FO-CPUE	539	LKTR	534	GN	2	514	1466	1.08	F	MA	GR	OT/FR/SC	23	OT	NM				17.7	102.3	pelvic	
FO-CPUE	539	LKTR	535	GN	2	565	1561	0.87	M	MA	GR	FR/SC			NM				12.7	33.1	photo 219 to 225	crustaceans in stomach
FO-CPUE	539	LKTR	536	GN	2	610	2426	1.07	F	MA	GR	FR/SC			NM				44.5	183.1		
FO-CPUE	539	LKTR	537	GN	3	559	1677	0.96	M	MA	GR	OT/FR/SC	47	OT	NM	PV			18.2	36	Golder 0973	photo 226
FO-CPUE	539	LKTR	538	GN	3	555	1725	1.01	M	MA	GR	FR/SC			NM				16.5	34.2		
FO-CPUE	539	LKTR	539	GN	3	584	2000	1.00	F	SD	UN	FR/SC			RM	AD	454		16.6	20.9	Y0454	
FO-CPUE	539	LKTR	540	GN	3	397	637	1.02	F	IM	UD	FR/SC	6	FR	NM				5.5	1.3		
FO-CPUE	540	LKTR	541	GN	2	590	1468	0.71	F	SD	UN	FR/SC			NM				15.2	15.3		
FO-CPUE	540	LKTR	542	GN	4	529	1368	0.92	M	IM	UD	FR/SC			NM				10.7	2.8		
FO-CPUE	542	LKTR	543	GN	3	515	1541	1.13	F	SD	UN	FR/SC			NM				13.8	28.7		
FO-CPUE	542	LKTR	544	GN	3	567	1991	1.09	F	MA	M	OT/FR/SC	19	OT	NM	PV			31.5	163.4	Golder 0949	pelvic
FO-CPUE	542	LKTR	545	GN	3	595	1978	0.94	F	MA	GR	FR/SC			RM	AD	165		36.6	145.6	Y0165	
FO-CPUE	542	LKTR	546	GN	3	560	1436	0.82	M	MA	GR	FR/SC			NM				9.5	40.4		
FO-CPUE	542	LKTR	547	GN	3	555	1771	1.04	F	MA	GR	FR/SC			NM				20.6	116.7		
FO-CPUE	542	LKTR	548	GN	3	594	1945	0.93	M	MA	GR	FR/SC	14	FR	NM				15.9	53.6		
FO-CPUE	542	LKTR	549	GN	3	544	1578	0.98	F	SD	UN	FR/SC			NM				12.2	20.4		
FO-CPUE	542	LKTR	550	GN	3	524	1271	0.88	M	MA	GR	FR/SC			NM				9.6	44.5		
FO-CPUE	542	LKTR	551	GN	3	531	1469	0.98	F	SD	UN	FR/SC			NM				13.1	21.5		
FO-CPUE	542	LKTR	552	GN	3	595	2026	0.96	F	MA	GR	FR/SC			NM				25.1	206.2		
FO-CPUE	542	LKTR	553	GN	3	565	1827	1.01	F	SD	UN	OT/FR/SC	24	OT	NM	PV			15.9	23.7	Golder 0962	pelvic
FO-CPUE	542	LKTR	554	GN	3	560	1449	0.83	F	SD	UN	FR/SC			NM				14.1	16.3		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	542	LKTR	555	GN	3	570	1361	0.73	F	SD	UN	OT/FR/SC	40	OT	NM	PV			11.4	24.6	Golder 0798	pelvic
FO-CPUE	542	LKTR	556	GN	3	566	1479	0.82	M	MA	GR	FR/SC			NM				12.1	13.8		
FO-CPUE	542	LKTR	557	GN	2	480	1303	1.18	M	MA	GR	FR/SC	8	FR	RM	AD	205		8.3	31.3	Y0205	
FO-CPUE	542	LKTR	558	GN	2	537	1653	1.07	F	SD	UN	FR/SC			NM				14.8	10.2		
FO-CPUE	542	LKTR	559	GN	2	560	1704	0.97	F	SD	UN	FR/SC			NM				15.5	30.7	RLL 2534	
FO-CPUE	542	LKTR	560	GN	2	557	1546	0.89	M	MA	GR	FR/SC			NM				11.8	47.5		
FO-CPUE	542	LKTR	561	GN	2	555	1290	0.75	M	MA	GR	FR/SC			RM	AD	147		9.6	14	Y0147	
FO-CPUE	542	LKTR	562	GN	2	599	2037	0.95	F	MA	GR	FR/SC	17	FR	NM				26.3	130.4		
FO-CPUE	542	LKTR	563	GN	2	575	1754	0.92	M	MA	GR	FR/SC			RM	AD	190		16.3	53.8	Y0190	
FO-CPUE	542	LKTR	564	GN	4	545	1739	1.07	F	MA	GR	FR/SC			NM				25.2	118.3		
FO-CPUE	542	LKTR	565	GN	4	535	1524	1.00	M	MA	GR	FR/SC			NM				11.3	53.4		
FO-CPUE	544	LKTR	566	GN	1.5	574	1861	0.98	M	MA	GR	FR/SC			RM	AD	315		10.2	49.2	Y0315; RLL 2122	photo 227, 228
FO-CPUE	544	LKTR	567	GN	1.5	590	2094	1.02	F	SD	UN	FR/SC			RM	AD	118		17.2	21.4	Y0118	
FO-CPUE	544	LKTR	568	GN	1.5	605	2068	0.93	F	MA	GR	FR/SC			RM	AD	175		24.8	140.7	Y0175	
FO-CPUE	544	LKTR	569	GN	1.5	564	1488	0.83	M	MA	GR	N/A			NM				7.6	47.4		
FO-CPUE	544	LKTR	570	GN	1.5	547	1638	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	571	GN	1.5	600	2280	1.06	N/A	N/A	N/A	N/A			RM	AD	358		N/A	N/A	Y0354	
FO-CPUE	544	LKTR	572	GN	1.5	500	1362	1.09	M	MA	GR	OT/FR/SC	14	OT	NM				10.2	49.3	pelvic	
FO-CPUE	544	LKTR	573	GN	2	555	1542	0.90	N/A	N/A	N/A	N/A			RM	AD	441		N/A	N/A	Y0441	
FO-CPUE	544	LKTR	574	GN	2	555	1701	1.00	N/A	N/A	N/A	N/A			RM	AD	138		N/A	N/A	Y0138	
FO-CPUE	544	LKTR	575	GN	2	617	2242	0.95	N/A	N/A	N/A	N/A			RM	AD	185		N/A	N/A	Y0185	
FO-CPUE	544	LKTR	576	GN	2	520	1451	1.03	M	MA	GR	OT/FR/SC	19	OT	NM	PV			8.3	56.5	Golder 0963	pelvic
FO-CPUE	544	LKTR	577	GN	2	564	1748	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	578	GN	2	630	2011	0.80	F	SD	UN	OT/FR/SC	37	OT	NM				20.4	25.2	pelvic	
FO-CPUE	544	LKTR	579	GN	2	570	1594	0.86	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	580	GN	2	560	1357	0.77	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	581	GN	2	565	1771	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	582	GN	2	555	1554	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	583	GN	2	605	2061	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	584	GN	2	531	1447	0.97	M	MA	GR	FR/SC	19	FR	NM				12.9	36.7		
FO-CPUE	544	LKTR	585	GN	2	483	1257	1.12	M	MA	GR	FR/SC	10	FR	NM				9	39.8		
FO-CPUE	544	LKTR	586	GN	1	650	2818	1.03	F	MA	GR	OT/FR/SC	36	OT	RM	AD	415		25.9	66.6	Y0415	RLL 2126
FO-CPUE	544	LKTR	587	GN	1	569	1876	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	588	GN	1	525	1495	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	589	GN	3	581	1895	0.97	M	MA	GR	FR/SC			RM	AD	299		20.5	60.2	Y0299	
FO-CPUE	544	LKTR	590	GN	3	540	1716	1.09	N/A	N/A	N/A	N/A			RM	AD	409		N/A	N/A	Y0409	
FO-CPUE	544	LKTR	591	GN	3	521	1379	0.98	N/A	N/A	N/A	N/A			RM	AD	318		N/A	N/A	Y0318	
FO-CPUE	544	LKTR	592	GN	3	576	1612	0.84	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	593	GN	3	595	1694	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	594	GN	3	585	1605	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	595	GN	3	591	1827	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	596	GN	3	563	1348	0.76	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	597	GN	3	518	1495	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	598	GN	3	526	1401	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	599	GN	4	566	1538	0.85	N/A	N/A	N/A	N/A			RM	AD	113		N/A	N/A	Y0113	
FO-CPUE	544	LKTR	600	GN	4	584	1736	0.87	N/A	N/A	N/A	N/A			RM	AD	231		N/A	N/A	Y0231	
FO-CPUE	544	LKTR	601	GN	4	533	1526	1.01	M	MA	GR	OT/FR/SC	17	OT	NM				11.2	59.4	RLL 2159	pelvic
FO-CPUE	544	LKTR	602	GN	4	567	1615	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	603	GN	4	529	1180	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	604	GN	4	559	1382	0.79	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	605	GN	4	591	2116	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	606	GN	4	589	1831	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	607	GN	4	526	1718	1.18	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	544	LKTR	608	GN	4	605	2439	1.10	M	MA	GR	OT/FR/SC	11	FR	NM				17	9.3		
FO-CPUE	544	LKTR	609	GN	0.5	570	1508	0.81	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	610	GN	2	518	1511	1.09	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	611	GN	2	592	2173	1.05	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	612	GN	2	503	1684	1.32	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	613	GN	2	577	1781	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	614	GN	2	566	1921	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	615	GN	2	600	2168	1.00	F	MA	GR	OT/FR/SC			NM				20.9	134.1		
FO-CPUE	543	LKTR	616	GN	2	584	1540	0.77	N/A	N/A	N/A	N/A			RM	AD	312		N/A	N/A	Y0312	
FO-CPUE	543	LKTR	617	GN	3	555	1342	0.79	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	618	GN	3	547	1318	0.81	N/A	N/A	N/A	N/A			NM				N/A	N/A		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	543	LKTR	619	GN	3	573	1811	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	620	GN	3	565	1906	1.06	F	MA	GR	OT/FR/SC			RM	AD	263		36.8	160.4	Y0263	RLL 2154
FO-CPUE	543	LKTR	621	GN	3	609	1973	0.87	F	MA	GR	OT/FR/SC			NM				12.4	41.1	photos 770-777	strange growth attached to liver
FO-CPUE	543	LKTR	622	GN	3	579	1939	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	623	GN	3	581	1817	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	624	GN	3	561	1508	0.85	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	625	GN	3	532	1495	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	626	GN	3	555	1668	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	627	GN	3	557	1629	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	628	GN	3	546	1249	0.77	N/A	N/A	N/A	N/A			RM	AD	43		N/A	N/A	Y0043	
FO-CPUE	543	LKTR	629	GN	3	561	1665	0.94	M	MA	GR	OT/FR/SC			RM	AD	134		9.2	41.3	Y0134; RLL 2559	pelvic
FO-CPUE	543	LKTR	630	GN	3	557	1562	0.90	N/A	N/A	N/A	N/A			RM	AD	428		N/A	N/A	Y0428	
FO-CPUE	543	LKTR	631	GN	3	559	1762	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	632	GN	1.5	539	1622	1.04	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	633	GN	1.5	587	1925	0.95	F	MA	R	OT/FR/SC			NM				24.4	127.9	RLL 2196	pelvic
FO-CPUE	543	LKTR	634	GN	1.5	521	1408	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	635	GN	1.5	506	1534	1.18	N/A	N/A	N/A	N/A			RM	AD	168		N/A	N/A	Y0168	
FO-CPUE	543	LKTR	636	GN	1.5	500	1338	1.07	N/A	N/A	N/A	N/A			RM	AD	300		N/A	N/A	Y0300	
FO-CPUE	543	LKTR	637	GN	1.5	411	662	0.95	F	IM	UD	FR/SC	6	OT	NM				8.5	0.6		
FO-CPUE	543	LKTR	638	GN	1.5	166	49	1.07	U	IM	UD	OT/FR/SC	4	OT	NM				0.5	N/A	pelvic	
FO-CPUE	543	LKTR	639	GN	4	567	1716	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	640	GN	4	575	1571	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	641	GN	4	569	1750	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	642	GN	4	566	2002	1.10	M	MA	GR	OT/FR/SC	18	FR	NM				14.5	80.4	RLL 2198	pelvic
FO-CPUE	543	LKTR	643	GN	4	586	1440	0.72	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	644	GN	1	557	1892	1.09	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	543	LKTR	645	GN	1	532	1379	0.92	N/A	N/A	N/A	N/A			RM	AD	302		N/A	N/A	Y0302	
FO-CPUE	545	LKTR	646	GN	4	487	1017	0.88	F	IM	UD	OT/FR/SC	10	OT	NM				6.4	2.2		
FO-CPUE	545	LKTR	647	GN	4	555	1497	0.88	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	545	LKTR	648	GN	4	547	1681	1.03	F	SD	UN	OT/FR/SC			NM				11.2	17.2	RLL 2184	
FO-CPUE	545	LKTR	649	GN	4	549	1770	1.07	N/A	N/A	N/A	N/A			RM	AD	324		N/A	N/A	Y0324	
FO-CPUE	545	LKTR	650	GN	2	380	575	1.05	F	IM	UD	FR/SC	6	FR	NM				7	0.5		
FO-CPUE	545	LKTR	651	GN	3	522	1592	1.12	F	SD	UN	OT/FR/SC			NM				15.4	19.4		
FO-CPUE	545	LKTR	652	GN	3	371	513	1.00	F	IM	UD	FR/SC	5	FR	NM				5.3	N/A		
FO-CPUE	546	LKTR	653	GN	1.5	527	1275	0.87	F	IM	UD	FR/SC			NM				10.1	17.2		
FO-CPUE	546	LKTR	654	GN	2	400	651	1.02	F	IM	UD	FR/SC	6	FR	NM				6.4	1.6		
FO-CPUE	546	LKTR	655	GN	2	579	1642	0.85	N/A	N/A	N/A	N/A			RM	AD	254		N/A	N/A	Y0254	
FO-CPUE	546	LKTR	656	GN	4	528	1371	0.93	F	SD	UN	FR/SC			NM				7.6	21.2		
FO-CPUE	546	LKTR	657	GN	4	543	1723	1.08	M	MA	GR	OT/FR/SC	16	FR	NM				14.5	47.5		
FO-CPUE	546	LKTR	658	GN	4	583	1770	0.89	F	MA	GR	OT/FR/SC			RM	AD	116		14.2	38.8	RLL 2123, Y0116	
FO-CPUE	546	LKTR	659	GN	4	596	1730	0.82	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	546	LKTR	660	GN	4	566	1742	0.96	M	MA	GR	OT/FR/SC	27	OT	NM				11	58.1	GOLDER 0974	
FO-CPUE	5	LKTR	661	GN	4	576	1841	0.96	N/A	N/A	N/A	N/A			RM	AD	425		N/A	N/A	Y0425	
FO-CPUE	5	LKTR	662	GN	4	569	1542	0.84	N/A	N/A	N/A	N/A			RM	AD	251		N/A	N/A	Y0251	
FO-CPUE	5	LKTR	663	GN	1.5	548	1677	1.02	M	MA	GR	OT/FR/SC	19	OT	RM	AD	47		9.6	61.9	Y0047	
FO-CPUE	5	LKTR	664	GN	2	304	263	0.94	F	IM	UD	FR/SC	6	FR	NM				1.7	0.7		
FO-CPUE	5	LKTR	665	GN	2	247	150	1.00	F	IM	UD	FR/SC	3	FR	NM				1.4	0.3		
FO-CPUE	5	LKTR	666	GN	3	626	2057	0.84	F	SD	UN	FR/SC			NM				17.4	33.4		
FO-CPUE	5	LKTR	667	GN	3	469	1043	1.01	F	IM	UD	FR/SC	7	FR	NM				10.6	4.3		
FO-CPUE	5	LKTR	668	GN	3	384	557	0.98	M	IM	UD	FR/SC	5	FR	NM				5.4	0.4		
FO-CPUE	5	LKTR	669	GN	3	593	1786	0.86	F	SD	UN	OT/FR/SC	37	OT	NM				17.5	19.4	GOLDER 0732	
FO-CPUE	5	LKTR	670	GN	3	551	1306	0.78	M	MA	GR	OT/FR/SC			NM				10.8	21.5	RLL 2178	
FO-CPUE	5	LKTR	671	GN	3	560	1325	0.75	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	5	LKTR	672	GN	3	462	1033	1.05	M	IM	UD	FR/SC	6	FR	NM				10.9	0.7		
FO-CPUE	5	LKTR	673	GN	3	394	635	1.04	F	IM	UD	FR/SC	6	FR	NM				4.8	0.6		
FO-CPUE	6	LKTR	674	GN	4	561	1676	0.95	N/A	N/A	N/A	N/A			RM	AD	227		N/A	N/A	Y0227	
FO-CPUE	6	LKTR	675	GN	4	534	1787	1.17	F	MA	GR	FR/SC			NM				26.1	20.9		
FO-CPUE	6	LKTR	676	GN	4	561	1687	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	6	LKTR	677	GN	4	376	540	1.02	F	IM	UD	FR/SC	6	FR	NM				10	2.2		
FO-CPUE	547	LKTR	678	GN	1	538	1481	0.95	M	MA	GR	FR/SC			RM	AD	130		8.7	47.6	Y0130	
FO-CPUE	547	LKTR	679	GN	4	648	2179	0.80	F	MA	GR	OT/FR/SC	41	OT	RM	AD	142		21.8	137.1	Y0142, GOLDER 0840?	
FO-CPUE	547	LKTR	680	GN	3	440	983	1.15	M	IM	UD	FR/SC	9	FR	NM				9	7.5		
FO-CPUE	548	LKTR	681	GN	1.5	561	1812	1.03	M	MA	GR	OT/FR/SC	13	FR	NM				12.6	78.6	RLL 2188	
FO-CPUE	548	LKTR	682	GN	3	575	1553	0.82	F	SD	UN	OT/FR/SC	17	FR	RM	AD	234		15.8	61.3	Y0234, RLL 2591	

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	548	LKTR	683	GN	4	584	1907	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	548	LKTR	684	GN	4	585	1291	0.64	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	548	LKTR	685	GN	2	380	574	1.05	F	IM	UD	FR/SC	4	FR	NM				6.4	1.8		
FO-CPUE	554	LKTR	686	GN	3	593	2005	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	551	LKTR	687	GN	1.5	179	59	1.03	F	IM	UD	OT/FR/SC			NM			ST	0.8	0.2	pelvic	
FO-CPUE	553	NSST	688	GN	0.5	66	1	0.35	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	551	LKTR	689	GN	2	341	424	1.07	F	IM	UD	OT/FR/SC	8	OT	NM			ST	4.9	0.1		
FO-CPUE	551	LKTR	690	GN	2	576	1476	0.77	F	SD	UN	OT/FR/SC			RM	AD	453		9.2	18.9		
FO-CPUE	553	LKTR	691	GN	3	411	673	0.97	F	IM	UD	FR/SC	5	FR	NM				7.5	0.2		
FO-CPUE	549	LKTR	692	GN	1.5	180	68	1.17	M	IM	UD	OT/FR/SC	3	OT	NM				0.8	N/A	pelvic	
FO-CPUE	549	LKTR	693	GN	4	562	1743	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	549	LKTR	694	GN	4	310	289	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	556	LKTR	695	GN	2	537	1539	0.99	M	MA	GR	OT/FR/SC	17	FR	NM				8.5	40.5	pelvic	
FO-CPUE	556	LKTR	696	GN	3	311	293	0.97	F	IM	UD	FR/SC	3	FR	NM				3.5	0.3		
FO-CPUE	556	LKTR	697	GN	4	554	1521	0.89	F	MA	GR	OT/FR/SC			RM	AD	171		10.1	32.5	Y0171	
FO-CPUE	552	LKTR	698	GN	4	558	1767	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	552	LKTR	699	GN	4	545	1110	0.69	M	SD	UD	OT/FR/SC			NM				19.7	2.6	photo 235, 236	
FO-CPUE	552	LKTR	700	GN	4	586	1621	0.81	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	552	LKTR	701	GN	3	554	1524	0.90	M	MA	GR	OT/FR/SC			NM				11.4	60.7	RLL 2541	
FO-CPUE	552	LKTR	702	GN	3	537	1587	1.02	M	MA	GR	OT/FR/SC	21	OT	NM				11.7	47.8	Golder 0957	pelvic
FO-CPUE	552	LKTR	703	GN	3	548	1625	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	552	LKTR	704	GN	2	283	191	0.84	F	IM	UD	OT/FR/SC	4	FR	NM				1.9	0.2		
FO-CPUE	8	LKTR	705	GN	1.5	218	102	0.98	M	IM	UD	OT/FR/SC	5		NM			ST	0.9	0.6	pelvic	
FO-CPUE	8	LKTR	706	GN	2	349	445	1.05	M	IM	UD	FR/SC	6	FR	NM				2.5	0.2		
FO-CPUE	8	LKTR	707	GN	3	555	1783	1.04	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	8	LKTR	708	GN	4	532	1412	0.94	F	MA	RI	OT/FR/SC	38	OT	NM				22	163.2	RLL 2564	pelvic
FO-CPUE	8	NSST	709	GN	0.5	61	2	0.88	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	12	LKTR	710	GN	2	594	1662	0.79	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	9	LKTR	711	GN	4	536	1584	1.03	F	MA	RI	FR/SC			NM			ST	27	128.3		
FO-CPUE	9	LKTR	712	GN	4	573	1432	0.76	F	SD	UN	OT/FR/SC			NM				18.1	40.3	RLL 2130	
FO-CPUE	9	LKTR	713	GN	4	601	1520	0.70	F	SD	UN	N/A			NM			ST	14.5	27.5		
FO-CPUE	9	LKTR	714	GN	3	550	1491	0.90	N/A	N/A	N/A	N/A			RM	AD	412		N/A	N/A	Y04112	
FO-CPUE	9	LKTR	715	GN	3	565	1527	0.85	N/A	N/A	N/A	N/A			RM	AD	487		N/A	N/A	Y0487	
FO-CPUE	9	LKTR	716	GN	3	542	1151	0.72	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	9	LKTR	717	GN	3	538	1414	0.91	M	MA	GR	FR/SC			NM				14.2	41		
FO-CPUE	9	LKTR	718	GN	3	352	369	0.85	M	IM	UD	FR/SC	10	FR	RM	AD	273		3	0.3	Y0273	
FO-CPUE	9	LKTR	719	GN	2	585	1621	0.81	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	9	LKTR	720	GN	2	590	1325	0.65	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	10	LKTR	721	GN	4	568	1635	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	10	LKTR	722	GN	3	545	1911	1.18	M	MA	GR	FR/SC			NM			ST	14.9	72.1		
FO-CPUE	13	LKTR	723	GN	2	363	451	0.94	F	IM	UD	FR/SC	6	FR	RM	AD	122		4.4	0.2	Y0122	
FO-CPUE	13	LKTR	724	GN	3	388	662	1.13	F	IM	UD	FR/SC			NM				5.1	0.9		
FO-CPUE	13	LKTR	725	GN	4	576	2059	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	13	LKTR	726	GN	4	407	1509	2.24	M	MA	GR	OT/FR/SC	10	FR	NM				9.5	40.4		
FO-CPUE	13	LKTR	727	GN	1	337	371	0.97	N/A	N/A	N/A	FR/SC	6	FR	NM				N/A	N/A		
FO-CPUE	13	LKTR	728	GN	1	548	1775	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	13	LKTR	729	GN	1	525	1420	0.98	N/A	N/A	N/A	N/A			RM	AD	14		N/A	N/A	Y0014	
FO-CPUE	11	LKTR	730	GN	2	404	597	0.91	M	IM	UD	FR/SC	7	FR	NM				7	0.2		
FO-CPUE	11	LKTR	731	GN	4	580	2041	1.05	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	11	LKTR	732	GN	4	509	1324	1.00	M	MA	GR	OT/FR/SC	16	FR	NM				11.7	46.9		
FO-CPUE	14	LKTR	735	GN	2	539	1440	0.92	F	MA	GR	FR/SC			NM			ST	13.5	88.4		
FO-CPUE	14	LKTR	736	GN	4	553	1501	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	16	LKTR	737	GN	4	550	1610	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	16	LKTR	738	GN	4	562	1565	0.88	M	MA	GR	OT/FR/SC			NM				9	69.5	RLL 2201	pelvic
FO-CPUE	20	LKTR	739	GN	1.5	570	1592	0.86	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	20	LKTR	740	GN	1.5	590	1865	0.91	M	MA	GR	OT/FR/SC	34	OT	NM				1.01	51.2	Golder 0997	pelvic
FO-CPUE	20	LKTR	741	GN	1.5	564	1535	0.86	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	20	LKTR	742	GN	1.5	577	1465	0.76	M	MA	GR	OT/FR/SC			NM			ST	8.2	60	RLL 2177	
FO-CPUE	20	LKTR	743.1	GN	1.5	570	1840	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	20	LKTR	743.2	GN	3	567	1691	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	20	LKTR	744	GN	3	530	1465	0.98	M	MA	GR	FR/SC			NM				9.2	54.4		
FO-CPUE	20	LKTR	745	GN	3	584	1854	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	20	LKTR	746	GN	3	502	1388	1.10	M	MA	GR	OT/FR/SC	15	OT	NM				10.4	34.2	pelvic	
FO-CPUE	20	LKTR	747	GN	3	575	1583	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	20	LKTR	748	GN	4	578	1693	0.88	F	MA	RI	OT/FR/SC	51	OT	NM				28.3	120	Golder 0767	
FO-CPUE	20	LKTR	749	GN	4	538	1572	1.01	F	MA	GR	FR/SC			NM			ST	26.2	130.5		
FO-CPUE	20	LKTR	750	GN	4	551	1779	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	20	LKTR	751	GN	4	579	1735	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	20	LKTR	752	GN	4	593	2041	0.98	N/A	N/A	N/A	N/A			RM	AD	355		N/A	N/A	Y0355	
FO-CPUE	20	LKTR	753	GN	4	533	1501	0.99	M	MA	GR	FR/SC			RM	AD	80		11.8	54.3	Y0080	
FO-CPUE	20	LKTR	754	GN	4	561	1852	1.05	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	20	LKTR	755	GN	4	558	1554	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	18	LKTR	756	GN	2	551	1568	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	18	LKTR	757	GN	2	570	1742	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	18	LKTR	758	GN	3	437	883	1.06	F	IM	UD	FR/SC	7	FR	NM				7.5	1.9		
FO-CPUE	18	LKTR	759	GN	3	401	618	0.96	M	IM	UD	FR/SC	6	FR	NM				6.5	0.3		
FO-CPUE	18	LKTR	760	GN	3	574	1930	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	18	LKTR	761	GN	3	355	475	1.06	M	IM	UD	FR/SC	7	FR	NM				4.5	0.2		
FO-CPUE	18	LKTR	762	GN	4	606	2025	0.91	F	MA	RI	OT/FR/SC	12	FR	NM				33.5	185.7	RLL 2205	pelvic
FO-CPUE	18	LKTR	763	GN	4	583	1765	0.89	N/A	N/A	N/A	N/A			RM	AD	478		N/A	N/A	Y0478	
FO-CPUE	18	LKTR	764	GN	4	540	1579	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	18	LKTR	765	GN	4	536	1464	0.95	M	MA	GR	FR/SC			NM				13.5	46.8		
FO-CPUE	19	LKTR	766	GN	2	560	1816	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	17	LKTR	767	GN	3	524	1497	1.04	M	MA	GR	OT/FR/SC	24	OT	NM				8.7	45	Golder 0967	pelvic
FO-CPUE	15	LKTR	768	GN	1.5	218	122	1.18	F	IM	UD	FR/SC	4	FR	NM				2.4	0.1		
FO-CPUE	15	LKTR	769	GN	1.5	189	56	0.83	U	IM	UD	OT/FR/SC	3	FR	NM				1.4	0.1		
FO-CPUE	15	LKTR	770	GN	2	527	1659	1.13	F	MA	RI	FR/SC			NM				24.2	162		
FO-CPUE	15	LKTR	771	GN	2	631	1934	0.77	F	MA	GR	FR/SC	15	FR	NM			ST	31.4	165.5		
FO-CPUE	15	LKTR	772	GN	3	531	1226	0.82	F	MA	GR	FR/SC			NM				11.9	15.3		
FO-CPUE	15	LKTR	773	GN	3	595	2055	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	15	LKTR	774	GN	3	620	2245	0.94	F	SD	UN	FR/SC			NM			ST	12.8	37.8		
FO-CPUE	15	LKTR	775	GN	4	508	1415	1.08	F	SD	UN	OT/FR/SC	12	FR	RM	AD	259		11.5	18.5	Y0259	
FO-CPUE	557	LKTR	776	GN	3	585	2208	1.10	N/A	N/A	N/A	N/A			RM	AD	285		N/A	N/A	Y0285	
FO-CPUE	557	LKTR	777	GN	3	564	1835	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	557	LKTR	778	GN	3	404	609	0.92	F	IM	UD	FR/SC	5	FR	NM			ST	5.7	1.2		
FO-CPUE	557	LKTR	779	GN	1.5	491	1185	1.00	M	MA	GR	OT/FR/SC	12	FR	RM	AD	243		6.7	34.1	Y0243	
FO-CPUE	557	LKTR	780	GN	1.5	194	78	1.07	M	IM	UD	FR/SC	3	FR	NM			ST	1.2	0.2		
FO-CPUE	557	LKTR	781	GN	1.5	256	167	1.00	M	IM	UD	OT/FR/SC	3	FR	NM			ST	1.7	0.1		
FO-CPUE	557	LKTR	782	GN	4	602	1979	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	557	LKTR	783	GN	2	562	1431	0.81	N/A	N/A	N/A	N/A			RM	AD	115		N/A	N/A	Y0115	
FO-CPUE	558	LKTR	789	GN	4	602	1808	0.83	F	SD	UN	OT/FR/SC	37	OT	NM				13.7	24.5	GOLDER 4046	green tag
FO-CPUE	558	LKTR	790	GN	4	501	1495	1.19	M	MA	GR	OT/FR/SC	14	FR	NM				13.4	39		
FO-CPUE	558	LKTR	791	GN	4	501	1483	1.18	F	MA	RI	FR/SC			NM				25.5	179.9		
FO-CPUE	558	LKTR	792	GN	4	571	1917	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	558	LKTR	793	GN	4	525	1553	1.07	M	MA	GR	FR/SC			NM				13.4	48.6		
FO-CPUE	558	LKTR	794	GN	4	524	1604	1.11	F	MA	RI	FR/SC			RM	AD	143		26.5	143.8	Y0143	
FO-CPUE	558	LKTR	795	GN	4	564	1698	0.95	F	SD	UN	N/A			NM			ST	16.1	18		
FO-CPUE	558	LKTR	796	GN	4	576	1798	0.94	N/A	N/A	N/A	N/A			RM	AD	222		N/A	N/A	Y0222	
FO-CPUE	558	LKTR	797	GN	4	605	2319	1.05	N/A	N/A	N/A	N/A			RM	AD	161		N/A	N/A	Y0161	
FO-CPUE	558	LKTR	798	GN	4	568	1727	0.94	N/A	N/A	N/A	N/A			RM	AD	402		N/A	N/A	Y0402	
FO-CPUE	558	LKTR	799	GN	4	549	1714	1.04	N/A	N/A	N/A	N/A			RM	AD	294		N/A	N/A	Y0294	
FO-CPUE	558	LKTR	800	GN	4	559	1586	0.91	N/A	N/A	N/A	N/A			RM	AD	298		N/A	N/A	Y0298	
FO-CPUE	558	LKTR	801	GN	3	560	2000	1.14	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	558	LKTR	802	GN	3	565	1704	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	558	LKTR	803	GN	3	523	1705	1.19	N/A	N/A	N/A	OT/FR/SC	15	FR	NM				N/A	N/A	RLL 2598	PELVIC
FO-CPUE	558	LKTR	804	GN	3	593	1835	0.88	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	558	LKTR	805	GN	3	551	1747	1.04	N/A	N/A	N/A	OT/FR/SC			NM				N/A	N/A	RLL 2169	PELVIC
FO-CPUE	558	LKTR	806	GN	3	524	1580	1.10	M	MA	GR	FR/SC			NM				17.8	49.8		
FO-CPUE	558	LKTR	807	GN	3	535	1495	0.98	F	SD	UN	FR/SC			NM			ST	17.3	34.3		
FO-CPUE	558	LKTR	808	GN	1.5	558	1995	1.15	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	559	LKTR	809	GN	4	548	1570	0.95	M	MA	GR	N/A			NM				7.8	51.7		
FO-CPUE	559	LKTR	810	GN	4	560	1733	0.99	M	MA	GR	FR/SC			RM	AD	452		7.9	37.8	GOLDER TAG REMOVED	Y0452
FO-CPUE	559	LKTR	811	GN	4	530	1583	1.06	F	MA	GR	FR/SC			RM	AD	467		14.4	120.2	Y0467	
FO-CPUE	559	LKTR	812	GN	4	535	1645	1.07	F	MA	GR	FR/SC			NM				19.5	124.2		
FO-CPUE	559	LKTR	813	GN	4	545	1696	1.05	M	MA	GR	N/A			NM			ST	8.2	55.6		
FO-CPUE	559	LKTR	814	GN	4	560	1683	0.96	F	MA	RI	N/A			NM				21.7	143.5		
FO-CPUE	559	LKTR	815	GN	4	574	1495	0.79	M	MA	GR	N/A			NM				N/A	39.4		
FO-CPUE	559	LKTR	816	GN	3	570	2147	1.16	M	MA	GR	N/A			NM				N/A	66.2		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	559	LKTR	817	GN	3	579	2030	1.05	F	MA	GR	N/A			NM				N/A	173.4		
FO-CPUE	559	LKTR	818	GN	3	600	1637	0.76	F	SD	UN	N/A			NM				N/A	N/A		
FO-CPUE	559	LKTR	819	GN	3	545	1619	1.00	F	MA	GR	N/A			NM				N/A	103.4		
FO-CPUE	559	LKTR	820	GN	3	580	1751	0.90	F	SD	UN	N/A			NM				N/A	N/A		
FO-CPUE	559	LKTR	821	GN	3	594	1839	0.88	F	MA	RI	N/A			NM				N/A	148.8		
FO-CPUE	559	LKTR	822	GN	3	549	1646	0.99	M	MA	GR	N/A			RM	AD	111		N/A	41.6	Y0111	
FO-CPUE	559	LKTR	823	GN	2	616	2328	1.00	F	SD	UN	N/A			NM				N/A	N/A		
FO-CPUE	559	LKTR	824	GN	2	534	1519	1.00	M	MA	GR	FR/SC			NM				7.9	44.2		
FO-CPUE	561	LKTR	825	GN	3	577	1934	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	562	LKTR	826	GN	3	387	600	1.04	M	IM	UD	FR/SC	6	FR	RM	AD	206		6.2	0.2	Y0206	
FO-CPUE	562	LKTR	827	GN	4	561	1804	1.02	M	MA	GR	N/A			RM	AD	215		N/A	52.8	Y0215	
FO-CPUE	560	LKTR	828	GN	3	513	1593	1.18	F	MA	RI	FR/SC			NM				18.8	N/A		
FO-CPUE	560	LKTR	829	GN	4	575	2043	1.07	M	MA	GR	N/A			NM				14.6	49.9		
FO-CPUE	560	LKTR	830	GN	4	535	1807	1.18	F	MA	GR	FR/SC			NM				29.2	181.3		
FO-CPUE	560	LKTR	831	GN	4	556	1418	0.82	M	MA	GR	N/A			RM	AD	365		N/A	41.8	Y0365	
FO-CPUE	557	LKTR	832	GN	4	575	1695	0.89	F	SD	UN	N/A			RM	AD	135		N/A	N/A	Y0135	
FO-CPUE	555	LKTR	833	GN	4	453	1720	1.85	M	MA	GR	FR/SC	15	FR	RM	AD	193		12.6	28.6	Y0193	
FO-CPUE	555	LKTR	834	GN	4	445	1432	1.63	F	SD	UN	FR/SC			NM				16.1	12.1		
FO-CPUE	555	LKTR	835	GN	4	544	1749	1.09	N/A	N/A	N/A	N/A			RM	AD	464		N/A	N/A	Y0464	
FO-CPUE	555	LKTR	836	GN	4	598	2171	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	555	LKTR	837	GN	3	545	1715	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	555	LKTR	838	GN	3	511	1597	1.20	F	SD	UN	FR/SC			NM				14.7	20.1		
FO-CPUE	555	LKTR	839	GN	3	420	819	1.11	M	IM	UD	N/A			NM				6.7	0.5		
FO-CPUE	555	LKTR	840	GN	2	525	1111	0.77	M	MA	GR	FR/SC			NM				6.8	12.7		
FO-CPUE	555	LKTR	841	GN	2	320	428	1.31	F	IM	UD	OT/FR/SC	7	OT	NM				3.7	0.6		
FO-CPUE	556	LKTR	842	GN	3	570	1705	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	556	LKTR	843	GN	3	354	453	1.02	M	IM	UD	FR/SC	5	FR	NM				3.3	0.1		
FO-CPUE	556	LKTR	844	GN	3	585	1972	0.99	N/A	N/A	N/A	OT/FR/SC			RM	AD	42		N/A	N/A	Y0042	GOLDER TAG REMOVED
FO-CPUE	556	LKTR	845	GN	3	585	1575	0.79	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	556	LKTR	846	GN	2	260	198	1.13	M	IM	UD	OT/FR/SC	4	OT	NM				1.5	0.4		
FO-CPUE	556	LKTR	847	GN	2	564	2176	1.21	N/A	N/A	N/A	OT/FR/SC	16	FR	NM				N/A	N/A	RLL 2137	
FO-CPUE	556	LKTR	848	GN	2	565	1781	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	556	LKTR	849	GN	4	528	1618	1.10	F	SD	UN	FR/SC			NM				13.9	18.8		
FO-CPUE	21	LKTR	850	GN	1.5	198	79	1.02	F	IM	UD	FR/SC	3	FR	NM				0.8	0		
FO-CPUE	21	LKTR	851	GN	1.5	525	1686	1.17	F	MA	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	852	GN	1.5	540	1746	1.11	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	853	GN	2	525	1594	1.10	N/A	N/A	N/A	N/A			RM	AD	?		N/A	N/A	Y0043	
FO-CPUE	21	LKTR	854	GN	2	555	1690	0.99	N/A	N/A	N/A	N/A			RM	AD	418		N/A	N/A	Y0418	
FO-CPUE	21	LKTR	855	GN	2	550	1875	1.13	N/A	N/A	N/A	OT/FR/SC	30	OT	NM				N/A	N/A	GOLDER 0789	PELVIC
FO-CPUE	21	LKTR	856	GN	2	557	1668	0.97	N/A	N/A	N/A	OT/FR/SC	16	FR	RM	AD	207		N/A	N/A	RLL 2141	Y0207
FO-CPUE	21	LKTR	857	GN	2	599	1879	0.87	N/A	N/A	N/A	N/A			RM	AD	177		N/A	N/A	Y0177	
FO-CPUE	21	LKTR	858	GN	2	545	1543	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	859	GN	2	580	2095	1.07	F	MA	RI	N/A			NM			ST	N/A	N/A		
FO-CPUE	21	LKTR	860	GN	2	590	1985	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	861	GN	2	566	2009	1.11	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	862	GN	2	550	1507	0.91	N/A	N/A	N/A	OT/FR/SC			RM	AD	145		N/A	N/A	RLL 2580	Y0145
FO-CPUE	21	LKTR	863	GN	3	555	1562	0.91	M	MA	GR	N/A			NM			ST	N/A	N/A		
FO-CPUE	21	LKTR	864	GN	3	570	2068	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	865	GN	3	553	1699	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	866	GN	3	520	1457	1.04	M	MA	GR	FR/SC			RM	AD	462		12	59.5	Y0462	
FO-CPUE	21	LKTR	867	GN	3	576	1585	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	868	GN	3	550	1689	1.02	N/A	N/A	N/A	N/A			RM	AD	202		N/A	N/A	Y0202	
FO-CPUE	21	LKTR	869	GN	3	571	1654	0.89	F	SD	UN	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	870	GN	3	540	1635	1.04	N/A	N/A	N/A	N/A			RM	AD	239		N/A	N/A	Y0239	
FO-CPUE	21	LKTR	871	GN	1	580	1773	0.91	N/A	N/A	N/A	N/A			RM	AD	408		N/A	N/A	Y0408	
FO-CPUE	21	LKTR	872	GN	1	469	1017	0.99	M	SD	UD	FR/SC	9	FR	RM	AD	372		7.5	15.2	Y0372	
FO-CPUE	21	LKTR	873	GN	1	585	1926	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	874	GN	4	555	1852	1.08	N/A	N/A	N/A	N/A			RM	AD	413		N/A	N/A	Y0413	
FO-CPUE	21	LKTR	875	GN	4	547	1502	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	876	GN	4	565	1765	0.98	N/A	N/A	N/A	N/A			RM	AD	198		N/A	N/A	Y0198	
FO-CPUE	21	LKTR	877	GN	4	540	1768	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	878	GN	4	525	1275	0.88	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	879	GN	4	530	1583	1.06	N/A	N/A	N/A	OT/FR/SC	21	OT	NM				N/A	N/A	GOLDER 0749	
FO-CPUE	21	LKTR	880	GN	4	530	1663	1.12	M	MA	GR	FR/SC			NM				14.2	51.7		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	21	LKTR	881	GN	4	531	1784	1.19	F	MA	RI	FR/SC			NM				27.9	220.3		
FO-CPUE	21	LKTR	882	GN	4	550	1789	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	21	LKTR	883	GN	4	526	1542	1.06	M	MA	GR	FR/SC			NM				18	40.5		
FO-CPUE	22	LKTR	884	GN	3	565	1970	1.09	N/A	N/A	N/A	N/A			RM	AD	477		N/A	N/A	Y0477	
FO-CPUE	22	LKTR	885	GN	3	525	1616	1.12	M	MA	GR	FR/SC			NM				6.3	56.6		
FO-CPUE	22	LKTR	886	GN	3	552	1972	1.17	F	MA	RI	N/A			NM			ST	N/A	N/A		
FO-CPUE	22	LKTR	887	GN	3	544	1564	0.97	N/A	N/A	N/A	N/A			RM	AD	?		N/A	N/A	lost tag	
FO-CPUE	22	LKTR	888	GN	3	555	1673	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	889	GN	3	585	1867	0.93	N/A	N/A	N/A	N/A			RM	AD	416		N/A	N/A	Y0416	
FO-CPUE	22	LKTR	890	GN	3	566	1922	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	891	GN	3	555	1677	0.98	N/A	N/A	N/A	N/A			RM	AD	247		N/A	N/A	Y0247	
FO-CPUE	22	LKTR	892	GN	3	550	1310	0.79	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	893	GN	2	590	2365	1.15	N/A	N/A	N/A	N/A			RM	AD	194		N/A	N/A	Y0194	
FO-CPUE	22	LKTR	894	GN	2	600	2102	0.97	N/A	N/A	N/A	OT/FR/SC	16	FR	NM				N/A	N/A	RLL 2542	
FO-CPUE	22	LKTR	895	GN	2	550	1711	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	896	GN	2	520	1491	1.06	F	MA	RI	N/A			RM	AD	20	ST	6.5	133	Y0020	
FO-CPUE	22	LKTR	897	GN	2	568	1866	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	898	GN	2	591	1851	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	899	GN	4	546	1527	0.94	N/A	N/A	N/A	N/A			RM	AD	320		N/A	N/A	Y0320	
FO-CPUE	22	LKTR	900	GN	4	530	1531	1.03	M	MA	GR	FR/SC			NM				9.2	45.6		
FO-CPUE	22	LKTR	901	GN	4	535	1432	0.94	M	MA	GR	FR/SC			RM	AD	37		7.2	52.2	Y0037	
FO-CPUE	22	LKTR	902	GN	4	548	1689	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	903	GN	4	575	1852	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	904	GN	4	570	1928	1.04	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	905	GN	4	547	1808	1.10	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	22	LKTR	906	GN	4	542	1541	0.97	N/A	N/A	N/A	OT/FR/SC	13	FR	NM				N/A	N/A	RLL 2503	
FO-CPUE	23	LKTR	907	GN	2	552	1544	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	23	LKTR	908	GN	2	286	234	1.00	F	IM	UD	OT/FR/SC	7	OT	NM				2.8	0.1		
FO-CPUE	23	LKTR	909	GN	2	542	1606	1.01	M	MA	GR	N/A			RM	AD	500		N/A	N/A	Y0500	
FO-CPUE	23	LKTR	910	GN	2	534	1247	0.82	M	MA	GR	FR/SC			NM				7.3	18.4		
FO-CPUE	23	LKTR	911	GN	2	518	1482	1.07	F	SD	UN	FR/SC			NM				15.4	19.5		
FO-CPUE	23	LKTR	912	GN	2	547	1441	0.88	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	23	LKTR	913	GN	3	575	1866	0.98	F	MA	GR	N/A			NM			ST	N/A	N/A		
FO-CPUE	23	LKTR	914	GN	3	510	1557	1.17	F	SD	UN	OT/FR/SC	21	OT	NM			ST	14.9	26.3	GOLDER 0964	
FO-CPUE	23	LKTR	915	GN	3	535	1722	1.12	M	MA	GR	FR/SC			NM				12	63.5		
FO-CPUE	23	LKTR	916	GN	3	558	1879	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	23	LKTR	917	GN	3	478	1266	1.16	F	MA	GR	FR/SC	9	FR	NM				21.5	83		
FO-CPUE	23	LKTR	918	GN	3	593	1655	0.79	N/A	N/A	N/A	N/A			RM	AD	36		N/A	N/A	Y0036	
FO-CPUE	23	LKTR	919	GN	4	605	2136	0.96	N/A	N/A	N/A	N/A			RM	AD	488		N/A	N/A	Y0488	
FO-CPUE	23	LKTR	920	GN	4	561	1837	1.04	N/A	N/A	N/A	N/A			RM	AD	18		N/A	N/A	Y0018	
FO-CPUE	23	LKTR	921	GN	4	616	1953	0.84	N/A	N/A	N/A	N/A			RM	AD	368		N/A	N/A	Y0368	
FO-CPUE	23	LKTR	922	GN	4	519	1572	1.12	F	MA	GR	FR/SC			RM	AD	213		20.8	92.7	Y0213	
FO-CPUE	23	LKTR	923	GN	4	560	1717	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	23	LKTR	924	GN	4	538	1668	1.07	F	MA	GR	FR/SC			NM				28.5	124.4		
FO-CPUE	23	LKTR	925	GN	4	607	2057	0.92	F	SD	UN	N/A			NM			ST	N/A	N/A		
FO-CPUE	23	LKTR	926	GN	4	540	1683	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	927	GN	1	560	1779	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	928	GN	4	565	1558	0.86	N/A	N/A	N/A	N/A			RM	AD	240		N/A	N/A	Y0240	
FO-CPUE	24	LKTR	929	GN	4	611	2081	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	930	GN	4	557	1544	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	931	GN	4	595	1974	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	932	GN	4	540	1703	1.08	N/A	N/A	N/A	OT/FR/SC	17	FR	NM				N/A	N/A	RLL 2561	
FO-CPUE	24	LKTR	933	GN	1.5	613	2079	0.90	N/A	N/A	N/A	N/A			RM	AD	31		N/A	N/A	Y0031	
FO-CPUE	24	LKTR	934	GN	1.5	525	1545	1.07	M	MA	GR	FR/SC			NM				9.5	44.8		
FO-CPUE	24	LKTR	935	GN	1.5	604	1880	0.85	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	936	GN	3	592	1935	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	937	GN	3	594	2158	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	938	GN	3	546	1771	1.09	N/A	N/A	N/A	N/A			RM	AD	56		N/A	N/A	Y0056	
FO-CPUE	24	LKTR	939	GN	3	595	2221	1.05	N/A	N/A	N/A	N/A			RM	AD	160		N/A	N/A	Y0160	
FO-CPUE	24	LKTR	940	GN	3	591	1850	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	941	GN	3	604	2017	0.92	F	MA	RI	N/A			NM			ST	N/A	N/A		
FO-CPUE	24	LKTR	942	GN	3	571	1337	0.72	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	943	GN	2	595	2244	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	24	LKTR	944	GN	2	544	1785	1.11	N/A	N/A	N/A	N/A			NM				N/A	N/A		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	26	LKTR	945	GN	3	566	1307	0.72	N/A	N/A	N/A	N/A			RM	AD	293		N/A	N/A	Y0293	
FO-CPUE	26	LKTR	946	GN	3	455	1059	1.12	F	SD	UN	FR/SC	8	FR	NM				7.6	10.7		
FO-CPUE	26	LKTR	947	GN	2	491	1196	1.01	M	MA	GR	FR/SC	9	FR	NM				10.2	38.5		
FO-CPUE	26	LKTR	948	GN	4	544	1489	0.92	F	SD	UN	OT/FR/SC	12	FR	NM	PV			10.1	20.6	RLL 2157	
FO-CPUE	26	LKTR	949	GN	4	556	2085	1.21	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	26	LKTR	950	GN	4	604	1818	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	26	LKTR	951	GN	4	515	1041	0.76	M	SD	UD	FR/SC			NM				5	N/A		
FO-CPUE	26	LKTR	952	GN	4	530	1609	1.08	F	MA	RI	OT/FR/SC	9	FR	RM	AD	166		16.9	108.9	Y0166	
FO-CPUE	26	LKTR	953	GN	1.5	540	1885	1.20	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	26	LKTR	954	GN	1.5	585	1989	0.99	N/A	N/A	N/A	N/A			RM	AD	170		N/A	N/A	Y0170	
FO-CPUE	28	LKTR	955	GN	3	608	2357	1.05	F	MA	RI	N/A			RM	AD	154	ST	N/A	N/A	Y0154	
FO-CPUE	28	LKTR	956	GN	3	490	1254	1.07	F	SD	UN	OT/FR/SC	9	FR	NM				12.7	22.3		
FO-CPUE	28	LKTR	957	GN	3	540	1244	0.79	M	MA	GR	N/A			NM				10.5	26.1	RLL 2583	
FO-CPUE	28	LKTR	958	GN	2	545	1355	0.84	N/A	N/A	N/A	N/A			RM	AD	431		N/A	N/A	Y0431	
FO-CPUE	28	LKTR	959	GN	2	525	1726	1.19	F	SD	UN	FR/SC			RM	AD	371		9.4	6.3	Y0371	
FO-CPUE	28	LKTR	960	GN	2	550	1287	0.77	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	28	LKTR	961	GN	2	500	1562	1.25	F	SD	UN	FR/SC			NM				11.6	13.8		
FO-CPUE	28	LKTR	962	GN	2	512	1577	1.17	N/A	N/A	N/A	FR/SC			NM				13.1	53.2		
FO-CPUE	28	LKTR	963	GN	1.5	216	116	1.15	M	IM	UD	OT/FR/SC	6	OT	NM				0.7	N/A		
FO-CPUE	28	LKTR	964	GN	1.5	182	66	1.09	U	IM	UD	OT/FR/SC	3	FR	NM				N/A	N/A		
FO-CPUE	28	LKTR	965	GN	4	559	1541	0.88	N/A	N/A	N/A	N/A			RM	AD	439		N/A	N/A	Y0439	
FO-CPUE	25	LKTR	966	GN	4	534	1752	1.15	M	MA	GR	FR/SC			NM				12.1	61.6		
FO-CPUE	25	LKTR	967	GN	3	543	1572	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	25	LKTR	968	GN	3	521	1231	0.87	M	MA	GR	OT/FR/SC			RM	PV	131		8.1	21.4	Y0131	GOLDER 0738
FO-CPUE	25	LKTR	969	GN	3	472	1125	1.07	M	IM	UD	OT/FR/SC	10	OT	NM				7	0.5		
FO-CPUE	27	LKTR	970	GN	4	585	1603	0.80	N/A	N/A	N/A	N/A			RM	AD	228		N/A	N/A	Y0228	
FO-CPUE	27	LKTR	971	GN	4	509	1447	1.10	F	MA	RI	FR/SC	11	FR	NM				27.9	98.1		
FO-CPUE	27	LKTR	972	GN	2	355	503	1.12	F	IM	UD	OT/FR/SC	8	OT	NM				3.5	0.7		
FO-CPUE	27	LKTR	973	GN	1.5	184	61	0.98	F	IM	UD	OT/FR/SC	3	FR	NM				0.7	N/A		
FO-CPUE	33	LKTR	974	GN	3	578	1897	0.98	N/A	N/A	N/A	N/A			RM	AD	124		N/A	N/A	Y0124	
FO-CPUE	33	LKTR	975	GN	3	530	1717	1.15	M	MA	GR	FR/SC			NM				12.7	47.5		
FO-CPUE	33	LKTR	976	GN	3	591	1717	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	33	LKTR	977	GN	3	541	1788	1.13	N/A	N/A	N/A	N/A			RM	AD	?		N/A	N/A	Y0241	
FO-CPUE	33	LKTR	978	GN	4	536	1408	0.91	M	SD	UD	FR/SC			RM	AD	309		5.9	14.7	Y0309	
FO-CPUE	33	LKTR	979	GN	4	527	1623	1.11	M	MA	GR	FR/SC			NM			ST	14.7	61.2		
FO-CPUE	33	LKTR	980	GN	4	517	2345	1.70	F	MA	RI	N/A			RM	AD	2	ST	N/A	N/A	Y0002	
FO-CPUE	33	LKTR	981	GN	4	540	1839	1.17	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	33	LKTR	982	GN	4	570	1995	1.08	N/A	N/A	N/A	N/A			RM	AD	269		N/A	N/A	Y0269	
FO-CPUE	33	LKTR	983	GN	4	555	1782	1.04	F	MA	RI	OT/FR/SC			NM				23.5	161.9	RLL 2109	
FO-CPUE	33	LKTR	984	GN	4	583	1913	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	33	LKTR	985	GN	2	556	1923	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	33	LKTR	986	GN	2	546	1570	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	33	LKTR	987	GN	2	548	1466	0.89	N/A	N/A	N/A	N/A			RM	AD	451		N/A	N/A	Y0451	
FO-CPUE	33	LKTR	988	GN	2	509	1420	1.08	M	MA	GR	FR/SC			NM				9.5	46.1		
FO-CPUE	35	LKTR	989	GN	1	140	28.4	1.03	U	IM	UD	OT/FR/SC	3	OT	NM				N/A	N/A		
FO-CPUE	35	LKTR	990	GN	4	510	1470	1.11	M	MA	GR	FR/SC	16	FR	RM	AD	287		12.4	67.6	Y0287	
FO-CPUE	35	LKTR	991	GN	4	390	631	1.06	M	IM	GR	FR/SC	5	FR	NM				4.4	0.2		
FO-CPUE	35	LKTR	992	GN	4	525	1526	1.05	M	MA	GR	FR/SC			NM				9.7	35.3		
FO-CPUE	35	LKTR	993	GN	4	514	1476	1.09	M	MA	GR	N/A			NM				13.9	38.6		
FO-CPUE	35	LKTR	994	GN	4	592	2031	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	35	LKTR	995	GN	4	505	1485	1.15	M	MA	GR	OT/FR/SC	13	FR	NM				7.5	44.5		
FO-CPUE	35	LKTR	996	GN	1.5	606	2019	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	35	LKTR	997	GN	1.5	575	1789	0.94	M	MA	GR	N/A			RM	AD	291	ST	N/A	N/A	Y0291	
FO-CPUE	35	LKTR	998	GN	1.5	522	1548	1.09	M	MA	GR	FR/SC			RM	AD	128		11.3	37.7	Y0128	
FO-CPUE	35	LKTR	999	GN	3	565	1587	0.88	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	35	LKTR	1000	GN	3	541	1415	0.89	M	MA	GR	OT/FR/SC	39	OT	NM			ST	8.5	22.5	RLL 2136	
FO-CPUE	35	LKTR	1001	GN	3	575	1739	0.91	F	MA	RI	OT/FR/SC			NM				29.1	133.1	RLL 2127	
FO-CPUE	35	LKTR	1002	GN	3	582	1639	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	35	LKTR	1003	GN	3	530	1352	0.91	F	SD	UN	FR/SC			NM				8.3	27.2		
FO-CPUE	35	LKTR	1004	GN	3	547	1672	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	35	LKTR	1005	GN	2	561	1766	1.00	N/A	N/A	N/A	N/A			RM	AD	445		N/A	N/A	Y0445	
FO-CPUE	35	LKTR	1006	GN	2	545	1558	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	35	LKTR	1007	GN	2	546	1410	0.87	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	34	LKTR	1008	GN	4	560	1625	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	34	LKTR	1009	GN	4	564	1853	1.03	N/A	N/A	N/A	OT/FR/SC			NM				N/A	N/A	RLL 2536	
FO-CPUE	34	LKTR	1010	GN	4	532	1581	1.05	M	SD	UD	FR/SC			RM	AD	181		16.1	52	Y0181	
FO-CPUE	34	LKTR	1011	GN	4	550	1658	1.00	N/A	N/A	N/A	N/A			RM	AD	38		N/A	N/A	Y0038	
FO-CPUE	34	LKTR	1012	GN	4	545	1631	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	34	LKTR	1013	GN	3	565	1541	0.85	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	34	LKTR	1014	GN	1.5	515	1174	0.86	M	MA	GR	FR/SC			NM				10.6	47.1		
FO-CPUE	32	LKTR	1015	GN	3	500	1280	1.02	M	MA	GR	OT/FR/SC	15	FR	NM				9.7	29.8		
FO-CPUE	32	LKTR	1016	GN	4	556	1648	0.96	N/A	N/A	N/A	N/A			RM	AD	242		N/A	N/A	Y0242	
FO-CPUE	32	LKTR	1017	GN	4	497	1295	1.05	M	MA	GR	OT/FR/SC	18	OT	NM				8.2	36.5		
FO-CPUE	37	LKTR	1018	GN	4	557	1750	1.01	N/A	N/A	N/A	N/A			RM	AD	295		N/A	N/A	Y0295	
FO-CPUE	37	LKTR	1019	GN	3	511	1435	1.08	F	SD	UN	OT/FR/SC	12	FR	NM				9	18.5		
FO-CPUE	37	LKTR	1020	GN	3	581	1690	0.86	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	37	LKTR	1021	GN	3	575	1720	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	38	LKTR	1022	GN	4	526	1618	1.11	F	MA	GR	FR/SC			RM	AD	144		24.5	128.2	Y0144	
FO-CPUE	38	LKTR	1023	GN	4	491	1361	1.15	M	MA	GR	FR/SC	9	FR	NM				13.5	42.6		
FO-CPUE	39	LKTR	1024	GN	4	538	1691	1.09	F	MA	GR	FR/SC			NM				27.5	162.7		
FO-CPUE	39	LKTR	1025	GN	4	545	1535	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	39	LKTR	1026	GN	1.5	526	1400	0.96	F	SD	UN	FR/SC			NM				9	11		
FO-CPUE	36	LKTR	1027	GN	1.5	175	57.8	1.08	F	IM	UD	OT/FR/SC	3	FR	NM				2	N/A		
FO-CPUE	36	LKTR	1028	GN	2	589	1560	0.76	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	36	LKTR	1029	GN	3	571	1730	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	36	LKTR	1030	GN	4	570	1791	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A	LOST GOLDER TAG	
FO-CPUE	36	LKTR	1031	GN	4	600	1891	0.88	N/A	N/A	N/A	N/A			RM	AD	195		N/A	N/A	Y0195	
FO-CPUE	42	LKTR	1035	GN	4	559	1848	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	42	LKTR	1036	GN	1.5	544	1627	1.01	N/A	N/A	N/A	N/A			RM	AD	218		N/A	N/A	Y0218	
FO-CPUE	42	LKTR	1037	GN	1.5	546	1799	1.11	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	42	LKTR	1038	GN	1.5	168	53	1.12	U	IM	UD	OT/FR/SC	2	FR	NM				0.3	N/A		
FO-CPUE	42	LKTR	1039	GN	3	500	1053	0.84	M	MA	GR	OT/FR/SC			NM				6.9	8.6		
FO-CPUE	42	LKTR	1040	GN	3	502	1495	1.18	M	MA	GR	OT/FR/SC	10	FR	NM				17.4	46.5		
FO-CPUE	41	LKTR	1041	GN	2	565	1950	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	41	LKTR	1042	GN	3	584	1723	0.87	N/A	N/A	N/A	N/A			RM	AD	493		N/A	N/A	Y0493	
FO-CPUE	41	LKTR	1043	GN	3	521	1522	1.08	M	MA	GR	OT/FR/SC	13	FR	NM				12.2	47		
FO-CPUE	41	LKTR	1044	GN	3	521	1418	1.00	M	MA	GR	OT/FR/SC	15	FR	NM				9	34.2		
FO-CPUE	41	LKTR	1045	GN	3	530	1123	0.75	M	MA	GR	OT/FR/SC			NM				12.9	13.5	RLL 2161	
FO-CPUE	41	LKTR	1046	GN	4	585	1659	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	41	LKTR	1047	GN	4	479	1269	1.15	F	SD	UN	FR/SC	6	FR	RM	AD	28		10.5	3.7	Y0028	
FO-CPUE	41	LKTR	1048	GN	4	611	2327	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	41	LKTR	1049	GN	4	562	1903	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	40	LKTR	1050	GN	3	505	1443	1.12	F	MA	GR	OT/FR/SC	14	FR	RM	AD	214		18.9	164.1	Y0215	
FO-CPUE	40	LKTR	1051	GN	3	510	1324	1.00	M	MA	GR	OT/FR/SC			RM	AD	200		9	38.9	Y0200	
FO-CPUE	40	LKTR	1052	GN	3	575	2059	1.08	N/A	N/A	N/A	N/A			RM	AD	15		N/A	N/A	Y0015	
FO-CPUE	40	LKTR	1053	GN	3	521	1483	1.05	M	MA	GR	FR/SC			RM	AD	25		11.6	41.3	Y0025	
FO-CPUE	40	LKTR	1054	GN	3	441	962	1.12	M	IM	UD	OT/FR/SC	8	OT	NM				9.1	0.7		
FO-CPUE	40	LKTR	1055	GN	3	475	1130	1.05	M	IM	UD	OT/FR/SC	10	OT	NM				12.9	0.9		
FO-CPUE	40	LKTR	1056	GN	3	544	1579	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	40	LKTR	1057	GN	3	421	740	0.99	F	IM	UD	OT/FR/SC	5	FR	NM				10.3	0.6		
FO-CPUE	40	LKTR	1058	GN	4	550	1330	0.80	N/A	N/A	N/A	N/A			RM	AD	485		N/A	N/A	Y0485	
FO-CPUE	40	LKTR	1059	GN	4	534	1737	1.14	F	MA	RI	FR/SC			NM				32.9	175.5		
FO-CPUE	40	LKTR	1060	GN	4	481	1195	1.07	M	IM	UD	OT/FR/SC	11	OT	NM				13.2	0.9		
FO-CPUE	40	LKTR	1061	GN	4	581	1758	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	46	LKTR	1062	GN	1.5	542	1524	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	46	LKTR	1063	GN	3	381	577	1.04	F	IM	UD	OT/FR/SC	3	FR	NM				7.5	0.9		
FO-CPUE	46	LKTR	1064	GN	3	538	1464	0.94	M	MA	GR	FR/SC	13	FR	NM			GO	8	59	gonads and OT for HS	
FO-CPUE	45	LKTR	1065	GN	3	563	1625	0.91	N/A	N/A	N/A	N/A			RM	AD	55		N/A	N/A	Y0055	
FO-CPUE	45	LKTR	1066	GN	3	462	1074	1.09	M	IM	UD	FR/SC	7	FR	NM				10.5	1.3		
FO-CPUE	45	LKTR	1067	GN	4	579	1583	0.82	F	MA	GR	FR/SC	9	FR	RM	AD	455	EG	24	158	Y0455	ovary and OT for HS
FO-CPUE	43	LKTR	1068	GN	2	593	2076	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	43	LKTR	1069	GN	4	552	1825	1.09	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	43	LKTR	1070	GN	4	548	1625	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	43	LKTR	1071	GN	4	540	1559	0.99	N/A	N/A	N/A	N/A			RM	AD	364		N/A	N/A	Y0364	
FO-CPUE	43	LKTR	1072	GN	4	580	1822	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	43	LKTR	1073	GN	4	530	1495	1.00	F	MA	GR	FR/SC			NM				29.9	140.8		
FO-CPUE	43	LKTR	1074	GN	3	579	1951	1.01	N/A	N/A	N/A	N/A			RM	AD	419		N/A	N/A	Y0419	
FO-CPUE	43	LKTR	1075	GN	3	534	1585	1.04	M	MA	GR	FR/SC			NM				17.6	40.5		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	43	LKTR	1076	GN	3	577	1869	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	43	LKTR	1077	GN	3	534	1595	1.05	F	SD	UN	FR/SC			RM	AD	460		14.9	17.7	Y0460	
FO-CPUE	44	LKTR	1078	GN	1	409	711	1.04	F	IM	UD	FR/SC	6	FR	NM				6.9	1		
FO-CPUE	44	LKTR	1079	GN	2	550	1467	0.88	M	MA	GR	N/A			RM	AD	278		9.6	40.1	Y0278	
FO-CPUE	44	LKTR	1080	GN	2	570	1850	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	44	LKTR	1081	GN	3	573	1930	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	44	LKTR	1082	GN	3	507	1527	1.17	F	MA	GR	FR/SC			NM				23.9	177.5		
FO-CPUE	44	LKTR	1083	GN	4	540	1530	0.97	F	MA	GR	N/A			RM	AD	178		16.8	140.6	Y0178	
FO-CPUE	44	LKTR	1084	GN	4	610	2028	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	44	LKTR	1085	GN	4	542	1810	1.14	M	MA	GR	N/A			NM				N/A	72.7		
FO-CPUE	44	LKTR	1086	GN	4	502	1387	1.10	M	MA	GR	FR/SC			NM				11.4	31.2		
FO-CPUE	44	LKTR	1087	GN	4	529	1667	1.13	F	MA	GR	FR/SC			NM				36	97.3		
FO-CPUE	44	LKTR	1088	GN	4	524	1424	0.99	M	MA	GR	FR/SC			NM				8.5	30.3		
FO-CPUE	50	LKTR	1089	GN	4	583	1929	0.97	N/A	N/A	N/A	N/A			RM	AD	51		N/A	N/A	Y0051	
FO-CPUE	50	LKTR	1090	GN	3	664	2740	0.94	F	SD	UN	FR/SC	28	OT	RM	AD	429		21	47.1	Y0429	
FO-CPUE	50	LKTR	1091	GN	3	584	1433	0.72	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	51	LKTR	1092	GN	4	546	1413	0.87	N/A	N/A	N/A	N/A			RM	AD	426		N/A	N/A	Y0426	
FO-CPUE	51	LKTR	1093	GN	4	525	1635	1.13	F	MA	GR	FR/SC			NM				28.5	186.8		
FO-CPUE	52	LKTR	1094	GN	4	581	1905	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	52	LKTR	1095	GN	4	612	2167	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	52	LKTR	1096	GN	4	602	2146	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	52	LKTR	1097	GN	3	563	1756	0.98	N/A	N/A	N/A	N/A			RM	AD	?		N/A	N/A	TAG LOST	
FO-CPUE	52	LKTR	1098	GN	3	535	1684	1.10	F	MA	RI	FR/SC			NM				27.9	119.7		
FO-CPUE	52	LKTR	1099	GN	3	495	1339	1.10	M	MA	GR	OT/FR/SC	10	OT	NM				13.1	37		
FO-CPUE	52	LKTR	1100	GN	1.5	638	2572	0.99	N/A	N/A	N/A	N/A			RM	AD	317		N/A	N/A	Y0317	
FO-CPUE	52	LKTR	1101	GN	2	341	440	1.11	M	IM	UD	FR/SC	4	FR	NM				3	0.2		
FO-CPUE	49	LKTR	1102	GN	1.5	194	73	1.00	M	IM	UD	OT/FR/SC	3	FR	NM				0.6	N/A		
FO-CPUE	49	LKTR	1103	GN	3	456	995	1.05	F	SD	UN	FR/SC	8	FR	NM				9.8	6.3		
FO-CPUE	49	LKTR	1104	GN	2	566	1546	0.85	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	49	LKTR	1105	GN	4	541	1623	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	49	LKTR	1106	GN	4	590	1995	0.97	N/A	N/A	N/A	N/A			RM	AD	148		N/A	N/A	Y0148	
FO-CPUE	49	LKTR	1107	GN	4	594	2081	0.99	N/A	N/A	N/A	N/A			RM	AD	282		N/A	N/A	Y0282	
FO-CPUE	49	LKTR	1108	GN	4	563	1786	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	49	LKTR	1109	GN	4	555	1495	0.87	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	48	LKTR	1110	GN	4	523	1603	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	48	LKTR	1111	GN	4	598	2006	0.94	F	SD	UN	OT/FR/SC	37	OT	NM				10.5	18.3	RLL 2584	PELVIC
FO-CPUE	48	LKTR	1112	GN	1.5	580	1529	0.78	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	48	LKTR	1113	GN	1.5	195	90	1.21	F	IM	UD	OT/FR/SC			NM				1.1	N/A		
FO-CPUE	48	LKTR	1114	GN	2	550	1755	1.05	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	48	LKTR	1115	GN	2	392	623	1.03	F	IM	UD	OT/FR/SC	7	OT	NM				5.3	0.6		PELVIC
FO-CPUE	48	LKTR	1116	GN	3	603	2262	1.03	F	SD	UN	OT/FR/SC			NM				17.3	24.3	RLL 2206	PELVIC
FO-CPUE	48	LKTR	1117	GN	3	559	1220	0.70	N/A	N/A	N/A	N/A			RM	AD	410		N/A	N/A	Y0410	
FO-CPUE	48	LKTR	1118	GN	3	550	1545	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	47	LKTR	1119	GN	4	582	1984	1.01	N/A	N/A	N/A	OT/FR/SC			NM				N/A	N/A		RLL 2107
FO-CPUE	47	LKTR	1120	GN	4	566	1839	1.01	N/A	N/A	N/A	OT/FR/SC			NM				N/A	N/A		RLL 2531
FO-CPUE	54	LKTR	1121	GN	2	537	1454	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	54	LKTR	1122	GN	2	560	1975	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	54	LKTR	1123	GN	2	515	1531	1.12	M	MA	GR	FR/SC			RM	AD	424		12.3	35.4	Y0424	
FO-CPUE	54	LKTR	1124	GN	4	570	1168	0.63	M	SD	UD	OT/FR/SC	45	OT	NM				10.7	1.5	GOLDER 0776	PELVIC
FO-CPUE	54	LKTR	1125	GN	1.5	530	1370	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	54	LKTR	1126	GN	3	545	1649	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	53	LKTR	1127	GN	4	608	2501	1.11	N/A	N/A	N/A	N/A			RM	AD	438		N/A	N/A		Y0438
FO-CPUE	53	LKTR	1128	GN	4	610	1841	0.81	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	53	LKTR	1129	GN	4	540	1769	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	53	LKTR	1130	GN	3	614	1938	0.84	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	53	LKTR	1131	GN	3	560	1702	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	53	LKTR	1132	GN	3	614	1607	0.69	N/A	N/A	N/A	N/A			RM	AD	249		N/A	N/A		Y0249
FO-CPUE	53	LKTR	1133	GN	3	565	2021	1.12	N/A	N/A	N/A	N/A			RM	AD	199		N/A	N/A	Y0199; old tag from Golder clipped off	PELVIC
FO-CPUE	53	LKTR	1134	GN	3	481	1209	1.09	M	MA	GR	OT/FR/SC	7	FR	NM				14.4	25.9		
FO-CPUE	55	LKTR	1135	GN	4	547	1480	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	55	LKTR	1136	GN	4	515	1245	0.91	M	MA	GR	OT/FR/SC	26	OT	NM				8.3	37	PELVIC	
FO-CPUE	55	LKTR	1137	GN	4	559	1861	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	55	LKTR	1138	GN	4	561	1641	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	55	LKTR	1139	GN	4	549	1777	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	55	LKTR	1140	GN	4	560	1698	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	55	LKTR	1141	GN	4	579	2123	1.09	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	55	LKTR	1142	GN	3	584	1758	0.88	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	55	LKTR	1143	GN	3	419	816	1.11	F	IM	UD	OT/FR/SC	7	OT	RM	AD	212		8.6	1.7	Y0212	PELVIC
FO-CPUE	55	LKTR	1144	GN	3	388	611	1.05	F	IM	UD	OT/FR/SC			NM				6.8	1.6		
FO-CPUE	55	LKTR	1145	GN	2	559	1800	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A	RLL 2191	
FO-CPUE	55	LKTR	1146	GN	2	244	134	0.92	F	IM	UD	OT/FR/SC	5	OT	NM				1.8	N/A		
FO-CPUE	55	NSST	1147	GN	0.5	59	1.5	0.73	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	46	LKTR	1148	GN	3	640	1937	0.74	F	SD	UN	OT/FR/SC			NM				11.3	21	PELVIC	
FO-CPUE	46	NSST	1149	GN	0.5	53	1.1	0.74	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	46	NSST	1150	GN	0.5	62	1.5	0.63	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	46	NSST	1151	GN	0.5	57	1.3	0.70	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	60	LKTR	1200	GN	4	619	2137	0.90	N/A	N/A	N/A	FR/SC	44	OT	NM	PV			N/A	N/A	Golder tag 0965	
FO-CPUE	60	LKTR	1201	GN	4	564	1631	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	60	LKTR	1202	GN	4	530	1550	1.04	F	MA	RI	FR/SC			NM			EG	20.1	157.9	sampled for HS	
FO-CPUE	60	LKTR	1203	GN	4	523	1579	1.10	M	MA	GR	FR/SC			NM			GO	10.9	47.9	sampled for HS	
FO-CPUE	60	LKTR	1204	GN	3	594	1625	0.78	N/A	N/A	N/A	N/A			RM	AD	8		N/A	N/A	Y0008	
FO-CPUE	60	LKTR	1205	GN	3	553	1833	1.08	F	N/A	N/A	N/A			RM	AD	281		N/A	N/A	Y0281	
FO-CPUE	60	LKTR	1206	GN	3	540	1357	0.86	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	60	LKTR	1207	GN	3	535	1712	1.12	M	MA	GR	FR/SC			NM			GO	17.5	53.2	sampled for HS	
FO-CPUE	60	LKTR	1208	GN	3	552	1600	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	60	LKTR	1209	GN	3	541	1514	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	60	LKTR	1210	GN	3	448	910	1.01	M	IM	UD	FR/SC	9	FR	NM				9.4	0.5		
FO-CPUE	58	LKTR	1211	GN	4	555	1666	0.97	N/A	N/A	N/A	N/A			RM	AD	304		N/A	N/A	Y0304, RLL 2158	
FO-CPUE	58	LKTR	1212	GN	4	570	1478	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	58	LKTR	1213	GN	4	555	1498	0.88	N/A	N/A	N/A	OT/FR/SC	36	OT	NM	PV			N/A	N/A	GOLDER 0778	
FO-CPUE	58	LKTR	1214	GN	4	567	1447	0.79	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	58	LKTR	1215	GN	2	569	1729	0.94	M	MA	GR	N/A			RM	AD	446		N/A	N/A	Y0446	
FO-CPUE	58	LKTR	1216	GN	2	618	2444	1.04	N/A	N/A	N/A	N/A			RM	AD	373		N/A	N/A	Y0373	
FO-CPUE	58	LKTR	1217	GN	3	592	2043	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	58	LKTR	1218	GN	3	598	2029	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	62	LKTR	1219	GN	2	252	176	1.10	M	IM	UD	OT/FR/SC	3	FR	NM	PV			2.3	0.2	no previous tag but fin clipped	
FO-CPUE	57	LKTR	1220	GN	4	532	1637	1.09	F	MA	GR	N/A			NM				N/A	130.3		
FO-CPUE	57	LKTR	1221	GN	4	567	1611	0.88	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	56	LKTR	1222	GN	2	251	167	1.06	F	IM	UD	OT/FR/SC	4	FR	NM				1.5	0.3		
FO-CPUE	56	LKTR	1223	GN	3	633	2364	0.93	M	MA	GR	OT/FR/SC	31	OT	NM				23.2	21.1		
FO-CPUE	56	LKTR	1224	GN	4	559	1799	1.03	N/A	N/A	N/A	N/A			RM	AD	480		N/A	N/A	Y0480	
FO-CPUE	56	LKTR	1225	GN	4	552	1545	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	56	LKTR	1226	GN	4	541	1606	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	66	LKTR	1227	GN	4	555	1762	1.03	N/A	N/A	N/A	N/A			RM	AD	49		N/A	N/A	Y0049	
FO-CPUE	66	LKTR	1228	GN	4	575	1925	1.01	N/A	N/A	N/A	N/A			RM	AD	216		N/A	N/A	Y0216	
FO-CPUE	61	LKTR	1229	GN	2	530	1574	1.06	M	MA	GR	FR/SC			RM	AD	217		11	56.9	Y0217	
FO-CPUE	61	LKTR	1230	GN	2	568	1785	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	61	LKTR	1231	GN	2	623	1985	0.82	F	SD	UN	FR/SC	14	FR	RM	AD	76		N/A	N/A	Y0076	
FO-CPUE	61	LKTR	1232	GN	4	543	1621	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	61	LKTR	1233	GN	4	547	1659	1.01	F	MA	RI	N/A			NM				N/A	130.7		
FO-CPUE	61	LKTR	1234	GN	4	567	1716	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	61	LKTR	1235	GN	3	541	1455	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	63	LKTR	1236	GN	3	554	1763	1.04	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	64	LKTR	1237	GN	1.5	205	92	1.07	M	IM	UD	FR/SC	4	FR	NM				0.6	0.1		
FO-CPUE	64	LKTR	1238	GN	3	578	2147	1.11	M	MA	GR	N/A			NM				N/A	52.9		
FO-CPUE	64	LKTR	1239	GN	3	592	1680	0.81	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	64	LKTR	1240	GN	3	588	1921	0.94	F	MA	GR	N/A			NM			EG	N/A	215.1	GOLDER 4040	sampled for HS
FO-CPUE	64	LKTR	1241	GN	3	550	1603	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A	RLL 2187	
FO-CPUE	64	LKTR	1242	GN	4	594	2092	1.00	F	MA	RI	N/A			RM	AD	449	EG	N/A	186.3	sampled for HS	
FO-CPUE	64	LKTR	1243	GN	4	544	1559	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	64	LKTR	1244	GN	4	538	1658	1.06	F	MA	RI	FR/SC	18	FR	NM			EG	N/A	20.9	sampled for HS	
FO-CPUE	64	LKTR	1245	GN	4	560	1876	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	64	LKTR	1246	GN	4	568	1832	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	64	LKTR	1247	GN	4	511	1561	1.17	F	MA	GR	FR/SC			NM				N/A	126.4		
FO-CPUE	65	LKTR	1248	GN	4	564	1849	1.03	N/A	N/A	N/A	N/A			RM	AD	357		N/A	N/A		
FO-CPUE	75	LKTR	1249	GN	3	587	1673	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	75	LKTR	1250	GN	3	581	1757	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	70	LKTR	1251	GN	2	546	1187	0.73	N/A	N/A	N/A	N/A			NM				N/A	N/A		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	70	LKTR	1252	GN	1.5	579	1774	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	70	LKTR	1253	GN	1.5	481	1180	1.06	M	MA	GR	OT/FR/SC	11	FR	RM	AD	465		N/A	N/A		
FO-CPUE	70	LKTR	1254	GN	1.5	166	47.9	1.05	F	IM	UD	OT/FR/SC	4	OT	NM				1	0.1	pelvic	
FO-CPUE	70	LKTR	1255	GN	4	556	1577	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	70	LKTR	1256	GN	4	617	2529	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	70	LKTR	1257	GN	4	594	2095	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	70	LKTR	1258	GN	4	559	1841	1.05	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	76	LKTR	1259	GN	4	561	1589	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	76	LKTR	1260	GN	2	531	1614	1.08	M	MA	GR	FR/SC			RM	AD	491		12.3	56.6	Y0491	
FO-CPUE	72	LKTR	1261	GN	3	521	1585	1.12	F	MA	GR	FR/SC			NM				28.1	125.8		
FO-CPUE	72	LKTR	1262	GN	3	542	1659	1.04	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	72	LKTR	1263	GN	4	573	1978	1.05	N/A	N/A	N/A	N/A			RM	AD	119		N/A	N/A	Y0119	
FO-CPUE	72	LKTR	1264	GN	4	569	1816	0.99	N/A	N/A	N/A	N/A			RM	AD	457		N/A	N/A	Y0457	
FO-CPUE	72	LKTR	1265	GN	4	586	1720	0.85	N/A	N/A	N/A	N/A			RM	AD	266		N/A	N/A	Y0266	
FO-CPUE	72	LKTR	1266	GN	4	573	1640	0.87	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	72	LKTR	1267	GN	4	531	1539	1.03	M	MA	GR	FR/SC			RM	AD	292		12	42.2	Y0292	
FO-CPUE	72	LKTR	1268	GN	4	578	1643	0.85	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	72	LKTR	1269	GN	4	421	810	1.09	M	IM	UD	FR/SC	6	FR	NM				10.4	0.6	liver cist	
FO-CPUE	74	LKTR	1270	GN	4	585	1967	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	74	LKTR	1271	GN	4	565	1691	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	73	LKTR	1272	GN	2	604	1850	0.84	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	73	LKTR	1273	GN	2	583	1986	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	73	LKTR	1274	GN	4	553	1519	0.90	N/A	N/A	N/A	N/A			RM	AD	403		N/A	N/A	Y0403	
FO-CPUE	73	LKTR	1275	GN	3	549	1748	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	73	LKTR	1276	GN	3	686	3104	0.96	F	SD	UN	OT/FR/SC	35	OT	RM	AD	296		42	39.1	Y0296	
FO-CPUE	69	LKTR	1277	GN	4	600	2342	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	69	LKTR	1278	GN	3	549	1705	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	68	LKTR	1279	GN	2	330	395	1.10	M	IM	UD	OT/FR/SC	7	OT	NM				5.9	0.3	pelvic fin	
FO-CPUE	68	LKTR	1280	GN	2	230	143	1.18	F	IM	UD	OT/FR/SC	7	OT	NM				1.3	0.2	pelvic fin	
FO-CPUE	71	LKTR	1281	GN	4	545	1484	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	71	LKTR	1282	GN	2	313	328	1.07	F	IM	UD	OT/FR/SC	6	OT	NM				3	0.5	pelvic fin	
FO-CPUE	71	LKTR	1283	GN	1.5	317	322	1.01	M	IM	UD	FR/SC	7	FR	NM				3.7	0.4		
FO-CPUE	81	LKTR	1284	GN	3	535	1688	1.10	N/A	N/A	N/A	N/A			RM	AD	153		N/A	N/A	Y0153	
FO-CPUE	81	LKTR	1285	GN	3	568	1887	1.03	N/A	N/A	N/A	N/A			RM	AD	52		N/A	N/A	Y0052	
FO-CPUE	81	LKTR	1286	GN	3	542	1691	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	81	LKTR	1287	GN	4	515	1391	1.02	M	MA	GR	FR/SC			RM	AD	253		8	33.6	Y0253	
FO-CPUE	81	LKTR	1288	GN	4	600	1965	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	81	LKTR	1289	GN	4	590	1495	0.73	N/A	N/A	N/A	N/A			NM				N/A	N/A	RLL 2167	
FO-CPUE	78	LKTR	1290	GN	1.5	188	66.5	1.00	M	IM	UD	FR/SC	3	FR	NM				0.5	N/A		
FO-CPUE	78	LKTR	1291	GN	4	602	2402	1.10	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	85	LKTR	1292	GN	1	432	1612	2.00	M	MA	GR	FR/SC	14	FR	RM	AD	13		9.7	50.4	Y0013	
FO-CPUE	85	LKTR	1293	GN	3	620	1630	0.68	F	SD	UN	OT/FR/SC	49	OT	RM	AD	423		17	28.3	GOLDER 0793	
FO-CPUE	85	LKTR	1294	GN	4	563	1715	0.96	N/A	N/A	N/A	N/A			RM	AD	497		N/A	N/A	Y0497	
FO-CPUE	85	LKTR	1295	GN	4	535	1468	0.96	M	MA	GR	FR/SC			NM				10.4	32.7		
FO-CPUE	85	LKTR	1296	GN	4	535	1014	0.66	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	80	LKTR	1297	GN	4	541	1775	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	80	LKTR	1298	GN	3	355	459	1.03	M	IM	UD	OT/FR/SC	6	FR	NM				4.4	N/A		
FO-CPUE	84	NSST	1299	GN	0.5	66	1.5	0.52	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	84	LKTR	1300	GN	1	368	556	1.12	F	IM	UD	FR/SC	7	FR	NM				6.1	0.4		
FO-CPUE	84	LKTR	1301	GN	4	575	1563	0.82	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	84	LKTR	1302.1	GN	3	574	1544	0.82	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	84	LKTR	1302.2	GN	1.5	258	175	1.02	F	IM	UD	OT/FR/SC	6	OT	NM				2.2	0.1	pelvic fin	
FO-CPUE	84	LKTR	1303	GN	1.5	280	267	1.22	M	IM	UD	OT/FR/SC	8	OT	NM				3.1	0.1	pelvic fin	
FO-CPUE	86	LKTR	1304	GN	4	577	1509	0.79	N/A	N/A	N/A	N/A			RM	AD	108		N/A	N/A	Y0108	
FO-CPUE	86	LKTR	1305	GN	4	566	1734	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	82	NSST	1306	GN	0.5	68	2	0.64	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	82	LKTR	1307	GN	4	563	1682	0.94	N/A	N/A	N/A	N/A			RM	AD	3		N/A	N/A	Y0003	
FO-CPUE	82	LKTR	1308	GN	2	573	1422	0.76	N/A	N/A	N/A	N/A			RM	AD	40		N/A	N/A	Y0040	
FO-CPUE	77	LKTR	1309	GN	4	520	1512	1.08	N/A	N/A	N/A	N/A			RM	AD	232		N/A	N/A	Y0232	
FO-CPUE	77	LKTR	1310	GN	4	591	1647	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	77	NSST	1311	GN	0.5	69	2.1	0.64	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	77	LKTR	1312	GN	2	240	154	1.11	M	IM	UD	OT/FR/SC	5	OT	NM				1.7	N/A	pelvic	
FO-CPUE	79	LKTR	1313	GN	3	606	1843	0.83	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	79	LKTR	1314	GN	3	539	1519	0.97	N/A	N/A	N/A	N/A			NM	PV			N/A	N/A	lost old tag with clipped fins	

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	79	LKTR	1315	GN	2	524	1648	1.15	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	79	LKTR	1316	GN	1.5	175	50	0.93	U	IM	UD	OT/FR/SC	3	FR	NM				0.5	N/A		
FO-CPUE	83	LKTR	1317	GN	3	391	685	1.15	F	IM	UD	FR/SC			NM				7.9	0.3		
FO-CPUE	118	NSST	1350	GN	N/A	56	1.3	0.74	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	NSST	1351	GN	N/A	69	N/A	N/A	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1352	GN	N/A	583	1927	0.97	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0082	
FO-CPUE	118	LKTR	1353	GN	N/A	530	1664	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1354	GN	N/A	521	1721	1.22	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1355	GN	N/A	560	1524	0.87	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1356	GN	N/A	575	1727	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1357	GN	N/A	578	2032	1.05	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1358	GN	N/A	532	1584	1.05	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0016	
FO-CPUE	118	LKTR	1359	GN	N/A	519	1551	1.11	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1360	GN	N/A	536	1600	1.04	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1361	GN	N/A	580	2019	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1362	GN	N/A	589	1907	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1363	GN	N/A	579	1938	1.00	N/A	N/A	N/A	N/A			RM	AD	260		N/A	N/A	Y-0260	
FO-CPUE	118	LKTR	1364	GN	N/A	529	1609	1.09	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0006	
FO-CPUE	118	LKTR	1365	GN	N/A	545	1808	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A	RL&L 2171	
FO-CPUE	118	LKTR	1366	GN	N/A	509	1470	1.11	M	MA	RI	FR/SC			NM				9.7	39		
FO-CPUE	118	LKTR	1367	GN	N/A	577	1849	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1368	GN	N/A	542	1808	1.14	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1369	GN	N/A	534	1645	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1370	GN	N/A	555	1837	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1371	GN	N/A	583	1932	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1372	GN	N/A	541	1763	1.11	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	118	LKTR	1373	GN	N/A	535	1634	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	123	LKTR	1374	GN	N/A	564	1773	0.99	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0468	
FO-CPUE	123	LKTR	1375	GN	N/A	555	1916	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	123	LKTR	1376	GN	N/A	315	333	1.07	F	IM	UD	FR/SC	4	FR	NM				4.4	0.7		
FO-CPUE	124	NSST	1390	GN	N/A	65	1.8	0.66	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	124	NSST	1391	GN	N/A	63	1.4	0.56	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	124	LKTR	1392	GN	N/A	581	1878	0.96	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0127	
FO-CPUE	124	LKTR	1393	GN	N/A	495	1458	1.20	M	MA	GR	FR/SC	13	FR	NM				13.1	39.7		TAIL IS DEFORMED
FO-CPUE	124	LKTR	1394	GN	N/A	559	2262	1.29	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	124	LKTR	1395	GN	N/A	204	101	1.19	F	IM	UD	FR/SC	3	FR	NM				1.7	0.1		
FO-CPUE	119	LKTR	1396	GN	N/A	536	1607	1.04	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	122	LKTR	1397	GN	N/A	553	1911	1.13	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	122	LKTR	1398	GN	N/A	570	1841	0.99	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0366	
FO-CPUE	122	LKTR	1399	GN	N/A	618	1956	0.83	F	SD	UN	OT/FR/SC			NM	PV			26.4	18.6	Y-0996 GOLDER YELLOW	
FO-CPUE	616	LKTR	1500	GN	N/A	575	497	0.26	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	627	LKTR	1501	GN	N/A	599	1698	0.79	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-CPUE	627	LKTR	1502	GN	N/A	368	529	1.06	M	IM	UD	FR/SC	5	FR	NM				6.9	0.2		
FO-CPUE	212	LKTR	1503	GN	N/A	179	59.7	1.04	F	IM	UD	OT/FR/SC	2	FR	NM				0.6	0.5	PV	
FO-CPUE	617	LKTR	1504	GN	N/A	393	666	1.10	F	IM	UD	FR/SC			NM				10.8	1.1		
FO-CPUE	624	LKTR	1505	GN	N/A	177	56.5	1.02	F	IM	UD	OT/FR/SC	6	OT	NM				0.8	0.5	PV	
FO-CPUE	625	LKTR	1506	GN	N/A	437	884	1.06	F	IM	UD	FR/SC	7	FR	NM				13.2	1.4		
FO-CPUE	622	LKTR	1507	GN	N/A	451	899	0.98	M	MA	RI	FR/SC	9	FR	RM				8.4	15.4	Y0264	
FO-CPUE	622	LKTR	1508	GN	N/A	390	655	1.10	M	IM	UD	FR/SC	6	FR	NM				7.5	0.2	stomach full of NSSB	
FO-CPUE	622	LKTR	1509	GN	N/A	368	654	1.31	F	IM	UD	FR/SC	6	FR	NM				9	1.1		
FO-CPUE	619	LKTR	1510	GN	N/A	595	1675	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A	RLL 2203	
FO-CPUE	626	LKTR	1511	GN	N/A	421	848	1.14	F	IM	UD	FR/SC	10	FR	NM				11.8	3.4		
FO-CPUE	626	LKTR	1512	GN	N/A	174	56.7	1.08	F	IM	UD	FR/SC	3	FR	NM				1	0	PV	
FO-CPUE	216	LKTR	1513	GN	N/A	168	50.3	1.06	M	IM	UD	OT/FR/SC	3	OT	NM				0.6	0	PV	
FO-CPUE	213	LKTR	1514	GN	N/A	166	56	1.22	M	IM	UD	OT/FR/SC	2	FR	NM				0.8	0	PV	
FO-CPUE	3	LKTR	5000	GN	3	555	1228	0.72	F	IM	UD	FR/SC			RM	AD	156		10	11		
FO-CPUE	3	LKTR	5001	GN	4	596	1996	0.94	F	IM	UD	FR/SC			NM				17	14		
FO-CPUE	1	LKTR	5003	GN	1	545	1747	1.08	M	MA	GR	FR/SC			NM				16	65		
FO-CPUE	1	LKTR	5004	GN	1.5	553	1880	1.11	F	MA	GR	FR/SC			NM				24	113		
FO-CPUE	1	LKTR	5005	GN	1.5	539	1383	0.88	M	MA	GR	FR/SC			NM				11	43		
FO-CPUE	1	LKTR	5006	GN	2	574	2030	1.07	M	MA	GR	FR/SC			NM				11	65		
FO-CPUE	1	LKTR	5007	GN	2	573	1450	0.77	F	IM	UD	FR/SC			RM	AD	44		11	15		
FO-CPUE	1	LKTR	5008	GN	2	558	1664	0.96	M	MA	GR	FR/SC			NM				20	32		
FO-CPUE	1	LKTR	5009	GN	2	535	1543	1.01	M	MA	GR	FR/SC			NM				13	49		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-CPUE	1	LKTR	5010	GN	2	378	644	1.19	M	MA	UD	FR/SC	5	FR	NM				5	0		
FO-CPUE	1	LKTR	5011	GN	2	533	1610	1.06	F	MA	GR	FR/SC			NM				20	84		
FO-CPUE	1	LKTR	5012	GN	2	659	1549	0.54	F	IM	UD	FR/SC			NM				13	22		
FO-CPUE	1	LKTR	5013	GN	2	550	1122	0.67	M	SD	UD	FR/SC			RM	AD	471		11	4		
FO-CPUE	1	LKTR	5014	GN	3	560	1674	0.95	F	IM	UD	FR/SC			RM	AD	110		13	31		
FO-CPUE	1	LKTR	5015	GN	3	540	1535	0.97	F	MA	GR	FR/SC			NM				18	71		
FO-CPUE	1	LKTR	5016	GN	3	580	1863	0.95	M	SD	UD	FR/SC			NM				18	3		
FO-CPUE	1	LKTR	5017	GN	3	510	1426	1.08	M	MA	GR	FR/SC			NM				12	44		
FO-CPUE	1	LKTR	5018	GN	3	525	1488	1.03	M	MA	GR	FR/SC			NM				12	54		
FO-CPUE	1	LKTR	5019	GN	3	545	1295	0.80	M	MA	GR	FR/SC			NM				14	28		
FO-CPUE	1	LKTR	5020	GN	4	575	1736	0.91	F	MA	GR	FR/SC			NM				24	92		
FO-CPUE	1	LKTR	5021	GN	4	615	2011	0.86	F	IM	UD	FR/SC			NM				14	18		
FO-CPUE	1	LKTR	5022	GN	4	554	1505	0.89	M	MA	GR	FR/SC			NM				8	66		
FO-CPUE	1	LKTR	5023	GN	4	553	1520	0.90	F	IM	UD	FR/SC			NM				13	9		
FO-CPUE	1	LKTR	5024	GN	4	516	1358	0.99	M	MA	GR	FR/SC			NM				10	24		
FO-CPUE	1	LKTR	5025	GN	4	612	1884	0.82	F	MA	GR	FR/SC			NM				32	138		
FO-CPUE	3	LKTR	5026	GN	1.5	570	1383	0.75	M	MA	GR	FR/SC			NM				7	52		
FO-CPUE	3	LKTR	5027	GN	2	556	861	0.50	M	MA	GR	FR/SC			RM	AD	241		8	10		
FO-CPUE	3	LKTR	5028	GN	2	550	1126	0.68	M	MA	GR	FR/SC			NM				8	43		
FO-CPUE	3	LKTR	5029	GN	2	609	1181	0.52	F	IM	UD	FR/SC			NM				10	18		
FO-CPUE	3	LKTR	5030	GN	3	565	894	0.50	M	MA	GR	FR/SC			RM	AD	363		6	24		
FO-CPUE	3	LKTR	5031	GN	3	577	1618	0.84	F	IM	UD	FR/SC			NM				17	20		
FO-CPUE	3	LKTR	5032	GN	3	510	1455	1.10	M	MA	GR	FR/SC			NM				8	40		
FO-CPUE	3	LKTR	5033	GN	3	576	1840	0.96	F	MA	GR	FR/SC			NM				23	151		
FO-CPUE	3	LKTR	5034	GN	3	572	1553	0.83	M	MA	GR	FR/SC			NM				12	35		
FO-CPUE	3	LKTR	5035	GN	3	574	1803	0.95	F	MA	GR	FR/SC			NM				28	206		
FO-CPUE	3	LKTR	5036	GN	4	575	1609	0.85	F	IM	UD	FR/SC			NM				15	27		
FO-CPUE	3	LKTR	5037	GN	4	541	1626	1.03	F	MA	GR	FR/SC			NM				23	75		
FO-CPUE	7	LKTR	5101	GN	3	556	1180	0.69	F	IM	UD	FR/SC			RM	AD	437		13.1	17.3		
FO-CPUE	7	LKTR	5102	GN	3	526	1685	1.16	M	MA	GR	FR/SC			NM				10	68.5		
FO-CPUE	7	LKTR	5103	GN	3	555	1637	0.96	M	MA	GR	FR/SC			NM				13.5	45.3		
FO-CPUE	7	LKTR	5104	GN	3	550	1171	0.70	M	IM	GR	FR/SC			NM				13.2	2.4		
FO-CPUE	7	LKTR	5105	GN	3	555	1690	0.99	F	IM	UD	FR/SC			NM				15.6	18.3		
FO-CPUE	7	LKTR	5106	GN	3	535	1510	0.99	F	MA	GR	FR/SC			NM				22	115.7		
FO-CPUE	7	LKTR	5107	GN	3	565	1466	0.81	M	MA	GR	FR/SC			NM				18.6	20		
FO-CPUE	7	LKTR	5108	GN	3	380	575	1.05	M	IM	UD	FR/SC	9	FR	NM				6	0.5		
FO-CPUE	7	LKTR	5109	GN	3	345	460	1.12	M	IM	UD	FR/SC	7	FR	NM				7	0.5		
FO-CPUE	7	LKTR	5110.1	GN	2	557	1619	0.94	M	MA	GR	FR/SC			NM				16.9	67		
FO-CPUE	7	LKTR	5110.2	GN	2	568	1660	0.91	M	MA	GR	FR/SC			NM				11.6	48		
FO-CPUE	7	LKTR	5111	GN	2	570	1956	1.06	F	MA	RI	FR/SC			NM				23	124		
FO-CPUE	7	LKTR	5112	GN	2	590	1554	0.76	F	IM	UD	FR/SC			NM				23	18		
FO-CPUE	7	LKTR	5113	GN	2	538	1563	1.00	F	IM	UD	FR/SC			NM				19	23		
FO-CPUE	7	LKTR	5114	GN	2	448	1260	1.40	M	MA	GR	FR/SC			NM				15	45		
FO-CPUE	7	LKTR	5115	GN	4	578	1695	0.88	M	SD	UD	FR/SC			NM				16	11.7		
FO-CPUE	7	LKTR	5116	GN	4	570	1550	0.84	F	SD	UN	FR/SC			NM				66	17		
FO-CPUE	7	LKTR	5117	GN	4	575	1905	1.00	F	MA	RI	FR/SC			NM				101	25		
FO-CPUE	7	LKTR	5118	GN	1	610	1733	0.76	F	IM	UD	FR/SC			NM				15.7	16		
FO-CPUE	7	LKTR	5119	GN	1.5	550	1481	0.89	F	IM	UD	FR/SC			NM				15	20		
FO-CPUE	7	LKTR	5120	GN	1.5	390	591	1.00	F	IM	UD	FR/SC	7	FR	NM				8.1	0.8		
FO-CPUE	7	LKTR	5121	GN	1.5	205	80	0.93	F	IM	UD	OT/FR/SC	5	OT	NM				1	0.8		
FO-FREM		LKTR	6001	GN	N/A	600	1720	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6002	GN	N/A	605	1487	0.67	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0952 GOLDER	
FO-FREM		LKTR	6003	GN	N/A	569	1128	0.61	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6004	GN	N/A	561	1793	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6005	GN	N/A	585	1855	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6006	GN	N/A	566	1680	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A	Y-2530 GOLDER	
FO-FREM		LKTR	6007	GN	N/A	510	1648	1.24	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6008	GN	N/A	595	1940	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A	Y-0174	
FO-FREM		LKTR	6009	GN	N/A	565	1744	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6010	GN	N/A	414	698	0.98	N/A	N/A	N/A	FR/SC	7	FR	NM				N/A	N/A		
FO-FREM		LKTR	6011	GN	N/A	395	754	1.22	N/A	N/A	N/A	FR/SC	6	FR	NM				N/A	N/A		
FO-FREM		LKTR	6012	GN	N/A	325	411	1.20	N/A	N/A	N/A	FR/SC	4	FR	NM				N/A	N/A		
FO-FREM		LKTR	6013	GN	N/A	304	298	1.06	N/A	N/A	N/A	FR/SC	4	FR	NM				N/A	N/A		
FO-FREM		LKTR	6014	GN	N/A	214	120	1.22	N/A	N/A	N/A	FR/SC	2	FR	NM				N/A	N/A		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-FREM		LKTR	6015	GN	N/A	192	95	1.34	N/A	N/A	N/A	FR/SC	2	FR	NM				N/A	N/A		
FO-FREM		LKTR	6016	GN	N/A	172	54	1.06	N/A	N/A	N/A	FR/SC	3	FR	NM				N/A	N/A		
FO-FREM		LKTR	6017	GN	N/A	188	67	1.01	N/A	N/A	N/A	FR/SC	2	FR	NM				N/A	N/A		
FO-FREM		LKTR	6018	GN	N/A	184	59	0.95	N/A	N/A	N/A	FR/SC	4	FR	NM				N/A	N/A		
FO-FREM		LKTR	6019	GN	N/A	592	2195	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6020	GN	N/A	620	2019	0.85	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6021	GN	N/A	246	156	1.05	U	IM	UD	FR/SC	3	FR	NM				1.8	0		
FO-FREM		LKTR	6022	GN	N/A	631	2931	1.17	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6023	GN	N/A	590	2305	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6024	GN	N/A	486	1517	1.32	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6025	GN	N/A	356	533	1.18	M	IM	UD	FR/SC	7	FR	NM				6.8	0.3		
FO-FREM		LKTR	6026	GN	N/A	208	101	1.12	U	IM	UD	FR/SC	3	FR	NM				0.1	0		LESS THAN .1
FO-FREM		LKTR	6027	GN	N/A	582	1997	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6028	GN	N/A	572	1383	0.74	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0747	
FO-FREM		LKTR	6029	GN	N/A	590	2043	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6030	GN	N/A	550	1774	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6031	GN	N/A	503	1551	1.22	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6032	GN	N/A	578	1787	0.93	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0368	
FO-FREM		LKTR	6033	GN	N/A	569	1708	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6034	GN	N/A	445	1041	1.18	F	IM	GR	FR/SC	8	FR	NM				13.5	3.6		
FO-FREM		LKTR	6035	GN	N/A	480	1221	1.10	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6036	GN	N/A	579	2353	1.21	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6037	GN	N/A	581	1818	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6038	GN	N/A	319	368	1.13	F	IM	UD	FR/SC			NM				4.2	0.3		
FO-FREM		LKTR	6039	GN	N/A	573	1702	0.90	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0425 GOLDER TAG LOST	
FO-FREM		LKTR	6040	GN	N/A	568	1653	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6041	GN	N/A	517	1502	1.09	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6042	GN	N/A	618	1856	0.79	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0123	
FO-FREM		LKTR	6043	GN	N/A	527	1546	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	6044	GN	N/A	400	736	1.15	F	IM	UD	FR/SC	6	FR	NM				8.7	1.5		
FO-FREM		LKTR	6045	GN	N/A	345	462	1.13	F	IM	UD	FR/SC	7	FR	RM				2.3	0.7	Y-0272	
FO-FREM		LKTR	7001	GN	N/A	580	1106	0.57	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0370	
FO-FREM		LKTR	7002	GN	N/A	520	1633	1.16	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0017	
FO-FREM		LKTR	7003	GN	N/A	532	1474	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	7004	GN	N/A	540	1820	1.16	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	7005	GN	N/A	540	1497	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	7006	GN	N/A	483	1116	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	7007	GN	N/A	176	55	1.01	U	IM	UD	N/A	2	FR	NM				N/A	N/A		
FO-FREM		LKTR	7008	GN	N/A	263	204	1.12	U	IM	UD	N/A	3	FR	NM				N/A	N/A		
FO-FREM		LKTR	8001	GN	N/A	602	2102	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	8002	GN	N/A	550	2120	1.27	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0152	
FO-FREM		LKTR	8003	GN	N/A	511	1618	1.21	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	8004	GN	N/A	561	2079	1.18	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0444	
FO-FREM		LKTR	8005	GN	N/A	497	1411	1.15	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	8006	GN	N/A	566	2110	1.16	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0129	
FO-FREM		LKTR	8007	GN	N/A	554	1880	1.11	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	8008	GN	N/A	470	1075	1.04	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0280	
FO-FREM		LKTR	8009	GN	N/A	428	857	1.09	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	8010	GN	N/A	450	1069	1.17	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	8011	GN	N/A	285	272	1.17	N/A	N/A	N/A	N/A	4	FR	NM				N/A	N/A		KEPT FOR OTILITHS
FO-FREM		LKTR	8012	GN	N/A	224	148	1.32	N/A	N/A	N/A	N/A			NM				N/A	N/A		KEPT FOR OTILITHS
FO-FREM		LKTR	9001	GN	N/A	482	1070	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	9002	GN	N/A	431	446	0.56	U	IM	UD	FR/SC	7	FR	NM				8.9	0.8		
FO-FREM		LKTR	9003	GN	N/A	597	1743	0.82	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	9004	GN	N/A	540	1762	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	9005	GN	N/A	546	1815	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	9006	GN	N/A	599	1988	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	9007	GN	N/A	615	2225	0.96	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0283	
FO-FREM		LKTR	9008	GN	N/A	560	1470	0.84	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0019	
FO-FREM		LKTR	9009	GN	N/A	570	1768	0.95	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0203	
FO-FREM		LKTR	9010	GN	N/A	608	2208	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A	RL&L 2425	
FO-FREM		LKTR	9011	GN	N/A	561	2054	1.16	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	9012	GN	N/A	393	722	1.19	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10001	GN	N/A	550	1846	1.11	N/A	N/A	N/A	N/A			NM				N/A	N/A		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-FREM		LKTR	10002	GN	N/A	485	1278	1.12	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10003	GN	N/A	361	628	1.33	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10004	GN	N/A	475	1216	1.13	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10005	GN	N/A	555	1780	1.04	N/A	N/A	N/A	OT/FR/SC	26	OT	NM	PV			N/A	N/A	Y-0975	
FO-FREM		LKTR	10006	GN	N/A	458	1162	1.21	F	IM	UD	FR/SC	8	FR	NM				9.9	7.3		
FO-FREM		LKTR	10007	GN	N/A	564	1728	0.96	N/A	N/A	N/A	OT/FR/SC	27	OT	NM	PV			N/A	N/A	Y-0753 GOLDER TAG	
FO-FREM		LKTR	10008	GN	N/A	545	1648	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10009	GN	N/A	396	691	1.11	M	IM	UD	FR/SC			NM				12.8	0.4		
FO-FREM		LKTR	10010	GN	N/A	561	1338	0.76	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0401	
FO-FREM		LKTR	10011	GN	N/A	595	2095	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10012	GN	N/A	580	1891	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10013	GN	N/A	606	2223	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10014	GN	N/A	449	1081	1.19	M	IM	UD	FR/SC	6	FR	NM				16.3	0.7		
FO-FREM		LKTR	10015	GN	N/A	378	630	1.17	F	IM	UD	FR/SC	6	FR	NM				7.4	0.9		
FO-FREM		LKTR	10016	GN	N/A	340	415	1.06	M	IM	UD	OT/FR/SC	6	FR	RM	AD			5	0.1	Y-0012	
FO-FREM		LKTR	10017	GN	N/A	549	1711	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10018	GN	N/A	550	1783	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10019	GN	N/A	554	1600	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10020	GN	N/A	367	580	1.17	M	IM	UD	FR/SC	5	FR	NM				7.3	0.3		
FO-FREM		LKTR	10021	GN	N/A	410	747	1.08	M	IM	UD	FR/SC	6	FR	NM				9.7	0.3		
FO-FREM		LKTR	10022	GN	N/A	565	1790	0.99	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0050	
FO-FREM		LKTR	10023	GN	N/A	597	1830	0.86	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0496	
FO-FREM		LKTR	10024	GN	N/A	610	2033	0.90	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0053	
FO-FREM		LKTR	10025	GN	N/A	574	1611	0.85	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0361	
FO-FREM		LKTR	10026	GN	N/A	560	1791	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10027	GN	N/A	617	1881	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10028	GN	N/A	543	1380	0.86	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10029	GN	N/A	567	1493	0.82	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10030	GN	N/A	571	1798	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A	RL&L 2118	
FO-FREM		LKTR	10031	GN	N/A	593	1801	0.86	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10032	GN	N/A	540	1591	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A	RL&L 2570	
FO-FREM		LKTR	10033	GN	N/A	555	1580	0.92	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10034	GN	N/A	571	2002	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10035	GN	N/A	611	1490	0.65	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0081	
FO-FREM		LKTR	10036	GN	N/A	611	1830	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A	RL&L 2131	
FO-FREM		LKTR	10037	GN	N/A	500	2074	1.66	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0447	
FO-FREM		LKTR	10038	GN	N/A	600	1620	0.75	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0375	
FO-FREM		LKTR	10039	GN	N/A	546	1304	0.80	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10040	GN	N/A	536	1522	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10041	GN	N/A	614	2068	0.89	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	10042	GN	N/A	525	1588	1.10	N/A	N/A	N/A	N/A			NM				N/A	N/A	RL&L 2143	
FO-FREM		LKTR	10043	GN	N/A	412	760	1.09	M	IM	UD	FR/SC			NM				7.7	0.3		
FO-FREM		LKTR	11000	GN	N/A	560	1923	1.10	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11001	GN	N/A	195	72	0.97	F	IM	UD	FR/SC	2	FR	NM				1	0		
FO-FREM		LKTR	11002	GN	N/A	452	974	1.05	N/A	N/A	N/A	FR/SC	8	FR	NM				N/A	N/A		
FO-FREM		LKTR	11003	GN	N/A	489	1181	1.01	N/A	N/A	N/A	FR/SC	7	FR	NM				N/A	N/A		
FO-FREM		LKTR	11004	GN	N/A	551	1959	1.17	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0039	
FO-FREM		LKTR	11005	GN	N/A	535	1647	1.08	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0233 / RL&L 2204	
FO-FREM		LKTR	11006	GN	N/A	546	2046	1.26	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11007	GN	N/A	593	2088	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11008	GN	N/A	522	1470	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11009	GN	N/A	604	1542	0.70	M	MA	RI	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11010	GN	N/A	574	1836	0.97	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0208	
FO-FREM		LKTR	11011	GN	N/A	565	1813	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11012	GN	N/A	545	1667	1.03	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11013	GN	N/A	565	1472	0.82	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0459	
FO-FREM		LKTR	11014	GN	N/A	591	1699	0.82	M	MA	RI	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11015	GN	N/A	524	1541	1.07	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0271	
FO-FREM		LKTR	11016	GN	N/A	575	1887	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11017	GN	N/A	518	1591	1.14	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11018	GN	N/A	587	2023	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	11019	GN	N/A	166	53	1.16	N/A	N/A	N/A	OT/FR/SC	3	FR	NM				N/A	N/A		
FO-FREM		LKTR	11020	GN	N/A	435	929	1.13	M	IM	UD	FR/SC	6	FR	NM				15.4	0.6		
FO-FREM		LKTR	12000	GN	N/A	895	7450	1.04	M	MA	RI	OT/FR/SC	52	OT	NM				55.9	227.4	PV	

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-FREM		LKTR	12001	GN	N/A	583	1707	0.86	N/A	N/A	N/A	N/A			NM				N/A	N/A	RL&L 2581	
FO-FREM		LKTR	12002	GN	N/A	597	1788	0.84	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12003	GN	N/A	543	1402	0.88	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0450	
FO-FREM		LKTR	12004	GN	N/A	615	1909	0.82	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12005	GN	N/A	556	1625	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12006	GN	N/A	536	1500	0.97	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12007	GN	N/A	575	1725	0.91	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0183	
FO-FREM		LKTR	12008	GN	N/A	557	1700	0.98	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12009	GN	N/A	535	1525	1.00	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12010	GN	N/A	569	1750	0.95	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0257	
FO-FREM		LKTR	12011	GN	N/A	600	2000	0.93	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y-0009	
FO-FREM		LKTR	12012	GN	N/A	548	1800	1.09	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12013	GN	N/A	570	1525	0.82	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12014	GN	N/A	600	2200	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12015	GN	N/A	579	2050	1.06	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12016	GN	N/A	555	1700	0.99	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12017	GN	N/A	548	1775	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12018	GN	N/A	381	500	0.90	N/A	N/A	N/A	FR/SC			NM				N/A	N/A		
FO-FREM		LKTR	12019	GN	N/A	318	325	1.01	N/A	N/A	N/A	FR/SC	4	FR	NM				N/A	N/A		
FO-FREM		LKTR	12020	GN	N/A	247	175	1.16	N/A	N/A	N/A	OT/FR/SC	4	FR	NM				1.9	0.1		
FO-FREM		LKTR	12021	GN	N/A	173	57	1.10	M	IM	UD	OT/FR/SC	3	FR	NM				1.1	0		
FO-FREM		LKTR	12022	GN	N/A	358	550	1.20	F	IM	UD	FR/SC	5	FR	NM				5.8	0.3		
FO-FREM		LKTR	12023	GN	N/A	452	900	0.97	F	IM	UD	FR/SC	9	FR	NM				12.2	1.2		
FO-FREM		LKTR	12024	GN	N/A	569	2000	1.09	N/A	N/A	N/A	N/A			RM	AD	433		N/A	N/A	Y-0433	
FO-FREM		LKTR	12025	GN	N/A	540	1500	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12026	GN	N/A	550	1800	1.08	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12027	GN	N/A	550	2100	1.26	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12028	GN	N/A	557	1625	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A	RL&L 2162	
FO-FREM		LKTR	12029	GN	N/A	443	950	1.09	F	IM	UD	FR/SC	7	FR	NM				11.6	2.1		
FO-FREM		LKTR	12030	GN	N/A	583	1250	0.63	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	12031	GN	N/A	548	1575	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	13000	GN	N/A	558	1841	1.06	N/A	N/A	N/A	N/A			RM	AD	369		N/A	N/A	Y0369	
FO-FREM		LKTR	13001	GN	N/A	597	1930	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	13002	GN	N/A	602	1892	0.87	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	13003	GN	N/A	596	2170	1.02	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	13004	GN	N/A	569	1650	0.90	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	13005	GN	N/A	592	1795	0.87	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	13006	GN	N/A	551	1578	0.94	N/A	N/A	N/A	N/A			NM				N/A	N/A	RLL 2543	
FO-FREM		LKTR	13007	GN	N/A	193	63.1	0.88	F	IM	UD	FR/SC	2	FR	NM				0.6	0.2		
FO-FREM		LKTR	13008	GN	N/A	621	2584	1.08	F	MA	RI	FR/SC	17	FR	RM	AD	417		22.7	21.3	Y0417	
FO-FREM		LKTR	13009	GN	N/A	298	290	1.10	F	IM	UD	OT/FR/SC	5	FR	NM				4.7	0.1		
FO-FREM		LKTR	13010	GN	N/A	567	1834	1.01	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	13011	GN	N/A	422	852	1.13	M	IM	UD	FR/SC	7	FR	NM				11	0.3		
FO-FREM		LKTR	13012	GN	N/A	618	2111	0.89	N/A	N/A	N/A	N/A			NM	N/A	N/A	N/A	N/A	N/A	RLL 2180	
FO-FREM		LKTR	13013	GN	N/A	555	1428	0.84	N/A	N/A	N/A	N/A			NM	N/A	N/A	N/A	N/A	N/A		
FO-FREM		LKTR	13014	GN	N/A	379	649	1.19	M	IM	UD	N/A			NM	N/A	N/A	N/A	10	0		
FO-FREM		LKTR	13015	GN	N/A	392	700	1.16	M	IM	UD	N/A			NM	N/A	N/A	N/A	7.5	0.2		
FO-FREM		LKTR	13016	GN	N/A	575	1920	1.01	N/A	N/A	N/A	N/A			NM	N/A	N/A	N/A	N/A	N/A		
FO-FREM		LKTR	13017	GN	N/A	536	1498	0.97	N/A	N/A	N/A	N/A			RM	AD	313	N/A	N/A	N/A	Y0313	
FO-FREM		LKTR	13018	GN	N/A	555	1740	1.02	N/A	N/A	N/A	N/A			NM	N/A	N/A	N/A	N/A	N/A		
FO-FREM		LKTR	13019	GN	N/A	585	2104	1.05	N/A	N/A	N/A	N/A			NM	N/A	N/A	N/A	N/A	N/A		
FO-FREM		LKTR	13021	GN	N/A	583	1484	0.75	M	MA	GR	N/A			RM	AD	186	N/A	15.3	7.3	Y0186	
FO-FREM		LKTR	14000	GN	N/A	550	1207	0.73	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y-0106	
FO-FREM		LKTR	14001	GN	N/A	408	812	1.20	M	IM	UD	FR/SC	6	FR	RM				10.3	0.1	Y-0121	
FO-FREM		LKTR	14002	GN	N/A	388	615	1.05	M	IM	UD	FR/SC			NM				6.9	0.1		
FO-FREM		LKTR	14003	GN	N/A	233	141	1.11	M	IM	UD	FR/SC			NM				2.1	0		
FO-FREM		LKTR	14004	GN	N/A	180	57	0.98	M	IM	UD	OT/FR/SC	3	FR	NM				1.2	0		
FO-FREM		LKTR	14005	GN	N/A	687	2712	0.84	M	MA	GR	OT/FR/SC	31	OT	NM				23.4	1.2		
FO-FREM		LKTR	14006	GN	N/A	602	2029	0.93	N/A	N/A	N/A	N/A			NM				N/A	N/A	RLL 2551	
FO-FREM		LKTR	14007	GN	N/A	602	2526	1.16	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	14008	GN	N/A	570	1965	1.06	N/A	N/A	N/A	N/A			RM				N/A	N/A	Y0448	
FO-FREM		LKTR	14009	GN	N/A	409	755	1.10	M	IM	UD	FR/SC	7	FR	NM				13.3	0.2		
FO-FREM		LKTR	14010	GN	N/A	238	150	1.11	M	IM	UD	FR/SC			NM				2.6	0		
FO-FREM		LKTR	14011	GN	N/A	214	102	1.04	M	IM	UD	FR/SC	3	FR	NM				1.4	0		

Appendix 3.1-1. Fish Biological Data, Tail Lake Fish-out, Doris North Project, 2011

Assessment Code	Site ID	Species	Sample	Gear Code	Mesh (inches)	Length (F, mm)	Weight (g)	Condition	Sex Code	Maturity Code	Reprod Code	Agestruct Code	Age	Aging Structure	Fate Code	Fin Code	Tag No.	Tissue Code	Liver Weight (g)	Gonad Weight (g)	Comment 1	Comment 2
FO-FREM		LKTR	14012	GN	N/A	591	1826	0.88	F	MA	RI	N/A			NM				N/A	N/A		
FO-FREM		LKTR	14013	GN	N/A	559	1760	1.01	F	MA	RI	N/A			NM				N/A	N/A		
FO-FREM		LKTR	14014	GN	N/A	601	1858	0.86	N/A	N/A	N/A	N/A			RM	AD			N/A	N/A	Y0048	
FO-FREM		LKTR	14015	GN	N/A	500	1358	1.09	M	IM	UD	FR/SC			NM				13.1	0.7		
FO-FREM		LKTR	16000	GN	N/A	568	1412	0.77	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	16001	GN	N/A	446	872	0.98	M	IM	UD	FR/SC	7	FR	NM				13.7	0.4		
FO-FREM		LKTR	16002	GN	N/A	379	591	1.09	M	IM	UD	FR/SC	6	FR	NM				8.8	0.2		
FO-FREM		LKTR	16003	GN	N/A	379	725	1.33	F	IM	UD	FR/SC	6	FR	NM				11.8	0.8		
FO-FREM		LKTR	16004	GN	N/A	188	66	0.99	M	IM	UD	FR/SC	3	FR	NM				1	0		
FO-FREM		LKTR	16005	GN	N/A	126	17	0.85	M	IM	UD	FR/SC	2	FR	NM				0.4	0		
FO-FREM		LKTR	16006	GN	N/A	570	1772	0.96	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	16007	GN	N/A	575	2042	1.07	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	16008	GN	N/A	368	566	1.14	F	IM	UD	FR/SC	6	FR	NM				8.2	1		
FO-FREM		LKTR	16009	GN	N/A	402	724	1.11	F	IM	UD	N/A			NM				10.6	1		
FO-FREM		LKTR	16010	GN	N/A	171	56.1	1.12	F	IM	UD	OT/FR/SC	3	FR	NM				0.5	0		
FO-FREM		LKTR	16011	GN	N/A	565	1388	0.77	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	16012	GN	N/A	261	184	1.03	M	IM	UD	FR/SC	3	FR	NM				2.5	0		
FO-FREM		LKTR	16013	GN	N/A	162	45.5	1.07	F	IM	UD	N/A			NM				0.6	0		
FO-FREM		LKTR	17000	GN	N/A	210	105.6	1.14	M	IM	UD	N/A			NM				1.3	0		
FO-FREM		LKTR	17001	GN	N/A	184	55.6	0.89	F	IM	UD	N/A			NM				N/A	N/A		
FO-FREM		LKTR	17002	GN	N/A	245	140	0.95	F	IM	UD	N/A			NM				1.5	0.4		
FO-FREM		LKTR	17003	GN	N/A	200	86	1.08	M	IM	UD	N/A			NM				1.5	0		
FO-FREM		LKTR	17004	GN	N/A	585	1821	0.91	N/A	N/A	N/A	N/A			NM				N/A	N/A	RLL 2596	
FO-FREM		LKTR	17005	GN	N/A	420	839	1.13	M	IM	UD	N/A			RM	AD	305		8.4	0.5	Y0305	
FO-FREM		LKTR	17007	GN	N/A	458	940	0.98	M	IM	UD	N/A			NM				11.5	0.4		
FO-FREM		LKTR	17008	GN	N/A	419	824	1.12	M	IM	UD	N/A			NM				10.8	0.5		
FO-FREM		LKTR	18000	GN	N/A	368	575	1.15	F	IM	UD	FR/SC	6	FR	RM	AD	21		7.8	0.7	Y0021	
FO-FREM		LKTR	18001	GN	N/A	251	167	1.06	M	IM	UD	OT/FR/SC	6	OT	NM				2.7	0	PV	
FO-FREM		LKTR	18002	GN	N/A	238	151	1.12	F	IM	UD	FR/SC			NM				1.6	0		
FO-FREM		LKTR	18003	GN	N/A	565	1706	0.95	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	18004	GN	N/A	156	39.4	1.04	U	IM	UD	OT/FR/SC	4	OT	NM				0.4	0	PV	
FO-FREM		LKTR	18005	GN	N/A	449	849	0.94	F	IM	UD	FR/SC	7	FR	RM	AD	303		11.4	2.2	Y0303	
FO-FREM		LKTR	18006	GN	N/A	277	240	1.13	M	IM	UD	FR/SC			NM				3.5	0		
FO-FREM		LKTR	18007	GN	N/A	218	105	1.01	M	IM	UD	FR/SC	3	FR	NM				1	0.1		
FO-FREM		LKTR	19000	GN	N/A	557	1884	1.09	N/A	N/A	N/A	N/A			NM				N/A	N/A		
FO-FREM		LKTR	19001	GN	N/A	380	691	1.26	M	IM	UD	FR/SC			NM				12.5	0.1		
FO-FREM		LKTR	19002	GN	N/A	237	138	1.04	F	IM	UD	FR/SC			NM				2.1	0.1		
FO-FREM		LKTR	19003	GN	N/A	213	105	1.09	F	IM	UD	FR/SC	4	FR	NM				1.8	0.1		
FO-FREM		LKTR	19004	GN	N/A	217	100	0.98	M	IM	UD	FR/SC	4	FR	NM				1.4	0		
FO-FREM		LKTR	20000	GN	N/A	330	411	1.14	M	IM	UD	OT/FR/SC	8	OT	NM				5.4	0.1	PV	
FO-FREM		LKTR	20001	GN	N/A	217	111	1.09	M	IM	UD	FR/SC	4	FR	NM				1.2	0		
FO-FREM		LKTR	20002	GN	N/A	212	106	1.11	M	IM	UD	FR/SC	4	FR	NM				1.7	0		
FO-FREM		LKTR	20003	GN	N/A	217	106	1.04	F	IM	UD	FR/SC	3	FR	NM				1.2	0.1	photo 422, 423	
FO-FREM		LKTR	20004	GN	N/A	230	136.4	1.12	F	IM	UD	FR/SC	4	FR	NM				1.9	0.3		
FO-FREM		LKTR	20005	GN	N/A	169	49	1.02	M	IM	UD	OT/FR/SC	3	FR	NM				0.4	0	PV	
FO-FREM		LKTR	21000	GN	N/A	580	1584	0.81	N/A	N/A	N/A	OT/FR/SC	16	FR	RM	AD	486		N/A	N/A	PV	GOLDER TAG MISSING
FO-FREM		LKTR	21001	GN	N/A	358	500	1.09	F	IM	UD	FR/SC	5	FR	NM				6.7	0.2		
FO-FREM		LKTR	21002	GN	N/A	210	111	1.20	F	IM	UD	FR/SC	3	FR	NM				2.4	0.1		
FO-FREM		LKTR	21003	GN	N/A	128	19.7	0.94	F	IM	UD	OT/FR/SC	2	FR	NM				0.5	0	PV	
FO-FREM		LKTR	22000	GN	N/A	365	543	1.12	M	IM	UD	FR/SC	6	FR	RM	AD	470		9.1	0.2		Y0470
FO-FREM		LKTR	22001	GN	N/A	332	403	1.10	F	IM	UD	OT/FR/SC	5	FR	NM				5.4	0	PV	
FO-FREM		LKTR	22002	GN	N/A	338	440	1.14	M	IM	UD	OT/FR/SC	7	FR	NM				5.5	0	PV	
FO-FREM		LKTR	22003	GN	N/A	214	107	1.09	F	IM	UD	FR/SC	3	FR	NM				1	0.1		
FO-FREM		LKTR	22004	GN	N/A	168	51.5	1.09	F	IM	UD	OT/FR/SC	2	FR	NM				1.1	0	PV	
FO-FREM		LKTR	22005	GN	N/A	176	57.8	1.06	M	IM	UD	OT/FR/SC	2	FR	NM				1	0	PV	

Appendix 3.1-2

Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

A) CPUE/Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

					Start		End		Catch per Mesh Panel (inches)						Total
Site ID	Set Date	Set Time	Lift Date	Lift Time	Easting	Northing	Easting	Northing	0.5	1	1.5	2	3	4	Catch
1	5-Aug	17:05	6-Aug	9:42	434777	7558839	434690	7558791	0	1	2	9	6	6	24
2	5-Aug	17:10	6-Aug	10:30	434858	7558465	434913	7558384	2	3	8	13	13	22	61
3	6-Aug	12:08	6-Aug	15:38	434824	7558106	434882	7558208	0	0	1	4	6	3	14
4	6-Aug	16:45	7-Aug	8:45	435011	7558069	435018	7557945	0	2	4	4	10	11	31
5	6-Aug	16:00	7-Aug	10:15	435118	7557625	435089	7557736	0	3	1	4	16	0	24
6	6-Aug	16:25	7-Aug	11:42	435220	7557372	435255	7557291	0	0	0	23	1	22	46
7	6-Aug	16:10	7-Aug	8:47	435477	7556550	435351	7556526	0	1	3	6	9	3	22
8	6-Aug	12:00	6-Aug	15:16	434913	7558304	434900	7558212	0	0	1	2	2	2	7
9	7-Aug	16:30	8-Aug	10:25	435200	7557147	435295	7557123	0	2	7	9	12	6	36
500	7-Aug	10:00	7-Aug	15:18	435090	7558537	435133	7558441	0	1	0	1	0	1	3
501	7-Aug	10:11	7-Aug	15:31	435087	7558160	435078	7558049	0	0	2	0	0	4	6
503	7-Aug	14:35	8-Aug	12:11	435358	7556558	435294	7556679	0	1	2	0	2	16	21
505	7-Aug	17:43	8-Aug	9:05	435031	7558484	434917	7558457	0	1	2	1	5	2	11
520	8-Aug	11:40	8-Aug	14:45	434926	7558161	434861	7558240	0	1	0	0	0	2	3
521	8-Aug	11:45	8-Aug	15:20	435160	7558125	435055	7558153	0	0	1	1	0	1	3
522	8-Aug	13:20	9-Aug	9:00	435261	7557471	435154	7557451	0	1	1	2	1	9	14
523	8-Aug	15:10	9-Aug	10:39	435182	7557061	435289	7557095	1	0	1	9	8	9	28
524	8-Aug	15:35	9-Aug	8:35	435178	7557996	435071	7557996	0	1	4	8	8	3	24
525	9-Aug	10:27	9-Aug	15:02	434764	7558752	434669	7558850	0	0	0	0	0	0	0
526	9-Aug	10:30	9-Aug	15:30	434932	7558142	434859	7558231	0	0	0	0	0	0	0
527	9-Aug	12:31	9-Aug	15:20	435147	7557941	435098	7558053	0	0	0	0	1	1	2
528	9-Aug	15:30	10-Aug	8:45	435105	7558525	435032	7558615	0	1	2	0	0	3	6
529	9-Aug	16:50	10-Aug	10:45	435316	7556957	435265	7556881	0	0	0	2	2	3	7
530	9-Aug	17:15	10-Aug	9:40	435046	7557761	435168	7557783	0	0	2	6	4	2	14
531	10-Aug	13:30	11-Aug	9:10	434859	7558522	434910	7558430	0	0	1	0	0	1	2
532	10-Aug	13:38	11-Aug	9:34	435010	7557842	435095	7557856	0	0	1	4	0	2	7
533	10-Aug	13:43	11-Aug	10:35	435320	7557055	435335	7556952	0	0	1	0	3	1	5
534	11-Aug	10:15	12-Aug	9:30	435181	7558081	435074	7558095	0	0	0	0	0	1	1
535	11-Aug	13:09	12-Aug	9:40	435286	7556813	435302	7556700	0	1	1	2	0	1	5
536	11-Aug	13:18	12-Aug	9:30	435118	7557417	435147	7557321	0	0	4	0	0	1	5
001	12-Aug	10:15	13-Aug	8:30	434777	7558839	434690	7558791	1	0	1	0	0	1	3
002	12-Aug	11:25	13-Aug	9:41	434858	7558465	434913	7558384	0	0	0	0	0	0	0
003	12-Aug	11:55	13-Aug	11:15	435123	7557425	435211	7557478	0	0	1	2	4	3	10
004	12-Aug	15:30	13-Aug	9:00	434561	7558885	434614	n/a	0	0	0	5	0	3	8
537	12-Aug	16:40	13-Aug	10:18	435022	7557826	435134	7557875	0	0	0	0	3	0	3
539	13-Aug	9:35	14-Aug	8:40	435093	7558166	435079	7558249	0	0	1	4	4	3	12
540	13-Aug	9:56	14-Aug	8:50	434870	7558008	434902	7558101	0	0	0	1	0	1	2
541	13-Aug	10:11	14-Aug	8:35	434923	7558648	4345009	7558547	0	1	0	1	3	2	7
542	13-Aug	10:51	14-Aug	10:00	435212	7557585	435123	7557556	0	0	0	7	14	2	23
543	13-Aug	11:50	14-Aug	11:15	435344	7557144	435256	7557115	0	2	7	8	16	5	38
544	13-Aug	13:05	14-Aug	11:10	435387	7556828	435290	7556810	1	3	7	13	10	10	44
547	13-Aug	14:34	14-Aug	13:15	435351	7557080	435248	7557066	0	0	0	0	2	1	3
005	14-Aug	11:00	15-Aug	10:30	435105	7557590	435187	7557562	0	0	1	2	8	2	13
006	14-Aug	11:05	15-Aug	11:30	435283	7557444	435174	7557441	0	0	0	0	4	0	4
545	14-Aug	9:45	15-Aug	9:20	434949	7558520	435039	7558541	0	0	0	1	2	4	7
546	14-Aug	11:01	15-Aug	9:10	435116	7557982	435052	7557965	0	0	1	2	5	0	8
548	14-Aug	14:40	15-Aug	13:45	435384	7556835	435280	7556807	0	0	1	1	1	2	5
549	15-Aug	14:20	16-Jan	9:15	435612	7557807	4345085	7557918	0	0	1	0	0	2	3
551	15-Aug	14:30	16-Aug	9:05	434781	7558131	434876	7558149	0	0	1	2	0	0	3
552	15-Aug	15:00	16-Aug	11:50	4345511	7556372	435459	7556483	0	0	0	1	3	3	7
553	15-Aug	15:15	16-Aug	9:20	434982	7558209	435070	7558122	0	0	0	0	1	0	1
554	15-Aug	15:50	16-Aug	9:00	434759	7558815	434694	7558901	0	0	0	0	1	0	1
016	17-Aug	10:45	18-Aug	10:00	435149	7557949	435151	7558073	0	0	0	0	0	2	2
018	17-Aug	12:45	18-Aug	10:30	435417	7556674	435311	7556646	0	0	0	2	4	4	10
019	17-Aug	12:45	18-Aug	9:30	435146	7557440	435249	7557471	0	0	0	1	0	0	1
020	17-Aug	13:00	18-Aug	10:20	435192	7557848	435116	7557964	0	0	5	0	5	8	18
556	15-Aug	14:25	16-Aug	9:36	435460	7556654	435325	7556630	0	0	0	1	1	1	3

Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

A) CPUE/Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

					Start		End		Catch per Mesh Panel (inches)						Total
Site ID	Set Date	Set Time	Lift Date	Lift Time	Easting	Northing	Easting	Northing	0.5	1	1.5	2	3	4	Catch
557	18-Aug	12:!5	19-Aug	18:00	435205	7556789	435391	7556793	0	0	0	0	0	1	1
558	18-Aug	12:30	19-Aug	12:00	435192	7557922	435164	7558033	0	0	1	0	8	12	21
559	18-Aug	12:45	19-Aug	14:30	435192	7557922	435184	7558033	0	0	0	2	7	7	16
560	18-Aug	14:20	19-Aug	16:30	435203	7558429	435238	7558323	0	0	0	0	1	3	4
561	18-Aug	15:00	19-Aug	16:45	435008	7557898	435177	7557930	0	0	0	0	1	0	1
562	18-Aug	12:15	19-Aug	16:50	435096	7558364	435190	7558437	0	0	0	0	2	1	3
021	19-Aug	14:30	20-Aug	10:15	435266	7557512	435259	7557593	0	3	4	10	8	10	35
022	19-Aug	14:40	20-Aug	13:10	435232	7557712	435249	7557620	0	0	0	7	9	7	23
023	19-Aug	14:45	20-Aug	15:05	435238	7557787	435203	7557873	0	0	0	6	6	8	20
024	19-Aug	16:00	20-Aug	16:45	435209	7557903	435172	7557976	0	1	3	2	7	5	18
025	19-Aug	16:30	20-Aug	19:30	435094	7557893	435053	7557817	0	0	0	0	2	1	3
026	19-Aug	17:30	20-Aug	19:30	435077	7557959	435161	7558000	0	0	2	1	2	5	10
027	19-Aug	17:15	20-Aug	19:30	435145	7558027	435152	7558119	0	0	1	1	0	2	4
028	19-Aug	17:30	20-Aug	19:30	434888	7558325	434795	7558359	0	0	2	5	3	1	11
032	20-Aug	17:30	21-Aug	15:30	4345066	7557737	435050	7557797	0	0	0	0	1	2	3
033	20-Aug	17:30	21-Aug	15:00	435190	7557893	435179	7557953	0	0	0	4	4	7	15
034	20-Aug	19:30	21-Aug	15:00	435210	7557856	435229	7557757	0	0	1	0	1	5	7
035	20-Aug	17:30	21-Aug	15:30	435225	7557740	435235	7557638	0	1	3	3	6	6	19
036	21-Aug	17:00	22-Aug	10:45	435193	7557767	n/a	n/a	0	0	1	1	1	2	5
037	21-Aug	17:00	22-Aug	10:30	435149	7557880	n/a	n/a	0	0	0	0	3	1	4
038	21-Aug	17:05	22-Aug	11:00	435259	7556889	n/a	n/a	0	0	0	0	0	2	2
039	21-Aug	17:00	22-Aug	10:50	435186	7557674	n/a	n/a	0	0	1	0	0	2	3
040	21-Aug	16:00	23-Aug	10:30	434812	7558229	n/a	n/a	0	0	0	0	8	4	12
041	21-Aug	16:15	23-Aug	10:45	434988	7558563	n/a	n/a	0	0	0	1	4	4	9
042	21-Aug	16:00	23-Aug	11:00	434799	7558774	n/a	n/a	0	0	3	0	2	1	6
043	23-Aug	9:00	24-Aug	9:50	435192	7557941	435182	7557879	0	0	0	1	5	4	10
044	23-Aug	9:05	24-Aug	9:50	435204	7557837	435204	7557746	0	1	0	2	2	6	11
045	23-Aug	9:15	24-Aug	10:00	435177	7557763	435207	7557681	0	0	0	0	2	1	3
046	23-Aug	16:00	24-Aug	10:15	434954	7558360	435019	7558244	0	0	1	1	1	1	4
050	23-Aug	16:00	24-Aug	14:30	435016	7558535	435089	7558567	0	0	0	0	2	1	3
051	23-Aug	16:00	24-Aug	14:30	435138	7558455	435401	7558402	0	0	0	0	0	2	2
052	23-Aug	16:00	24-Aug	14:30	434957	7558027	434890	7557977	0	0	1	1	3	3	8
047	24-Aug	14:10	25-Aug	9:15	434831	7558195	434899	7558119	0	0	0	0	0	2	2
048	24-Aug	14:25	25-Aug	9:25	434893	7558345	434771	7558347	0	0	2	2	3	2	9
049	24-Aug	14:30	25-Aug	9:30	435236	7557784	435214	7557670	0	0	1	1	1	0	3
053	24-Aug	16:30	25-Aug	15:10	435037	7558641	434991	7558564	0	0	0	0	5	3	8
054	24-Aug	16:30	25-Aug	9:30	435184	7558125	435097	7558199	0	0	1	3	1	1	6
055	24-Aug	16:45	25-Aug	12:55	435208	7557799	435189	7557907	0	0	0	2	3	7	12
056	25-Aug	11:50	26-Aug	12:14	435124	7557698	435226	7557701	0	0	0	1	1	3	5
057	25-Aug	11:55	26-Aug	9:43	435200	7557840	435210	7557722	0	0	0	0	0	2	2
058	25-Aug	12:05	26-Aug	9:25	435237	7557180	435355	7557193	0	0	0	2	2	4	8
059	25-Aug	12:15	26-Aug	9:50	435228	7557017	435318	7557104	0	0	1	0	0	0	1
060	25-Aug	14:30	26-Aug	9:28	435130	7558570	435049	7558512	0	0	0	0	8	4	12
061	25-Aug	14:45	26-Aug	12:41	435034	7557771	435009	7557897	0	0	0	3	1	3	7
062	25-Aug	15:55	26-Aug	9:35	435445	7556449	435399	7556545	0	0	0	1	0	0	1
063	25-Aug	18:15	26-Aug	14:41	434965	7558281	434961	7558416	0	0	0	0	1	0	1
064	25-Aug	18:15	26-Aug	14:50	434762	7558324	434879	7558336	0	0	1	0	4	6	11
065	25-Aug	18:45	26-Aug	15:50	434738	7558810	434652	7558880	0	0	0	0	0	1	1
066	26-Aug	10:00	26-Aug	12:27	435237	7557180	435395	7557193	0	0	0	0	0	2	2
067	26-Aug	14:55	27-Aug	13:55	435398	7556664	435495	7556563	0	0	0	0	0	0	0
068	26-Aug	15:05	27-Aug	13:35	435221	7557144	435230	7557034	0	0	0	2	0	0	2
069	26-Aug	15:10	27-Aug	13:00	435221	755144	435144	7557619	0	0	0	0	1	1	2
070	26-Aug	15:20	27-Aug	10:00	435199	7557842	435238	7557755	0	0	3	1	0	4	8
071	26-Aug	15:50	27-Aug	13:15	434974	7557881	435048	7557785	0	0	1	1	0	1	3
072	26-Aug	16:00	27-Aug	10:52	435148	7558192	435188	7558083	0	0	0	0	2	7	9
073	26-Aug	16:05	27-Aug	10:00	435018	7558072	435066	7557982	0	0	0	2	2	1	5
074	26-Aug	16:10	27-Aug	10:42	435054	7558427	435116	7558337	0	0	0	0	0	2	2

Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

A) CPUE/Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

					Start		End		Catch per Mesh Panel (inches)						Total Catch
Site ID	Set Date	Set Time	Lift Date	Lift Time	Easting	Northing	Easting	Northing	0.5	1	1.5	2	3	4	
075	26-Aug	16:15	27-Aug	10:00	434892	7558563	435945	7558514	0	0	0	0	2	0	2
076	26-Aug	16:52	27-Aug	10:28	434997	7558556	435115	7558536	0	0	0	1	0	1	2
077	27-Aug	12:54	28-Aug	15:00	434942	7558635	435015	7558668	0	0	0	1	0	2	3
078	27-Aug	13:02	28-Aug	10:45	435189	7558483	435068	7558475	0	0	1	1	0	1	3
079	27-Aug	13:50	28-Aug	15:00	435302	7557060	435211	7557031	0	0	1	1	2	0	4
080	27-Aug	14:00	28-Aug	10:55	435242	7557417	435148	7557384	0	0	0	0	1	1	2
081	27-Aug	14:10	28-Aug	10:29	434891	7558625	434858	7557939	0	0	0	0	4	3	7
082	27-Aug	14:20	28-Aug	15:15	434866	7558345	434858	7558443	0	0	0	1	0	1	2
083	27-Aug	16:20	28-Aug	15:00	435083	7558349	435103	7558255	0	0	0	0	1	0	1
084	27-Aug	16:25	28-Aug	10:25	435302	7557195	435320	7557077	0	1	2	0	1	1	5
085	27-Aug	16:35	28-Aug	10:35	435140	7557601	435241	7557638	0	1	0	0	1	3	5
086	27-Aug	16:45	28-Aug	15:15	434749	7558194	434838	7558244	0	0	0	0	0	2	2

Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

B) Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

Site ID	Net ID	Set Date	Set Time	Lift Date	Lift Time	Total Catch
87	1	28-Aug	14:30	29-Aug	10:30	0
88	2	28-Aug	14:30	29-Aug	10:35	1
89	3	28-Aug	14:40	29-Aug	10:40	1
96	4	28-Aug	17:05	29-Aug	10:45	1
90	5	28-Aug	14:45	29-Aug	10:50	2
91	6	28-Aug	14:45	29-Aug	10:55	2
94	7	28-Aug	16:55	29-Aug	12:00	1
92	8	28-Aug	16:35	29-Aug	12:00	1
93	9	28-Aug	16:45	29-Aug	12:00	0
95	10	28-Aug	17:00	29-Aug	12:10	0
101	1	29-Aug	14:19	30-Aug	9:30	0
102	2	29-Aug	14:23	30-Aug	9:45	0
98	3	29-Aug	13:46	30-Aug	10:09	1
99	4	29-Aug	14:05	30-Aug	10:22	1
104	5	29-Aug	14:39	30-Aug	10:45	0
100	6	29-Aug	14:13	30-Aug	10:45	0
103	7	29-Aug	14:31	30-Aug	10:45	6
105	8	29-Aug	16:20	30-Aug	11:30	1
106	9	29-Aug	16:36	30-Aug	12:30	1
97	10	29-Aug	11:25	30-Aug	16:30	0
109	1	30-Aug	15:09	31-Aug	10:00	4
108	2	30-Aug	15:02	31-Aug	10:00	0
116	3	30-Aug	15:51	31-Aug	10:15	1
111	4	30-Aug	15:19	31-Aug	10:25	1
107	5	30-Aug	11:52	31-Aug	10:34	0
112	6	30-Aug	15:22	31-Aug	10:37	3
113	7	30-Aug	15:37	31-Aug	10:55	0
110	8	30-Aug	15:11	31-Aug	11:00	1
115	9	30-Aug	15:47	31-Aug	12:40	0
114	10	30-Aug	15:42	31-Aug	12:40	0
123	1	31-Aug	13:34	1-Sep	10:00	3
120	2	31-Aug	12:57	1-Sep	10:06	0
117	3	31-Aug	12:26	1-Sep	12:50	7
124	4	31-Aug	13:40	1-Sep	13:00	4
126	5	31-Aug	13:57	1-Sep	13:17	0
122	6	31-Aug	13:30	1-Sep	16:39	3
125	7	31-Aug	13:45	1-Sep	16:41	4
118	8	31-Aug	12:32	1-Sep	16:44	22
119	9	31-Aug	12:51	1-Sep	17:35	1
121	10	31-Aug	13:24	1-Sep	17:38	0
132	1	1-Sep	16:41	2-Sep	9:16	6
136	2	1-Sep	17:38	2-Sep	9:37	1
130	3	1-Sep	13:17	2-Sep	9:50	0
127	4	1-Sep	16:44	2-Sep	10:02	1
128	5	1-Sep	12:50	2-Sep	10:19	0
129	6	1-Sep	13:00	2-Sep	pulled out	0
134	7	1-Sep	10:15	2-Sep	10:31	10
135	8	1-Sep	10:32	2-Sep	11:05	0
133	9	1-Sep	10:10	2-Sep	11:19	0
131	10	1-Sep	14:02	2-Sep	11:35	0
132	1	2-Sep	9:16	3-Sep	11:15	3
136	2	2-Sep	9:37	3-Sep	11:32	7
130	3	2-Sep	9:50	3-Sep	11:45	0
127	4	2-Sep	10:02	3-Sep	11:54	0
128	5	2-Sep	10:19	3-Sep	12:06	0
134	6	2-Sep	10:31	3-Sep	11:40	2
135	7	2-Sep	11:05	3-Sep	13:05	0
133	8	2-Sep	11:19	3-Sep	13:11	1
131	9	2-Sep	11:35	3-Sep	13:20	4

Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

B) Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

Site ID	Net ID	Set Date	Set Time	Lift Date	Lift Time	Total Catch
133	1	3-Sep	13:11	4-Sep	14:05	3
135	2	3-Sep	13:05	4-Sep	14:20	0
131	3	3-Sep	13:20	4-Sep	14:28	1
132	4	3-Sep	11:15	4-Sep	15:11	0
134	5	3-Sep	11:40	4-Sep	13:25	5
139	6	3-Sep	14:32	4-Sep	12:20	3
140	7	3-Sep	12:40	4-Sep	13:46	0
141	8	3-Sep	15:03	4-Sep	12:46	0
142	9	3-Sep	13:00	4-Sep	14:00	0
143	10	3-Sep	15:35	4-Sep	13:20	7
144	11	3-Sep	15:50	4-Sep	13:56	1
139	1	4-Sep	12:20	5-Sep	16:04	5
140	2	4-Sep	13:46	5-Sep	16:20	0
141	3	4-Sep	12:46	5-Sep	16:41	0
142	4	4-Sep	14:00	5-Sep	17:01	0
143	5	4-Sep	13:20	5-Sep	17:44	1
144	6	4-Sep	13:46	5-Sep	9:28	6
147	1	5-Sep	14:56	6-Sep	10:16	0
133	2	5-Sep	12:38	6-Sep	10:32	0
127	3	5-Sep	12:50	6-Sep	10:48	1
132	4	5-Sep	13:12	6-Sep	10:57	1
131	5	5-Sep	13:27	6-Sep	11:10	0
144	6	5-Sep	13:56	6-Sep	11:18	0
136	7	5-Sep	14:40	6-Sep	11:32	0
128	8	5-Sep	14:55	6-Sep	11:49	6
130	9	5-Sep	15:12	6-Sep	11:58	1
145	10	5-Sep	15:30	6-Sep	12:15	1
146	11	5-Sep	15:46	6-Sep	13:04	2
134	12	5-Sep	15:55	6-Sep	13:21	0
139	13	5-Sep	16:04	6-Sep	13:35	2
140	14	5-Sep	16:20	6-Sep	13:46	0
141	15	5-Sep	16:41	6-Sep	14:01	0
142	16	5-Sep	17:01	6-Sep	14:14	0
143	17	5-Sep	17:44	6-Sep	14:23	8
135	18	5-Sep	12:06	6-Sep	14:48	0
145	1	6-Sep	12:15	8-Sep	9:15	1
146	2	6-Sep	13:04	8-Sep	9:30	1
139	3	6-Sep	13:35	8-Sep	9:51	1
141	4	6-Sep	14:01	8-Sep	10:10	1
142	5	6-Sep	14:14	8-Sep	10:23	2
143	6	6-Sep	14:23	8-Sep	10:41	3
144	7	6-Sep	11:18	8-Sep	10:50	7
147	8	6-Sep	10:16	8-Sep	11:03	2
133	9	6-Sep	10:32	8-Sep	11:13	2
127	10	6-Sep	10:48	8-Sep	13:03	9
128	11	6-Sep	11:49	8-Sep	13:27	9
130	12	6-Sep	11:58	8-Sep	13:56	3
131	13	6-Sep	11:10	8-Sep	11:38	0
135	14	6-Sep	14:48	8-Sep	11:20	0
140	15	6-Sep	13:46	8-Sep	10:02	0
134	16	6-Sep	13:21	8-Sep	9:46	0
132	17	6-Sep	10:57	8-Sep	11:28	1
136	18	6-Sep	11:32	8-Sep	11:49	1
128	1	8-Sep	13:27	9-Sep	9:45	4
142	2	8-Sep	15:00	9-Sep	10:05	6
127	3	8-Sep	14:00	9-Sep	10:50	3
130	4	8-Sep	14:30	9-Sep	10:30	0
135	5	8-Sep	11:20	9-Sep	9:30	2
152	6	8-Sep	11:28	9-Sep	10:58	1

Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

B) Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

Site ID	Net ID	Set Date	Set Time	Lift Date	Lift Time	Total Catch
153	7	8-Sep	10:50	9-Sep	11:08	0
140	8	8-Sep	10:02	9-Sep	10:00	0
155	9	8-Sep	9:30	9-Sep	9:00	0
147	10	8-Sep	11:03	9-Sep	10:15	0
133	11	8-Sep	11:13	9-Sep	10:50	0
131	12	8-Sep	11:38	9-Sep	9:30	1
134	13	8-Sep	9:46	9-Sep	10:33	1
136	14	8-Sep	11:49	9-Sep	10:30	1
151	1	9-Sep	10:30	10-Sep	12:00	2
152	2	9-Sep	14:30	10-Sep	10:20	10
153	3	9-Sep	10:00	10-Sep	10:45	1
154	4	9-Sep	11:05	10-Sep	10:08	1
155	5	9-Sep	9:45	10-Sep	11:00	2
156	6	9-Sep	14:15	10-Sep	10:05	0
157	7	9-Sep	13:45	10-Sep	12:00	0
158	8	9-Sep	16:30	10-Sep	11:34	0
159	9	9-Sep	16:35	10-Sep	12:05	1
160	10	9-Sep	16:30	10-Sep	12:30	6
n/a	11	9-Sep	14:40	10-Sep	12:00	0
n/a	12	9-Sep	14:50	10-Sep	12:00	0
n/a	13	9-Sep	15:05	10-Sep	12:00	0
601	1	10-Sep	12:00	11-Sep	19:46	0
n/a	2	11-Sep	12:00	11-Sep	11:07	0
n/a	3	10-Sep	12:00	11-Sep	12:00	1
n/a	4	10-Sep	12:00	11-Sep	10:40	0
n/a	5	10-Sep	12:00	11-Sep	10:54	0
n/a	6	10-Sep	12:00	11-Sep	10:16	0
n/a	7	10-Sep	12:00	11-Sep	12:27	0
n/a	8	10-Sep	12:00	11-Sep	12:36	0
n/a	9	10-Sep	12:00	11-Sep	12:53	0
n/a	10	10-Sep	12:00	11-Sep	13:04	0
n/a	11	10-Sep	12:00	11-Sep	10:24	0
n/a	12	10-Sep	12:00	11-Sep	10:38	0
n/a	13	10-Sep	12:00	11-Sep	10:18	0
600	1	11-Sep	10:30	12-Sep	10:00	7
601	2	11-Sep	11:05	12-Sep	10:15	4
602	3	11-Sep	11:25	12-Sep	11:50	1
603	4	11-Sep	11:45	12-Sep	11:15	4
604	5	11-Sep	13:20	12-Sep	11:30	0
605	6	11-Sep	13:40	12-Sep	12:00	1
606	7	11-Sep	13:50	12-Sep	11:11	0
n/a	8	11-Sep	12:00	12-Sep	13:03	0
n/a	9	11-Sep	12:00	12-Sep	12:21	0
n/a	10	11-Sep	12:00	12-Sep	12:38	0
n/a	11	11-Sep	12:00	12-Sep	11:22	0
n/a	12	11-Sep	12:00	12-Sep	12:10	0
n/a	13	11-Sep	12:00	12-Sep	9:50	0
n/a	14	11-Sep	12:00	12-Sep	10:15	0
n/a	15	11-Sep	12:00	12-Sep	10:30	0
n/a	16	11-Sep	12:00	12-Sep	12:10	0
200	1	12-Sep	9:50	13-Sep	10:00	1
201	2	12-Sep	10:15	13-Sep	9:45	0
202	3	12-Sep	11:11	13-Sep	10:30	1
202	4	12-Sep	10:30	13-Sep	10:20	0
205	5	12-Sep	11:22	13-Sep	10:45	0
607	6	12-Sep	10:10	13-Sep	13:30	0
608	7	12-Sep	10:40	13-Sep	11:25	2
610	8	12-Sep	11:25	13-Sep	13:50	1
611	9	12-Sep	11:40	13-Sep	11:00	1

Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

B) Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

Site ID	Net ID	Set Date	Set Time	Lift Date	Lift Time	Total Catch
612	10	12-Sep	12:00	13-Sep	14:30	1
613	11	12-Sep	12:15	13-Sep	12:00	1
615	12	12-Sep	13:10	13-Sep	14:45	0
n/a	13	12-Sep	12:00	13-Sep	13:40	2
n/a	14	12-Sep	12:00	13-Sep	9:30	1
212	1	13-Sep	9:44	14-Sep	16:00	1
213	2	13-Sep	10:00	14-Sep	10:30	1
214	3	13-Sep	10:21	14-Sep	9:55	0
215	4	13-Sep	10:32	14-Sep	10:50	0
216	5	13-Sep	10:54	14-Sep	11:25	1
217	6	13-Sep	11:15	14-Sep	11:05	0
218	7	13-Sep	11:28	14-Sep	12:00	0
219	8	13-Sep	11:40	14-Sep	10:05	0
616	9	13-Sep	15:00	14-Sep	16:10	1
617	10	13-Sep	14:05	14-Sep	15:40	1
618	11	13-Sep	10:50	14-Sep	12:15	0
619	12	13-Sep	11:20	14-Sep	14:15	1
620	13	13-Sep	10:15	14-Sep	14:10	0
621	14	13-Sep	10:40	14-Sep	11:50	0
622	15	13-Sep	13:30	14-Sep	14:45	3
623	16	13-Sep	11:50	14-Sep	14:30	0
624	17	13-Sep	14:00	14-Sep	15:10	1
625	18	13-Sep	14:15	14-Sep	15:25	1
626	19	13-Sep	9:45	14-Sep	13:40	2
627	20	13-Sep	16:00	14-Sep	16:30	2
628	21	13-Sep	9:55	14-Sep	13:30	0
629	1	14-Sep	16:50	15-Sep	13:52	0
630	2	14-Sep	17:00	15-Sep	14:15	1
631	3	14-Sep	16:35	15-Sep	14:30	0
632	4	14-Sep	16:45	15-Sep	12:20	0
633	5	14-Sep	16:00	15-Sep	12:15	1
634	6	14-Sep	16:10	15-Sep	14:41	0
635	7	14-Sep	15:35	15-Sep	13:42	0
636	8	14-Sep	15:45	15-Sep	14:09	3
637	9	14-Sep	14:40	15-Sep	12:15	0
638	10	14-Sep	15:00	15-Sep	14:30	0
639	11	14-Sep	13:55	15-Sep	14:00	2
640	12	14-Sep	14:25	15-Sep	12:05	0
641	13	14-Sep	12:15	15-Sep	11:47	0
642	14	14-Sep	13:50	15-Sep	13:50	0
643	15	14-Sep	11:01	15-Sep	11:15	0
644	16	14-Sep	11:45	15-Sep	11:50	0
645	17	14-Sep	10:15	15-Sep	11:05	1
646	18	14-Sep	10:20	15-Sep	11:00	0
647	19	14-Sep	10:45	15-Sep	10:50	0
648	20	14-Sep	11:00	15-Sep	11:20	1
720	1	15-Sep	13:55	16-Sep	12:40	0
721	2	15-Sep	14:05	16-Sep	12:50	1
718	3	15-Sep	17:00	16-Sep	14:30	0
719	4	15-Sep	14:35	16-Sep	14:45	1
717	5	15-Sep	17:15	16-Sep	14:10	3
715	6	15-Sep	11:00	16-Sep	9:30	0
716	7	15-Sep	11:10	16-Sep	9:40	0
713	8	15-Sep	11:25	16-Sep	10:25	0
714	9	15-Sep	11:50	16-Sep	11:05	1
711	10	15-Sep	11:10	16-Sep	9:55	0
712	11	15-Sep	11:30	16-Sep	10:00	1
709	12	15-Sep	11:55	16-Sep	10:15	0
710	13	15-Sep	12:30	16-Sep	11:25	0

Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

B) Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

Site ID	Net ID	Set Date	Set Time	Lift Date	Lift Time	Total Catch
707	14	15-Sep	16:50	16-Sep	13:55	0
708	15	15-Sep	16:55	16-Sep	12:00	2
705	16	15-Sep	14:20	16-Sep	13:15	1
706	17	15-Sep	14:36	16-Sep	13:35	0
704	18	15-Sep	14:50	16-Sep	13:40	1
700	19	15-Sep	13:48	16-Sep	11:50	1
701	20	15-Sep	14:00	16-Sep	12:30	0
702	21	15-Sep	12:12	16-Sep	11:10	0
703	22	15-Sep	12:30	16-Sep	11:35	1
736	1	16-Sep	10:15	18-Sep	9:42	1
731	2	16-Sep	10:55	17-Sep	9:50	0
722	3	16-Sep	13:25	17-Sep	13:00	0
723	4	16-Sep	13:35	17-Sep	13:00	0
724	5	16-Sep	12:55	17-Sep	14:00	0
725	6	16-Sep	12:10	17-Sep	14:10	0
726	7	16-Sep	14:20	17-Sep	15:05	0
727	8	16-Sep	14:50	17-Sep	14:50	1
728	9	16-Sep	13:50	17-Sep	13:30	0
729	10	16-Sep	14:00	17-Sep	13:15	1
730	11	16-Sep	11:55	17-Sep	11:40	0
731	12	16-Sep	12:45	17-Sep	13:50	0
732	13	16-Sep	11:25	17-Sep	11:00	0
733	14	16-Sep	11:48	17-Sep	11:20	1
734	15	16-Sep	11:05	17-Sep	10:45	0
735	16	16-Sep	11:15	17-Sep	11:15	0
738	17	16-Sep	9:55	17-Sep	10:00	0
739	18	16-Sep	10:10	17-Sep	10:20	0
740	19	16-Sep	9:35	17-Sep	9:40	0
741	20	16-Sep	9:50	17-Sep	9:50	1
742	21	16-Sep	16:50	17-Sep	15:15	1
743	22	16-Sep	17:00	17-Sep	17:35	2
782	1	18-Sep	15:00	19-Sep	13:40	0
783	2	18-Sep	15:15	19-Sep	14:30	0
780	3	18-Sep	14:35	19-Sep	13:10	0
781	4	18-Sep	14:45	19-Sep	13:30	0
776	5	18-Sep	13:25	19-Sep	13:00	0
777	6	18-Sep	13:35	19-Sep	11:50	0
778	7	18-Sep	13:45	19-Sep	14:00	2
779	8	18-Sep	13:50	19-Sep	14:10	0
774	9	18-Sep	12:55	19-Sep	13:30	0
775	10	18-Sep	13:10	19-Sep	14:00	0
772	11	18-Sep	12:30	19-Sep	11:10	0
773	12	18-Sep	12:45	19-Sep	11:20	0
768	13	18-Sep	10:20	19-Sep	10:00	0
769	14	18-Sep	10:45	19-Sep	10:30	1
770	15	18-Sep	11:25	19-Sep	10:45	0
771	16	18-Sep	11:30	19-Sep	11:00	0
766	17	18-Sep	9:45	19-Sep	9:40	0
767	18	18-Sep	10:00	19-Sep	9:50	0
764	19	18-Sep	9:25	19-Sep	10:10	1
765	20	18-Sep	9:35	19-Sep	9:30	0
784	21	18-Sep	15:25	19-Sep	14:45	1
785	22	18-Sep	15:40	19-Sep	15:00	1
796	1	19-Sep	13:35	21-Sep	12:10	0
797	2	19-Sep	11:45	21-Sep	13:15	0
794	3	19-Sep	11:15	21-Sep	11:50	0
795	4	19-Sep	11:25	21-Sep	12:00	0
800	5	19-Sep	13:20	21-Sep	13:35	0
801	6	19-Sep	13:35	21-Sep	14:00	0

Appendix 3.1-2. Gillnet Set and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

B) Removal Phase Gillnet and Catch Data, Tail Lake Fish-out, Doris North Project, 2011

Site ID	Net ID	Set Date	Set Time	Lift Date	Lift Time	Total Catch
798	7	19-Sep	11:55	21-Sep	12:25	0
799	8	19-Sep	13:00	21-Sep	13:25	0
803	9	19-Sep	14:15	21-Sep	14:15	0
802	10	19-Sep	13:45	21-Sep	13:04	0
790	11	19-Sep	10:25	21-Sep	11:15	0
791	12	19-Sep	10:40	21-Sep	11:05	0
792	13	19-Sep	10:50	21-Sep	11:25	0
793	14	19-Sep	11:00	21-Sep	11:40	0
786	15	19-Sep	9:35	21-Sep	10:10	1
787	16	19-Sep	9:45	21-Sep	10:20	0
788	17	19-Sep	9:50	21-Sep	10:30	0
789	18	19-Sep	10:05	21-Sep	10:45	1
805	19	19-Sep	14:40	21-Sep	15:55	1
804	20	19-Sep	14:25	21-Sep	14:25	0
807	21	19-Sep	15:10	21-Sep	15:00	0
806	22	19-Sep	14:50	21-Sep	15:15	0
808	1	21-Sep	15:20	22-Sep	13:25	0
809	2	21-Sep	15:55	22-Sep	13:10	1
809	3	21-Sep	15:10	22-Sep	13:30	0
809	4	21-Sep	14:10	22-Sep	11:15	0
809	5	21-Sep	14:20	22-Sep	12:55	0
809	6	21-Sep	14:35	22-Sep	12:05	0
809	7	21-Sep	11:35	22-Sep	10:30	0
809	8	21-Sep	11:45	22-Sep	10:55	0
809	9	21-Sep	11:10	22-Sep	10:10	0
809	10	21-Sep	11:20	22-Sep	10:20	1
809	11	21-Sep	12:20	22-Sep	12:25	0
809	12	21-Sep	12:30	22-Sep	11:45	1
809	13	21-Sep	11:55	22-Sep	10:40	0
809	14	21-Sep	12:10	22-Sep	11:40	0
809	15	21-Sep	10:15	22-Sep	9:30	0
809	16	21-Sep	10:30	22-Sep	9:35	0
809	17	21-Sep	10:40	22-Sep	9:40	1
809	18	21-Sep	11:00	22-Sep	10:00	1
809	19	21-Sep	13:20	22-Sep	12:45	0
809	20	21-Sep	13:30	22-Sep	12:35	0
809	21	21-Sep	13:40	22-Sep	12:55	0
809	22	21-Sep	13:50	22-Sep	13:20	0
						335

Appendix 3.1-3

Lake Trout Diet Data by Number, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.1-3. Lake Trout Diet Data by Number, Tail Lake Fish-out, Doris North Project, 2011

Stomach Number			472	474	475	476	480	481	482	484	486	491	495	498	500	513	522	666	705	711	722
Date			11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	13-Aug-11	no date	13-Aug-11	no date	15-Aug-11	17-Aug-11	17-Aug-11	17-Aug-11
Sample No.			110336	110337	110338	110339	110340	110341	110342	110343	110344	110345	110346	110347	110348	110349	110350	110351	110352	110353	110354
Fullness (%)			90	40	50	75	10	75	90	50	20	90	100	10	5	100	100	75	0	90	80
Digestion (%)			90	10	90	10	10	10	75	50	75	25	25	0	25	50	75	25	100	25	50
Actual Weight (mg)			34312	8353	11162	808	252	11292	25045	9987	1297	1442	860	559	114	20395	32068	29981	0	27211	20593
Species/Group	**Stage**	**Origin**																			
CRUSTACEA																					
EUBRANCHIOPODA																					
Triops longicaudatus	A	B		8	80			1	81	1						130	36			76	66
AMPHIPODA																					
Gammaridae																					
Gammarus lacustris		C		130	2		1	2	367	10					3	50	33			8	146
INSECTA																					
TRICHOPTERA																					
Limnephilidae		B																			
Grensia	L	B		23	127		1		140	4						1		516			18
Grensia	P	B																			
DIPTERA																					
Chironomidae																					
Tanypodinae																					
Procladius	L	B						2		4											1
Chironomini	L	B																			
Phaenopsectra	L	B						2		3											
Phaenopsectra	P	B																			
Orthocladinae damaged	L	B								2											1
Orthocladinae damaged	P	B						4		8											
Diamesinae		B																			
Monodiamesa	L	B								1											
Protanypus	L	B		1				1													
MOLLUSCA																					
Bivalvia																					
Sphaeridae																					
Pisidium		B		11				4		4						6	2			1	7
FISH																					
Fish	juv							1													
Gasterostidae																					
Pungitius pungitius		W				6	2	92		54	3	15	11	4			14				1
MAMMALIA																					
Mammalia fur	damaged																				
Rodentia	damaged	T	1														1				
NON-FOOD ITEMS																					
Case materials				X	X				X	X						X		X			X
Plant				X	X			X	X							X	X			X	X
Pebble				X				X		X	X						X			X	X
TOTAL			**1**	**173**	**209**	**6**	**4**	**109**	**588**	**91**	**3**	**15**	**11**	**4**	**3**	**187**	**86**	**516**	**0**	**85**	**240**

Abbreviation	*Description*	*Abbreviation*	*Description*	*Abbreviation*	*Description*
A	*adult*	*L**	*larva too small to be identified further*	*D*	*Drift*
cop	*copepodite (juvenile copepod)*	*M*	*male*	*TERR*	*Terrestrial*
dam	*damaged*	*N*	*nymph (juvenile of hemimetabolous insect)*	*W*	*Water column*
E	*egg*	*N**	*nymph too small to be identified further*	*Z*	*Zooplankton*
F	*female*	*P*	*pupa (second juvenile of homometabolous insect)*	*Estimated Weight*	*Used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.*
juv	*juvenile*	*I to V*	*first through fifth copepodite stages*	*X*	*Present (in fish diet studies)*
L	*larva (first juvenile of homometabolous insect)*	*B*	*Benthic/epibenthic*		

Appendix 3.1-3. Lake Trout Diet Data by Number, Tail Lake Fish-out, Doris North Project, 2011

Stomach Number			735	742	749	771	774	778	780	795	807	813	851	859	864	869	883	886	896	919	913
Date			18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	no date	no date	no date	20-Aug-11	20-Aug-11	20-Aug-11	20-Aug-11	20-Aug-11	no date	no date	no date	no date
Sample No.			110355	110356	110357	110358	110359	110360	110361	110362	110363	110364	110365	110366	110367	110368	110369	110370	110371	110372	110373
Fullness (%)			25	0	1	0	50	1	80	0	0	1	0	0	0	100	0	0	0	0	0
Digestion (%)			90	100	50	100	75	100	10	100	100	90	100	100	100	50	100	100	100	100	100
Actual Weight (mg)			957	0	35	0	14377	0	1103	0	0	20	0	0	0	102651	0	0	0	0	0
Species/Group	Stage	Origin																			
CRUSTACEA																					
EUBRANCHIOPODA																					
Triops longicaudatus	A	B					100									625					
AMPHIPODA																					
Gammaridae																					
Gammarus lacustris		C			1											126					
INSECTA																					
TRICHOPTERA																					
Limnephilidae		B																			
Grensia	L	B					1									6					
Grensia	P	B																			
DIPTERA																					
Chironomidae																					
Tanypodinae																					
Procladius	L	B																			
Chironomini	L	B																			
Phaenopsectra	L	B																			
Phaenopsectra	P	B																			
Orthocladinae damaged	L	B																			
Orthocladinae damaged	P	B																			
Diamesinae		B																			
Monodiamesa	L	B																			
Protanypus	L	B																			
MOLLUSCA																					
Bivalvia																					
Sphaeridae																					
Pisidium		B					1														
FISH																					
Fish	juv		3																		
Gasterostidae																					
Pungitius pungitius		W							10												
MAMMALIA																					
Mammalia fur	damaged																				
Rodentia	damaged	T																			
NON-FOOD ITEMS																					
Case materials							X									X					
Plant							X					X									
Pebble							X														
TOTAL			**3**	**0**	**1**	**0**	**102**	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**757**	**0**	**0**	**0**	**0**	**0**

Abbreviation	*Description*	*Abbreviation*	*Description*	*Abbreviation*	*Description*
A	*adult*	*L**	*larva too small to be identified further*	*D*	*Drift*
cop	*copepodite (juvenile copepod)*	*M*	*male*	*TERR*	*Terrestrial*
dam	*damaged*	*N*	*nymph (juvenile of hemimetabolous insect)*	*W*	*Water column*
E	*egg*	*N**	*nymph too small to be identified further*	*Z*	*Zooplankton*
F	*female*	*P*	*pupa (second juvenile of homometabolous insect)*	*Estimated Weight*	*Used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.*
juv	*juvenile*	*I to V*	*first through fifth copepodite stages*	*X*	*Present (in fish diet studies)*
L	*larva (first juvenile of homometabolous insect)*	*B*	*Benthic/epibenthic*		

Appendix 3.1-3. Lake Trout Diet Data by Number, Tail Lake Fish-out, Doris North Project, 2011

Stomach Number			914	925	941	948	952	955	965	979	890	986	997	1000	no #	
Date			no date	no date	no date	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	Aug 11	
Sample No.			110374	110375	110376	110377	110378	110379	110380	110381	110382	110383	110384	110385	110386	
Fullness (%)			0	0	1	0	90	100	100	1	0	0	0	0	90	
Digestion (%)			100	100	99	100	25	10	25	99	100	100	100	100	25	
Actual Weight (mg)			0	0	1	0	13598	25759	41005	4	0	0	0	0	37490	Totals
Species/Group	Stage	Origin														
CRUSTACEA																
EUBRANCHIOPODA																
Triops longicaudatus	A	B					8	25	150						160	1547
AMPHIPODA																0
Gammaridae																0
Gammarus lacustris		C			1		205	372	55	1					75	1588
INSECTA																0
TRICHOPTERA																0
Limnephilidae		B														0
Grensia	L	B					1		2						1	841
Grensia	P	B					1									1
DIPTERA																0
Chironomidae																0
Tanypodinae																0
Procladius	L	B														7
Chironomini	L	B					1									1
Phaenopsectra	L	B														5
Phaenopsectra	P	B														0
Orthocladinae damaged	L	B														3
Orthocladinae damaged	P	B														12
Diamesinae		B														0
Monodiamesa	L	B														1
Protanypus	L	B														2
MOLLUSCA																0
Bivalvia																0
Sphaeridae																0
Pisidium		B					3									39
FISH																0
Fish	juv															4
Gasterostidae																0
Pungitius pungitius		W						1								213
MAMMALIA																0
Mammalia fur	damaged								X							0
Rodentia	damaged	T														2
NON-FOOD ITEMS																0
Case materials									X						X	0
Plant					X		X	X	X						X	0
Pebble					X											0
TOTAL			**0**	**0**	**1**	**0**	**219**	**398**	**207**	**1**	**0**	**0**	**0**	**0**	**236**	**4266**

Abbreviation	*Description*	*Abbreviation*	*Description*	*Abbreviation*	*Description*
A	*adult*	*L**	*larva too small to be identified further*	*D*	*Drift*
cop	*copepodite (juvenile copepod)*	*M*	*male*	*TERR*	*Terrestrial*
dam	*damaged*	*N*	*nymph (juvenile of hemimetabolous insect)*	*W*	*Water column*
E	*egg*	*N**	*nymph too small to be identified further*	*Z*	*Zooplankton*
F	*female*	*P*	*pupa (second juvenile of homometabolous insect)*	*Estimated Weight*	*Used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.*
juv	*juvenile*	*I to V*	*first through fifth copepodite stages*	*X*	*Present (in fish diet studies)*
L	*larva (first juvenile of homometabolous insect)*	*B*	*Benthic/epibenthic*		

Appendix 3.1-4

Lake Trout Diet Data by Weight, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.1-4. Lake Trout Diet Data by Weight, Tail Lake Fish-out, Doris North Project, 2011

Stomach Number			472	474	475	476	480	481	482	484	486	491	495	498	500	513	522	666	705	711	722
Date			11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	11-Aug-11	13-Aug-11	no date	13-Aug-11	no date	15-Aug-11	17-Aug-11	17-Aug-11	17-Aug-11
Sample No.			110336	110337	110338	110339	110340	110341	110342	110343	110344	110345	110346	110347	110348	110349	110350	110351	110352	110353	110354
Fullness (%)			90	40	50	75	10	75	90	50	20	90	100	10	5	100	100	75	0	90	80
Digestion (%)			90	10	90	10	10	10	75	50	75	25	25	0	25	50	75	25	100	25	50
Actual Weight (mg)			34312	8353	11162	808	252	11292	25045	9987	1297	1442	860	559	114	20395	32068	29981	0	27211	20593
Species/Group	Stage	Origin																			
CRUSTACEA																					
EUBRANCHIOPODA																					
Triops longicaudatus	A	B		1420	14200			130	10788	123						17616	6942			26665	9374
AMPHIPODA																					
Gammaridae																					
Gammarus lacustris		C		5351	80		34	38	9981	235					114	2267	1177			324	8857
INSECTA																					
TRICHOPTERA																					
Limnephilidae		B																			
Grensia	L	B		460	2540		14		2787	112						18		17829			414
Grensia	P	B																			
DIPTERA																					
Chironomidae																					
Tanypodinae																					
Procladius	L	B						9		9											3
Chironomini	L	B																			
Phaenopsectra	L	B						8		20											
Phaenopsectra	P	B																			
Orthocladinae damaged	L	B								3											1
Orthocladinae damaged	P	B						7		16											
Diamesinae		B																			
Monodiamesa	L	B								4											
Protanypus	L	B		8				7													
MOLLUSCA																					
Bivalvia																					
Sphaeridae																					
Pisidium		B		91				46		30						32	10			6	59
FISH																					
Fish	juv							12													
Gasterostidae																					
Pungitius pungitius		W				808	204	10777		9306	1279	1442	860	559			4434				232
MAMMALIA																					
Mammalia fur	damaged																				
Rodentia	damaged	T	34312														19358				
NON-FOOD ITEMS																					
Case materials				765	3427				3359	102						35		12152			787
Plant				166	295			210	403							427	68			13	694
Pebble				92				48		27	18						79			203	172
TOTAL			**34312**	**8353**	**20542**	**808**	**252**	**11292**	**27318**	**9987**	**1297**	**1442**	**860**	**559**	**114**	**20395**	**32068**	**29981**	**0**	**27211**	**20593**

Abbreviation	*Description*	*Abbreviation*	*Description*	*Abbreviation*	*Description*
A	*adult*	*L**	*larva too small to be identified further*	*D*	*Drift*
cop	*copepodite (juvenile copepod)*	*M*	*male*	*TERR*	*Terrestrial*
dam	*damaged*	*N*	*nymph (juvenile of hemimetabolous insect)*	*W*	*Water column*
E	*egg*	*N**	*nymph too small to be identified further*	*Z*	*Zooplankton*
F	*female*	*P*	*pupa (second juvenile of homometabolous insect)*	*Estimated Weight*	*Used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.*
juv	*juvenile*	*I to V*	*first through fifth copepodite stages*	*X*	*Present (in fish diet studies)*
L	*larva (first juvenile of homometabolous insect)*	*B*	*Benthic/epibenthic*		

Appendix 3.1-4. Lake Trout Diet Data by Weight, Tail Lake Fish-out, Doris North Project, 2011

Stomach Number			735	742	749	771	774	778	780	795	807	813	851	859	864	869	883	886	896	919	913
Date			18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	no date	no date	no date	20-Aug-11	20-Aug-11	20-Aug-11	20-Aug-11	20-Aug-11	no date	no date	no date	no date
Sample No.			110355	110356	110357	110358	110359	110360	110361	110362	110363	110364	110365	110366	110367	110368	110369	110370	110371	110372	110373
Fullness (%)			25	0	1	0	50	1	80	0	0	1	0	0	0	100	0	0	0	0	0
Digestion (%)			90	100	50	100	75	100	10	100	100	90	100	100	100	50	100	100	100	100	100
Actual Weight (mg)			957	0	35	0	14377	0	1103	0	0	20	0	0	0	102651	0	0	0	0	0
Species/Group	**Stage**	**Origin**																			
CRUSTACEA																					
EUBRANCHIOPODA																					
Triops longicaudatus	A	B					13633									97580					
AMPHIPODA																					
Gammaridae																					
Gammarus lacustris		C			35											4738					
INSECTA																					
TRICHOPTERA																					
Limnephilidae		B																			
Grensia	L	B					25									157					
Grensia	P	B																			
DIPTERA																					
Chironomidae																					
Tanypodinae																					
Procladius	L	B																			
Chironomini	L	B																			
Phaenopsectra	L	B																			
Phaenopsectra	P	B																			
Orthocladinae damaged	L	B																			
Orthocladinae damaged	P	B																			
Diamesinae		B																			
Monodiamesa	L	B																			
Protanypus	L	B																			
MOLLUSCA																					
Bivalvia																					
Sphaeridae																					
Pisidium		B					3														
FISH																					
Fish	juv		957																		
Gasterostidae																					
Pungitius pungitius		W							1103												
MAMMALIA																					
Mammalia fur	damaged																				
Rodentia	damaged	T																			
NON-FOOD ITEMS																					
Case materials							49									176					
Plant							473					20									
Pebble							194														
TOTAL			**957**	**0**	**35**	**0**	**14377**	**0**	**1103**	**0**	**0**	**20**	**0**	**0**	**0**	**102651**	**0**	**0**	**0**	**0**	**0**

Abbreviation	*Description*	*Abbreviation*	*Description*	*Abbreviation*	*Description*
A	*adult*	*L**	*larva too small to be identified further*	*D*	*Drift*
cop	*copepodite (juvenile copepod)*	*M*	*male*	*TERR*	*Terrestrial*
dam	*damaged*	*N*	*nymph (juvenile of hemimetabolous insect)*	*W*	*Water column*
E	*egg*	*N**	*nymph too small to be identified further*	*Z*	*Zooplankton*
F	*female*	*P*	*pupa (second juvenile of homometabolous insect)*	*Estimated Weight*	*Used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.*
juv	*juvenile*	*I to V*	*first through fifth copepodite stages*	*X*	*Present (in fish diet studies)*
L	*larva (first juvenile of homometabolous insect)*	*B*	*Benthic/epibenthic*		

Appendix 3.1-4. Lake Trout Diet Data by Weight, Tail Lake Fish-out, Doris North Project, 2011

Stomach Number			914	925	941	948	952	955	965	979	890	986	997	1000	no #	
Date			no date	no date	no date	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	21-Aug-11	Aug 11	
Sample No.			110374	110375	110376	110377	110378	110379	110380	110381	110382	110383	110384	110385	110386	
Fullness (%)			0	0	1	0	90	100	100	1	0	0	0	0	90	
Digestion (%)			100	100	99	100	25	10	25	99	100	100	100	100	25	
Actual Weight (mg)			0	0	1	0	13598	25759	41005	4	0	0	0	0	37490	Totals
Species/Group	Stage	Origin														
CRUSTACEA																
EUBRANCHIOPODA																
Triops longicaudatus	A	B					1559	7633	36192						33170	277025
AMPHIPODA																0
Gammaridae																0
Gammarus lacustris		C			35		10435	17901	2874	35					3297	67808
INSECTA																0
TRICHOPTERA																0
Limnephilidae		B														0
Grensia	L	B					25		50						19	24450
Grensia	P	B					53									53
DIPTERA																0
Chironomidae																0
Tanypodinae																0
Procladius	L	B														21
Chironomini	L	B					5									5
Phaenopsectra	L	B														28
Phaenopsectra	P	B														0
Orthocladinae damaged	L	B														4
Orthocladinae damaged	P	B														23
Diamesinae		B														0
Monodiamesa	L	B														4
Protanypus	L	B														15
MOLLUSCA																0
Bivalvia																0
Sphaeridae																0
Pisidium		B					18									295
FISH																0
Fish	juv															969
Gasterostidae																0
Pungitius pungitius		W						200								31204
MAMMALIA																0
Mammalia fur	damaged								1650							1650
Rodentia	damaged	T														53670
NON-FOOD ITEMS																0
Case materials									56						38	20946
Plant					1		1503	25	183						966	5447
Pebble					15											848
TOTAL			**0**	**0**	**51**	**0**	**13598**	**25759**	**41005**	**35**	**0**	**0**	**0**	**0**	**37490**	**484465**

Abbreviation	*Description*	*Abbreviation*	*Description*	*Abbreviation*	*Description*
A	*adult*	*L**	*larva too small to be identified further*	*D*	*Drift*
cop	*copepodite (juvenile copepod)*	*M*	*male*	*TERR*	*Terrestrial*
dam	*damaged*	*N*	*nymph (juvenile of hemimetabolous insect)*	*W*	*Water column*
E	*egg*	*N**	*nymph too small to be identified further*	*Z*	*Zooplankton*
F	*female*	*P*	*pupa (second juvenile of homometabolous insect)*	*Estimated Weight*	*Used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.*
juv	*juvenile*	*I to V*	*first through fifth copepodite stages*	*X*	*Present (in fish diet studies)*
L	*larva (first juvenile of homometabolous insect)*	*B*	*Benthic/epibenthic*		

Appendix 3.1-5

Lake Trout Tissue Metals Concentrations, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.1-5. Lake Trout Tissue Metals Concentrations, Tail Lake Fish-out, Doris North Project, 2011

Sample ID	0463 LAKE TROUT MUSCLE TISSUE 1	0463 LAKE TROUT MUSCLE TISSUE 2	0463 LAKE TROUT MUSCLE TISSUE 3	0463 LAKE TROUT MUSCLE TISSUE 4	0463 LAKE TROUT MUSCLE TISSUE 5	0463 LAKE TROUT MUSCLE TISSUE 6	0463 LAKE TROUT MUSCLE TISSUE 7	0463 LAKE TROUT MUSCLE TISSUE 8
Date Sampled	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**
Time Sampled	**16:00**	**16:00**	**16:00**	**16:00**	**16:00**	**16:00**	**16:00**	**16:00**
ALS Sample ID	**L1035342-1**	**L1035342-2**	**L1035342-3**	**L1035342-4**	**L1035342-5**	**L1035342-6**	**L1035342-7**	**L1035342-8**
Matrix	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**
Fork Length (mm)	n/a	566	547	570	565	560	551	615
Physical Tests								
% Moisture	79.8	77.1	78.0	75.4	78.7	78.6	77.4	79.2
Metals								
Aluminum (Al)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Antimony (Sb)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)-Total	0.040	0.026	0.024	0.025	0.027	0.026	0.024	0.076
Barium (Ba)-Total	0.015	0.016	<0.010	0.015	0.013	<0.010	0.051	0.018
Beryllium (Be)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Bismuth (Bi)-Total	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Cadmium (Cd)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)-Total	321	149	99.8	106	94.0	111	183	136
Chromium (Cr)-Total	0.25	0.20	0.20	0.22	0.19	0.21	0.21	0.18
Cobalt (Co)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Copper (Cu)-Total	0.203	0.263	0.282	0.207	0.263	0.168	0.286	0.182
Lead (Pb)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Lithium (Li)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Magnesium (Mg)-Total	295	303	292	295	267	282	280	278
Manganese (Mn)-Total	0.251	0.220	0.181	0.220	0.240	0.198	0.176	0.284
Mercury (Hg)-Total	0.143	0.137	0.191	0.158	0.177	0.263	0.202	0.0948
Molybdenum (Mo)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel (Ni)-Total	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Selenium (Se)-Total	<0.20	0.22	<0.20	<0.20	0.21	0.22	0.23	<0.20
Strontium (Sr)-Total	0.362	0.106	0.064	0.056	0.074	0.026	0.137	0.126
Thallium (Tl)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tin (Sn)-Total	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium (U)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium (V)-Total	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)-Total	2.97	3.76	3.30	3.03	3.32	2.53	3.20	2.96

Appendix 3.1-5. Lake Trout Tissue Metals Concentrations, Tail Lake Fish-out, Doris North Project, 2011

Sample ID	0463 LAKE TROUT MUSCLE TISSUE 9	0463 LAKE TROUT MUSCLE TISSUE 10	0463 LAKE TROUT MUSCLE TISSUE 11	0463 LAKE TROUT MUSCLE TISSUE 12	0463 LAKE TROUT MUSCLE TISSUE 13	0463 LAKE TROUT MUSCLE TISSUE 14	0463 LAKE TROUT MUSCLE TISSUE 15	0463 LAKE TROUT MUSCLE TISSUE 16
Date Sampled	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**	**16-JUL-11**
Time Sampled	**16:00**	**16:00**	**16:00**	**16:00**	**16:00**	**16:00**	**16:00**	**16:00**
ALS Sample ID	**L1035342-9**	**L1035342-10**	**L1035342-11**	**L1035342-12**	**L1035342-13**	**L1035342-14**	**L1035342-15**	**L1035342-16**
Matrix	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**
Fork Length (mm)	580	550	545	590	580	570	600	550
Physical Tests								
% Moisture	80.6	78.1	73.5	80.0	75.2	76.3	76.7	76.8
Metals								
Aluminum (Al)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Antimony (Sb)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)-Total	0.068	0.032	0.039	0.033	0.037	0.036	0.030	0.037
Barium (Ba)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Bismuth (Bi)-Total	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Cadmium (Cd)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)-Total	205	152	90.1	132	100	108	140	141
Chromium (Cr)-Total	0.21	0.18	0.19	0.16	0.21	0.22	0.20	0.22
Cobalt (Co)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Copper (Cu)-Total	0.170	0.301	0.260	0.222	0.226	0.163	0.198	0.195
Lead (Pb)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Lithium (Li)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Magnesium (Mg)-Total	249	285	272	246	277	288	270	287
Manganese (Mn)-Total	0.175	0.184	0.140	0.163	0.196	0.166	0.149	0.163
Mercury (Hg)-Total	0.138	0.176	0.103	0.188	0.145	0.116	0.133	0.143
Molybdenum (Mo)-Total	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel (Ni)-Total	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Selenium (Se)-Total	<0.20	0.23	0.22	0.21	0.21	<0.20	<0.20	0.23
Strontium (Sr)-Total	0.226	0.128	0.051	0.097	0.055	0.069	0.101	0.104
Thallium (Tl)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tin (Sn)-Total	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium (U)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium (V)-Total	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)-Total	3.20	3.49	3.43	4.14	4.01	2.64	3.09	3.37

Appendix 3.2-1

Physical Limnology Results, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.2-1. Physical Limnology Results, Tail Lake Fish-out, Doris North Project, 2011

Lake	Tail Lake		
Date	24-Jul-11		
Depth (m)	Temperature ℃	Dissolved Oxygen mg/L	Dissolved Oxygen Saturation %
0.1	16.3	8.13	82.9
0.5	16.3	8.12	82.8
1	16.3	8.13	82.8
1.5	16.3	8.13	82.9
2	16.2	8.14	82.8
2.5	16.2	8.14	82.8
3	16.2	8.14	82.8
3.5	16.2	8.14	82.8
4	16.2	8.14	82.8
4.5	16.2	8.13	82.7
5	16.2	8.12	82.6
5.5	16.2	8.12	82.6
6	16.2	8.12	82.6
6.5	16.2	5.3	50.3

Lake	Tail Lake		
Date	17-Sep-11		
Depth (m)	Temperature ℃	Dissolved Oxygen mg/L	Dissolved Oxygen Saturation %
0.1	5.2	10.36	81.4
0.5	5.2	10.37	81.6
1	5.2	10.39	81.6
1.5	5.2	10.41	81.8
2	5.2	10.41	81.9
2.5	5.2	10.42	82.6
3	5.2	10.42	82
3.5	5.2	10.42	82
4	5.2	10.43	82.1
4.5	5.2	10.43	82.1
5	5.2	10.43	82.1
5.5	5.2	10.44	82.2
6	5.2	10.44	82.2
6.5	5.2	9.91	78

Lake	Tail Lake		
Date	18-Aug-11		
Depth (m)	Temperature ℃	Dissolved Oxygen mg/L	Dissolved Oxygen Saturation %
0.1	11.8	8.97	82.8
1	11.9	8.98	83.1
2	12	8.96	83.1
3	12	8.96	83.1
4	12	8.96	83.1
5	12	7.28	76
6	12.1	4.43	45.5

Appendix 3.3-1

Water Quality Results, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.3-1. Water Quality Results, Tail Lake Fish-out, Doris North Project, 2011

			Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
			Date	24-Jul-11	24-Jul-11	24-Jul-11	24-Jul-11	24-Jul-11	24-Jul-11	18-Aug-11	18-Aug-11	18-Aug-11
			Depth (m)	1	1	1	5	5	5	1	1	1
			Replicate	1	2	3	1	2	3	1	2	3
			ALS Sample ID	L1035865-28	L1035865-29	L1035865-30	L1035865-31	L1035865-32	L1035865-33	L1047702-1	L1047702-2	L1047702-3
Physical Tests		**CCME guidelines**	**Realized Detection Limits**									
Colour, True	CU		5	17.4	17.3	17.6	17.0	17.2	17.2	16.3	16.2	16.2
Conductivity	µS/cm		2	141	142	142	143	143	143	148	146	146
Hardness (as $CaCO_3$)	mg/L		0.5	32.4	34.5	34.2	33.0	32.1	33.4	34.9	34.3	34.6
pH	pH	6.5-9.0	0.1	7.68	8.15	8.14	8.17	8.15	8.13	7.80	7.80	7.81
Acidity (as $CaCO_3$)	mg/L		1	1.5	3.9	4.1	3.8	4.0	4.1	2.0	2.0	2.0
Alkalinity, Total (as $CaCO_3$)	mg/L		2	26.5	27.2	27.2	27.0	27.0	27.1	28.3	28.9	28.7
ORP (Oxidation Reduction Potential)	mV		-1000	-	-	-	-	-	-	-	-	-
Total Suspended Solids	mg/L	dependent on background levels	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L		10	81	77	79	79	82	81	69	86	89
Turbidity	NTU	dependent on background levels	0.1	0.92	0.71	0.67	0.74	0.80	0.77	0.86	1.10	0.70
Anions												
Bromide (Br)	mg/L		0.05-0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050	0.055	<0.050
Chloride (Cl)	mg/L		0.5	24.5	24.5	24.5	24.5	24.5	24.6	25.0	25.1	25.0
Fluoride (F)	mg/L	0.120[b]	0.02	0.056	0.056	0.057	0.057	0.056	0.057	0.059	0.056	0.059
Nutrients												
Ammonia (as N)	mg/L	pH- and temperature-dependent	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0324	0.0183
Nitrate (as N)	mg/L	2.935[b]	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.05	0.484	0.453	0.393	0.441	0.348	0.305	0.419	0.340	0.336
Total Nitrogen	mg/L		0.0025-0.05	0.460	0.420	0.440	0.430	0.430	0.430	0.420	0.380	0.370
Orthophosphate (as P)	mg/L		0.001	<0.0010	<0.0010	0.0040	<0.0010	<0.0010	<0.0010	0.0016	0.0011	<0.0010
Phosphorus (P)-Total Dissolved	mg/L		0.002	0.0045	0.0038	0.0066	0.0034	0.0034	0.0073	0.0048	0.0044	0.0041
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework	0.002	0.0165	0.0074	0.0247	0.0255	0.0079	0.0198	0.0093	0.0118	0.0083
Silicate (as SIO_2)	mg/L		0.025-1	1.3	1.4	1.4	1.4	1.4	1.4	<1.0	<1.0	1.1
Sulphate (SO_4)	mg/L		0.5	1.46	1.45	1.45	1.46	1.46	1.49	1.44	1.45	1.45
Cyanides												
Cyanide, Weak Acid Dissociable	mg/L	0.005 (as free CN)	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0034	0.0027	0.0011
Cyanide, Total	mg/L	0.005 (as free CN)	0.001-0.0011	0.0053	0.0042	0.0053	0.0048	0.0050	0.0047	0.0042	0.0043	0.0044
Organic / Inorganic Carbon												
Total Organic Carbon	mg/L		0.5	6.56	6.44	6.47	6.46	6.58	6.51	7.76	7.46	7.49
Total Metals												
Aluminum (Al)	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.003	0.0339	0.0317	0.0346	0.0371	0.0337	0.0339	0.0295	0.0315	0.0320
Antimony (Sb)	mg/L		0.00005	<0.000050	<0.000050	<0.000050	<0.000050	0.000161	0.000063	<0.000050	<0.000050	<0.000050
Arsenic (As)	mg/L	0.005	0.00003	0.000167	0.000157	0.000153	0.000155	0.000154	0.000134	0.000173	0.000179	0.000179
Barium (Ba)	mg/L		0.00005	0.00200	0.00197	0.00200	0.00207	0.00204	0.00203	0.00240	0.00205	0.00215
Beryllium (Be)	mg/L		0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Bismuth (Bi)	mg/L		0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	mg/L	short-term: 29; long-term: 1.5	0.001-0.005	0.0154	0.0167	0.0159	0.0163	0.0164	0.0160	0.0149	0.0142	0.0145
Cadmium (Cd)	mg/L	equation[b,d]	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000023	<0.000010
Calcium (Ca)	mg/L		0.02	5.68	5.93	6.02	6.16	6.13	6.09	6.78	6.33	6.46
Chromium (Cr)	mg/L	Cr(VI): 0.001 ; Cr(III): 0.0089[b]	0.0001	0.00027	0.00035	0.00031	0.00031	0.00031	0.00030	0.00019	0.00014	0.00017
Cobalt (Co)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	mg/L	≥0.002[e]	0.0005	0.00159	0.00188	0.00121	0.00132	0.00127	0.00251	0.00120	0.00114	0.00118
Iron (Fe)	mg/L	0.3	0.01	0.086	0.085	0.085	0.085	0.087	0.090	0.112	0.107	0.110
Lead (Pb)	mg/L	≥0.001[f]	0.00005	0.000123	0.00635	0.00133	0.00232	0.00305	0.00348	<0.000050	<0.000050	<0.000050
Lithium (Li)	mg/L		0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)	mg/L		0.005	4.65	4.57	4.59	4.82	4.47	4.45	4.68	4.53	4.53
Manganese (Mn)	mg/L		0.00005	0.00754	0.00622	0.00598	0.00582	0.00531	0.00533	0.00753	0.00769	0.00751
Mercury (Hg)	µg/L	Inorganic Mercury: 0.000026 Methylmercury: 0.000004[b]	0.00001-0.00050	0.00160	0.00130	0.00120	0.00130	0.00130	0.00130	0.00137	0.00144	0.00145

a) Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Updated January 2011.

b) Interim guideline.

c) Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotriphic; 0.004-0.01 = Oligotrophic; 0.01-0.02 = Mesotrophic; 0.02-0.035 = Meso-eutrophic; 0.035-0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

d) Guideline is hardness-dependent: cadmium guideline (mg/L) = $1e^{\{0.86[\ln(\text{hardness})]-3.2\}}$ / 1000.

*e) Guideline is hardness-dependent: copper guideline (mg/L) = $e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ * 0.0002. Copper guideline is a minimum of 0.002 mg/L regardless of water hardness*

f) Guideline is hardness-dependent: lead guideline (mg/L) = $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ / 1000. Lead guideline is a minumum of 0.001 mg/L regardless of hardness.

g) Guideline is hardness-dependent: nickel guideline (mg/L) = $e^{\{0.76[\ln(\text{hardness})]+1.06\}}$ / 1000. Nickel guideline is a minimum of 0.025 mg/L regardless of water hardness.

Appendix 3.3-1. Water Quality Results, Tail Lake Fish-out, Doris North Project, 2011

			Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
			Date	24-Jul-11	24-Jul-11	24-Jul-11	24-Jul-11	24-Jul-11	24-Jul-11	18-Aug-11	18-Aug-11	18-Aug-11
			Depth (m)	1	1	1	5	5	5	1	1	1
			Replicate	1	2	3	1	2	3	1	2	3
			ALS Sample ID	L1035865-28	L1035865-29	L1035865-30	L1035865-31	L1035865-32	L1035865-33	L1047702-1	L1047702-2	L1047702-3
Physical Tests		**CCME guidelines**	**Realized Detection Limits**									
Molybdenum (Mo)	mg/L	0.073[d]	0.00005	0.000135	0.000137	0.000136	0.000152	0.000171	0.000159	0.000160	0.000153	0.000150
Nickel (Ni)	mg/L	≥0.025[g]	0.0001	0.00068	0.00066	0.00064	0.00073	0.00069	0.00065	0.00066	0.00065	0.00066
Phosphorus (P)	mg/L		0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L		0.05	1.46	1.44	1.44	1.52	1.41	1.40	1.47	1.42	1.42
Selenium (Se)	mg/L	0.001	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	mg/L		0.05	0.686	0.680	0.694	0.702	0.698	0.701	0.651	0.607	0.617
Silver (Ag)	mg/L	0.0001	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L		0.01	13.9	13.6	13.7	14.3	14.4	14.4	14.6	14.3	14.4
Strontium (Sr)	mg/L		0.0001	0.0193	0.0200	0.0202	0.0207	0.0210	0.0209	0.0233	0.0217	0.0220
Thallium (Tl)	mg/L	0.0008	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L		0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	mg/L	short-term: 0.033; long-term: 0.015	0.00001	0.000022	0.000021	0.000020	0.000021	0.000021	0.000021	0.000020	0.000021	0.000019
Vanadium (V)	mg/L		0.00005	0.000090	0.000076	0.000082	0.000090	0.000089	0.000079	0.000085	0.000080	0.000088
Zinc (Zn)	mg/L	0.03	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals												
Aluminum (Al)	mg/L		0.003	0.0241	0.0140	0.0129	0.0106	0.0126	0.0104	0.0098	0.0098	0.0085
Antimony (Sb)	mg/L		0.00005	<0.000050	<0.000050	<0.000050	0.000089	0.000066	<0.000050	<0.000050	<0.000050	<0.000050
Arsenic (As)	mg/L		0.00003	0.000135	0.000171	0.000131	0.000138	0.000132	0.000135	0.000186	0.000162	0.000168
Barium (Ba)	mg/L		0.00005	0.00177	0.00192	0.00178	0.00181	0.00186	0.00174	0.00226	0.00197	0.00197
Beryllium (Be)	mg/L		0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Bismuth (Bi)	mg/L		0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	mg/L		0.001-0.005	0.0143	0.0151	0.0165	0.0149	0.0160	0.0155	0.0132	0.0138	0.0133
Cadmium (Cd)	mg/L		0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	mg/L		0.02	5.75	5.80	6.40	5.93	6.02	5.98	6.40	6.33	6.34
Chromium (Cr)	mg/L		0.0001	0.00030	0.00034	0.00020	0.00019	0.00020	0.00018	0.00010	0.00013	0.00011
Cobalt (Co)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	mg/L		0.0005	0.00125	0.00138	0.00140	0.00116	0.00111	0.00117	0.00100	0.00105	0.00109
Iron (Fe)	mg/L		0.01	0.069	0.039	0.035	0.033	0.043	0.028	0.036	0.035	0.037
Lead (Pb)	mg/L		0.00005	<0.000050	0.00111	0.000825	0.000315	0.00112	0.000150	<0.000050	<0.000050	<0.000050
Lithium (Li)	mg/L		0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)	mg/L		0.005	4.38	4.87	4.42	4.42	4.15	4.47	4.60	4.50	4.56
Manganese (Mn)	mg/L		0.00005	0.00438	0.00147	0.00109	0.000546	0.00303	0.000429	0.000608	0.000782	0.000886
Mercury (Hg)	µg/L		0.00001-0.0005	0.00110	0.00210	0.00080	0.00090	0.00090	0.00090	0.00075	0.00077	0.00081
Molybdenum (Mo)	mg/L		0.00005	0.000127	0.000131	0.000160	0.000142	0.000131	0.000137	0.000152	0.000152	0.000152
Nickel (Ni)	mg/L		0.0001	0.00064	0.00077	0.00059	0.00070	0.00066	0.00069	0.00066	0.00064	0.00066
Phosphorus (P)	mg/L		0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L		0.05	1.37	1.53	1.40	1.36	1.30	1.39	1.45	1.42	1.45
Selenium (Se)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	mg/L		0.05	0.642	0.606	0.614	0.617	0.626	0.612	0.554	0.551	0.557
Silver (Ag)	mg/L		0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L		0.01	13.1	14.6	13.3	14.0	13.4	14.3	14.4	14.2	14.6
Strontium (Sr)	mg/L		0.0001	0.0193	0.0193	0.0212	0.0204	0.0204	0.0202	0.0219	0.0216	0.0217
Thallium (Tl)	mg/L		0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L		0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	mg/L		0.00001	0.000019	0.000019	0.000020	0.000018	0.000020	0.000017	0.000018	0.000017	0.000018
Vanadium (V)	mg/L		0.00005	0.000070	0.000055	0.000061	0.000051	0.000058	0.000056	<0.000050	0.000050	<0.000050
Zinc (Zn)	mg/L		0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

a) Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Updated January 2011.

b) Interim guideline.

c) Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotriphic; 0.004-0.01 = Oligotrophic; 0.01-0.02 = Mesotrophic; 0.02-0.035 = Meso-eutrophic; 0.035-0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

d) Guideline is hardness-dependent: cadmium guideline (mg/L) = $1c^{\{0.86[\log(\text{hardness})]-3.2\}}$ / 1000.

*e) Guideline is hardness-dependent: copper guideline (mg/L) = $\epsilon^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ * 0.0002. Copper guideline is a minimum of 0.002 mg/L regardless of water hardness*

f) Guideline is hardness-dependent: lead guideline (mg/L) = $\epsilon^{\{1.273[\ln(\text{hardness})]-4.705\}}$ / 1000. Lead guideline is a minumum of 0.001 mg/L regardless of hardness.

g) Guideline is hardness-dependent: nickel guideline (mg/L) = $\epsilon^{\{0.76[\ln(\text{hardness})]+1.06\}}$ / 1000. Nickel guideline is a minimum of 0.025 mg/L regardless of water hardness.

Appendix 3.3-1. Water Quality Results, Tail Lake Fish-out, Doris North Project, 2011

			Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
			Date	18-Aug-11	18-Aug-11	18-Aug-11	17-Sep-11	17-Sep-11	17-Sep-11	17-Sep-11	17-Sep-11	17-Sep-11
			Depth (m)	5	5	5	1	1	1	5.5	5.5	5.5
			Replicate	1	2	3	1	2	3	1	2	3
			ALS Sample ID	L1047702-4	L1047702-5	L1047702-6	L1060786-1	L1060786-2	L1060786-3	L1060786-4	L1060786-5	L1060786-6
Physical Tests		**CCME guidelines**	**Realized Detection Limits**									
Colour, True	CU		5	16.3	16.3	16.2	16.8	16.5	16.6	16.7	16.7	16.6
Conductivity	µS/cm		2	147	146	146	152	152	152	148	155	149
Hardness (as $CaCO_3$)	mg/L		0.5	34.5	34.4	34.1	34.6	35.1	35.7	35.5	35.7	35.5
pH	pH	6.5-9.0	0.1	7.81	7.81	7.82	7.77	7.81	7.81	7.67	7.92	7.75
Acidity (as $CaCO_3$)	mg/L		1	2.0	2.0	2.0	<1.0	<1.0	<1.0	<1.0	2.6	<1.0
Alkalinity, Total (as $CaCO_3$)	mg/L		2	28.5	28.3	28.8	29.6	30.8	30.2	30.1	29.9	29.8
ORP (Oxidation Reduction Potential)	mV		-1000	-	-	-	488	500	506	512	514	515
Total Suspended Solids	mg/L	dependent on background levels	1	1.4	1.8	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L		10	90	85	87	85	91	89	89	87	90
Turbidity	NTU	dependent on background levels	0.1	0.65	0.67	0.71	1.63	1.46	1.71	2.06	1.61	1.69
Anions												
Bromide (Br)	mg/L		0.05-0.1	<0.050	<0.050	<0.050	0.056	0.072	0.076	0.070	0.059	0.065
Chloride (Cl)	mg/L		0.5	25.0	25.0	25.0	25.4	25.4	25.3	25.3	25.3	25.3
Fluoride (F)	mg/L	0.120[b]	0.02	0.059	0.058	0.059	0.060	0.060	0.060	0.060	0.060	0.060
Nutrients												
Ammonia (as N)	mg/L	pH- and temperature-dependent	0.005	0.0166	0.0159	0.0062	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	mg/L	2.935[b]	0.005	<0.0050	<0.0050	<0.0050	0.0781	<0.0050	<0.0050	0.0148	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.05	0.313	0.352	0.405	0.402	0.405	0.385	0.411	0.426	0.404
Total Nitrogen	mg/L		0.0025-0.05	0.370	0.370	0.370	0.480	0.353	0.385	0.426	0.426	0.404
Orthophosphate (as P)	mg/L		0.001	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved	mg/L		0.002	0.0053	0.0036	0.0039	0.0044	0.0044	0.0040	0.0043	0.0046	0.0040
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework	0.002	0.0106	0.0093	0.0235	0.0101	0.0096	0.0092	0.0100	0.0097	0.0095
Silicate (as SIO_2)	mg/L		0.025-1	<1.0	1.0	1.03	1.2	1.1	1.1	1.1	1.8	1.2
Sulphate (SO_4)	mg/L		0.5	1.45	1.44	1.44	1.58	1.60	1.58	1.58	1.58	1.58
Cyanides												
Cyanide, Weak Acid Dissociable	mg/L	0.005 (as free CN)	0.001	0.0013	0.0011	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	0.005 (as free CN)	0.001-0.0011	0.0042	0.0044	0.0041	0.0053	0.0055	0.0034	0.0053	0.0051	0.0039
Organic / Inorganic Carbon												
Total Organic Carbon	mg/L		0.5	7.29	7.30	7.34	6.96	6.95	6.93	7.01	6.97	6.93
Total Metals												
Aluminum (Al)	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.003	0.0320	0.0332	0.0343	0.0512	0.0485	0.0455	0.0484	0.0507	0.0515
Antimony (Sb)	mg/L		0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Arsenic (As)	mg/L	0.005	0.00003	0.000157	0.000193	0.000177	0.000171	0.000189	0.000181	0.000181	0.000204	0.000177
Barium (Ba)	mg/L		0.00005	0.00211	0.00209	0.00438	0.00404	0.00232	0.00209	0.00387	0.00234	0.00224
Beryllium (Be)	mg/L		0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Bismuth (Bi)	mg/L		0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	mg/L	short-term: 29; long-term: 1.5	0.001-0.005	0.0151	0.0150	0.0139	0.0151	0.0163	0.0171	0.0172	0.0179	0.0175
Cadmium (Cd)	mg/L	equation[b,d]	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	mg/L		0.02	6.50	6.76	6.48	6.58	6.72	6.68	6.70	7.01	6.69
Chromium (Cr)	mg/L	Cr(VI): 0.001 ; Cr(III): 0.0089[b]	0.0001	0.00017	0.00024	0.00016	0.00039	0.00038	0.00032	0.00037	0.00030	0.00025
Cobalt (Co)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	mg/L	≥0.002[e]	0.0005	0.00114	0.00120	0.00118	0.00189	0.00140	0.00134	0.00141	0.00139	0.00126
Iron (Fe)	mg/L	0.3	0.01	0.111	0.142	0.116	0.117	0.110	0.107	0.109	0.111	0.107
Lead (Pb)	mg/L	≥0.001[f]	0.00005	<0.000050	<0.000050	<0.000050	0.000210	0.000203	0.000147	0.000101	0.000153	0.000088
Lithium (Li)	mg/L		0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)	mg/L		0.005	4.53	4.65	4.52	4.68	4.82	4.85	4.89	5.05	4.87
Manganese (Mn)	mg/L		0.00005	0.00706	0.00756	0.00744	0.00392	0.00409	0.00392	0.00388	0.00401	0.00400
Mercury (Hg)	µg/L	Inorganic Mercury: 0.000026 Methylmercury: 0.000004[b]	0.00001-0.00050	0.00132	0.00149	0.00113	0.00242	0.00161	0.00207	0.00211	0.00240	0.00189

a) Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Updated January 2011.

b) Interim guideline.

c) Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotriphic; 0.004-0.01 = Oligotrophic; 0.01-0.02 = Mesotrophic; 0.02-0.035 = Meso-eutrophic; 0.035-0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

d) Guideline is hardness-dependent: cadmium guideline (mg/L) = $1e^{\{0.86[\ln(\text{hardness})]-3.2\}}$ / 1000.

*e) Guideline is hardness-dependent: copper guideline (mg/L) = $e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ * 0.0002. Copper guideline is a minimum of 0.002 mg/L regardless of water hardness*

f) Guideline is hardness-dependent: lead guideline (mg/L) = $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ / 1000. Lead guideline is a minumum of 0.001 mg/L regardless of hardness.

g) Guideline is hardness-dependent: nickel guideline (mg/L) = $e^{\{0.76[\ln(\text{hardness})]+1.06\}}$ / 1000. Nickel guideline is a minimum of 0.025 mg/L regardless of water hardness.

Appendix 3.3-1. Water Quality Results, Tail Lake Fish-out, Doris North Project, 2011

			Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
			Date	18-Aug-11	18-Aug-11	18-Aug-11	17-Sep-11	17-Sep-11	17-Sep-11	17-Sep-11	17-Sep-11	17-Sep-11
			Depth (m)	5	5	5	1	1	1	5.5	5.5	5.5
			Replicate	1	2	3	1	2	3	1	2	3
			ALS Sample ID	L1047702-4	L1047702-5	L1047702-6	L1060786-1	L1060786-2	L1060786-3	L1060786-4	L1060786-5	L1060786-6
Physical Tests		**CCME guidelines**	**Realized Detection Limits**									
Molybdenum (Mo)	mg/L	0.073[d]	0.00005	0.000166	0.000166	0.000154	0.000201	0.000181	0.000168	0.000380	0.000168	0.000167
Nickel (Ni)	mg/L	≥0.025[g]	0.0001	0.00066	0.00067	0.00065	0.00081	0.00071	0.00070	0.00071	0.00072	0.00068
Phosphorus (P)	mg/L		0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L		0.05	1.45	1.49	1.46	1.44	1.50	1.51	1.50	1.57	1.51
Selenium (Se)	mg/L	0.001	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	mg/L		0.05	0.622	0.657	0.634	0.709	0.702	0.668	0.710	0.725	0.695
Silver (Ag)	mg/L	0.0001	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L		0.01	14.4	14.9	14.5	13.7	14.3	14.4	14.4	15.0	14.5
Strontium (Sr)	mg/L		0.0001	0.0222	0.0231	0.0221	0.0232	0.0232	0.0227	0.0229	0.0236	0.0226
Thallium (Tl)	mg/L	0.0008	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	0.00077	<0.00010	<0.00010	0.00021	0.00014	<0.00010
Titanium (Ti)	mg/L		0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	mg/L	short-term: 0.033; long-term: 0.015	0.00001	0.000017	0.000019	0.000018	0.000030	0.000020	0.000020	0.000019	0.000018	0.000017
Vanadium (V)	mg/L		0.00005	0.000087	0.000097	0.000085	0.000111	0.000105	0.000110	0.000194	0.000117	0.000116
Zinc (Zn)	mg/L	0.03	0.003	<0.0030	<0.0030	<0.0030	0.0050	0.0033	0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals												
Aluminum (Al)	mg/L		0.003	0.0094	0.0086	0.0105	0.0133	0.0125	0.0133	0.0123	0.0114	0.0140
Antimony (Sb)	mg/L		0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Arsenic (As)	mg/L		0.00003	0.000182	0.000160	0.000174	0.000163	0.000185	0.000185	0.000159	0.000169	0.000169
Barium (Ba)	mg/L		0.00005	0.00181	0.00169	0.00434	0.00372	0.00198	0.00177	0.00347	0.00196	0.00171
Beryllium (Be)	mg/L		0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Bismuth (Bi)	mg/L		0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	mg/L		0.001-0.005	0.0133	0.0139	0.0136	0.0138	0.0147	0.0150	0.0151	0.0155	0.0150
Cadmium (Cd)	mg/L		0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	mg/L		0.02	6.35	6.39	6.37	6.32	6.39	6.51	6.44	6.47	6.45
Chromium (Cr)	mg/L		0.0001	0.00013	0.00012	0.00012	0.00017	0.00014	0.00016	0.00015	0.00016	0.00018
Cobalt (Co)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	mg/L		0.0005	0.00104	0.00105	0.00107	0.00149	0.00115	0.00110	0.00120	0.00111	0.00106
Iron (Fe)	mg/L		0.01	0.036	0.035	0.037	0.041	0.035	0.039	0.036	0.036	0.038
Lead (Pb)	mg/L		0.00005	<0.000050	<0.000050	<0.000050	0.000053	0.000066	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	mg/L		0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)	mg/L		0.005	4.52	4.48	4.41	4.57	4.65	4.73	4.72	4.74	4.71
Manganese (Mn)	mg/L		0.00005	0.000589	0.000524	0.000513	0.000478	0.000430	0.000930	0.000632	0.000579	0.000568
Mercury (Hg)	µg/L		0.00001-0.0005	0.00078	0.00079	0.00076	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	mg/L		0.00005	0.000158	0.000148	0.000143	0.000166	0.000160	0.000160	0.000158	0.000161	0.000147
Nickel (Ni)	mg/L		0.0001	0.00065	0.00064	0.00063	0.00076	0.00067	0.00066	0.00066	0.00068	0.00068
Phosphorus (P)	mg/L		0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L		0.05	1.45	1.43	1.43	1.41	1.44	1.45	1.46	1.47	1.47
Selenium (Se)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	mg/L		0.05	0.556	0.560	0.558	0.587	0.578	0.584	0.582	0.579	0.590
Silver (Ag)	mg/L		0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L		0.01	14.5	14.4	14.3	13.6	13.8	14.1	14.0	14.0	14.0
Strontium (Sr)	mg/L		0.0001	0.0217	0.0217	0.0216	0.0220	0.0217	0.0218	0.0217	0.0217	0.0216
Thallium (Tl)	mg/L		0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L		0.0001	<0.00010	<0.00010	<0.00010	0.00065	<0.00010	<0.00010	0.00022	<0.00010	<0.00010
Titanium (Ti)	mg/L		0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	mg/L		0.00001	0.000016	0.000017	0.000017	0.000017	0.000015	0.000015	0.000015	0.000016	0.000015
Vanadium (V)	mg/L		0.00005	<0.000050	<0.000050	<0.000050	0.000059	0.000055	0.000056	0.000055	0.000057	0.000057
Zinc (Zn)	mg/L		0.003	<0.0030	<0.0030	<0.0030	0.0039	<0.0030	0.0053	<0.0030	<0.0030	0.0044

a) Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Updated January 2011.

b) Interim guideline.

c) Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotriphic; 0.004-0.01 = Oligotrophic; 0.01-0.02 = Mesotrophic; 0.02-0.035 = Meso-eutrophic; 0.035-0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

d) Guideline is hardness-dependent: cadmium guideline (mg/L) = $1^{\{0.86[\log(\text{hardness})]-3.2\}}$ / 1000.

*e) Guideline is hardness-dependent: copper guideline (mg/L) = $e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ * 0.0002. Copper guideline is a minimum of 0.002 mg/L regardless of water hardness*

f) Guideline is hardness-dependent: lead guideline (mg/L) = $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ / 1000. Lead guideline is a minumum of 0.001 mg/L regardless of hardness.

g) Guideline is hardness-dependent: nickel guideline (mg/L) = $e^{\{0.76[\ln(\text{hardness})]+1.06\}}$ / 1000. Nickel guideline is a minimum of 0.025 mg/L regardless of water hardness.

Appendix 3.4-1

Phytoplankton Biomass Results, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.4-1. Phytoplankton Biomass Results, Tail Lake Fish-out, Doris North Project, 2011

Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
Date	24-Jul-11	24-Jul-11	24-Jul-11	18-Aug-11	18-Aug-11	18-Aug-11	17-Sep-11	17-Sep-11	17-Sep-11
Depth (m)	1	1	1	1	1	1	1	1	1
Replicate	1	2	3	1	2	3	1	2	3
ALS Sample ID	L1047581-48	L1047581-49	L1047581-50	L1052616-1	L1052616-2	L1052616-3	COC 10-167062		
Chlorophyll *a*	0.896	0.486	0.429	0.732	1.15	1.12	Samples went missing at ALS Environmental Labs.		
Phaeophytin	-	-	-	0.317	0.433	0.511			

Appendix 3.4-2

Zooplankton Biomass Results, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.4-2. Zooplankton Biomass Results, Tail Lake Fish-out, Doris North Project, 2011

Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
Date	24-Jul-11	24-Jul-11	24-Jul-11	18-Aug-11	18-Aug-11	18-Aug-11	17-Sep-11	17-Sep-11	17-Sep-11	24-Jul-11
Replicate	1	2	3	1	2	3	1	2	3	blank
ALS Sample ID	L1039431-1	L1039431-2	L1039431-3	L1051546-1	L1051546-2	L1051546-3	L1066267-1	L1066267-2	L1066267-3	L1039431-4
Zooplankton Biomass (g)	0.060	0.067	0.064	0.116	0.099	0.113	0.050	0.050	0.024	0.000

Appendix 3.4-3

Zooplankton Density and Community Composition Results, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.4-3. Zooplankton Density and Community Composition Results, Tail Lake Fish-out, Doris North Project, 2011

Taxonomic group / Genus (species)	Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
	Date	24-Jul-11	24-Jul-11	24-Jul-11	18-Aug-11	18-Aug-11	18-Aug-11	17-Sep-11	17-Sep-11	17-Sep-11
	Replicate	1	2	3	1	2	3	1	2	3
ROTIFERA										
Kellicottia longispina		180014.7	272231.9	95309.4	747.1	22900.4	2474.5	5985.3	6113.6	13037.4
Keratella cochlearis		666.7	177.5	0.0	747.1	5725.1	6009.4	14963.3	15048.8	7822.4
Keratella quadrata		0.0	59.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Conochilus sp.	colony	P	P	P	P	P	P	P	P	P
Asplanchna		73339.3	41426.6	50162.8	2988.4	4198.4	3888.5	4788.3	4232.5	2607.5
Plautius		0.0	0.0	0.0	373.6	0.0	0.0			
Filinia		0.0	0.0	0.0	1120.7	0.0	1414.0	0.0	2351.4	1564.5
CLADOCERA										
Daphnidae										
Daphnia longiremis		173347.5	201214.9	145472.2	123272.5	133585.8	102514.0	16160.4	23043.5	26596.2
Daphnia middendorffiana		866.7	2663.1	1304.2	2054.5	1946.5	2050.3	1616.0	1975.2	2138.1
Bosminidae										
Bosmina longirostris		1600.1	1834.6	1053.4	15689.2	14121.9	12725.9	2753.3	3762.2	2711.8
Chydoridae										
Chydorus sphaericus		0.0	0.0	0.0	74.7	0.0	35.3	0.0	0.0	0.0
COPEPODA										
Calanoida										
Leptodiaptomus pribilofensis	M	0.0	0.0	0.0	2353.4	3816.7	1307.9	239.4	517.3	57.4
Leptodiaptomus pribilofensis	F	0.0	11.8	5.0	3511.4	4198.4	3040.1	778.1	658.4	1825.2
Leptodiaptomus pribilofensis		0.0	11.8	5.0	5864.8	8015.1	4348.0	1017.5	1175.7	1882.6
Leptodiaptomus sp.	V	800.1	473.4	351.1	261.5	152.7	247.4	0.0	0.0	52.1
Leptodiaptomus sp.	IV	1533.5	769.4	652.1	74.7	0.0	70.7	0.0	0.0	0.0
Leptodiaptomus sp.	III	3000.2	3195.8	1655.4	0.0	0.0	0.0	0.0	0.0	0.0
Leptodiaptomus sp.	II	1733.5	1361.2	1354.4	74.7	0.0	0.0	0.0	0.0	0.0
Leptodiaptomus sp.	I	66.7	118.4	150.5	0.0	0.0	353.5	0.0	0.0	0.0
Leptodiaptomus sp.		7133.9	5918.1	4163.5	410.9	152.7	671.6	0.0	0.0	52.1
Unidentified Calanoida	nauplius	66.7	59.2	0.0	747.1	0.0	0.0	0.0	0.0	0.0
Cyclopoida										
Cyclops scutifer	M	1666.8	1834.6	1153.7	373.6	229.0	565.6	538.7	329.2	782.2
Cyclops scutifer	F	3133.6	2722.3	2106.8	1045.9	763.3	777.7	419.0	752.4	573.6
Cyclops scutifer		4800.4	4556.9	3260.6	1419.5	992.4	1343.3	957.7	1081.6	1355.9
Cyclops sp.	copepodite	14667.9	10652.6	13042.3	9712.4	5343.4	6362.9	8978.0	11756.9	7300.9
Unidentified Cyclopoida	nauplius	12667.7	2959.0	3511.4	112065.9	152669.5	130793.7	71225.5	78065.9	68315.8
Total		**469171.6**	**543765.5**	**317284.9**	**277288.3**	**349651.2**	**274631.3**	**128445.3**	**148607.4**	**135385.2**

Note: Data represent individuals/m^3

Volume sampled is calculated based on flowmeter readings as outlined in methods section.

Abbreviations: P=pupa (second juvenile of homometabolous insect), M=Male, F=Female, I to V=first through fifth copepodite stage.

Appendix 3.4-4

Benthos Biomass Results, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.4-4. Benthos Biomass Results, Tail Lake Fish-out, Doris North Project, 2011

Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
Date	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11
Depth (m)	0-2	0-2	0-2	0-2	0-2	2-4	2-4	2-4	2-4	2-4
Replicate	1	2	3	4	5	1	2	3	4	5
Biomass (g/m^2)	0.911	3.520	1.604	0.173	2.556	1.738	2.996	6.804	6.884	12.662

Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
Date	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11
Depth (m)	4-6	4-6	4-6	4-6	4-6	6-8	6-8	6-8	6-8	6-8
Replicate	1	2	3	4	5	1	2	3	4	5
Biomass (g/m^2)	1.827	0.316	15.840	5.102	1.018	14.133	3.484	1.551	1.782	7.818

Appendix 3.4-5

Benthos Density and Community Composition Results, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.4-5. Benthos Density and Community Composition Results, Tail Lake Fish-out, Doris North Project, 2011

					Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
					Date	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11
					Depth (m)	0-2	0-2	0-2	0-2	0-2	2-4	2-4
	Family	Subfamily	Tribe	(species)	Replicate	1	2	3	4	5	1	2
Oligochaeta	Enchytraeidae	-	-	-		0.0	44.4	44.4	0.0	133.3	0.0	0.0
Oligochaeta	Lumbriculidae	-	-	-		133.3	44.4	88.9	0.0	222.2	44.4	44.4
Oligochaeta	Naididae	Tubificinae	-	-		133.3	88.9	311.1	0.0	400.0	0.0	0.0
Pelecypoda	Sphaeriidae	-	-	(i/d)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pelecypoda	Sphaeriidae	-	-	*Pisidium*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydracarina	-	-	-	-		0.0	44.4	44.4	0.0	44.4	0.0	0.0
Ostracoda	-	-	-	-		0.0	0.0	44.4	44.4	44.4	0.0	0.0
Amphipoda	Gammaridae	-	-	*Gammarus lacustris*		0.0	0.0	0.0	0.0	0.0	44.4	0.0
Trichoptera	-	-	-	(pupa)		0.0	133.3	0.0	0.0	0.0	0.0	0.0
Trichoptera	Apataniidae	-	-	*Apatania*		0.0	0.0	0.0	88.9	0.0	0.0	0.0
Trichoptera	Limnephilidae	-	-	*Grensia praeterica*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Tanypodinae	Pentaneurini	*Ablabesmyia*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Tanypodinae	Procladiini	*Procladius*		44.4	44.4	266.7	44.4	355.6	133.3	0.0
Diptera	Chironomidae	Prodiamesinae	-	*Monodiamesa*		44.4	88.9	311.1	44.4	355.6	0.0	0.0
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Cricotopus/Orthocladius*		0.0	0.0	0.0	0.0	44.4	0.0	0.0
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Psectrocladius*		44.4	0.0	44.4	44.4	88.9	0.0	0.0
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Zalutschia*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Chironomini	*Sergenta*		0.0	0.0	0.0	44.4	0.0	44.4	0.0
Diptera	Chironomidae	Chironominae	Chironomini	*Stictochironomus*		0.0	88.9	88.9	0.0	266.7	400.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	(i/d)		0.0	0.0	0.0	44.4	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Cladotanytarsus*		133.3	577.8	2355.6	133.3	1688.9	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Corynocera*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Micropsectra*		0.0	0.0	133.3	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Micropsectra / Tanytarsus*		0.0	0.0	44.4	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Paratanytarsus*		0.0	0.0	0.0	133.3	44.4	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Tanytarsus*		133.3	44.4	888.9	88.9	88.9	0.0	0.0
Total						**666.7**	**1200.0**	**4666.7**	**711.1**	**3777.8**	**666.7**	**44.4**
Individuals Not Included in Analyses*												
Nematoda	-	-	-	-		88.9	222.2	888.9	88.9	1688.9	0.0	0.0
Copepoda - Calanoida	-	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Copepoda - Cyclopoida	Cyclopidae	Cyclopinae	-	*Acanthocyclops*		0.0	0.0	0.0	0.0	44.4	0.0	0.0
Cladocera	Bosminidae	-	-	*Bosmina*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cladocera	Chydoridae	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cladocera	Daphnidae	-	-	*Daphnia*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terrestrial	-	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0	0.0

Data represents organisms/m²

i/d = immature or damaged individuals

**These taxa were not included in the total density calculation or other data analysis.*

Environment Canada (2011) states that as nematodes and copepods are meiofauna, samples using 500µm mesh will not be representative so should be excuded from analysis.

Cladocera (water fleas) are mobile, and were not considered permanent members of the benthos so were excluded form analysis.

Terrestrial organisms found in these samples are not part of the benthos, probably getting into the sample during sieving.

Appendix 3.4-5. Benthos Density and Community Composition Results, Tail Lake Fish-out, Doris North Project, 2011

					Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
					Date	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11
					Depth (m)	2-4	2-4	2-4	4-6	4-6	4-6	4-6
	Family	Subfamily	Tribe	(species)	Replicate	3	4	5	1	2	3	4
Oligochaeta	Enchytraeidae	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oligochaeta	Lumbriculidae	-	-	-		0.0	222.2	0.0	355.6	133.3	44.4	0.0
Oligochaeta	Naididae	Tubificinae	-	-		44.4	0.0	0.0	177.8	0.0	0.0	0.0
Pelecypoda	Sphaeriidae	-	-	(i/d)		577.8	0.0	0.0	222.2	44.4	44.4	0.0
Pelecypoda	Sphaeriidae	-	-	*Pisidium*		0.0	222.2	44.4	800.0	44.4	88.9	0.0
Hydracarina	-	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0	44.4
Ostracoda	-	-	-	-		44.4	0.0	0.0	0.0	0.0	0.0	0.0
Amphipoda	Gammaridae	-	-	*Gammarus lacustris*		400.0	88.9	0.0	133.3	44.4	44.4	88.9
Trichoptera	-	-	-	(pupa)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera	Apataniidae	-	-	*Apatania*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera	Limnephilidae	-	-	*Grensia praeterica*		133.3	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Tanypodinae	Pentaneurini	*Ablabesmyia*		44.4	0.0	0.0	0.0	133.3	0.0	0.0
Diptera	Chironomidae	Tanypodinae	Procladiini	*Procladius*		44.4	0.0	0.0	311.1	44.4	44.4	0.0
Diptera	Chironomidae	Prodiamesinae	-	*Monodiamesa*		0.0	0.0	0.0	44.4	0.0	0.0	222.2
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Cricotopus/Orthocladius*		533.3	0.0	44.4	0.0	44.4	0.0	0.0
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Psectrocladius*		0.0	0.0	0.0	44.4	0.0	0.0	0.0
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Zalutschia*		44.4	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus*		0.0	44.4	0.0	44.4	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Chironomini	*Sergenta*		622.2	177.8	0.0	44.4	44.4	88.9	0.0
Diptera	Chironomidae	Chironominae	Chironomini	*Stictochironomus*		133.3	177.8	222.2	533.3	44.4	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	(i/d)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Cladotanytarsus*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Corynocera*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Micropsectra*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Micropsectra / Tanytarsus*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Paratanytarsus*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Tanytarsus*		177.8	0.0	0.0	44.4	0.0	0.0	0.0
Total						**2800.0**	**933.3**	**311.1**	**2755.6**	**577.8**	**355.6**	**355.6**
Individuals Not Included in Analyses*												
Nematoda	-	-	-	-		0.0	44.4	0.0	0.0	0.0	44.4	0.0
Copepoda - Calanoida	-	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Copepoda - Cyclopoida	Cyclopidae	Cyclopinae	-	*Acanthocyclops*		0.0	0.0	0.0	44.4	0.0	44.4	0.0
Cladocera	Bosminidae	-	-	*Bosmina*		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cladocera	Chydoridae	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cladocera	Daphnidae	-	-	*Daphnia*		44.4	0.0	0.0	0.0	0.0	0.0	0.0
Terrestrial	-	-	-	-		0.0	0.0	0.0	0.0	44.4	0.0	0.0

Data represents organisms/m²

i/d = immature or damaged individuals

**These taxa were not included in the total density calculation or other data analysis.*

Environment Canada (2011) states that as nematodes and copepods are meiofauna, samples using 500µm mesh will not be representative so should be excuded from analysis.

Cladocera (water fleas) are mobile, and were not considered permanent members of the benthos so were excluded form analysis.

Terrestrial organisms found in these samples are not part of the benthos, probably getting into the sample during sieving.

Appendix 3.4-5. Benthos Density and Community Composition Results, Tail Lake Fish-out, Doris North Project, 2011

					Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake	Tail Lake
					Date	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11	18-Aug-11
					Depth (m)	4-6	6-8	6-8	6-8	6-8	6-8
	Family	Subfamily	Tribe	(species)	Replicate	5	1	2	3	4	5
Oligochaeta	Enchytraeidae	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0
Oligochaeta	Lumbriculidae	-	-	-		311.1	0.0	0.0	0.0	0.0	44.4
Oligochaeta	Naididae	Tubificinae	-	-		0.0	0.0	0.0	0.0	0.0	0.0
Pelecypoda	Sphaeriidae	-	-	(i/d)		533.3	44.4	177.8	0.0	133.3	266.7
Pelecypoda	Sphaeriidae	-	-	*Pisidium*		488.9	44.4	311.1	266.7	44.4	222.2
Hydracarina	-	-	-	-		533.3	0.0	0.0	0.0	0.0	0.0
Ostracoda	-	-	-	-		222.2	0.0	0.0	0.0	0.0	44.4
Amphipoda	Gammaridae	-	-	*Gammarus lacustris*		44.4	0.0	0.0	0.0	0.0	0.0
Trichoptera	-	-	-	(pupa)		0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera	Apataniidae	-	-	*Apatania*		0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera	Limnephilidae	-	-	*Grensia praeterica*		0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Tanypodinae	Pentaneurini	*Ablabesmyia*		0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Tanypodinae	Procladiini	*Procladius*		400.0	177.8	577.8	88.9	0.0	533.3
Diptera	Chironomidae	Prodiamesinae	-	*Monodiamesa*		44.4	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Cricotopus/Orthocladius*		133.3	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Psectrocladius*		0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Orthocladiinae	Orthocladiini	*Zalutschia*		0.0	0.0	0.0	0.0	44.4	88.9
Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus*		0.0	266.7	133.3	888.9	711.1	888.9
Diptera	Chironomidae	Chironominae	Chironomini	*Sergenta*		177.8	44.4	0.0	0.0	44.4	44.4
Diptera	Chironomidae	Chironominae	Chironomini	*Stictochironomus*		355.6	0.0	0.0	44.4	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	(i/d)		0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Cladotanytarsus*		0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Corynocera*		0.0	0.0	0.0	0.0	44.4	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Micropsectra*		0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Micropsectra / Tanytarsus*		0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Paratanytarsus*		0.0	0.0	0.0	0.0	0.0	0.0
Diptera	Chironomidae	Chironominae	Tanytarsini	*Tanytarsus*		88.9	755.6	266.7	355.6	888.9	1733.3
Total						**3333.3**	**1333.3**	**1466.7**	**1644.4**	**1911.1**	**3866.7**
Individuals Not Included in Analyses*											
Nematoda	-	-	-	-		0.0	177.8	0.0	0.0	222.2	355.6
Copepoda - Calanoida	-	-	-	-		44.4	0.0	0.0	0.0	44.4	0.0
Copepoda - Cyclopoida	Cyclopidae	Cyclopinae	-	*Acanthocyclops*		88.9	0.0	0.0	0.0	0.0	0.0
Cladocera	Bosminidae	-	-	*Bosmina*		44.4	0.0	0.0	0.0	0.0	0.0
Cladocera	Chydoridae	-	-	-		44.4	0.0	0.0	0.0	0.0	0.0
Cladocera	Daphnidae	-	-	*Daphnia*		0.0	44.4	0.0	0.0	0.0	0.0
Terrestrial	-	-	-	-		0.0	0.0	0.0	0.0	0.0	0.0

Data represents organisms/m²

i/d = immature or damaged individuals

**These taxa were not included in the total density calculation or other data analysis.*

Environment Canada (2011) states that as nematodes and copepods are meiofauna, samples using 500µm mesh will not be representative so should be excuded from analysis.

Cladocera (water fleas) are mobile, and were not considered permanent members of the benthos so were excluded form analysis.

Terrestrial organisms found in these samples are not part of the benthos, probably getting into the sample during sieving.

Appendix 3.5-1

Fish Habitat Map Data, Tail Lake Fish-out, Doris North Project, 2011

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Appendix 3.5-1. Fish Habitat Map Data, Tail Lake Fish-out, Doris North Project, 2011

Habitat Unit	Start of Unit (UTM)		End of Unit (UTM)		Depth (m)	Percent Substrate Composition					Percent Cover for Fish	Comments
	Easting	Northing	Easting	Northing		Bedrock	Boulder	Cobble	Gravel and Fines	Organic		
1	434775	7558872	434599	7558837	1	0	0	0	0	100	100% emergent vegetation	shallow littoral zone
2	434599	7558837	434574	7558940	1.5	20	0	0	0	80	5% emergent vegetations	bedrock outcrop
3	434574	7558940	434831	7558625	1	0	0	0	0	100	100% emergent vegetation	shallow littoral zone, photo 0429
4	434831	7558625	434821	7558484	1.5	10	10	70	10	0	100% cobble	deep bedrock shoreline
5	434821	7558484	434702	7558343	2	0	5	40	5	50	50% emergent vegetation, 50% cobble	25 m littoral dropping into cobble/boulder substrate
6	434702	7558343	434758	7558117	2.5	20	5	5	0	70	90% terrestrial shrubs, 10% cobble/boulder	shallow slope off bedrock and tundra
7	434758	7558117	434786	7557959	2	45	5	5	0	45	10% boulder/cobble	steep sloping shoreline
8	434786	7557959	435019	7557797	1.5	5	20	25	25	25	50% emergent vegetation, 50% cobble	shallow shoreline, photo 0432
9	435019	7557797	435099	7557557	2	80	10	10	0	0	100% cobble/boulder	steep sloping shoreline, photo 0433
10	435099	7557557	435102	7557417	1	0	10	25	25	40	50% emergent vegetation, 50% cobble	littoral area on top of cobble reef
11	435102	7557417	435138	7557309	2	80	10	10	0	0	100% cobble/boulder	steep bedrock shoreline
12	435138	7557309	435135	7557247	1	0	10	40	10	40	50% emergent vegetation, 50% cobble	submergent vegetation on top of cobble substrate, 5-10 m littoral area
13	435135	7557247	435151	7557206	2	100	0	0	0	0	100% bedrock	steep bedrock shoreline
14	435151	7557206	435171	7557045	1	0	10	30	10	50	50% emergent vegetation, 50% cobble	10 m wide littoral zone
15	435171	7557045	435188	7556981	2	50	10	0	0	40	100% bedrock	steep bedrock shoreline
16	435188	7556981	435240	7556889	1	0	5	30	30	35	50% emergent vegetation, 50% cobble	5 m wide littoral zone
17	435240	7556889	435272	4356773	1.5	50	25	25	0	0	50% cobble/boulder	steep rock shore
18	435272	4356773	435297	7556620	1.5	0	0	30	30	40	50% emergent vegetation, 50% cobble	4 m wide littoral zone
19	435297	7556620	435361	7556515	2	10	30	30	10	20	80% cobble/boulder, 20% emergent vegetation	intermitant bedrock and tundra shoreline
20	435361	7556515	435538	7556252	1	0	0	0	0	100	100% emergent vegetation	head of lake, shallow submergent grasses, 10 m littoral zone, photo 0434
21	435538	7556252	435419	7556783	1	0	0	0	0	100	100% emergent vegetation	20-30 m wide littoral zone, photo 0435
22	435419	7556783	435397	7556835	1	100	0	0	0	0	no cover for fish, 100% bedrock shoreline	steep bedrock shoreline
23	435397	7556835	435372	7557122	1	5	10	30	30	25	50% emergent vegetation, 50% cobble	10 m wide littoral zone
24	435372	7557122	435356	7557231	2	5	5	20	20	50	50% emergent vegetation, 50% cobble/boulder	steep rock bank with submergent vegetation
25	435356	7557231	435304	7557410	2	5	20	30	10	35	50% cobble/boulder, 50% overhanging vegetation	steep sloping tundra shoreline
26	435304	7557410	435264	7557587	3	50	30	10	5	10	70% cobble/boulder, 30% submergent vegetation	steep rocky shoreline
27	435264	7557587	435211	7557876	1	10	10	50	15	15	70% cobble, 30% submergent vegetation	shallow sloping shore, 10 m wide littoral zone, confirmed lake trout spawning site
28	435211	7557876	435195	7558045	1	0	5	20	40	25	90% cobble/gravel, 10% submergent vegetation	shallow sloping shore, minimal littoral area
29	435195	7558045	435259	7558367	1	0	5	30	30	35	20% cobble, 80% sumbergent vegetation	20 m littoral, submergent vegetation in shallow sloping shoreline
30	435259	7558367	435226	7558461	1.5	70	0	5	5	20	10% cobble and gravel	very little littoral zone, bedrock shoreline
31	435226	7558461	435167	7558530	1	0	0	20	40	40	10% cobble, 90% submergent vegetation	20 m littoral, submergent vegetation in shallow sloping shoreline
32	435167	7558530	435137	7558596	1	0	0	0	50	50	100% submergent vegetation	shallow sloping shoreline
33	435137	7558596	434941	7558721	1	0	0	30	30	40	30% cobble, 70% submergent vegetation	30 m wide littoral with emergenet and submergent vegetation
34	434941	7558721	434980	7558872	3	70	20	10	0	0	90% cobble/boulder, 10% overhanging vegetation	steep rock shoreline, no aquatic vegetation