

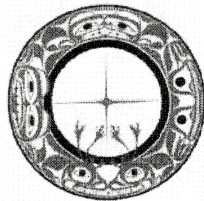
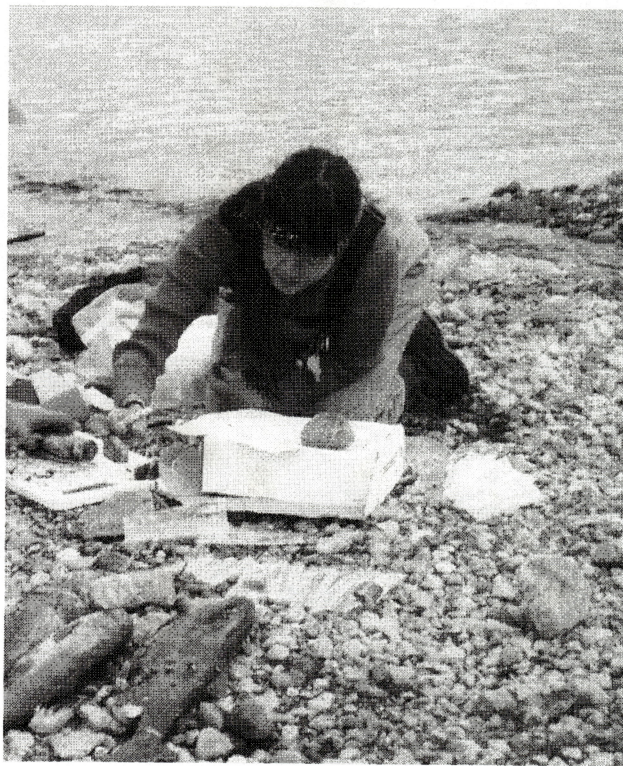
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Assessing Metal Levels in the Tissues of Food-Fish Species in Babine Lake

Summary Report on Analyte Levels Found in Fish Tissues Collected in 2006

**Prepared for:
Fisheries and Oceans Canada
Prince Rupert, B.C.**

July 2008



**Lake Babine First Nation
225 SUS Avenue
Box 879
Burns Lake, B.C.
V0J 1E0**

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Executive Summary

During the period August-October 2006 a total of 69 fish were collected from various locations in Babine Lake and its tributaries, including 16 char (lake trout), 17 rainbow trout, 18 sockeye and 18 coho. A total of 118 tissue samples were collected from these fish, including muscle, kidney and male and female gonad tissues. Samples were frozen and later analyzed to assess the concentration of metal analytes (Mercury, Copper, Zinc, Lead, Cadmium) contained within the tissues. Lab analyses were completed at the UNBC Community Health Sciences Lab in Prince George.

The Lake Babine Nation (LBN ~ 2500 member pop) rely heavily upon the fisheries resources sustained or supported by Babine Lake and its inflowing and out-flowing waters. Locally caught fish have been found to comprise in excess of 50% of the average LBN member's diet. However, the mineral-rich area surrounding Babine Lake has supported two large open-pit Copper extraction mines, both of which have been left in an un-reclaimed state for a number of decades. Further, additional mine operations are proposed for the nearby area. The un-reclaimed state of the existing mines and threat of additional mines has created a substantial amount of uncertainty and concern about the effects of mining activities on both fish health and consumer (human) health. The sampling and lab analyses conducted begin the process of redressing LBN's fish-health concerns, and uncertainties and concerns regarding possible human-health risks related to consuming fish from the area.

Metal analyte concentrations are assessed according to species, size and tissue-type, and where possible, geographical trends. Lead was below detection limits in all of the fish tissue samples tested. Cadmium levels were below detectable levels in all samples collected with the exception of char kidney, in which it was measured at an average concentration of 0.32 mg/kg for 16 samples. Mercury was either below detection limits or measured at levels very close to detection limits in rainbow trout, sockeye and coho tissues tested. Mercury concentrations within char tissues were considerably higher in all tissues sampled, with the exception of female gonad tissues, which were found to contain mercury concentrations at similarly low levels as in the other species tested. Char kidney, muscle and male gonad tissues contained mean concentrations of 0.85, 0.27 and 0.26 mg/kg mercury, respectively.

Copper concentrations were measured above detectable limits in all tissues sampled. Mean copper concentrations found in muscle tissues from coho, sockeye, char and rainbow trout were 0.50, 0.42, 1.23 and 0.26 mg/kg respectively. Mean copper concentrations within female coho, sockeye, char and rainbow trout gonad tissues were 1.84, 9.81, 1.66 and 2.40 mg/kg respectively. Copper concentrations in male char gonad tissues average 0.90mg/kg. Copper concentrations in char kidney tissues averaged 1.48mg/kg. Zinc concentrations were also found to be above detectable limits in all fish tissues sampled. Mean zinc concentrations found in muscle tissues from coho, sockeye, char and rainbow trout were 3.93, 2.71, 3.32, and 3.76 mg/kg respectively. Mean zinc concentrations within female coho, sockeye, char and rainbow trout gonad tissues were 9.71, 6.13, 5.60; and 12.15 mg/kg respectively. Zinc concentrations in male char gonad tissues average 8.47 mg/kg. Zinc concentrations in char kidney tissues averaged 20.63 mg/kg.

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It is recommended that the information developed be assessed from a toxicological perspective to consider both consumption guidelines and fish health, as required and, to monitor any changes in metals concentration in the area's in fish species.

Introduction

Babine Lake is a large Oligotrophic lake (surface area of 491 km²) located in the interior plateau of British Columbia within the Skeena watershed (Figure1). Babine lake is the largest sockeye nursery lake in Canada and annual returns of adult sockeye to the lake comprise > 90% of the Skeena River's total sockeye returns on an annual basis (Gottesfeld et al 2002). Other species of fish that inhabit Babine Lake are listed in table 1 Babine Lake is the traditional territory of the Lake Babine Nation (LBN) which consists of approximately 2,500 members.

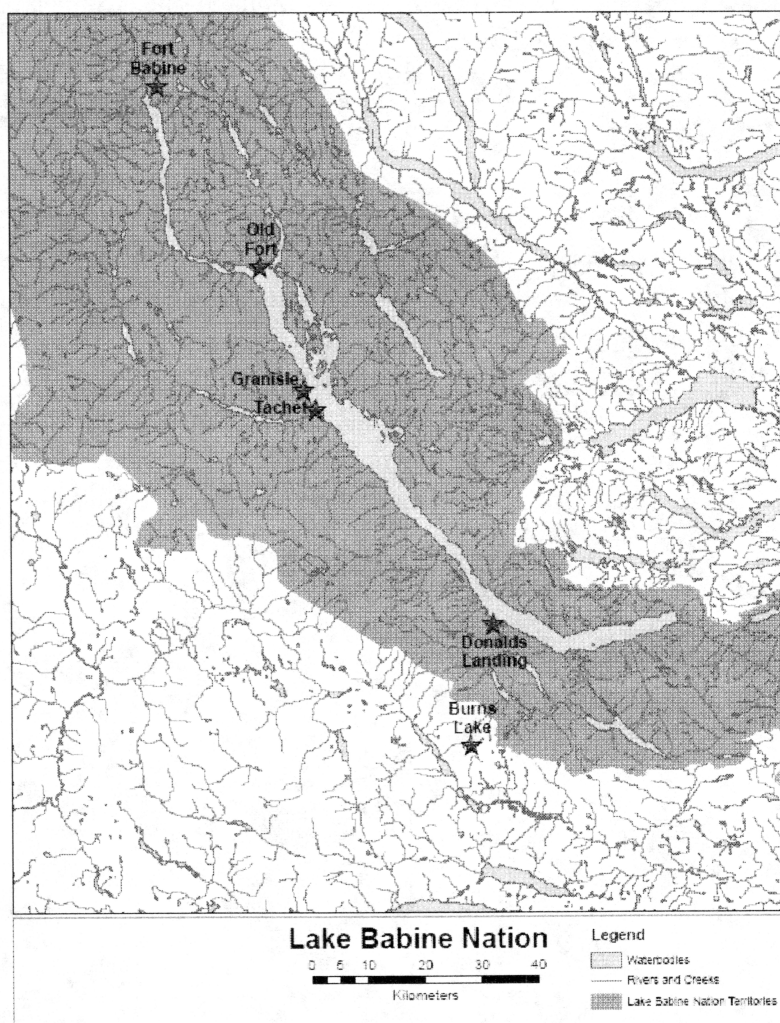


Figure 1. Babine Lake

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Table 1. Fish species in Babine Lake (Schell, 2003).

Chinook	Bull Trout
Coho	Char
Sockeye	Kokanee
Pink	Lake Whitefish
Steelhead	Mountain Whitefish
Rainbow Trout	Burbot
Cutthroat trout	Sculpins
Dolly Varden	Suckers
Shiners	Chub

The Lake Babine Nation (LBN) consists of 5 communities (Fort Babine, Old Fort, Tachet, Donald's Landing and Woyenne) and approximately 11 seasonal communities. LBN member's diets consist of locally harvested game, plant products, and the Nation relies heavily on various species of fish. Fish as a dietary item was found to comprise 40%-84% of member's diets (Lake Babine Nation, 1997). While all fish species play a fundamental role in LBN member's diets and LBN culture and tradition, sockeye was found to be the most important dietary item (Lake Babine Nation, 1997). Sockeye are also important economically, for trade and commercial sale.

The LBN houses a Fisheries Program within its organizational structure. One of the functions of the program is to monitor the amount of salmon (sockeye) being captured for Food, Social and Ceremonial (FSC) use each summer. Annual figures have shown that the number of members obtaining sockeye from Babine Lake is steadily increasing (Lake Babine Nation, 2007).

Background

The area surrounding Babine Lake has been an important copper producing area for BC, and has included two Open Pit mines and several other large prospects. The Bell and Granisle open pit mines are no longer in operation (Figures 2 and 3). A third proposed mine is in the process of applying for an Environmental certificate through the BC Environmental Process. The proposed mine is located approximately 25 km from the two existing mine sites.

The Granisle mine was in operation from 1979-1982 and involved the removal 55 million tonnes of ore-rock that produced 3 million tonnes of concentrate and 52 million tonnes of tailings (Bell Closure Plan, 1992). The Granisle mine closed prior to the increased environmental standards for reclamation and a bond of only \$150,000 was set aside for reclamation. The Bell mine was in operation from 1972-1982 and was reopened from 1985-1992.

The footprints of these mines in their non-reclaimed state act as constant symbols of potential contamination for LBN members who live in and use the area. Many LBN members have issues/concerns associated with these post-mining operations, and many have fears that their traditional diets may be unsafe to consume because of potential contamination (Lake Babine Nation, 2007).

Figure 2. Bell Mine¹

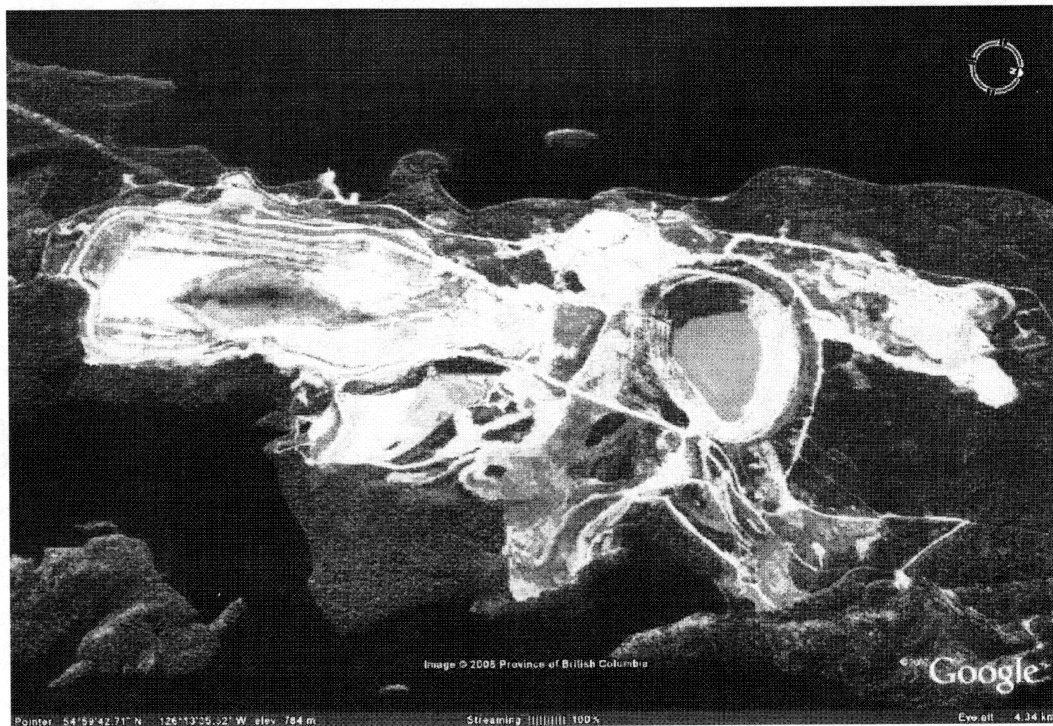
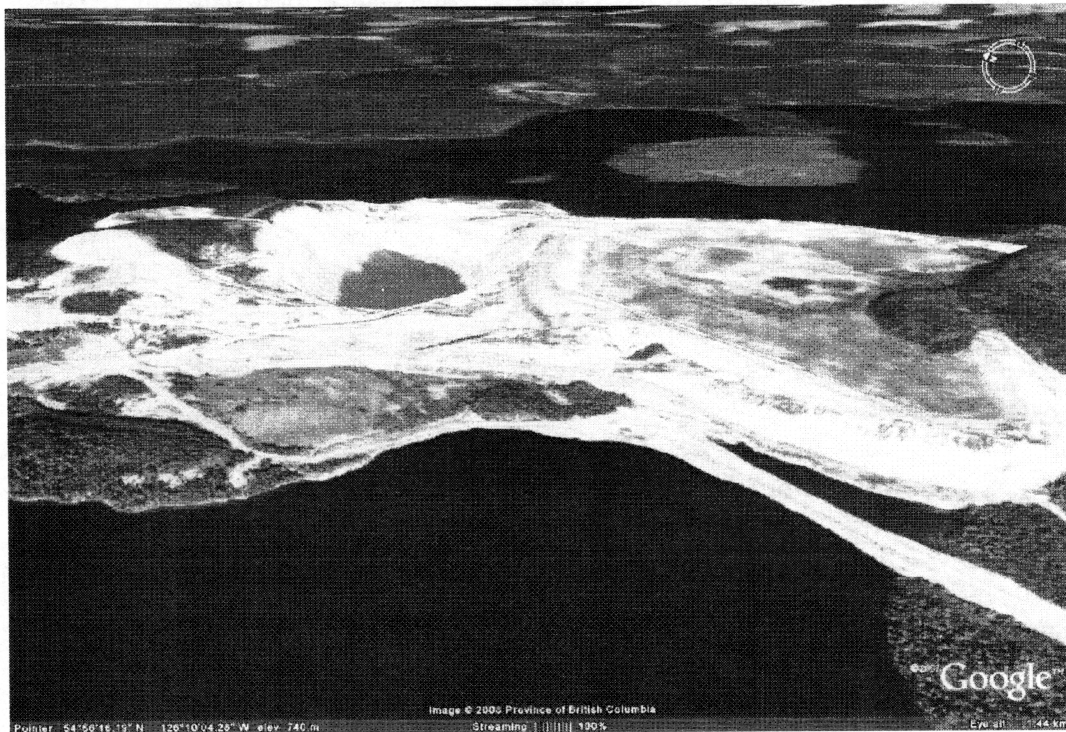


Figure 3. Granisle Mine²



¹ Aerial Photo taken from Google Earth, 2008

² Aerial photo taken from Google Earth, 2008.

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Fisheries resources have been documented to be negatively affected by mining and mining-related activities through both the impairment of aquatic production and the degradation of fish habitats (Nelson et al. 1991). Many of the effects of mining are obviously harmful to aquatic resources, while other potential indirect effects, such as low level contamination, are less obvious. The effects of mining on aquatic resources do not end at the cessation of a mining operation – the effects can persist for 100's of years after (Nelson et al. 1991)

While some metals are required in trace quantities to maintain the physiological functions of aquatic organisms, high levels can be toxic. Mining can be one of the largest contributors of higher than normal amounts of metals in aquatic ecosystems (Nelson, 1991). Metals such as Lead, Cadmium, Nickel and Arsenic are non-essential elements and can be released into aquatic environments from mining industry activities. The mixture of these elements can act synergistically and can form toxic (lethal and sub-lethal) compounds. Cadmium concentrations in aquatic environments are continually increasing in Canada, United States and, Europe and it has recently become a priority pollutant (Beak, 2002)

LBN Members rely heavily on the area's fisheries resources and are concerned about the health and sustainability of the fish populations that utilize Babine Lake. Further, there are great concerns regarding the potential cumulative effects of mine contamination, Mountain Pine Beetle epidemic and other climate change-related effects on the area's fish stocks. Studies of Mountain Pine Beetle salvage operations and climate change have shown that there is a potential for higher stream temperatures (Pike et al. 2008), which is a great concern as the toxicity of metal ions varies with factors such as aquatic species and their stage of development and age, pH and temperatures in the receiving environment (Nelson, 1991). Vegetation removal can indirectly affect fish and invertebrate species by shifting species composition and increasing water temperatures (Schell, 2003). Temperature is a very important biological factor because it interacts with physiological and chemical factors that affect many processes (Moyle and Cech, 2000). Presently, Babine Lake is known to experience high water temperatures in late summer (Schell, 2003) and is therefore very vulnerable to the effects increased temperatures facilitate.

The importance of the Fisheries health and sustainability remains the main focus for the LBN Fisheries program.

Purpose

LBN Members have raised many questions such as: Is the water polluted? Are the fish safe to eat? Do metals affect the fish in their growth and reproduction? Do our fish contain heavy metals? If so, what levels?

In order to gain information relating to these questions and any potential fish-health concerns, and possible human-health concerns relating to the consumption of fish species from the area, the Lake Babine Nation Fisheries program staff collected and sampled fish from Babine Lake during August-October, 2006. The objective was to determine the levels of various metal analytes in fish species frequently consumed by LBN members. The information collected is intended to document species, size and tissue-type specific metal analyte concentrations, and document any geographical trends in analyte

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concentrations. This information will eventually be assessed from a toxicological perspective to consider consumption guidelines as required and, to monitor any changes in metals concentration in the area's in fish species.

Methods

During the August-October period in 2006 fish were taken from areas close to 3 of LBN's communities, including Fort Babine, Tachet and Donald's Landing. Elders were consulted as to what species and tissue types should be collected, and the food fish harvest areas where sampling should be conducted. In general, tissue sampling followed the protocol below:

1. Fish were visually inspected for any lesions and abnormalities.
2. Scales samples taken
3. Fork Lengths measured
4. Using latex gloves and sanitized knives samples were dissected and ~10g of some or all of the following tissue types were removed; muscle tissue (from the left side between the dorsal fin and lateral line), gonad and kidney
5. Samples were then placed in zip-lock storage bags and placed on ice in a cooler.
6. Zip- lock bags and data sheets were labelled with sex, fork length, location, date, scale numbers and tissue type.
7. Samples were then transported to a deep freeze and stored for approximately 2 months

Samples were delivered to the UNBC Community Health Sciences Lab in Prince George where they were analyzed for the following metal analytes

(Cd) Cadmium.	Detection Level (DL) 0.05
(Cu) Copper:	DL 0.1
(Pb) Lead:	DL 0.05
(Zn) Zinc:	DL 0.1
(Hg) Mercury	DL 0.05

All analysis units and DL are in mg/Kg or parts per million (ppm).

Sample Collection Summary

Fish were collected from a number of locations based upon food fish harvesting patterns. Table 2 provides a summary of the species collected and the locations from which they were captured.

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Table 2. Summary of fish species sampled, and the locations where they were captured.

Location	Species	No	Method
Wright's Bay	Char (Lake Trout)	16	Gillnet
Babine Fence	Sockeye	14	Dipnet
Fulton C.	Coho	7	Angling
Sockeye C.	Coho	1	Angling
Sockeye C.	Rainbow Trout	5	Angling
Donald's Landing	Coho	10	Angling
Donald's Landing	Rainbow Trout	9	Angling
Tachet C.	Sockeye	4	Beach Seine
Tachet C.	Rainbow Trout	3	Angling

In total, 16 char (lake trout), 17 rainbow trout, 18 sockeye and 18 coho (69 fish in total) were collected from Babine Lake. A total of 118 tissue samples were collected from these fish (see Appendix 2 for a summary of fish lengths, dates sampled, and tissue types collected)

Results

The results of lab testing for various analytes within the tissue samples collected are presented graphically according to the species, tissue type and the area of the lake from where they were collected. Figures are presented in Appendix 1. All units are in mg/Kg or parts per million (ppm).

Coho

A total of 18 Coho were collected and analyzed from Fulton (7), Donalds (10) and Sockeye Creek (1). Both cadmium and lead were below detectable limits within all of the coho muscle and gonad tissue samples collected (no kidney tissue samples were collected from coho). Mercury levels were below detectable limits in 11 of the Coho muscle tissue samples.

Fulton Coho

Copper levels in muscle tissues from coho collected in Fulton Creek ranged from 0.40-0.47 mg/kg (Figure 4). Mercury levels within muscle tissues were either below detection limits or very close (0.5-0.07 mg/kg) to the limit (Figure 5). The concentrations of zinc within muscle tissues ranged from 3.57-6.71 mg/kg (Figure 6). The single female coho gonad sample from Fulton Creek was found to have concentrations of 1.51 and 7.57 mg/kg of copper and zinc respectively.

Donald's Coho

Concentrations of copper within muscle tissues from the 7 coho collected and analyzed from the Donald's Landing area ranged from 0.28-0.91 mg/kg (Figure 7). Zinc concentrations ranged from 2.05-3.0 mg/kg (Figure 8). Mercury was not detected in 8 of the 10 muscle samples, and was minimally above the detectable limit in the other 2. The levels of both copper and zinc in Donald's coho muscle tissues did not show a correlation with fork length (Figures 7 and 8). Copper and zinc concentrations within female gonad tissues were much higher than those measured in muscle tissues (see Table 3).

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Sockeye Creek Coho

The single coho collected muscle tissue contained concentrations of 1.3 mg/kg copper, 0.05 mg/kg mercury and 9.53 mg/kg zinc. The concentrations of copper and zinc within female gonad tissue indicated slightly higher concentrations of 1.7 mg/kg and 11.53 mg/kg respectively.

Table 3. Summary of metal analyte concentrations observed in coho muscle and gonad tissues sampled from three locations around Babine Lake.

Area/Tissue	Cadmium	Copper	Lead	Mercury	Zinc
Fulton/Muscle	< DL	.40- .47 (0.44)	< DL	ND-0.07 (0.06)	3.57-6.71 (4.90)
Fulton/Gonad	< DL	1.51	< DL	ND	7.57
Donald's/ Muscle	< DL	.28-.91 (0.47)	< DL	ND-0.06	2.05-3.0 (2.69)
Donald's/Gonad	< DL	1.87-2.27	< DL	ND	8.72-11.02
Sockeye C /Muscle	< DL	1.3	< DL	0.05	9.53
Sockeye C./Gonad	< DL	1.7	< DL	ND	11.53

Sockeye

A total of 18 sockeye were collected and sampled including 14 from the Babine Fence (n= 4 male and n= 10 female) and 4 from Tachet Creek (n= 3 female and n= 1 male). Tissues analyzed from the sockeye collected from the Babine Fence included muscle and female gonads. Samples from the sockeye collected from Tachet Creek included only muscle tissue. Neither cadmium nor lead were detected in any of the tissue samples collected from sockeye.

Babine Fence Sockeye

Zinc concentrations in female gonad tissues ranged from 4.73-8.16 mg/kg. Copper concentrations within gonad tissues were higher in comparison to zinc, ranging from 7.09-11.82 mg/kg (Figure 9). Mercury, cadmium and lead were not detected in any of the female gonad samples.

The concentration of copper within muscle tissues ranged from 0.16-0.81 mg/kg and was somewhat negatively correlated with increasing fish length (Figures 10 and 12). Zinc concentrations in muscle tissues were lower in comparison to gonad tissues and ranged from 1.21-3.87 mg/kg (Figure 11). Mercury concentrations in muscle tissues were either below detection limits or just above detection limits (Figure 13).

Tachet Creek Sockeye

Copper and zinc concentrations within muscle tissues collected from sockeye in the vicinity of Tachet Creek fell within the range of those collected from the Babine Fence (Figures 10 and 11).

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Table 4. Summary of metal analyte concentrations observed in sockeye muscle and gonad tissues sampled from two locations around Babine Lake.

Area/Tissue	Cadmium	Copper	Lead	Mercury	Zinc
Babine Fence/Muscle	< DL	0.16-0.81 (.39)	< DL	ND-0.07 (0.06)	1.21-3.81 (2.53)
Babine Fence/Gonad	< DL	7.09-11.82 (9.81)	< DL	<DL	4.73-8.16 (6.13)
Tachet/ Muscle	< DL	0.29-0.92 (.54)	< DL	0.05-0.06 (.06)	3.05-3.87 (3.37)
Tachet/Gonad	na	na	na	na	na

Char (Lake trout)

A Total of 16 char were collected from Wright's Bay (n=14 male and n= 2 females). Muscle, kidney, and male gonad tissues were collected. Lead levels in all char tissue samples were below detection limits.

Cadmium concentrations in char kidney tissue samples ranged from 0.1-1.14 mg/kg (Figure 15). Concentrations of copper ranged from 0.31-3.08 mg/kg (Figure 16). Mercury concentrations in char kidney samples ranged from 0.50-1.59 mg/kg and zinc concentrations ranged from 7.5-23.85 mg/kg (Figures 17 and 18).

Concentrations of copper in male char gonad tissues ranged from 0.35-1.74 mg/kg (Figure 19). Mercury concentrations in male gonad tissues ranged from 0.06-0.57 mg/kg (Figure 20). Zinc concentrations ranged from 5.65-11.15 mg/kg (Figure 21). While only two female char were captured and sampled, metal analyte concentrations measured in female gonad tissues fell within the range of values observed for male gonad tissues, with the exception of mercury levels, which appeared higher in male tissues (Table 5).

Copper concentrations in char muscle tissue ranged from 0.88-1.74 mg/kg and were not correlated to fish length (Figure 22). Mercury concentrations measured in muscle tissues ranged from below detectable limits to 0.46 mg/kg and averaged 0.27 mg/kg for the 16 samples (Figure 23). Mercury levels appeared to be somewhat correlated with increased fish length. Concentrations of zinc ranged from 2.83-3.92 mg/kg (Figure 24). Cadmium or lead were not detected in any of the muscle tissue samples.

Table 5. Summary of metal analyte concentrations observed in char (lake trout) kidney, muscle and gonad tissues sampled from Wright's Bay Babine Lake.

Area/Tissue	Cadmium	Copper	Lead	Mercury	Zinc
Wright's Bay/Kidney	0.1-1.14 (.34)	0.31-3.08 (1.48)	< DL	0.50-1.59 (0.85)	7.5-23.85 (20.63)
Wright's Bay/Muscle	< DL	0.88-1.74 (1.23)	< DL	ND-0.46 (0.27)	2.83-3.92 (3.32)
Wright's Bay/Male Gonad	< DL	0.35-1.74 (0.90)	< DL	0.06-.57 (0.26)	5.65-11.15 (8.47)
Wright's Bay/Female Gonad (n=2)	< DL	1.57-1.74	< DL	ND-0.05	5.15-6.04

Rainbow Trout

A total of 17 rainbow trout (female n= 5, male n= 1 and unknown n= 11) were collected from Donald's Landing area (n=9), Tachet Creek (n=3) and Sockeye Creek (n=5). Muscle tissues were collected and analyzed from all of the rainbow trout sampled and 3 female rainbow trout were sampled for gonad tissues. Cadmium and lead levels were below detectable levels in all rainbow trout tissues sampled

Concentrations of copper in rainbow trout muscle tissues ranged from 0.10-1.15 mg/kg and did not show any relationship with fork length (Figure 25). Mercury concentrations in muscle tissues were relatively low ranging from below detectable limits to 0.11 mg/kg (Figure 26) Zinc concentrations in muscle tissues ranged from 1.49-7.03 mg/kg and were slightly negatively correlated with increasing fork length (Figure 27).

Copper and zinc analyte concentrations within rainbow trout muscle tissues collected from various area of Babine Lake did not deviate substantially in concentration (Figures 28 and 29).

Copper and zinc concentrations measured in female rainbow trout gonad tissue were substantially higher than those observed for muscle tissues, as was noted with other species (Table 6).

Table 6. Summary of metal analyte concentrations observed in rainbow trout muscle and gonad tissues sampled from three locations around Babine Lake.

Area/Tissue	Cadmium	Copper	Lead	Mercury	Zinc
Donald's Landing/Muscle	< DL	0.1-.31 (.19)	< DL	ND-0.11 (0.07)	1.49-5.55 (3.44)
Tachet C./Muscle	< DL	0.18-0.21 (.19)	< DL	0.05-0.06	2.62-4.16 (3.31)
Sockeye C./Muscle	< DL	0.17-1.15 (.42)	< DL	DL-0.06	3.35-7.03 (4.60)
Rainbow Trout Gonad	< DL	2.01-2.88 (2 40)	< DL	< DL	10.74-13.7 (12.15)

Summary; Analyte Concentrations

Comparative Analyte Levels; Geographical

Analyte levels did not appear to vary substantially within species sampled at a number of locations. Significance of geographical variation in analyte levels was not tested due to the small sample sizes in most cases, but analyte concentrations from tissues of the same type from the same species collected at differing locations were noted to generally fall within the same range.

Comparative Analyte Levels; Within Species

Analyte levels did demonstrate some variability that appeared dependent on fish length.

Copper concentrations in sockeye muscle tissues appeared weakly negatively correlated to increasing fish length.

Assessing Metal Levels in the Tissues of Food-Fish Species in Babine Lake; Summary Report on Analyte Levels Found in Fish Tissues Collected in 2006

For char, zinc concentrations appear to be positively correlated to increasing fish length. Copper concentrations did not appear to be correlated with fish length. Concentrations of mercury in char muscle were positively correlated to increasing fish length. Mercury concentrations in char gonad and kidney tissue did not appear to be correlated to fish length. Cadmium concentrations, which were only detectable in char kidney tissues, were not correlated to fish length.

For rainbow trout, zinc concentrations appeared negatively correlated with increasing fish length.

Comparative Analyte Levels, Tissue Types Within Species

Analyte concentrations measured in both male and female char, rainbow trout, coho and sockeye gonad tissues were considerably higher than concentrations of the same analytes measured in muscle tissues from the same individuals, with the exception of mercury levels, which were consistently lower in gonad tissues. Analyte levels in char kidney tissues were consistently higher than concentrations measured in char muscle and gonad tissues, particularly for mercury and zinc. Char kidney tissue was the only tissue type in which cadmium was measured above detectable limits.

Comparative Analyte Levels; Between Species

Metal analyte concentrations in fish tissues can vary within and between species dependent on their age and longevity, and life history and diet.

Char vs Rainbow Trout

1. Copper concentrations were higher in Char muscle tissues ranging from 0.88-1.74 mg/kg in comparison to Rainbow trout muscle tissue concentrations which ranged from 0.16-1.15 (Figure 30).
2. Concentrations of mercury in muscle tissues were also higher in char with a range from 0.13-0.46 mg/kg relative to rainbow trout, where observed mercury muscle tissue concentrations ranged from 0.05-0.11 mg/kg (Figure 31).
3. Zinc concentrations in char and rainbow trout were similar, but varied to a greater degree within rainbow trout (Figure 32).

Sockeye vs Coho

1. Copper concentrations in muscle tissues from sockeye and coho were similar but slightly higher on average within coho tissues (Figure 33). The range of copper concentrations in sockeye and Coho were 0.16-0.81 and 0.28-1.3 mg/kg respectively.
2. Mercury concentrations in sockeye and coho muscle tissue samples were similar and ranged from 0.05-0.07 mg/kg, but were commonly detected in coho tissues (Figure 34).
3. Concentrations of zinc within muscle tissues were higher in coho with a range from 2.05-6.24 mg/kg relative to the zinc concentrations in sockeye that had a range of 1.21-3.87 mg/kg (Figure 35).

Sockeye vs Rainbow Trout

1. Copper concentrations within muscle tissues were higher on average in rainbow trout relative to sockeye (Figure 36).
2. Zinc concentrations were also higher in rainbow trout muscle tissue samples relative to sockeye samples (Figure 37)
3. Mercury concentrations within muscle tissue samples from rainbow trout and sockeye were similar (Figure 38).

Comparative Analyte Levels; Between Analytes

Analyte levels varied between species and tissue types sampled.

Lead

Lead was below detection limits in all of the fish tissue samples tested.

Cadmium

Cadmium levels were below detectable levels in all samples collected with the exception of char kidney, in which it was measured at an average concentration of 0.32 mg/kg for 16 samples.

Mercury

Mercury was either below detection limits or measured at levels very close to detection limits in rainbow trout, sockeye and coho tissues tested. Mercury concentrations within char tissues were considerably higher in all tissues sampled, with the exception of female gonad tissues, which were found to contain mercury concentrations at similarly low levels as in the other species tested. Char kidney, muscle and male gonad tissues contained mean concentrations of 0.85, 0.27 and 0.26 mg/kg mercury, respectively.

Copper

Copper concentrations were measured above detectable limits in all tissues sampled. Mean copper concentrations found in muscle tissues from coho, sockeye, char and rainbow trout were 0.50, 0.42, 1.23 and 0.26 mg/kg respectively. Mean copper concentrations within female coho, sockeye, char and rainbow trout gonad tissues were 1.84, 9.81, 1.66 and 2.40 mg/kg respectively. Copper concentrations in male char gonad tissues average 0.90 mg/kg. Copper concentrations in char kidney tissues averaged 1.48 mg/kg.

Zinc

Zinc concentrations were also found to be above detectable limits in all fish tissues sampled. Mean zinc concentrations found in muscle tissues from coho, sockeye, char and rainbow trout were 3.93, 2.71, 3.32, and 3.76 mg/kg respectively. Mean zinc concentrations within female coho, sockeye, char and rainbow trout gonad tissues were 9.71, 6.13, 5.60, and 12.15 mg/kg respectively. Zinc concentrations in male char gonad tissues average 8.47 mg/kg. Zinc concentrations in char kidney tissues averaged 20.63 mg/kg.

Recommendations

This information developed and presented in this report should be compared with previous assessments of metal analyte concentrations complete on Babine Lake's fish species and/or any nearby waterbodies.

Further, this data and the information provided in this report should now be assessed in relation to toxicological considerations that may be evident to either human and/or fish health

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Appendix 1 – Figures 4 - 38

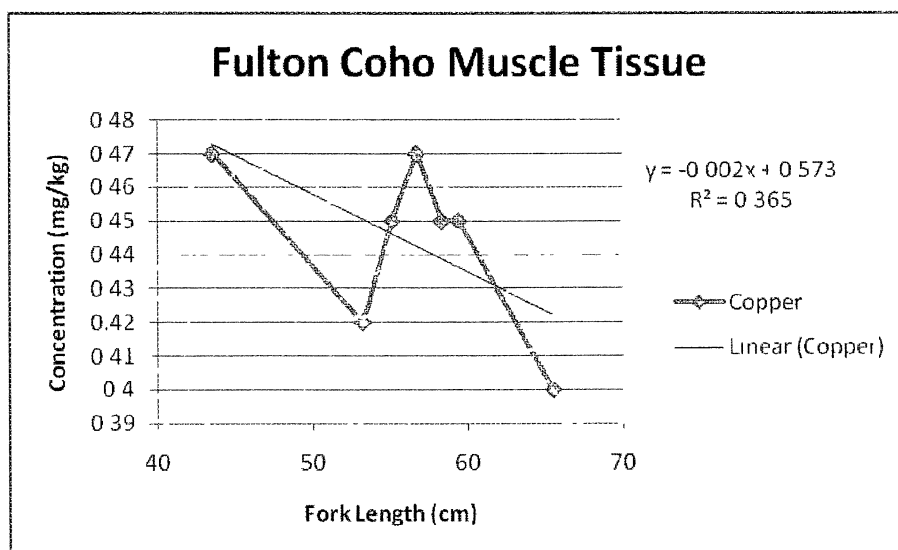


Figure 4. Fulton coho; muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

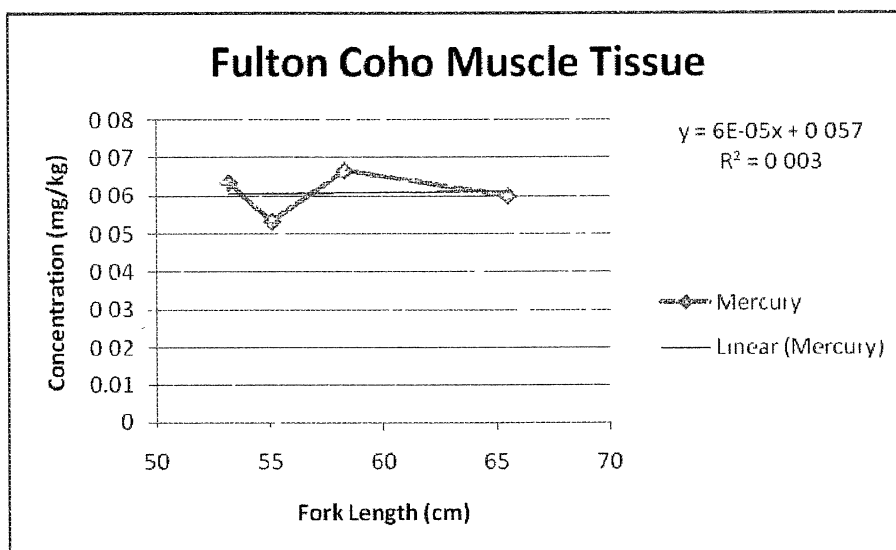


Figure 5. Fulton coho; muscle tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

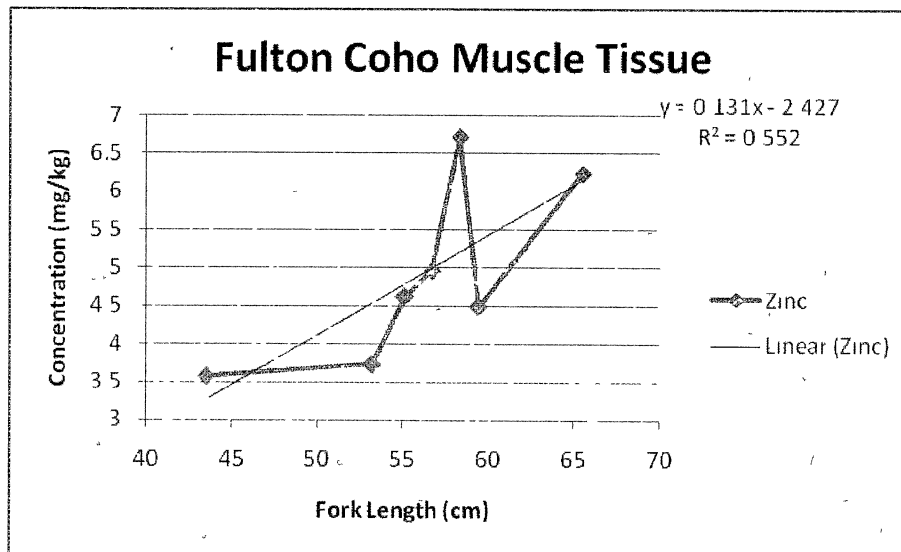


Figure 6. Fulton coho; muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

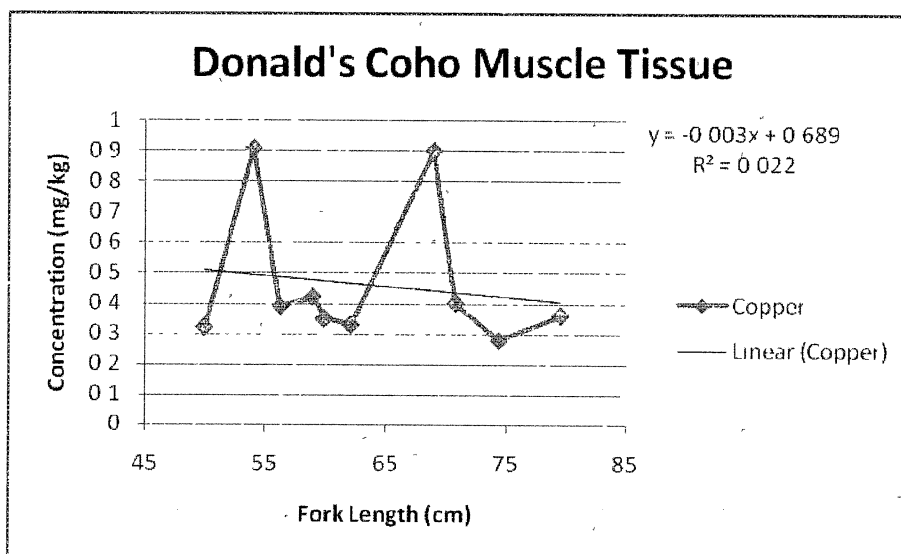


Figure 7. Donald's Landing coho; muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

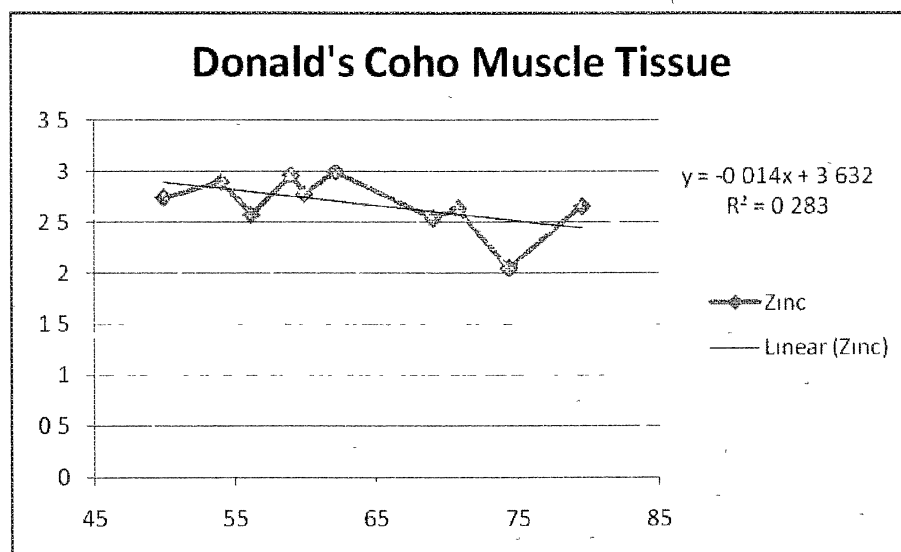


Figure 8. Donald's Landing coho; muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

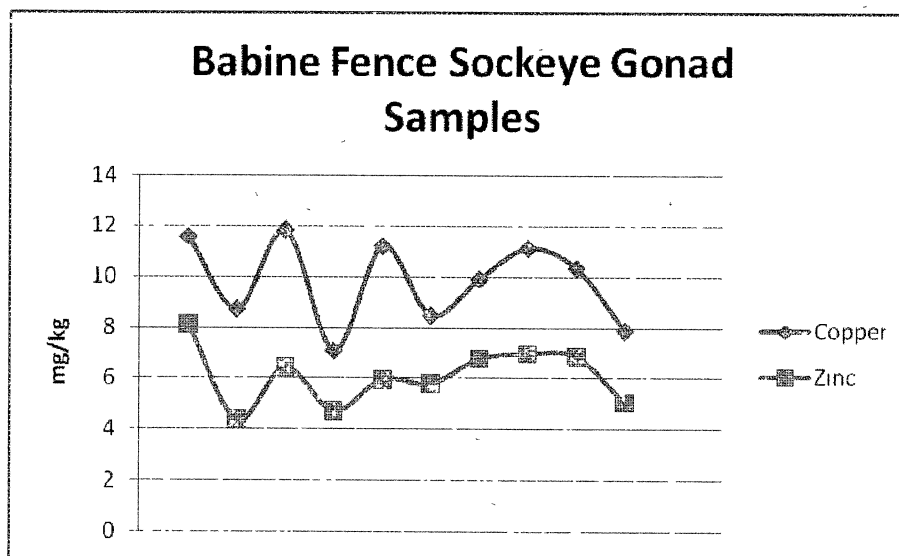


Figure 9. Babine Fence sockeye; gonad tissue - Copper (Cu DL 0.1ppm) and Zinc (Zn DL 0.1ppm) concentrations observed.

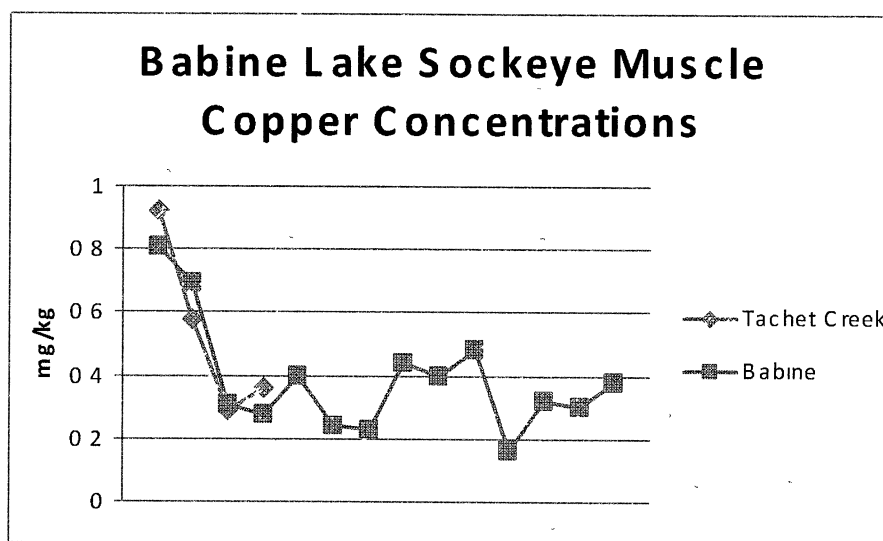


Figure 10. Babine sockeye (Babine Fence and Tachet C.); muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

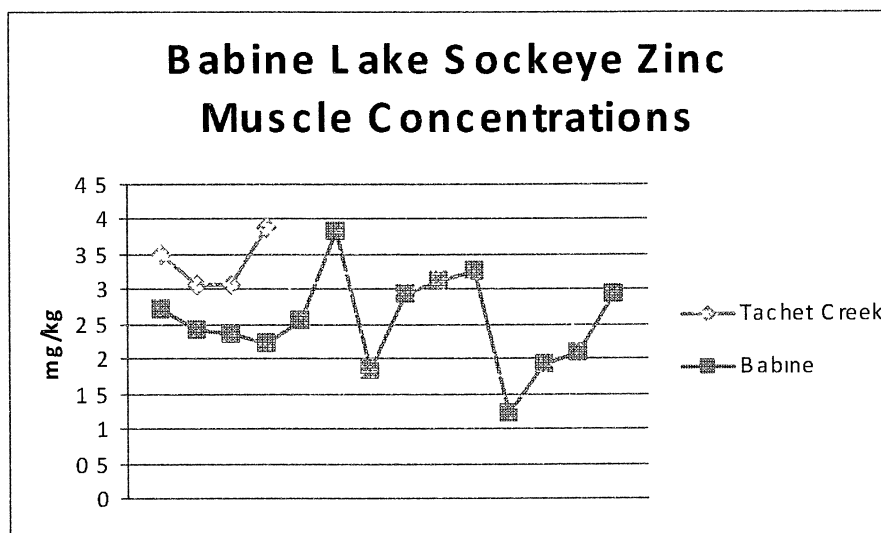


Figure 11. Babine sockeye (Babine Fence and Tachet C.); muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

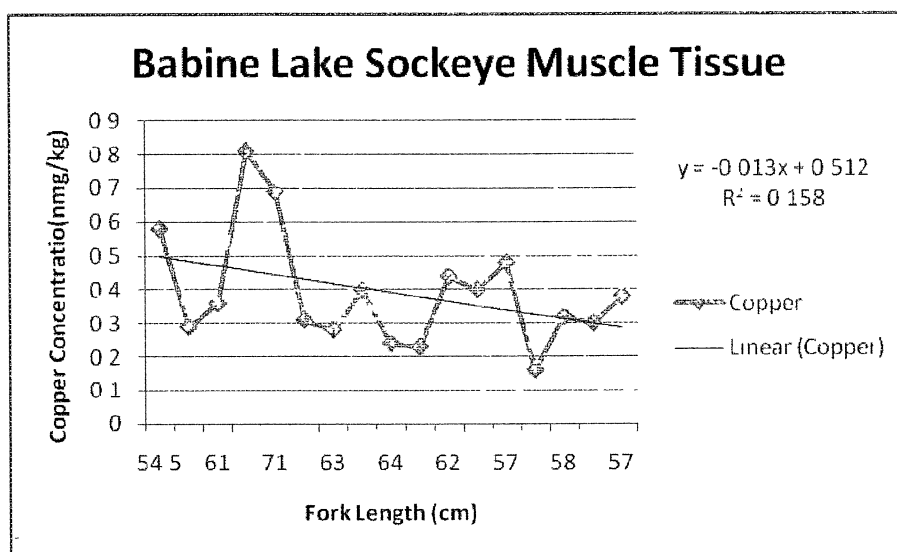


Figure 12. Babine sockeye (all); muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

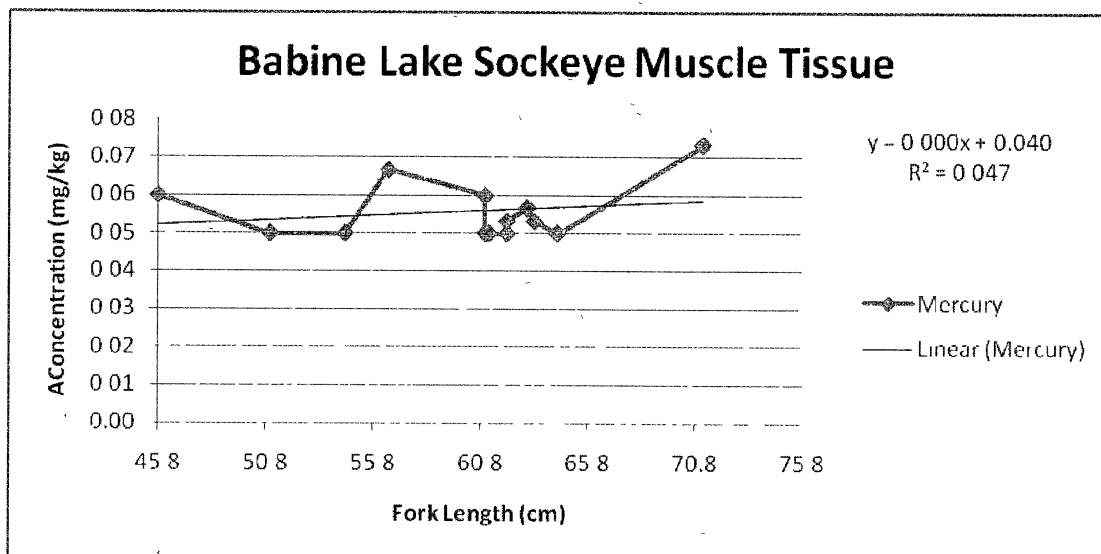


Figure 13. Babine Fence sockeye; muscle tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

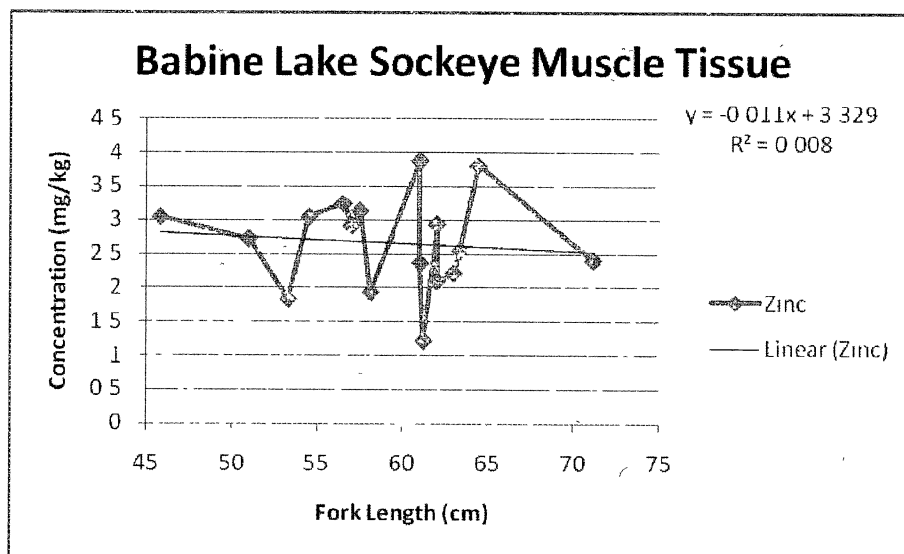


Figure 14. Babine sockeye (Babine Fence and Tachet C.); muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

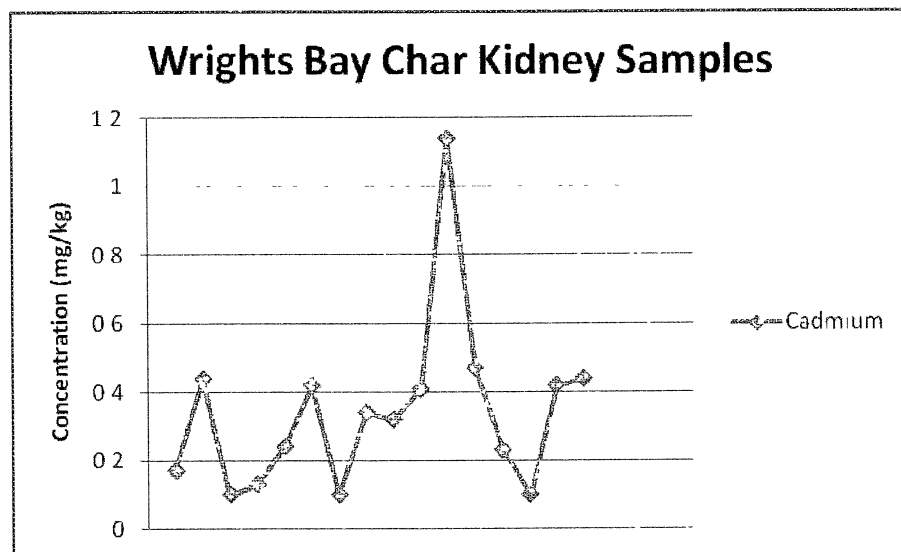


Figure 15. Babine Lake char (lake trout); kidney tissue and Cadmium (Cd DL 0.05ppm) concentrations observed.

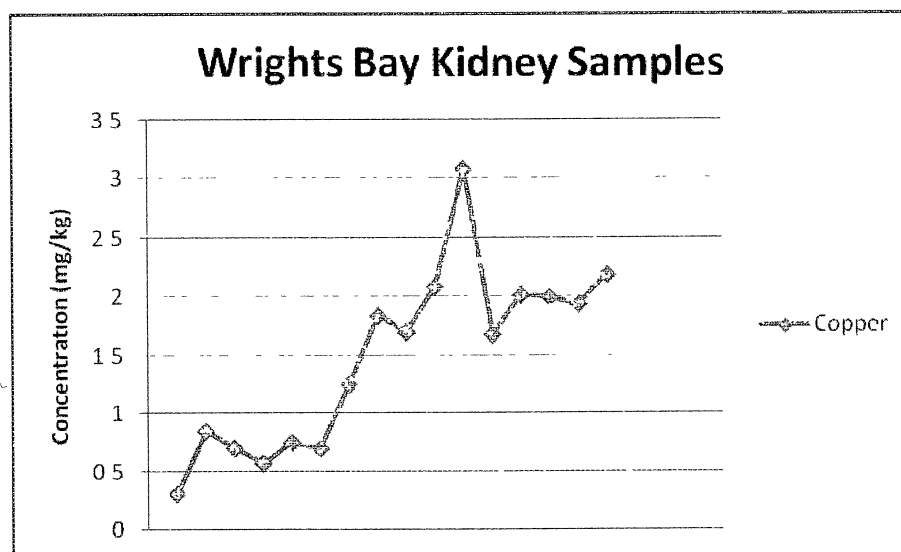


Figure 16. Babine Lake char (lake trout); kidney tissue and Copper (Cu DL 0.1ppm) concentrations observed.

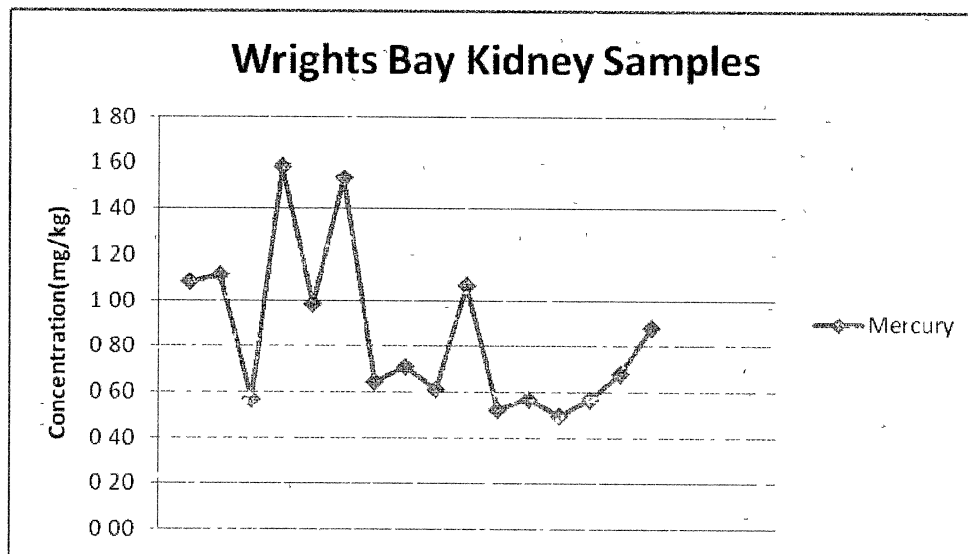


Figure 17. Babine Lake char (lake trout); kidney tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

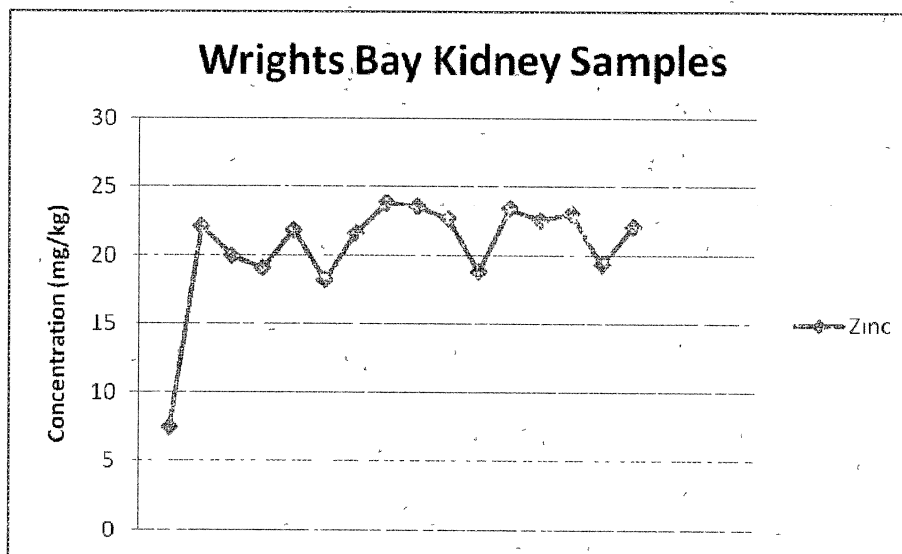


Figure 18. Babine Lake char (lake trout); kidney tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

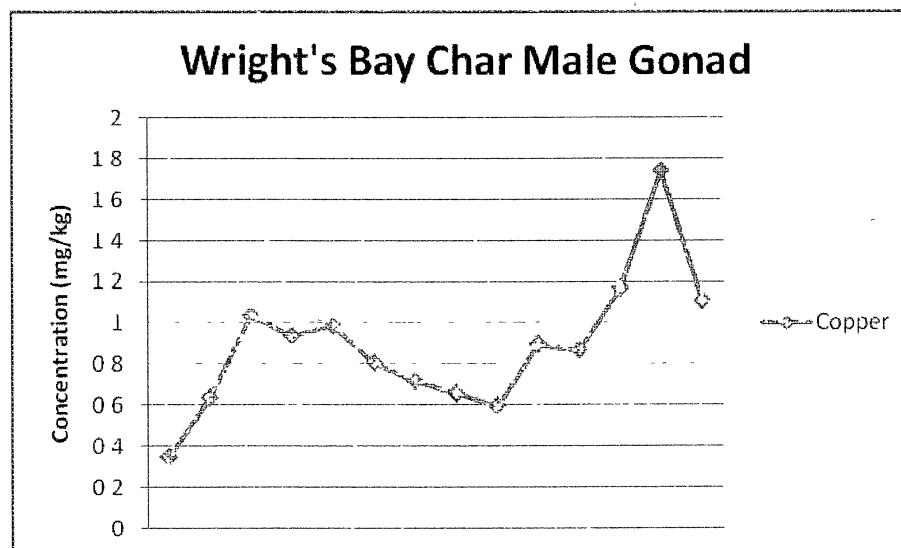


Figure 19. Babine Lake char (lake trout); male gonad tissue and Copper (Cu DL 0.1ppm) concentrations observed.

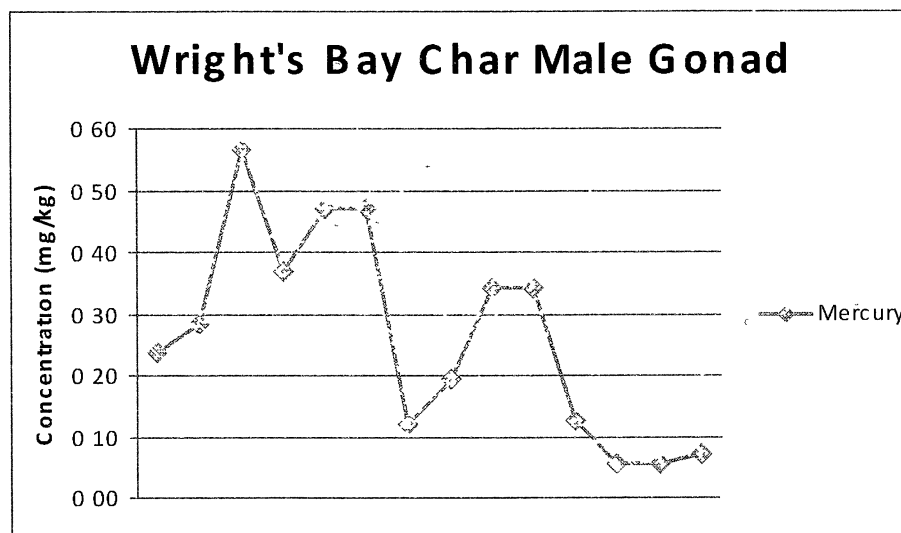


Figure 20. Babine Lake char (lake trout); male gonad tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

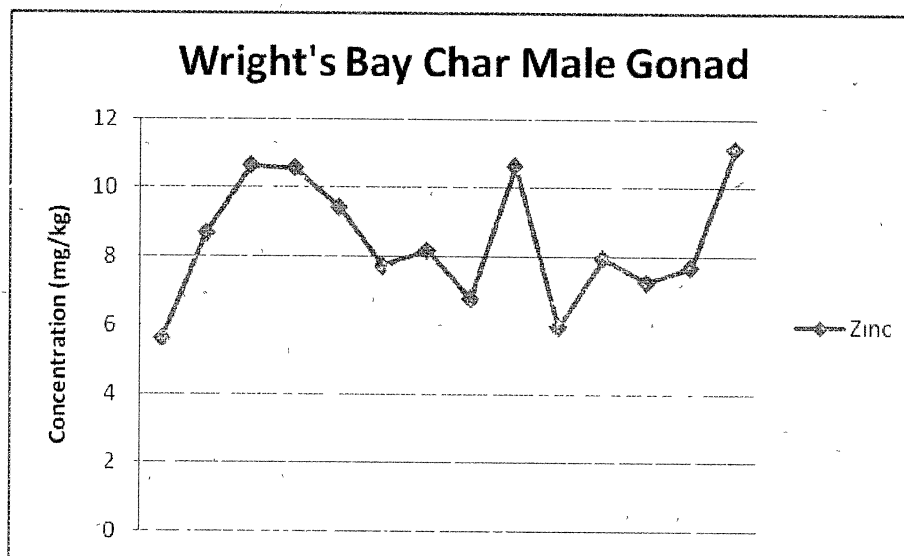


Figure 21. Babine Lake char (lake trout); male gonad tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

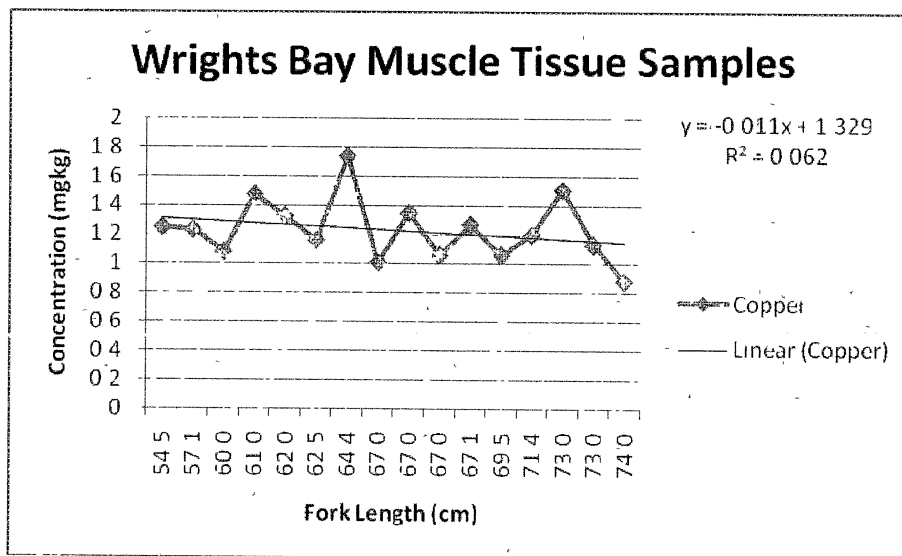


Figure 22. Babine Lake char (lake trout); muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

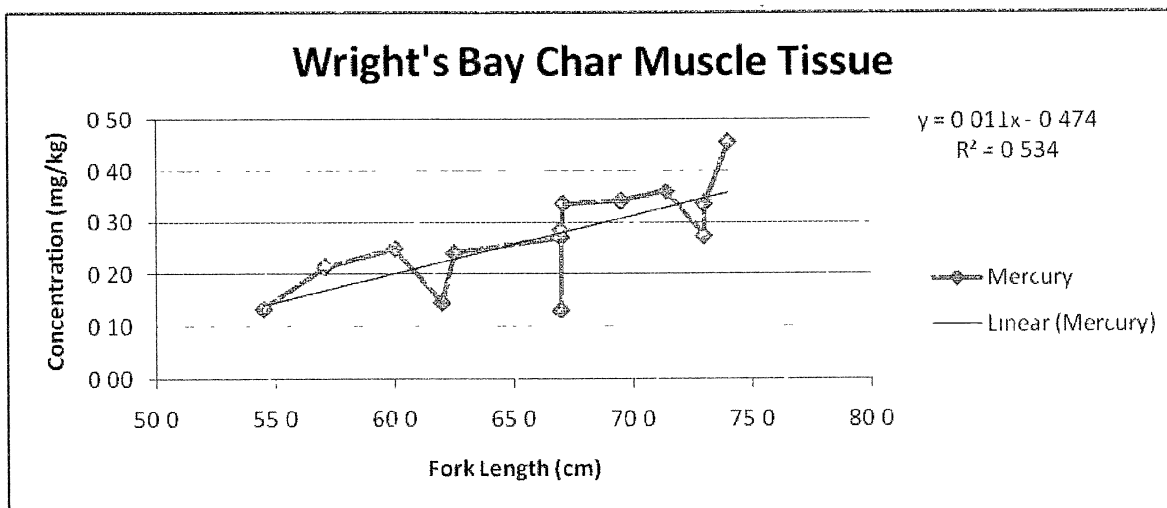


Figure 23. Babine Lake char (lake trout); muscle tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

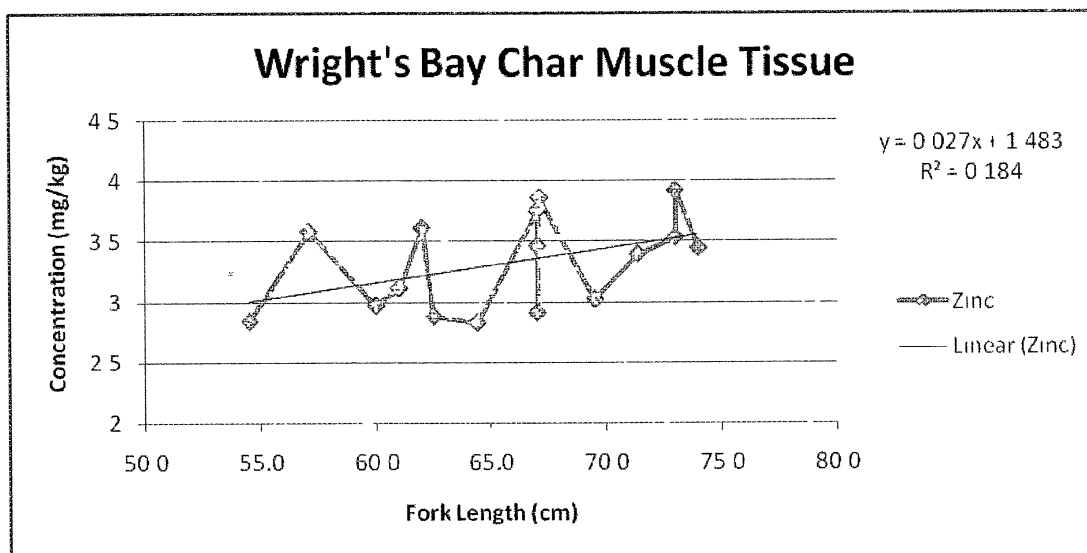


Figure 24. Babine Lake char (lake trout); muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

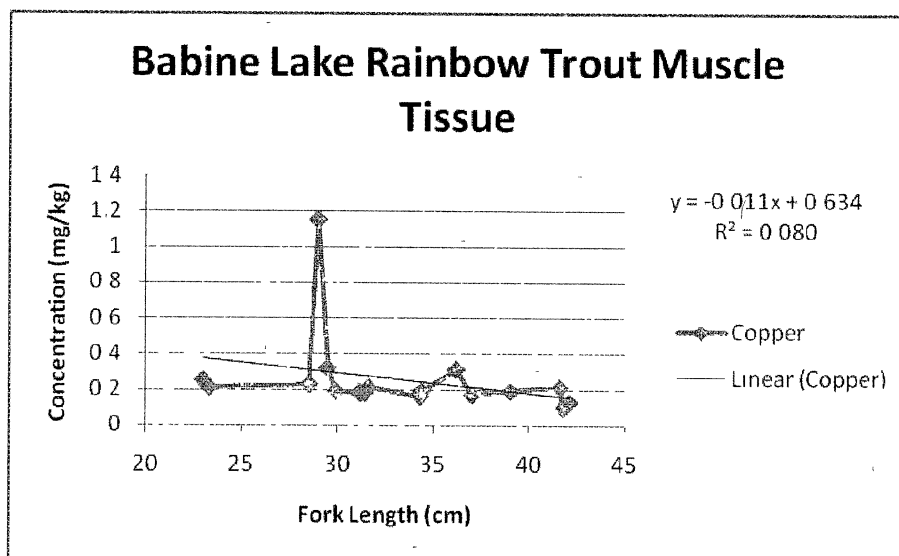


Figure 25. Babine Lake rainbow trout (all locations); muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

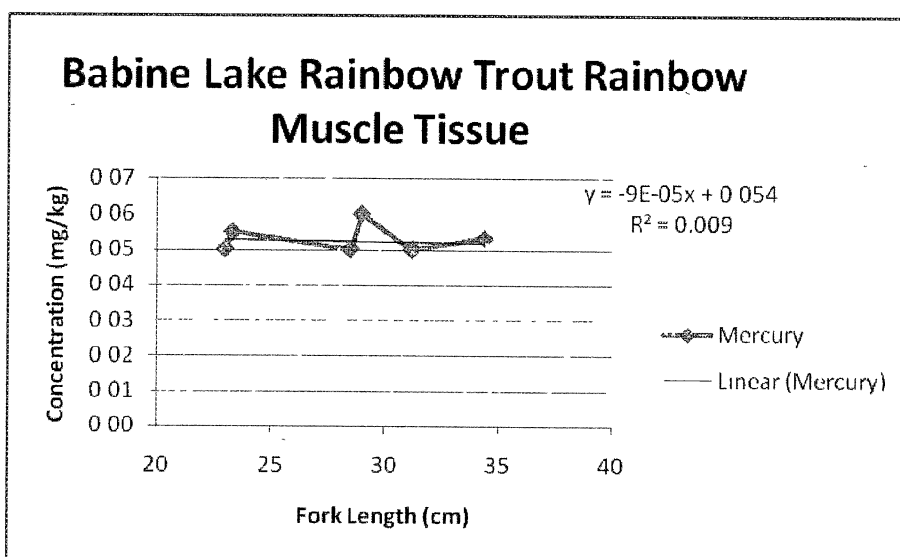


Figure 26. Babine Lake rainbow trout (all locations); muscle tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

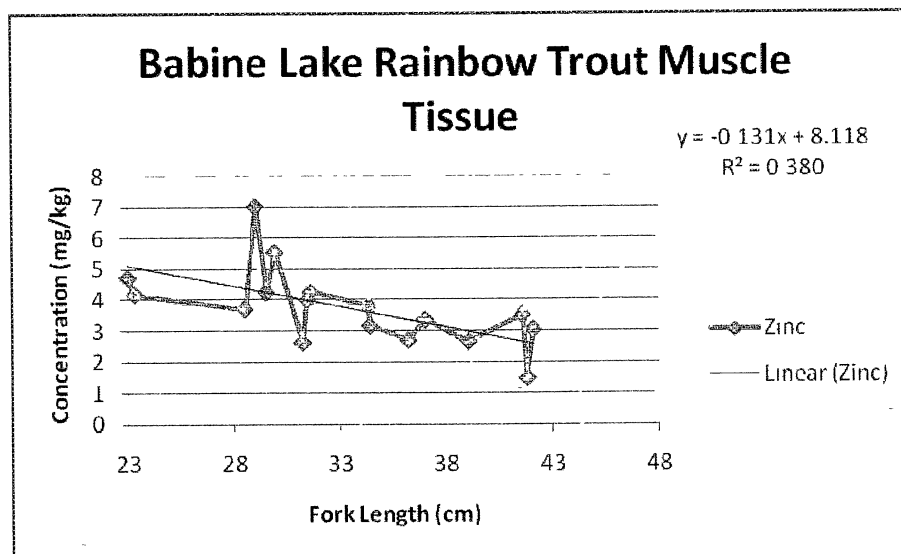


Figure 27. Babine Lake rainbow trout (all locations); muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

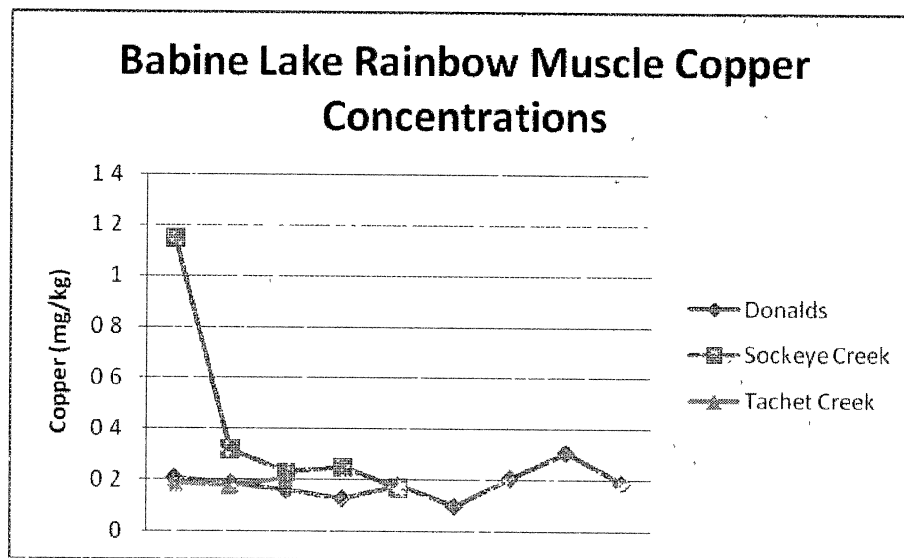


Figure 28. Babine Lake rainbow trout (all locations compared); muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

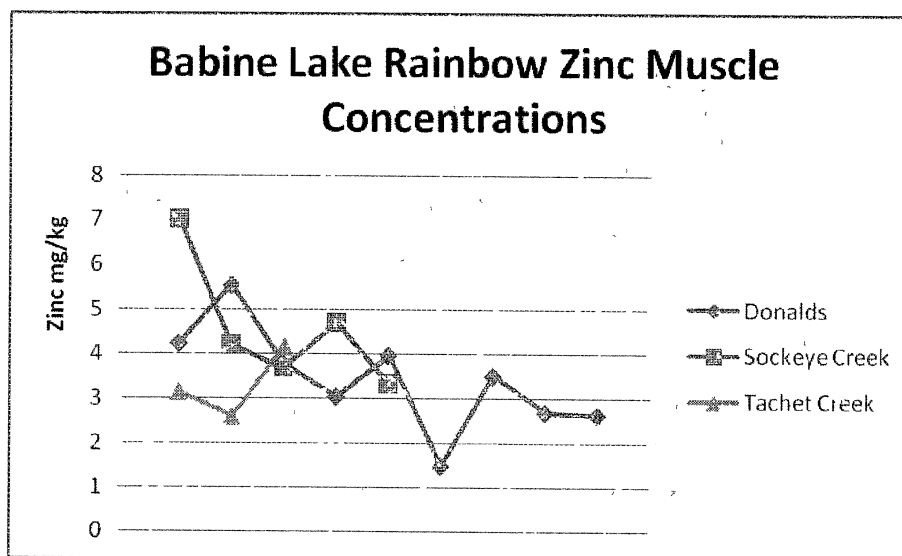


Figure 29. Babine Lake rainbow trout (all locations compared); muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

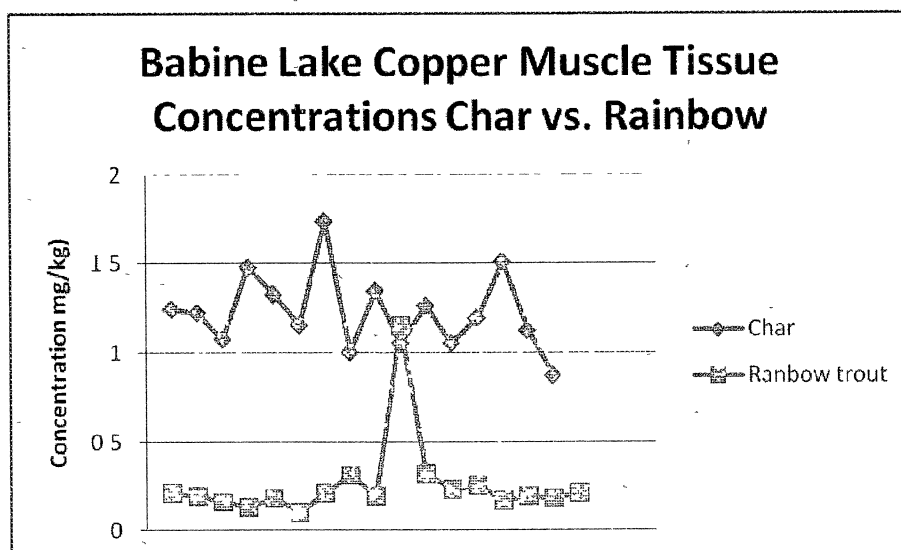


Figure 30. Babine Lake rainbow trout (all locations) and char (lake trout); muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

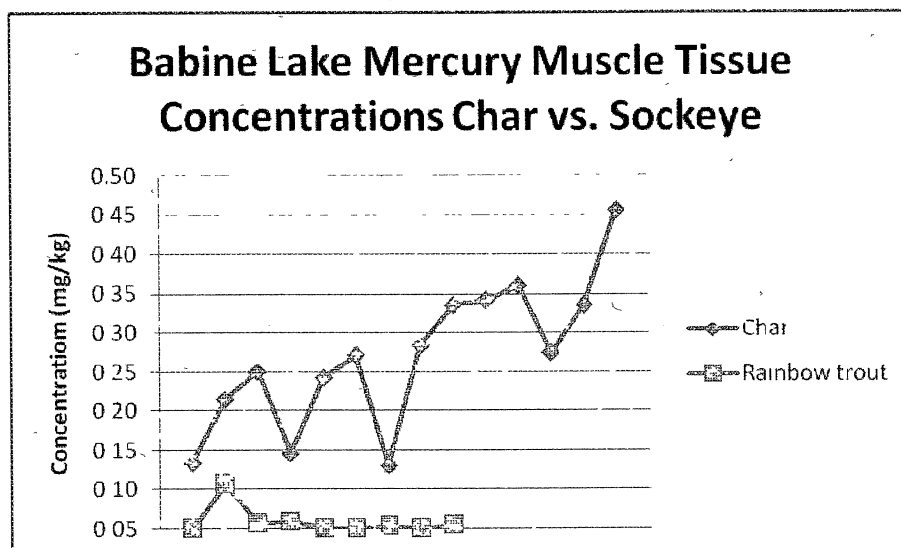


Figure 31. Babine Lake rainbow trout (all locations; where DL exceeded) and char (lake trout); muscle tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

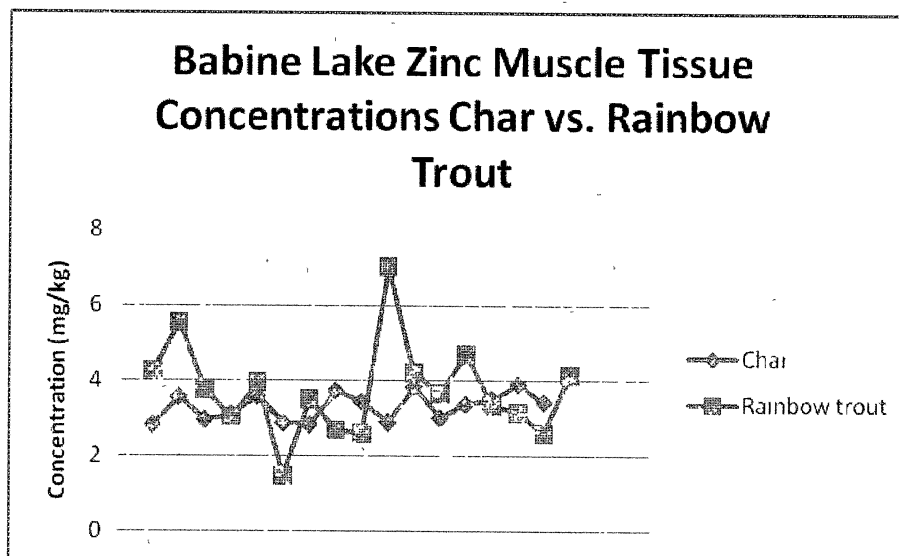


Figure 32. Babine Lake rainbow trout (all locations) and char (lake trout); muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

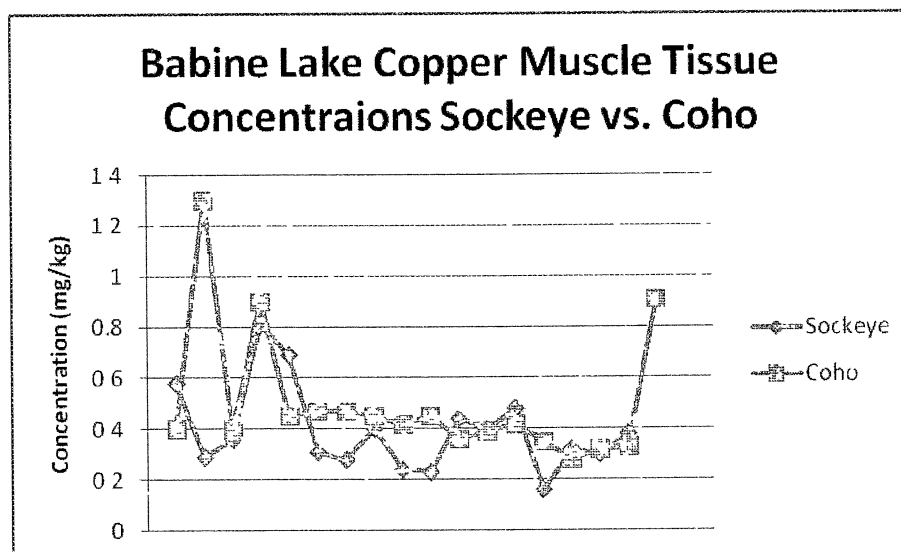


Figure 33. Babine Lake sockeye (all locations) and coho (all locations); muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

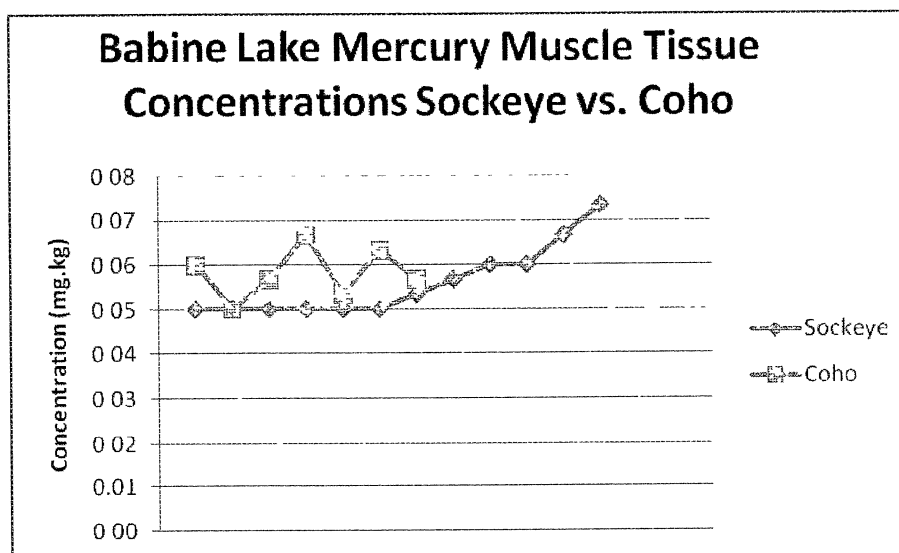


Figure 34. Babine Lake sockeye (all locations; where DL exceeded) and coho (all locations; where DL exceeded); muscle tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

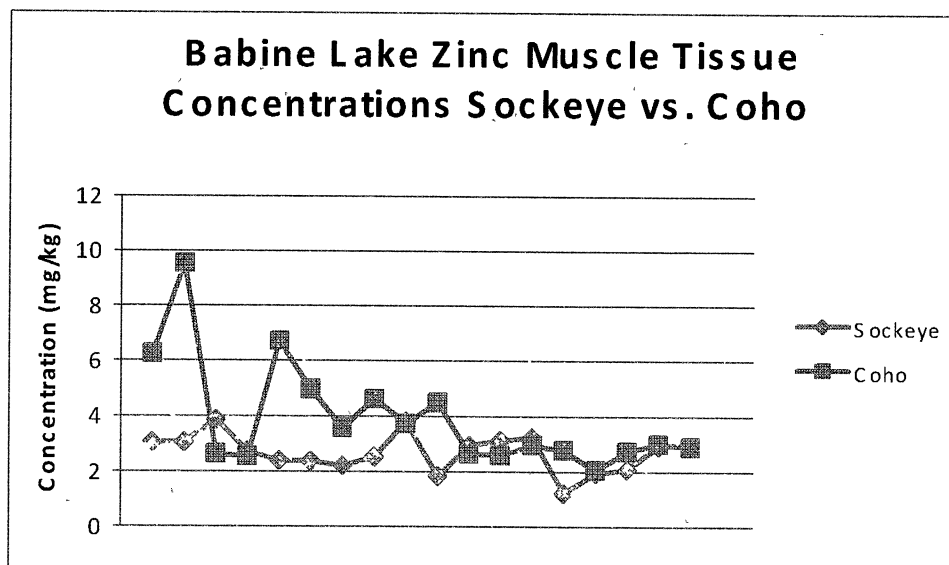


Figure 35. Babine Lake sockeye (all locations) and coho (all locations); muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

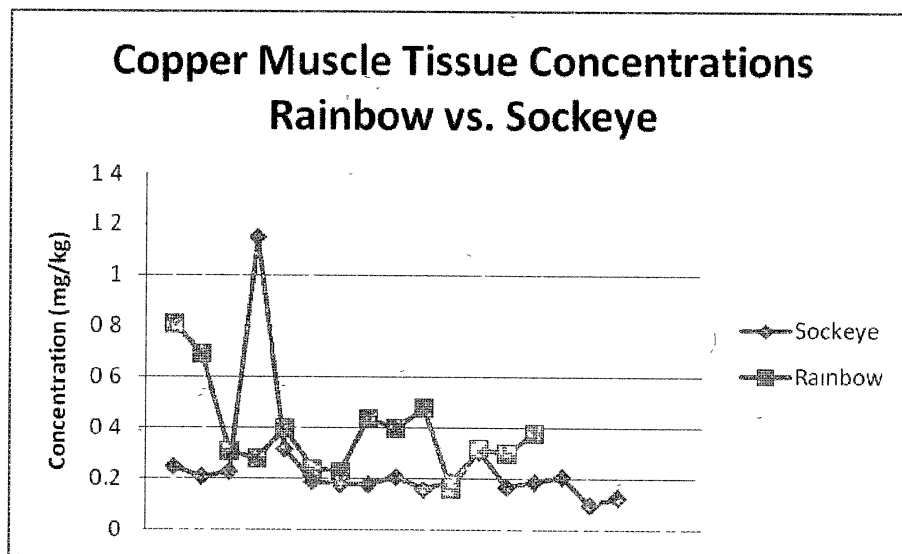


Figure 36. Babine Lake sockeye (all locations) and rainbow trout (all locations); muscle tissue and Copper (Cu DL 0.1ppm) concentrations observed.

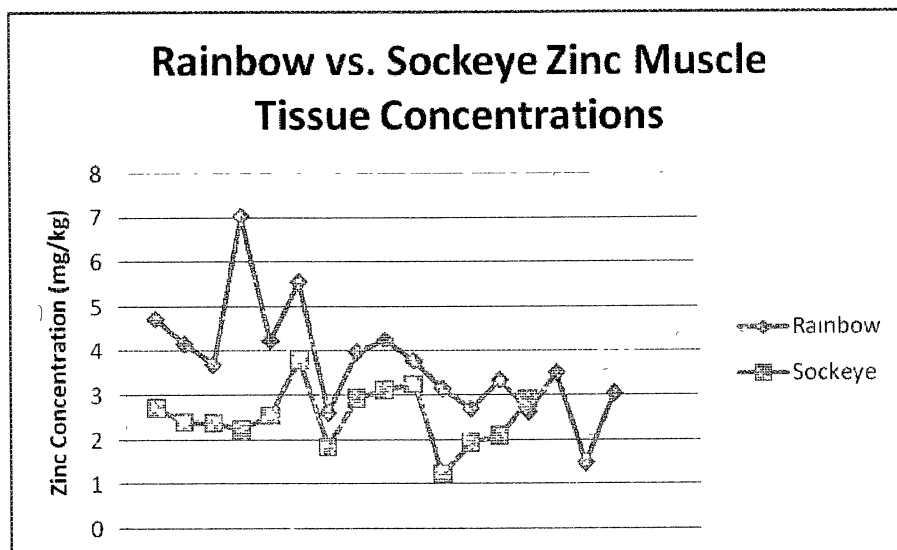


Figure 37. Babine Lake sockeye (all locations) and rainbow trout (all locations); muscle tissue and Zinc (Zn DL 0.1ppm) concentrations observed.

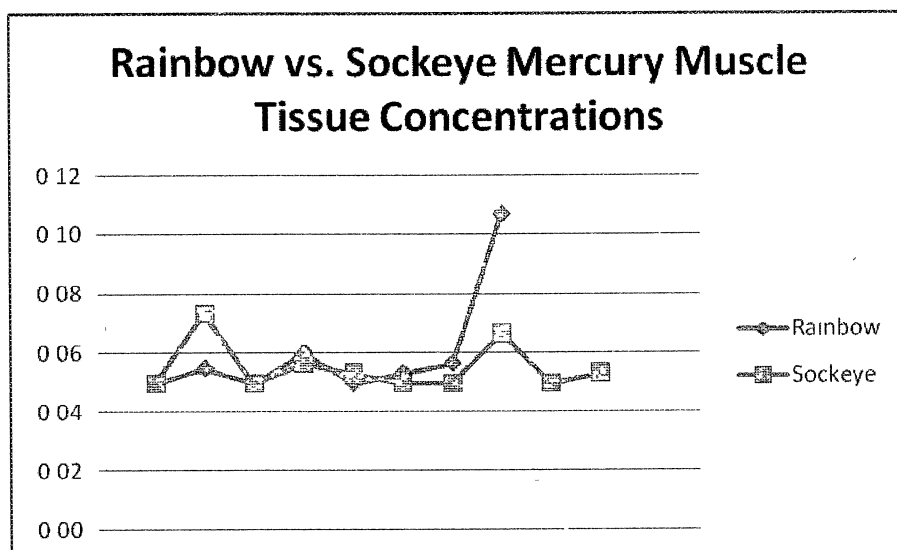


Figure 38. Babine Lake sockeye (all locations; where DL exceeded) and rainbow trout (all locations; where DL exceeded); muscle tissue and Mercury (Hg DL 0.05ppm) concentrations observed.

Appendix 2 – Tissue Analysis Data

Assessing Metal Levels in the Tissues of Food-Fish Species in Babine Lake; Summary Report on Analyte Levels Found in Fish Tissues Collected in 2006

Sample #	Species	Location	Date	Sex	Fork Length	Tissue	Scale	Sample Id	Sample ID	Cadmium	Copper	Lead	Mercury	Zinc
1	Coho	Fulton	17-Oct-06	male	583	Muscle	Yes	A1	A1	ND	0.45	ND	0.07	6.71
2	Coho	Fulton	17-Oct-06	male	567	Muscle	Yes	A2	A2	ND	0.47	ND	ND	4.96
3	Coho	Fulton	17-Oct-06	male	435	Muscle	Yes	A3	A3	ND	0.47	ND	ND	3.57
4	Coho	Fulton	17-Oct-06	male	551	Muscle	Yes	A4	A4	ND	0.45	ND	0.05	4.62
5	Coho	Fulton	17-Oct-06	male	532	Muscle	Yes	A5	A5	ND	0.42	ND	0.06	3.73
6	Coho	Fulton	17-Oct-06	male	594	Muscle	Yes	A6	A6	ND	0.45	ND	ND	4.49
7	Coho	Fulton	17-Oct-06	female	655	Muscle	Yes	A7	A7	ND	0.4	ND	0.06	6.24
7	Coho	Fulton	17-Oct-06	female	655	Gonad	Yes	A8	A8	ND	1.51	ND	ND	7.57
5	Rainbow	Sockeye C	18-Oct-06	Female	370	Gonad	yes	B1	B1	ND	2.01	ND	ND	10.74
7	Rainbow	Tachet Creek	18-Oct-06	Female	344	Gonad	yes	B2	B2	ND	2.88	ND	ND	13.7
8	Rainbow	Tachet Creek	18-Oct-06	Female	312	Gonad	yes	B3	B3	ND	2.31	ND	ND	12.02
1	Rainbow	Donalds	15-Oct-06	unk	316	Muscle	Yes	C1	C1	ND	0.21	ND	ND	4.25
2	Rainbow	Donalds	15-Oct-06	unk	299	Muscle	Yes	C2	C2	ND	0.19	ND	ND	5.55
3	Rainbow	Donalds	15-Oct-06	unk	343	Muscle	Yes	C3	C3	ND	0.16	ND	ND	3.78
4	Rainbow	Donalds	15-Oct-06	unk	421	Muscle	Yes	C4	C4	ND	0.13	ND	0.05	3.05
5	Rainbow	Donalds	15-Oct-06	unk	314	Muscle	Yes	C5	C5	ND	0.18	ND	ND	3.98
6	Rainbow	Donalds	15-Oct-06	unk	418	Muscle	Yes	C6	C6	ND	0.1	ND	0.11	1.49
7	Rainbow	Donalds	15-Oct-06	unk	416	Muscle	Yes	C7	C7	ND	0.21	ND	0.06	3.52
8	Rainbow	Donalds	15-Oct-06	unk	362	Muscle	Yes	C8	C8	ND	0.31	ND	ND	2.7
9	Rainbow	Donalds	15-Oct-06	unk	390	Muscle	Yes	C9	C9	ND	0.19	ND	ND	2.63
6	Coho	Sockeye C	18-Oct-06	Female	625	Muscle	Yes	D1	D1	ND	1.3	ND	0.05	9.53
6	Coho	Sockeye C	18-Oct-06	Female	625	Gonad	yes	D2	D2	ND	1.7	ND	ND	11.53
10	Sockeye	Tachet Creek	18-Oct-06	Female	573	Muscle	No	D3	D3	ND	0.92	ND	0.06	3.5
11	Sockeye	Tachet Creek	18-Oct-06	Female	545	Muscle	No	D4	D4	ND	0.58	ND	0.05	3.05
12	Sockeye	Tachet Creek	18-Oct-06	Female	458	Muscle	No	D5	D5	ND	0.29	ND	0.06	3.05
13	Sockeye	Tachet Creek	18-Oct-06	Male	610	Muscle	No	D6	D6	ND	0.36	ND	0.06	3.87

Assessing Metal Levels in the Tissues of Food-Fish Species in Babine Lake, Summary Report on Analyte Levels Found in Fish Tissues Collected in 2006

Sample #	Species	Location	Date	Sex	Fork Length	Tissue	Scale	Sample ID	Cadmium	Copper	Lead	Mercury	Zinc
1	Rainbow	Sockeye C	18-Oct-06	Unknown	290	Muscle	yes	E1	ND	1.15	ND	0.06	7.03
2	Rainbow	Sockeye C	18-Oct-06	Female	295	Muscle	yes	E2	ND	0.32	ND	ND	4.23
3	Rainbow	Sockeye C	18-Oct-06	Female	285	Muscle	Yes	E3	ND	0.23	ND	0.05	3.69
4	Rainbow	Sockeye C	18-Oct-06	Male	232	Muscle	Yes	E4	ND	0.25	ND	0.05	4.72
5	Rainbow	Sockeye C	18-Oct-06	Female	370	Muscle	Yes	E5	ND	0.17	ND	ND	3.35
7	Rainbow	Tachet Creek	18-Oct-06	Female	344	Muscle	Yes	E6	ND	0.19	ND	0.05	3.16
8	Rainbow	Creek Tachet	18-Oct-06	Female	312	Muscle	Yes	E7	ND	0.18	ND	0.05	2.62
9	Rainbow	Creek Tachet	18-Oct-06	Unknown	233	Muscle	Yes	E8	ND	0.21	ND	0.06	4.16
8	Coho	Donalds	15-Oct-06	Female	708	gonad	Yes	F1	ND	2.27	ND	ND	11.01
9	Coho	Donalds	15-Oct-06	Female	690	gonad	Yes	F2	ND	1.87	ND	ND	8.72
1	Coho	Donalds	15-Oct-06	Male	796	Muscle	Yes	G1	ND	0.36	ND	ND	2.66
2	Coho	Donalds	15-Oct-06	Male	562	Muscle	Yes	G2	ND	0.39	ND	ND	2.58
3	Coho	Donalds	15-Oct-06	Male	590	Muscle	Yes	G3	ND	0.42	ND	ND	2.97
4	Coho	Donalds	15-Oct-06	Male	599	Muscle	Yes	G4	ND	0.35	ND	ND	2.78
5	Coho	Donalds	15-Oct-06	Male	744	Muscle	Yes	G5	ND	0.28	ND	0.06	2.05
6	Coho	Donalds	15-Oct-06	Male	499	Muscle	Yes	G6	ND	0.32	ND	ND	2.74
7	Coho	Donalds	15-Oct-06	Male	621	Muscle	Yes	G7	ND	0.33	ND	ND	3
8	Coho	Donalds	15-Oct-06	Female	708	Muscle	Yes	G8	ND	0.4	ND	ND	2.63
9	Coho	Donalds	15-Oct-06	Female	690	Muscle	Yes	G9	ND	0.9	ND	0.06	2.54
10	Coho	Donalds	15-Oct-06	Male	540	Muscle	Yes	G10	ND	0.91	ND	ND	2.9
1	Sockeye	Babine Fence	18-Sep-06	F	510	Muscle	66851	H1	ND	0.81	ND	0.05	2.72
2	Sockeye	Babine Fence	18-Sep-06	F	712	Muscle	66851	H2	ND	0.69	ND	0.07	2.4
3	Sockeye	Babine Fence	18-Sep-06	F	610	Muscle	66851	H3	ND	0.31	ND	0.05	2.37
4	Sockeye	Babine Fence	18-Sep-06	F	630	Muscle	66851	H4	ND	0.28	ND	0.05	2.22
5	Sockeye	Babine Fence	18-Sep-06	F	633	Muscle	66851	H5	ND	0.4	ND	0.05	2.54

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Sample #	Species	Location	Date	Sex	Fork Length	Tissue	Scale	Sample Id	Sample ID	Cadmium	Copper	Lead	Mercury	Zinc
6	Sockeye	Babine Fence	18-Sep-06	F	64.4	Muscle	66852	H6	H6	ND	0.24	ND	0.05	3.81
7	Sockeye	Babine Fence	18-Sep-06	F	53.3	Muscle	66852	H7	H7	ND	0.23	ND	ND	1.83
8	Sockeye	Babine Fence	18-Sep-06	F	62.0	Muscle	66853	H8	H8	ND	0.44	ND	0.05	2.94
9	Sockeye	Babine Fence	18-Sep-06	F	57.5	Muscle	66853	H9	H9	ND	0.4	ND	ND	3.13
10	Sockeye	Babine Fence	18-Sep-06	F	56.5	Muscle	66853	H10	H10	ND	0.48	ND	0.07	3.25
11	Sockeye	Babine Fence	18-Sep-06	M	61.2	Muscle	66853	H11	H11	ND	0.16	ND	0.05	1.21
12	Sockeye	Babine Fence	18-Sep-06	M	58.1	Muscle	66853	H12	H12	ND	0.32	ND	ND	1.93
13	Sockeye	Babine Fence	18-Sep-06	M	62.0	Muscle	66852	H13	H13	ND	0.3	ND	0.05	2.09
14	Sockeye	Babine Fence	18-Sep-06	M	57.0	Muscle	66852	H14	H14	ND	0.38	ND	ND	2.92
4	Char	Wright Bay	Oct 16, 2006	Female	73.0	gonad	66854(16-20)	I1	I1	ND	1.57	ND	0.05	5.15
11	Char	Wright Bay	Oct 16, 2006	Female	69.5	gonad	66856(1-5)	I2	I2	ND	1.74	ND	ND	6.04
1	Sockeye	Babine Fence	18-Sep-06	F	51.0	Gonad	66851	J1	J1	ND	11.56	ND	ND	8.16
2	Sockeye	Babine Fence	18-Sep-06	F	71.2	Gonad	66851	J2	J2	ND	8.73	ND	ND	4.39
3	Sockeye	Babine Fence	18-Sep-06	F	61.0	Gonad	66851	J3	J3	ND	11.82	ND	ND	6.44
4	Sockeye	Babine Fence	18-Sep-06	F	63.0	Gonad	66851	J4	J4	ND	7.09	ND	ND	4.73
5	Sockeye	Babine Fence	18-Sep-06	F	63.3	Gonad	66851	J5	J5	ND	11.2	ND	ND	5.98
6	Sockeye	Babine Fence	18-Sep-06	F	64.4	Gonad	66852	J6	J6	ND	8.48	ND	ND	5.81
7	Sockeye	Babine Fence	18-Sep-06	F	53.3	Gonad	66852	J7	J7	ND	9.91	ND	ND	6.79

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Sample #	Species	Location	Date	Sex	Fork Length	Tissue	Scale	Sample Id	Sample ID	Cadmium	Copper	Lead	Mercury	Zinc
8	Sockeye	Babine Fence	18-Sep-06	F	62.0	Gonad	66853	J8	J8	ND	11.12	ND	ND	6.99
9	Sockeye	Babine Fence	18-Sep-06	F	57.5	Gonad	66853	J9	J9	ND	10.34	ND	ND	6.88
10	Sockeye	Babine Fence	18-Sep-06	F	56.5	Gonad	66853	J10	J10	ND	7.88	ND	ND	5.08
1	Char	Wright Bay	Oct 16 2006	Male	57.1	Kidney	66854(1-5)	K1	K1	0.17	0.31	ND	1.08	7.5
2	Char	Wright Bay	Oct 16 2006	Male	67.1	Kidney	66854(6-10)	K2	K2	0.44	0.85	ND	1.11	22.13
3	Char	Wright Bay	Oct 16 2006	Male	64.4	Kidney	66854(11-15)	K3	K3	0.1	0.7	ND	0.57	19.98
4	Char	Wright Bay	Oct 16 2006	Female	73.0	Kidney	66854(16-20)	K4	K4	0.13	0.57	ND	1.59	19.08
5	Char	Wright Bay	Oct 16 2006	male	62.0	Kidney	66854(21-25)	K5	K5	0.24	0.75	ND	0.99	21.87
6	Char	Wright Bay	Oct 16 2006	male	71.4	Kidney	66855(1-5)	K6	K6	0.42	0.7	ND	1.54	18.22
7	Char	Wright Bay	Oct 16 2006	male	67.0	Kidney	66855(6-10)	K7	K7*	0.1	1.25	ND	0.65	21.66
8	Char	Wright Bay	Oct 16 2006	male	60.0	Kidney	66855(11-15)	K8	K8	0.34	1.84	ND	0.71	23.85
9	Char	Wright Bay	Oct 16 2006	male	54.5	Kidney	66855(16-20)	K9	K9	0.32	1.7	ND	0.61	23.59
10	Char	Wright Bay	Oct 16 2006	male	67.0	Kidney	66855(21-25)	K10	K10	0.41	2.09	ND	1.07	22.71
11	Char	Wright Bay	Oct 16 2006	Female	69.5	Kidney	66856(1-5)	K11	K11	1.14	3.08	ND	0.52	18.85
12	Char	Wright Bay	Oct 16 2006	Male	61.0	Kidney	66856(6-10)	K12	K12	0.47	1.68	ND	0.57	23.45
13	Char	Wright Bay	Oct 16 2006	Male	73.0	Kidney	66856(11-15)	K13	K13	0.23	2.02	ND	0.50	22.58
14	Char	Wright Bay	Oct 16 2006	Male	67.0	Kidney	66856(16-20)	K14	K14	0.1	2	ND	0.57	23.09
15	Char	Wright Bay	Oct 16 2006	Male	62.5	Kidney	66856(21-25)	K15	K15*	0.42	1.94	ND	0.68	19.38

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Sample #	Species	Location	Date	Sex	Fork Length	Tissue	Scale	Sample Id	Sample ID	Cadmium	Copper	Lead	Mercury	Zinc
16	Char	Wright Bay	Oct 16 2006	Male	74 0	Kidney	66857(1-5)	K16	K16	0 44	2 19	ND	0 88	22 11
1	Char	Wright Bay	Oct 16 2006	Male	57 1	Muscle	66854(1-5)	L1	L1	ND	1 23	ND	0 22	3 58
3	Char	Wright Bay	Oct 16 2006	Male	64 4	Muscle	66854(11-15)	L2	L2	ND	1 74	ND	ND	2 83
6	Char	Wright Bay	Oct 16 2006	male	71 4	Muscle	66855(1-5)	L3	L3	ND	1 2	ND	0 36	3 39
7	Char	Wright Bay	Oct 16 2006	male	67 0	Muscle	66855(6-10)	L4	L4	ND	1 01	ND	0 27	3 75
8	Char	Wright Bay	Oct 16 2006	male	60 0	Muscle	66855(11-15)	L5	L5	ND	1 08	ND	0 25	2 97
12	Char	Wright Bay	Oct 16 2006	Male	61 0	Muscle	66856(6-10)	L6	L6	ND	1 48	ND	ND	3 11
13	Char	Wright Bay	Oct 16 2006	Male	73 0	Muscle	66856(11-15)	L7	L7	ND	1 51	ND	0 27	3 53
14	Char	Wright Bay	Oct 16 2006	Male	67 0	Muscle	66856(16-20)	L8	L8	ND	1 35	ND	0 13	3 46
15	Char	Wright Bay	Oct 16 2006	Male	62 5	Muscle	66856(21-25)	L9	L9	ND	1 16	ND	0 24	2 88
1	Char	Wright Bay	Oct 16 2006	Male	57 1	gonad	66854(1-5)	M1	M1	ND	0 35	ND	0 24	5 65
2	Char	Wright Bay	Oct 16 2006	Male	67 1	gonad	66854(6-10)	M2	M2	ND	0 64	ND	0 28	8 7
3	Char	Wright Bay	Oct 16 2006	Male	64 4	gonad	66854(11-15)	M3	M3	ND	1 04	ND	0 57	10 67
5	Char	Wright Bay	Oct 16 2006	male	62 0	gonad	66854(21-25)	M4	M4	ND	0 94	ND	0 37	10 6
6	Char	Wright Bay	Oct 16 2006	male	71 4	gonad	66855(1-5)	M5	M5	ND	0 99	ND	0 47	9 44
7	Char	Wright Bay	Oct 16 2006	male	67 0	gonad	66855(6-10)	M6	M6	ND	0 81	ND	0 47	7 74
8	Char	Wright Bay	Oct 16 2006	male	60 0	gonad	66855(11-15)	M7	M7	ND	0 72	ND	0 12	8 19
9	Char	Wright Bay	Oct 16 2006	male	54 5	gonad	66855(16-20)	M8	M8	ND	0 66	ND	0 19	6 8

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Sample #	Species	Location	Date	Sex	Fork Length	Tissue	Scale	Sample ID	Cadmium	Copper	Lead	Mercury	Zinc
10	Char	Wright Bay	Oct 16 2006	male	67.0	gonad	66855(21-25)	M9	ND	0.6	ND	0.34	10.66
12	Char	Wright Bay	Oct 16 2006	Male	61.0	gonad	66856(6-10)	M10	ND	0.9	ND	0.34	5.98
13	Char	Wright Bay	Oct 16 2006	Male	73.0	gonad	66856(11-15)	M11	ND	0.87	ND	0.12	7.97
14	Char	Wright Bay	Oct 16 2006	Male	67.0	gonad	66856(16-20)	M12	ND	1.17	ND	0.06	7.28
15	Char	Wright Bay	Oct 16 2006	Male	62.5	gonad	66856(21-25)	M13	ND	1.74	ND	0.06	7.71
16	Char	Wright Bay	Oct 16 2006	Male	74.0	gonad	66857(1-5)	M14	ND	1.11	ND	0.07	11.15
2	Char	Wright Bay	Oct 16 2006	Male	67.1	Muscle	66854(6-10)	N1	ND	1.27	ND	0.34	3.86
4	Char	Wright Bay	Oct 16 2006	Female	73.0	Muscle	66854(16-20)	N2	ND	1.13	ND	0.34	3.92
5	Char	Wright Bay	Oct 16 2006	male	62.0	Muscle	66854(21-25)	N3	ND	1.33	ND	0.15	3.61
9	Char	Wright Bay	Oct 16 2006	male	54.5	Muscle	66855(16-20)	N4	ND	1.25	ND	0.13	2.84
10	Char	Wright Bay	Oct 16 2006	male	67.0	Muscle	66855(21-25)	N5	ND	1.06	ND	0.28	2.91
11	Char	Wright Bay	Oct 16 2006	Female	69.5	Muscle	66856(1-5)	N6	ND	1.06	ND	0.34	3.02
16	Char	Wright Bay	Oct 16 2006	Male	74.0	Muscle	66857(1-5)	N7	ND	0.88	ND	0.46	3.44

ND= not detected

Detection limit

All units are in mg/kg or ppm