Historical Baseline Total Mercury and Carbon and Nitrogen Stable Isotope Data from Northern Dolly Varden Charr (*Salvelinus malma malma*) from Ten Locations Along the North Slope Region of Yukon and Northwest Territories

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2019

Canadian Data Report of Fisheries and Aquatic Sciences 1297

Fisheries and Oceans Canada / Pêches et Océans Canada

Canada

Canadian Data Report of Fisheries and Aquatic Sciences

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HISTORICAL BASELINE TOTAL MERCURY AND CARBON AND NITROGEN STABLE ISOTOPE DATA FROM NORTHERN DOLLY VARDEN CHARR (*SALVELINUS MALMA MALMA*) FROM TEN LOCATIONS ALONG THE NORTH SLOPE REGION OF YUKON AND NORTHWEST TERRITORIES

by

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Cat. No. Fs 97-13/1297E-PDF ISBN 978-0-660-30895-1 ISSN 1488-5395

Correct citation for this publication:

Tran, L., Reist, J.D., and Power, M. 2019. Historical baseline total mercury and carbon and nitrogen stable isotope data from Northern Dolly Varden charr (*Salvelinus malma malma*) from ten locations along the North Slope region of Yukon and Northwest Territories. Can. Data Rep. Fish. Aquat. Sci. 1297: v + 37 p.

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ABSTRACT

Tran, L., Reist, J.D., and Power, M. 2019. Historical baseline total mercury and carbon and nitrogen stable isotope data from Northern Dolly Varden charr (*Salvelinus malma malma*) from ten locations along the North Slope region of Yukon and Northwest Territories. Can. Data Rep. Fish. Aquat. Sci. 1297: v + 37 p.

Total mercury (THg) and carbon and nitrogen stable isotope analyses were conducted on Northern Dolly Varden (*Salvelinus malma malma*) from ten sites along the Yukon North Slope and northwestern area of the Northwest Territories. Various life-histories and years were analyzed, which included isolate, resident, and anadromous forms collected between 1986 and 2013. The objective of the study was to use archival tissue samples obtained from populations separated by space, time, and life-history type to examine the spatial, temporal, and life-history trends in THg concentrations in Northern Dolly Varden. The data were also used to build a historical baseline against which future changes in contaminant loading may be assessed. All Northern Dolly Varden muscle tissue samples were obtained from Fisheries and Oceans Canada, Winnipeg.

RÉSUMÉ

Tran, L., Reist, J.D., and Power, M. 2019. Historical baseline total mercury and carbon and nitrogen stable isotope data from Northern Dolly Varden charr (*Salvelinus malma malma*) from ten locations along the North Slope region of Yukon and Northwest Territories. Can. Data Rep. Fish. Aquat. Sci. 1297: v + 37 p.

Des analyses du mercure total (THg) et des isotopes stables du carbone et de l'azote ont été effectuées sur l'omble Dolly Varden du Nord (*Salvelinus malma malma*) à dix endroits le long du versant nord du Yukon et dans le nord-ouest des Territoires du Nord-Ouest. Divers cycles biologiques et diverses années ont été analysés, et les échantillons provenaient de formes isolées, résidentes et anadromes recueillies entre 1986 et 2013. L'objectif de l'étude consistait à utiliser des échantillons de tissus archivés provenant de populations séparées par l'espace, le temps et le type de cycle biologique pour examiner les tendances spatiales, temporelles et du cycle biologique des concentrations en THg chez l'omble Dolly Varden du Nord. Les données ont également servi à établir une base de référence historique par rapport à laquelle les changements futurs dans la charge en contaminants pourront être évalués. Tous les échantillons de tissus musculaires d'omble Dolly Varden du Nord ont été obtenus auprès de Pêches et Océans Canada, à Winnipeg.

INTRODUCTION

The toxic form of mercury (Hg), methylmercury (MeHg), can occur at measurably high levels in many top predators due to biomagnification up the food chain (Morel et al. 1998). MeHg is obtained by fish through food sources and/or uptake across the gill surface (Health Canada Mercury Issues Task Group 2004). Once in the fish, Hg adheres to muscle proteins, where it can accumulate to levels greater than those of the surrounding water (Health Canada Mercury Issues Task Group 2004). Inuvialuit and Gwich'in in the western Arctic have fished Northern Dolly Varden (NDV) for subsistence purposes for generations, yet little is known about the total mercury (THg) loading or how THg concentrations in the fish may vary spatially or temporally by life-history type. Many detailed studies have looked at THg contamination levels in other Arctic fish species in terms of spatial and temporal variability (e.g., Stewart et al. 2003; Evans et al. 2005; Lockhart et al. 2005; Muir et al. 2005). In contrast, NDV THg levels have only been studied incidentally, typically being reported as a single value in a list of studied fish (e.g., Deniseger et al. 1990 for southern form Dolly Varden; Lockhart et al. 2005 for NDV).

In view of the importance of NDV as a source of dietary protein (Daviglus et al. 2002), the increasing concerns for changes in THg accumulation rates in aquatic biota as a result of predicted climate change (Macdonald et al. 2005), and the fact that so little information exists on THg in NDV, the study completed as part of an MSc thesis and described below aimed to improve the existing data and understanding of Hg levels in NDV. To accomplish this objective, tissue samples of NDV were analyzed for THg concentrations and carbon and nitrogen stable isotope compositions. These data were then incorporated into spatial, life-history and temporal studies to better understand the factors that controlled THg in NDV. Specific objectives for the spatial study were to determine among-population level differences in THg, and carbon and nitrogen stable isotopes ($\delta^{13}C$ and $\delta^{15}N$), and if significant latitudinal or longitudinal trends in THg existed. The objective for the life-history study was to determine if life-history types displayed significantly different patterns of THg tissue concentrations as well as being potentially correlated with their $\delta^{13}C$ and $\delta^{15}N$ values. The objective for the temporal study was to determine if THg concentrations, $\delta^{13}C$ and $\delta^{15}N$ were significantly different between periods (1986-1988 and 2011-2013) in the Firth River and the Rat River.

This report presents total mercury, and carbon and nitrogen stable isotope values of NDV along with the corresponding biological data, life-history type, location, and sampling year. Further in-depth analyses were conducted, but those data are not presented here. This information can be found in Tran (2014) and Tran et al. (2015, 2016, 2019).

MATERIALS AND METHODS

A total of n=711 dorsal muscle tissue samples and biological data (i.e., fork-length (mm), age, sex, weight (g), gonad weight (g), life-history, and maturity) of NDV were obtained from Fisheries and Oceans Canada (DFO) in Winnipeg, Manitoba from different rivers along the Yukon North Slope and extreme northwestern mainland corner of the Northwest Territories which covered roughly half the natural geographical range of the northern form of Dolly Varden within Canada (Fig. 1). Where data were available, fish were sampled from June to October. The complete data set accumulated is presented in this report, however, sub-sets of these data were used in the follow-on studies (Tran et al. 2015, 2016, 2019). The spatial study consists of anadromous NDV across 10 sites collected between 1988 and 1991; the life-history study consists of anadromous, resident, and isolate NDV from the Babbage River from 1988 and 1991; and the temporal study consists of the anadromous NDV from the Rat and Firth Rivers from 1986-1988 and 2011-2013. Approximately 5 grams of muscle tissue was dissected with a clean scalpel from a standard area of each fish located posterior to the dorsal fin and above the lateral line (van der Velden et al. 2013). Obtained samples were subsequently split for use in THg and stable isotope analyses. For each study (spatial, temporal and life-history) samples were chosen to obtain a statistically sufficient sample size (e.g., Zar 2010) or remove possible confounding effects, such as variation in sample years when examining spatial patterns (e.g., Tran et al. 2015).

Mercury, and $\delta^{13}C$ and $\delta^{15}N$, were analyzed for all NDV muscle tissue samples following the methods from Tran et al. (2015). All statistical analyses were performed using the statistical program SPSS (SPSS Inc. 2008) with Type I error set to $\alpha = 0.05$. All data were tested for normality either with the use of residual plots or the Shapiro-Wilk statistic as appropriate (Swanson et al. 2011). THg data were $\log_{10}$-transformed when residual plots did not exhibit variance homogeneity or the Shapiro-Wilk statistic indicated non-normality (Swanson et al. 2011). For the spatial and life-history studies, THg concentrations were length-standardized following methods described in Fleming and Gross (1990):

$$M_i = MO_i * (L/LO_i)^b$$

where M_i is the adjusted logTHg concentration for the i^{th} fish, MO_i is the observed logTHg concentration for the i^{th} fish, L is the mean length from all populations, LO_i is the observed length of the i^{th} fish, and b is the common within-group slope of logTHg on logFork-length (Reist 1986; Quinn et al. 1998). A test of homogeneity of slopes was performed; if slopes were significantly different, then population-specific slopes were used to represent b. An analysis of variance (ANOVA) followed by Tukey's honestly significant difference (HSD) post hoc test was performed using length-adjusted logTHg to determine whether THg concentrations varied among populations. For the temporal study, data were compared between time periods 1986-1988 and 2011-2013 using a two-sample t-test appropriately adjusted for variance homogeneity (Zar 2010).

RESULTS

This report includes data from a total of n=711 NDV covering 10 sites, 8 different years ranging from 1986 to 2013, and three different life-history types (Appendix A). Some sites are referenced in earlier and outside studies by several names. Accordingly, a geographical cross-reference among studies and accurate sampling locations are provided to ensure no ambiguities exist (Appendix B). Sixty-five percent of the data (n=464) were used in determining the spatial, life-history, and temporal variability in NDV THg levels, as well as the $\delta^{13}C$ and $\delta^{15}N$ values described below. Methlymercury is the bioactive form of Hg, however, total Hg is more easily measured. To ensure THg values obtained accurately reflected MeHg values, specific analyses of MeHg levels in n=20 samples determined that the average (± standard deviation) percentage of MeHg in THg equalled 95 ± 3.4% and ranged from 87-98% (Table 1).

SPATIAL

Individual muscle mercury concentrations from the spatial study ranged from 15-254 ng/g wet weight (ww) (n=248). Mean values of THg in NDV differed by a factor of 5.5, according to sample location, with mean concentrations for locations ranging from a low of 29 ± 7 ng/g ww in Ptarmigan Bay to 161 ± 37 ng/g ww in the Firth River (Table 2). When length-adjusted, the mean THg concentrations also demonstrated significant among-site variability ($F_{(9,232)} = 22.2$, $p < 0.001$), varying by a factor of just under 4. Ptarmigan Bay fish had the lowest concentrations (34.8 ± 8.5 ng/g ww) and Firth River had the highest concentrations (128.2 ± 23.3 ng/g ww). Site means were not all significantly different from one another, with the ten sites being grouped into six groups (Fig. 2) within which length-adjusted mean site THg concentrations did not differ significantly (Tukey's HSD; $p > 0.061$).

Significant among-site differences in mean $\delta^{13}C$ ($F_{(9,236)} = 11.90$, $p < 0.001$) and non-baseline corrected $\delta^{15}N$ ($F_{(9,236)} = 19.70$, $p < 0.001$) were also evident. Mean NDV $\delta^{13}C$ values ranged from -23.9 ± 0.6‰ in Big Fish River to -22.2 ± 0.4‰ in Little Fish Creek (aka Cache Creek) two locations within the same basin, and mean $\delta^{15}N$ values ranged from 13.1 ± 0.6‰ in Ptarmigan Bay fish to 15.0 ± 0.6‰ and 15.0 ± 0.9‰ in Firth River and Babbage River, respectively (Table 2).

While significant differences in mean length-adjusted THg were present among populations, no large-scale spatial patterns were evident in the data. Mean length-adjusted THg did not vary significantly with latitude (regression; $F_{(1,8)} = 3.8$, $p = 0.089$) or longitude (regression; $F_{(1,8)} = 0.5$, $p = 0.485$) across the range of latitudes (67°47'N to 67°35'N) and longitudes (136°10'W to 140°55'W) for which data were available.

LIFE-HISTORY

The mean biological characteristics of the tested life-history groups (isolate, resident, and anadromous fish from the Babbage River) varied significantly: fork-length ($F_{(2,58)} = 596.23$, $p < 0.001$), weight ($F_{(2,57)} = 176.495$, $p < 0.001$), and age ($F_{(2,53)} = 18.56$, $p < 0.001$), with isolate and resident individuals differing significantly from the anadromous fish which were larger, heavier and older (Table 3). Growth rates similarly differed significantly among the life-history types ($F_{(2,52)} = 78.47$, $p < 0.001$).

Individual muscle mercury concentrations from the life-history study ranged from 8.2 to 180.8 ng/g ww (*n*=62). Mean THg significantly differed among life-history types ($F_{(2,59)} = 51.68$, $p < 0.001$). Mean THg concentrations (± standard deviation) ranged from 22 ± 14 ng/g ww in isolates, to 56 ± 27 ng/g ww in residents, and to 108 ± 39 ng/g ww in anadromous NDV. When THg concentrations were standardized for fork-length (218 mm) at a common age of 4, significant differences were found among life-history types ($F_{(2,13)} = 33.790$, $p < 0.001$, $r^2 = 0.839$). Mean values for resident fish (76.4 ± 10.8 ng/g ww) were significantly higher in standardized THg than in either anadromous (8.4 ± 0.2 ng/g ww; $p < 0.001$) or isolated fish (37.3 ± 5.3 ng/g ww; $p = 0.017$), and isolates were significantly higher in standardized THg than were anadromous fish ($p < 0.001$).

Among life-history types, the stable isotope metrics also differed significantly ($\delta^{13}C$ ($F_{(2,59)} = 631.24$, $p < 0.001$); $\delta^{15}N$ ($F_{(2,59)} = 611.31$, $p < 0.001$)). Mean $\delta^{13}C$ values ranged from -33.2 ± 1.5 ‰ in isolate, to -31.8 ± 1.2‰ in resident, and -22.7 ± 0.6‰ in anadromous NDV. Mean $\delta^{15}N$ values ranged from 7.3 ± 0.8‰ in isolate, increasing to 9.2 ± 0.7‰ in resident, and to 15.0 ± 0.9‰ in anadromous NDV.

TEMPORAL

Firth River

A total of n=54 NDV samples were analyzed, n=44 from 1986-1988 and n=10 from 2011-2012. Mean (± standard deviation) THg concentration in 1986-1988 (126 ± 45 ng/g ww) was significantly different from THg in 2011-2012 (178 ± 47 ng/g ww) (Table 4). Trophic position of NDV in 1986-1998, 15.1 ± 0.7‰ $\delta^{15}N$, was not significantly different from the mean value in 2011-2012, which averaged 15.1 ± 0.5‰ (p > 0.05); whereas isotopic values of carbon sources significantly decreased from 1986-1988 (-22.7 ± 0.8‰) to 2011-2012 (-24.4 ± 0.6‰) (Table 4).

Rat River

A total of n=100 NDV samples were analyzed, n=60 from 1986-1988 and n=40 from 2011-2013. Mean (± standard deviation) THg concentration in 1986-1988 (79 ± 42 ng/g ww) was significantly lower than the level in 2011-2013 (109 ± 44 ng/g ww) (Table 4). Trophic position of NDV ($\delta^{15}N$) significantly increased from 13.7 ± 0.7‰ in 1986-1988 to 15.0 ± 0.9‰ in 2011-2013, while carbon sources decreased over time from -23.6 ± 0.9‰ in 1986-1988 to -25.9 ± 1.0‰ in 2011-2013 (Table 4).

ACKNOWLEDGEMENTS

Financial support for this project was provided by the Fisheries Joint Management Committee (FJMC), Fisheries and Oceans Canada, and NSERC ArcticNet and Discovery Grant to M. Power. We thank Robert Fudge, Steven Sandstrom, Vic Gillman, Colin Gallagher, Ellen Lea, Parks Canada Agency staff, Yukon Territorial Parks staff, local harvesters, and Jim Johnson for their help in obtaining, managing and archiving the Northern Dolly Varden muscle tissue samples. Completion of the study was facilitated by the Beaufort Regional Environmental Assessment Marine Fish Project. Chantelle Sawatzky aided in the final preparation of this report.

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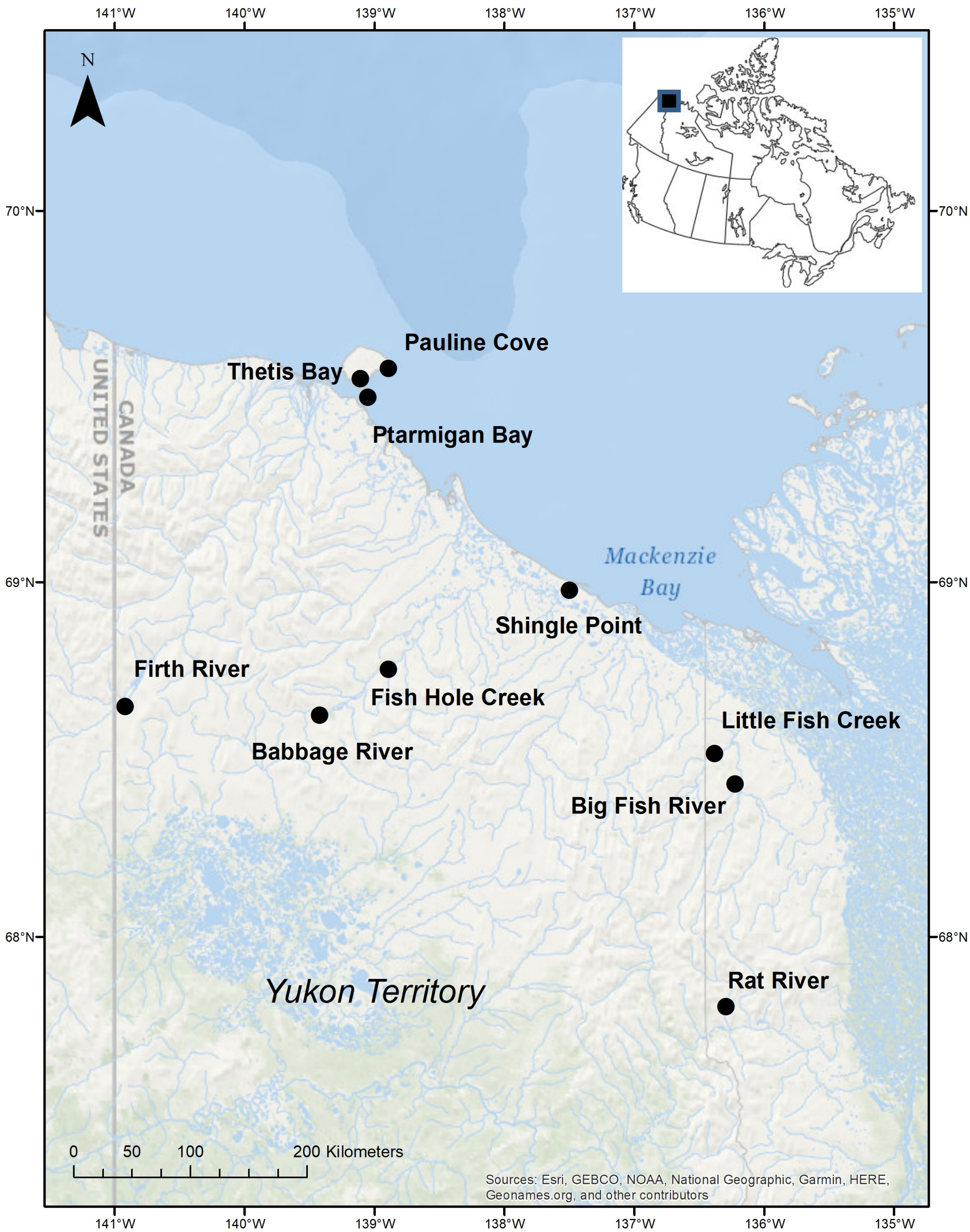

Figure 1. Location of sampling sites for populations of Northern Dolly Varden used in this study. Inset in the upper right highlights the sampling area with respect to Canada as a whole.

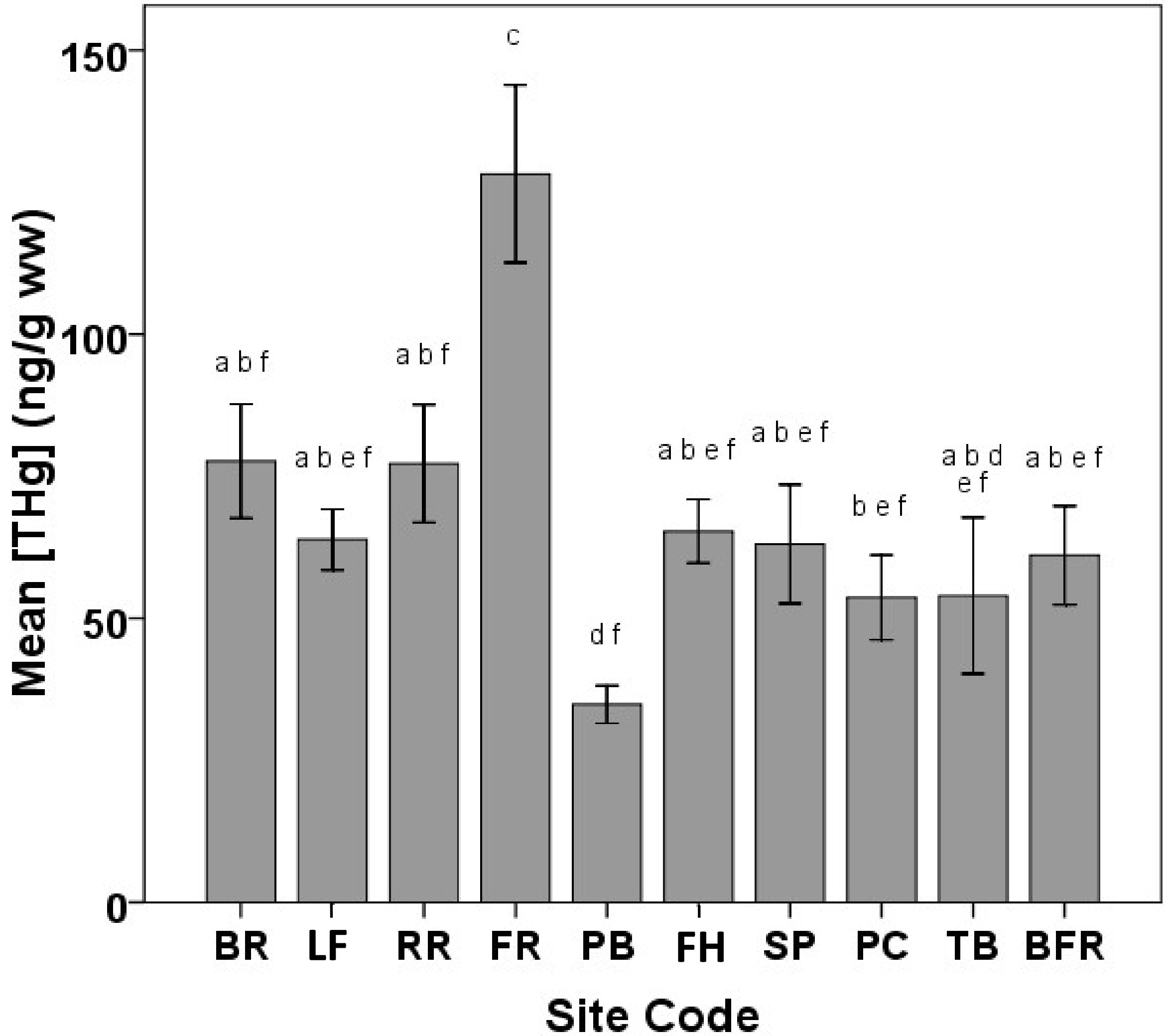

Figure 2. Mean length-adjusted total mercury concentrations ([THg]) (ng/g wet weight) of Northern Dolly Varden for the spatial study sites. Site codes correspond to those given in Table 2. I-bars represent 95% confidence intervals. Sites with the same letter were not significantly different from one another (Tukey's HSD; $p > 0.05$).

Table 1. Mercury (ng/g (ww)) concentrations determined from a subsample of samples of Northern Dolly Varden obtained from 1988-1991. Abbreviations: MeHg – methylmercury; THg – total mercury; ww – wet weight. Sample number refers to a specific individually identified fish.

Sample #	Location	Life-history	MeHg (ng/g (ww))	THg (ng/g (ww))	MeHg % of THg
27527	Babbage River	Isolate	23.90	25.51	94
27507	Babbage River	Isolate	21.21	22.76	93
27508	Babbage River	Isolate	18.24	20.77	88
27096	Little Fish Creek[1]	Isolate	25.02	26.07	96
27102	Little Fish Creek	Isolate	20.13	21.15	95
26905	Firth River	Anadromous	48.29	49.86	97
41519	Firth River	Anadromous	76.70	78.49	98
23647	Rat River	Anadromous	109.14	112.04	97
41120	Rat River	Anadromous	60.44	62.41	97
27696	Ptarmigan Bay	Anadromous	25.45	26.45	96
27644	Ptarmigan Bay	Anadromous	32.41	34.44	94
26617	Fish Hole Creek[2]	Anadromous	53.78	61.05	88
26618	Fish Hole Creek	Anadromous	29.69	30.81	96
26090	Pauline Cove	Anadromous	66.66	68.63	97
26159	Shingle Point	Anadromous	131.58	151.49	87
26166	Shingle Point	Anadromous	23.18	25.16	92
26089	Thetis Bay	Anadromous	132.16	137.30	96
34569	Babbage River	Anadromous	103.80	106.85	97
34608	Babbage River	Anadromous	81.73	84.32	97
26542	Little Fish Creek	Anadromous	55.38	57.15	97

1. Little Fish Creek also referred to as Cache Creek in some studies.

2. Fish Hole Creek also referred to as Canoe River in some studies (see Appendix B).

Table 2. Mean ± standard deviation and range of fork-length (mm), age (year), [THg] (ng/g wet weight), $\delta^{13}C$ (‰), and $\delta^{15}N$ (‰) for samples of Northern Dolly Varden obtained from each site between 1988 and 1991. Sites with biological measures not significantly different from one another at the $\alpha = 0.05$ level of significance are indicated with uppercase superscripts (e.g., A, B).

Site	Site Code	Statistic	Fork-length (mm)	Age (yr)	[THg] (ng/g ww)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)
Babbage River	BR	Mean ± Stdev	497 ± 45^{AGH}	n/a	108 ± 39^{ABF}	-22.7 ± 0.6^{AC}	$+15.0 \pm 0.9^{ADF}$
		Range	393–612	n/a	30–181	-24.6 to -21.8	+13.0 to +16.5
Little Fish Creek[1]	LF	Mean ± Stdev	405 ± 27^{BCFI}	6.5 ± 1.6^{ABDE}	63 ± 14^{ABEF}	-22.2 ± 0.4^{BCFG}	$+14.0 \pm 0.4^{BCFGH}$
		Range	361–489	4–10	43–102	-23.0 to -21.5	+13.4 to +14.9
Rat River	RR	Mean ± Stdev	438 ± 44^{BCGI}	7.4 ± 1.1^{ABEF}	83 ± 35^{ABF}	-23.3 ± 0.7^{ABCG}	$+13.7 \pm 0.7^{BCE}$
		Range	331–519	6–10	25–163	-25.4 to -21.8	+12.6 to +15.5
Firth River	FR	Mean ± Stdev	588 ± 67^{DH}	11.8 ± 1.6^{C}	161 ± 37^{C}	-22.6 ± 0.8^{D}	$+15.0 \pm 0.6^{ADFGH}$
		Range	505–681	10–15	102–254	-24.3 to -20.8	+13.8 to +16.0
Ptarmigan Bay	PB	Mean ± Stdev	272 ± 40^{E}	n/a	29 ± 7^{DF}	-23.1 ± 0.9^{EF}	$+13.1 \pm 0.6^{CE}$
		Range	205–363	n/a	16–45	-26.4 to -21.8	+11.7 to +14.1
Fish Hole Creek[2]	FH	Mean ± Stdev	360 ± 24^{BF}	5.2 ± 0.8^{ADE}	45 ± 11	-22.7 ± 0.6^{BEF}	$+13.5 \pm 0.6^{BCE}$
		Range	305–401	4–6	$21–67^{ABEF}$	-23.9 to -21.5	+11.8 to +14.5
Shingle Point	SP	Mean ± Stdev	439 ± 68^{BCGI}	6.6 ± 2.0^{ABDEF}	75 ± 48^{ABEF}	-22.9 ± 0.7^{BCFG}	$+14.4 \pm 0.7^{ABDFGH}$
		Range	354–623	4–10	27–167	-24.2 to -21.9	+13.3 to +15.9
Pauline Cove	PC	Mean ± Stdev	479 ± 97^{ACGH}	8.4 ± 3.0^{BEF}	80 ± 51^{BEF}	-23.3 ± 1.1^{BCG}	$+14.3 \pm 1.0^{BDFGH}$
		Range	292–627	3–15	15–212	-25.8 to -21.6	+12.1 to +16.0
Thetis Bay	TB	Mean ± Stdev	528 ± 91^{ADGH}	10.9 ± 2.9^{C}	93 ± 44^{ABDEF}	-22.5 ± 0.6^{ABCG}	$+14.9 \pm 0.7^{ADFGH}$
		Range	400–635	7–14	38–138	-23.3 to -21.6	+13.9 to +15.8
Big Fish River	BFR	Mean ± Stdev	434 ± 32^{BCI}	7.0 ± 1.6^{ABEF}	64 ± 27^{ABEF}	-23.9 ± 0.6^{BCFG}	$+14.3 \pm 0.7^{BDFGH}$
		Range	364–498	4–10	29–140	-25.2 to -22.7	+12.9 to +15.8

[1] Little Fish Creek also referred to as Cache Creek in some studies.

[2] Fish Hole Creek also referred to as Canoe River in some studies (see Appendix B).

Table 3. Sample size (n), mean ± standard deviation (SD), and range of fork-length (mm), weight (g), age (year), THg (ng/g ww), length-adjusted THg (ng/g ww), $\delta^{13}C$ (‰), $\delta^{15}N$ (‰), and growth rate (mm/year) for each life-history type of Northern Dolly Varden studied from the Babbage River basin. Life-history types with biological measures not significantly different from one another at the α = 0.05 level of significance are indicated with uppercase superscripts (e.g., A, B).

Statistic	Fork-length (mm)	Weight (g)	Age (year)	THg (ng/g ww)	Adjusted THg (ng/g ww)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	Growth rate (mm/year)
Isolates (n=22)								
Mean±SD	170 ± 25^{A}	62 ± 29^{A}	4.9 ± 1.5^{A}	22 ± 14^{A}	37 ± 5^{A}	-33.2 ± 1.5^{A}	7.3 ± 0.8^{A}	35 ± 6^{A}
Range	137–249	38–167	4–9	8–63	18–58	-37.3 to -30.6	5.9 to 8.7	21–42
Residents (n=10)								
Mean±SD	191 ± 27^{A}	80 ± 30^{A}	4.1 ± 0.9^{A}	56 ± 27^{B}	76 ± 11^{B}	-31.8 ± 1.2^{B}	9.2 ± 0.7^{B}	48 ± 9^{B}
Range	152–229	36–126	3–6	33–113	40–108	-33.9 to -30.3	8.2 to 10.6	38–69
Anadromous (n=30)								
Mean±SD	497 ± 45^{B}	1128 ± 305^{B}	6.8 ± 1.5^{B}	108 ± 39^{C}	8 ± 0^{C}	-22.7 ± 0.6^{C}	15.0 ± 0.9^{C}	75 ± 13^{C}
Range	393–612	643–1959	4–10	30–181	8–9	-24.6 to -21.8	13.0 to 16.5	55–115

Table 4. Comparisons of mean [THg] (ng/g ww), $\delta^{13}C$ (‰), and $\delta^{15}N$ (‰) of Northern Dolly Varden for the 1986-1988 and 2011-2013 periods determined from a two-sample t-test.

Site	Variable	*t*	*df*	*p*
Rat River	[THg]	-3.458	98	0.001
	$\delta^{13}C$	12.057	98	0.000
	$\delta^{15}N$	-7.774	98	0.000
Firth River	[THg]	-3.282	52	0.002
	$\delta^{13}C$	6.389	52	0.000
	$\delta^{15}N$	0.108	52	0.915

Appendix A. Sample number, samples used in the spatial (SS), temporal (TS) or life-history (LH) study, location, location-sublocation number, date of sampling, $\delta^{13}C$ (‰), $\delta^{15}N$ (‰), THg (ng/g wet weight) and biological data of Northern Dolly Varden samples received from DFO Winnipeg. Unfilled cells = missing data.

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
27528	LH	Babbage R.		-/-/88	-32.269	6.893	20.533	IAP	32	193	1	7	8	
27535	LH	Babbage R.		-/-/88	-30.634	6.544	11.810	IAP	53	163	2	3	19	
27533	LH	Babbage R.		-/-/88	-32.921	7.695	15.015	IAS	41	144	1	8	9	4
27530	LH	Babbage R.		-/-/88	-32.599	8.074	15.790	IAS	85	188	2	4	73	5
27532	LH	Babbage R.		-/-/88	-33.338	6.395	52.893	ISJ	38	147	2	1	1	
27510	LH	Babbage R.		-/-/88	-31.851	7.458	25.121	IAS	67	173	2	3	62	5
27507	LH	Babbage R.		-/-/88	-34.064	7.069	12.450	IAS	80	184	2	3	53	5
27504	LH	Babbage R.		-/-/88	-37.336	5.898	16.733	IAP	52	152	1	7	22	4
27506	LH	Babbage R.		-/-/88	-32.491	7.024	16.510	IAS	77	185	1	8	26	9
27515	LH	Babbage R.		-/-/88	-35.587	8.178	15.488	IAS	61	162	2	3	43	4
27511	LH	Babbage R.		-/-/88	-34.578	7.199	11.596	IAP	52	166	1	7	12	4
27531	LH	Babbage R.		-/-/88	-31.606	8.739	20.421	IAS	40	152	2	4	29	4
27514	LH	Babbage R.		-/-/88	-33.740	6.736	17.608	IAS	53	167	2	4	43	5
27529	LH	Babbage R.		-/-/88	-33.419	7.727	62.592	IAP	61	176	2	3	69	5
27508	LH	Babbage R.		-/-/88	-33.099	8.137	21.013	IAS	54	169	2	3	59	
27522	LH	Babbage R.		-/-/88	-32.291	8.443	37.065	IAS	167	249	1	8	41	8
27527	LH	Babbage R.		-/-/88	-35.213	7.929	33.538	IAS	89	137	2	3	71	5
27534	LH	Babbage R.		-/-/88	-32.501	7.171	24.649	ISJ	41	149	2	1	1	
27505	LH	Babbage R.		-/-/88	-32.283	6.889	19.892	IAS	54	167	2	3	36	4
27512	LH	Babbage R.		-/-/88	-31.339	7.596	17.076	IAV	76	199	2	1	6	
27526	LH	Babbage R.		-/-/88	-33.862	6.847	11.022	ISJ	39		2	1	1	4
27523	LH	Babbage R.		-/-/88	-34.217	6.132	8.169	IAS	49	148	1	8	11	4
26700	LH	Babbage R.		-/-/88	-32.555	8.226	33.795	RVA	36	154	1	7	2	4
26702	LH	Babbage R.		-/-/88	-33.909	10.577	90.165	RAS	42	152	1	8	3	3
26711	LH	Babbage R.		-/-/88	-31.307	9.720	43.442	RVA	115	224	1	8	6	4
26712	LH	Babbage R.		-/-/88	-30.308	9.016	75.794	RAS	126	229	1	8	4	6
26713	LH	Babbage R.		-/-/88	-31.486	10.011	112.914	RVA	101	210	1	7	4	5

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	δ^{13}C (‰)	δ^{15}N (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
26714	LH	Babbage R.		-/-/88	-30.657	8.484	43.975	RVA	76	190	1	7	3	4
26715	LH	Babbage R.		-/-/88	-32.534	8.862	39.706	RVA	86	188	1	7	4	4
26716	LH	Babbage R.		-/-/88	-30.540	8.594	32.532	RAS	93	206	1	8	3	3
26717	LH	Babbage R.		-/-/88	-33.072	9.233	48.526	RVA	57	174	1	7	2	4
26718	LH	Babbage R.		-/-/88	-31.544	9.128	38.969	RVA	66	182	1	8	2	4
34661	SS	Big Fish R.		-/-/91	-23.990	13.370	36.580	AAP	813	430	2	2	48	6
34662	SS	Big Fish R.		-/-/91	-23.270	14.110	67.310	AAP	815	437	2	2	59	7
34664	SS	Big Fish R.		-/-/91	-23.780	12.960	45.010	AAP	778	400	2	2	63	6
34665	SS	Big Fish R.		-/-/91	-23.810	14.790	65.780	AAP	922	435	2	2	89	10
34666	SS	Big Fish R.		-/-/91	-22.960	14.790	114.470	AAP	1254	470	2	2	107	8
34667	SS	Big Fish R.		-/-/91	-24.660	14.540	61.650	AAP	927	443	2	2	116	9
34668	SS	Big Fish R.		-/-/91	-23.180	14.760	83.550	AAP	1032	450	2	2	83	8
34670	SS	Big Fish R.		-/-/91	-24.200	14.550	58.150	AAP	1024	448	2	2	142	8
34671	SS	Big Fish R.		-/-/91	-24.180	14.470	72.350	AAP	862	422	2	2	45	7
34672	SS	Big Fish R.		-/-/91	-23.750	14.360	79.390	AAP	1120	460	2	2	74	
34673	SS	Big Fish R.		-/-/91	-23.150	14.480	41.380	AAP	874	426	2	2	64	6
34675	SS	Big Fish R.		-/-/91	-23.200	15.170	95.590	AAP	1202	471	2	2	105	10
34676	SS	Big Fish R.		-/-/91	-23.270	14.890	41.580	AAP	819	414	2	2	63	7
34677	SS	Big Fish R.		-/-/91	-25.160	13.480	28.590	AAP	814	412	2	2	76	6
34678	SS	Big Fish R.		-/-/91	-23.800	14.790	94.990	AAP	1228	480	2	2	106	6
34679	SS	Big Fish R.		-/-/91	-23.850	13.960	48.970	AAP	634	372	2	2	43	
34680	SS	Big Fish R.		-/-/91	-23.150	15.100	106.760	AAP	805	414	2	2	80	6
34681	SS	Big Fish R.		-/-/91	-24.360	13.920	46.880	AAP	1216	456	2	2	118	9
34685	SS	Big Fish R.		-/-/91	-23.370	14.980	83.810	AAP	1170	498	2	2	127	8
34686	SS	Big Fish R.		-/-/91	-24.250	13.390	37.580	AAP	936	441	2	2	87	5
34688	SS	Big Fish R.		-/-/91	-22.720	15.750	140.020	AAP	694	428	2	2	42	9
34689	SS	Big Fish R.		-/-/91	-24.040	14.890	49.620	AAP	757	427	2	2	43	
34691	SS	Big Fish R.		-/-/91	-24.010	14.020	59.440	AAP	893	435	2	2	73	5
34692	SS	Big Fish R.		-/-/91	-24.790	13.770	45.920	AAP	516	365	2	2	53	5

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	δ13C (‰)	δ15N (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
34693	SS	Big Fish R.		-/-/91	-23.730	14.580	62.050	AAP	1385	485	2	2	108	7
34696	SS	Big Fish R.		-/-/91	-24.180	14.470	65.780	AAP	968	438	2	2	126	7
34697	SS	Big Fish R.		-/-/91	-24.470	14.890	83.460	AAP	956	445	2	2	101	8
34698	SS	Big Fish R.		-/-/91	-24.070	13.230	47.200	AAR	708	405	2	5	19	
34699	SS	Big Fish R.		-/-/91	-24.430	13.760	33.900	AVA	916	434	2	1	9	6
34701	SS	Big Fish R.		-/-/91	-24.110	12.870	32.970	ALJ	560	364	2	1	2	4
26520	SS	Little Fish C.		18/8/88	-22.560	13.730	61.220	AVA	964	421	1	7	702	
26508	SS	Little Fish C.		18/8/88	-22.050	14.030	82.060	AAP	1340	489	2	2	1325	10
26512	SS	Little Fish C.		18/8/88	-22.920	13.460	102.020	AVA	579	361	2	2	532	8
26548	SS	Little Fish C.		18/8/88	-21.940	13.550	43.570	AAP	692	383	2	2	566	
26525	SS	Little Fish C.		18/8/88	-22.280	14.310	83.080	AAP	644	383	2	2	681	6
26517	SS	Little Fish C.		18/8/88	-22.470	13.940	84.680	AAP	935	416	1	7	585	8
26505	SS	Little Fish C.		18/8/88	-21.650	13.900	44.070	ALJ	846	399	2	1	40	
26528	SS	Little Fish C.		18/8/88	-22.130	13.720	45.070	AAP	700	388	2	2	477	5
26511	SS	Little Fish C.		18/8/88	-22.940	13.560	60.940	AAP	1047	455	1	7	581	7
26527	SS	Little Fish C.		18/8/88	-22.800	14.440	77.950	AAP	793	410	2	2	783	
26518	SS	Little Fish C.		18/8/88	-22.050	14.150	60.190	AAP	995	434	2	2	990	7
26529	SS	Little Fish C.		18/8/88	-22.110	14.300	62.690	AAP	924	424	2	2	725	8
26506	SS	Little Fish C.		18/8/88	-21.890	13.730	59.660	AVA	782	392	2	2	485	4
26515	SS	Little Fish C.		18/8/88	-21.510	14.260	57.530	ALJ	960	420	1	6	10	8
26513	SS	Little Fish C.		18/8/88	-22.370	13.440	62.560	ALJ	594	370	2	1	30	
26523	SS	Little Fish C.		18/8/88	-22.430	14.850	75.460	AAP	892	412	2	2	693	
26524	SS	Little Fish C.		18/8/88	-22.100	13.910	58.850	AAP	814	412	2	2	645	
26510	SS	Little Fish C.		18/8/88	-22.490	13.770	71.980	AVA	804	388	2	2	600	5
26541	SS	Little Fish C.		18/8/88	-21.650	14.010	59.950	AAP	794	406	2	2	860	9
26502	SS	Little FishC.		18/8/88	-22.280	13.470	51.200	AVA	816	395	2	2	382	5
26507	SS	Little Fish C.		18/8/88	-21.990	14.330	46.950	AVA	670	378	2	2	470	5
26542	SS	Little Fish C.		18/8/88	-22.090	14.130	70.300	AAP	749	395	2	2	677	
26534	SS	Little Fish C.		18/8/88	-22.590	14.390	52.700	AAP	1053	450	1	7	646	7

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	δ13C (‰)	δ15N (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
26543	SS	Little Fish C.		18/8/88	-22.010	14.210	54.200	ALJ	639	381	1	6	8	
26514	SS	Little Fish C.		18/8/88	-22.600	13.710	61.580	AAP	888	415	2	2	1052	6
26538	SS	Little Fish C.		18/8/88	-22.000	14.740	68.090	AAP	777	394	2	2	643	7
26501	SS	Little Fish C.		18/8/88	-21.690	14.270	42.990	ALJ	649	381	1	6	2	5
26537	SS	Little Fish C.		18/8/88	-22.960	14.110	64.050	AAP	650	374	2	2	361	
26504	SS	Little Fish C.		18/8/88	-22.120	14.270	50.450	AVA	831	407	2	2	470	5
26521	SS	Little Fish C.		18/8/88	-22.490	13.760	62.040	AAP	815	404	2	2	601	5
26627	SS	Fish Hole C.		21/9/88	-23.240	12.980	34.240	ALJ	273	320	2	1	10	6
26682	SS	Fish Hole C.		21/9/88	-22.560	14.020	56.750	ALJ	582	378	2	1	20	5
26687	SS	Fish Hole C.		21/9/88	-22.170	14.010	50.060	ALJ	569	373	1	6	3	
26621	SS	Fish Hole C.		21/9/88	-23.940	13.400	37.370	ALJ	471	353	2	1	1	4
26679	SS	Fish Hole C.		21/9/88	-21.450	14.450	51.110	ALJ	554	391	1	6	1	6
26631	SS	Fish Hole C.		21/9/88	-22.290	14.330	53.360	ALJ	654	401	1	6	1	5
26680	SS	Fish Hole C.		21/9/88	-22.490	13.890	50.680	ALJ	559	384	1	6	30	6
26673	SS	Fish Hole C.		21/9/88	-22.950	13.780	61.170	ALJ	439	347	2	1	28	5
26684	SS	Fish Hole C.		21/9/88	-22.250	13.270	39.010	ALJ	637	387	1	6	3	5
26637	SS	Fish Hole C.		21/9/88	-23.750	11.960	30.060	ALJ	396	332	1	6	1	
26629	SS	Fish Hole C.		21/9/88	-22.490	13.930	48.370	ALJ	512	379	2	1	18	4
26675	SS	Fish Hole C.		21/9/88	-22.540	11.820	57.610	ALJ	433	368	2	1	20	5
26614	SS	Fish Hole C.		21/9/88	-21.690	13.380	38.960	ALJ	508	360	2	1	7	
26620	SS	Fish Hole C.		21/9/88	-22.150	14.140	46.330	ALJ	473	365	1	6	1	5
26615	SS	Fish Hole C.		21/9/88	-22.280	13.860	34.130	ALJ	384	332	2	1	1	4
26639	SS	Fish Hole C.		21/9/88	-22.180	14.060	58.830	ALJ	360	334	1	6	1	4
26624	SS	Fish Hole C.		21/9/88	-22.690	13.630	67.230	ALJ	438	369	2	1	31	
26623	SS	Fish Hole C.		21/9/88	-21.990	13.570	25.900	ALJ	493	350	2	1	14	6
26678	SS	Fish Hole C.		21/9/88	-22.970	14.000	33.360	ALJ	355	321	2	1	5	6
26618	SS	Fish Hole C.		21/9/88	-23.370	13.690	38.170	ALJ	469	360	2	1	1	4
26625	SS	Fish Hole C.		21/9/88	-23.460	12.840	21.260	ALJ	313	305	2	1	6	6
26681	SS	Fish Hole C.		21/9/88	-22.720	13.690	53.230	ALJ	527	381	2	1	30	5

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
26683	SS	Fish Hole C.		21/9/88	-22.920	13.430	38.200	ALJ	447	342	1	6	1	
26633	SS	Fish Hole C.		21/9/88	-22.760	13.700	44.010	ALJ	535	360	2	1	6	5
26670	SS	Fish Hole C.		21/9/88	-22.100	14.190	52.210	ALJ	559	379	2	1	65	6
26677	SS	Fish Hole C.		21/9/88	-22.420	13.940	42.180	ALJ	535	369	1	6	1	6
26630	SS	Fish Hole C.		21/9/88	-22.210	13.180	43.000	ALJ	550	391	2	1	42	6
26626	SS	Fish Hole C.		21/9/88	-22.760	12.460	32.490	ALJ	512	369	1	6	1	5
26617	SS	Fish Hole C.		21/9/88	-23.640	13.280	54.820	ALJ	450		1	6	1	5
26616	SS	Fish Hole C.		21/9/88	-23.000	13.050	44.270	ALJ	459	337	2	1	12	5
26095	SS	Pauline C.		16-18/8/89	-23.150	15.000	85.940	AAR	2024	527	1	6	18	8
26098	SS	Pauline C.		16-18/8/89	-23.030	13.570	25.760	ALJ	1080	443	1	6	4	6
26099	SS	Pauline C.		16-18/8/89	-22.250	15.230	144.720	AAP	2987	627	2	3	2750	13
26134	SS	Pauline C.		16-18/8/89	-22.590	14.730	62.160	AAR	2200	556	1	7	47	
26107	SS	Pauline C.		16-18/8/89	-22.900	13.800	57.230	ALJ	1156	458	1	6	6	8
26120	SS	Pauline C.		16-18/8/89	-24.560	13.870	37.560	ALJ	441	327	2	1	11	6
26119	SS	Pauline C.		16-18/8/89	-22.420	15.040	66.930	AAR	3020	622	1	7	52	10
26118	SS	Pauline C.		16-18/8/89	-22.300	14.690	105.870	AAR	2119	605	1	7	23	
26128	SS	Pauline C.		16-18/8/89	-22.420	14.940	85.500	AAR	2569	598	1	7	40	
26093	SS	Pauline C.		16-18/8/89	-23.170	13.970	57.340	ALJ	1014	423	1	6	3	
26131	SS	Pauline C.		16-18/8/89	-23.580	14.370	72.270	ALJ	1089	447	1	6	5	8
26115	SS	Pauline C.		16-18/8/89	-22.870	14.940	115.640	AAP	1860	536	1	8	293	11
26096	SS	Pauline C.		16-18/8/89	-22.510	14.130	88.790	ALJ	1331	473	1	6	1	7
26103	SS	Pauline C.		16-18/8/89	-22.230	15.600	106.800	AAR	2232	563	2	2	239	13
26121	SS	Pauline C.		16-18/8/89	-24.710	12.080	15.240	ALJ	328	292	2	1	5	6
26101	SS	Pauline C.		16-18/8/89	-22.880	15.150	90.720	ALJ	1647	510	1	6	12	8
26123	SS	Pauline C.		16-18/8/89	-23.550	13.390	32.200	ALJ	630	361	2	1	11	7
26132	SS	Pauline C.		16-18/8/89	-23.370	14.500	97.430	AAR	1609	521	2	2	88	
26091	SS	Pauline C.		16-18/8/89	-21.600	16.040	206.410	AAR	1722	530	2	2	655	15
26106	SS	Pauline C.		16-18/8/89	-25.800	14.270	146.510	AAR	1565	506	2	2	119	11
26114	SS	Pauline C.		16-18/8/89	-23.230	15.070	109.620	AAR	1873	537	2	2	167	
26108	SS	Pauline C.		16-18/8/89	-24.950	12.550	30.880	ASJ	458	334	2	1	10	7
26116	SS	Pauline C.		16-18/8/89	-23.200	14.610	42.380	ALJ	1498	465	1	6	6	7
26097	SS	Pauline C.		16-18/8/89	-25.310	12.960	37.880	ALJ	1117	446	2	1	112	6

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
26094	SS	Pauline C.		16-18/8/89	-24.550	12.620	22.060	ASJ	625	350	2	1	11	5
26129	SS	Pauline C.		16-18/8/89	-21.820	14.870	100.380	AAR	1302	499	2	2	142	
26092	SS	Pauline C.		16-18/8/89	-24.630	13.360	21.310	ASJ	586	355	2	1	30	7
26125	SS	Pauline C.		16-18/8/89	-22.730	15.410	211.710	AAR	2590	620	2	2	361	12
26111	SS	Pauline C.		16-18/8/89	-24.380	13.100	26.380	ASJ	498	335	2	6	6	3
26090	SS	Pauline C.		16-18/8/89	-22.980	14.320	99.210	ALJ	1800	498	2	1	216	
27719	SS	Ptarmigan B.		-/-/88	-23.070	13.690	39.800	ASJ	299	276	1	6	1	
27706	SS	Ptarmigan B.		-/-/88	-23.510	13.300	26.520	ASJ	194	258	1	6	1	
27763	SS	Ptarmigan B.		-/-/88	-35.440	7.030	31.010	ASJ	59	182	1	6	1	
27738	SS	Ptarmigan B.		-/-/88	-21.790	14.060	24.510	ASJ	409	322	1	6	1	
27711	SS	Ptarmigan B.		-/-/88	-24.090	13.030	24.920	ASJ	233	265	2	1	2	
27683	SS	Ptarmigan B.		-/-/88	-26.350	13.500	15.580	ASJ	311	275	1	6	1	
27721	SS	Ptarmigan B.		-/-/88	-24.090	13.310	20.200	ASJ	224	259	2	1	2	
27696	SS	Ptarmigan B.		-/-/88	-22.660	13.720	31.560	ASJ	302	285	1	6	1	
27671	SS	Ptarmigan B.		-/-/88	-22.110	13.510	18.970	ASJ	154	222	1	6	1	
27644	SS	Ptarmigan B.		-/-/88	-23.980	12.870	37.810	ASJ	290	290	1	6	1	
27668	SS	Ptarmigan B.		-/-/88	-22.890	13.320	29.530	ASJ	127	215			1	
27737	SS	Ptarmigan B.		-/-/88	-23.100	13.850	39.230	ALJ	658	363	1	6	1	
27703	SS	Ptarmigan B.		-/-/88	-22.630	12.980	36.780	ASJ	256	280	2	1	7	
27725	SS	Ptarmigan B.		-/-/88	-23.500	12.920	24.180	ASJ	282	282	2	1	1	
27659	SS	Ptarmigan B.		-/-/88	-23.060	12.920	34.380	ASJ	385	302	1	6	1	
27729	SS	Ptarmigan B.		-/-/88	-32.750	7.510	22.790	ASJ	80	202	1	6	1	
27689	SS	Ptarmigan B.		-/-/88	-23.820	12.990	23.320	ASJ	204	261	2	1	1	
27677	SS	Ptarmigan B.		-/-/88	-22.120	13.980	30.570	ASJ	353	307	1	6	1	
27646	SS	Ptarmigan B.		-/-/88	-22.730	12.340	29.030	ASJ	319	302	2	1	5	
27700	SS	Ptarmigan B.		-/-/88	-23.570	13.500	22.070	ASJ	380	312	1	6	1	
27679	SS	Ptarmigan B.		-/-/88	-23.290	11.700	23.010	ASJ	116	229	1	6	1	
27662	SS	Ptarmigan B.		-/-/88	-23.760	12.580	21.620	ASJ	115	205	2	1	1	
27764	SS	Ptarmigan B.		-/-/88	-22.460	12.310	32.800	ASJ	149	232	2	1	3	
27743	SS	Ptarmigan B.		-/-/88	-23.430	13.080	28.880	ASJ	327	304	1	6	1	
27640	SS	Ptarmigan B.		-/-/88	-23.010	13.260	45.150	ASJ	202	250	1	6	1	
27717	SS	Ptarmigan B.		-/-/88	-22.680	13.230	33.500	ASJ	184	253	2	1		

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27651	SS	Ptarmigan B.		-/-/88	-22.800	12.930	36.360	ASJ	164	235	1	6	1	
27723	SS	Ptarmigan B.		-/-/88	-22.500	12.130	22.380	ASJ	196	248	2	1	1	
27765	SS	Ptarmigan B.		-/-/88	-22.340	13.130	27.130	ASJ	130	227	2	1	2	
27734	SS	Ptarmigan B.		-/-/88	-22.330	13.260	29.040	ALJ	553	352	2	1	1	
26169	SS	Shingle Pt.		11-14/8/89	-23.290	14.000	56.900	AAR	736	397	1	7	22	4
26173	SS	Shingle Pt.		11-14/8/89	-22.330	14.360	55.370	ALJ	1226	476	1	6	14	7
26167	SS	Shingle Pt.		11-14/8/89	-23.390	13.450	43.740	AAR	984	451	1	7	5	5
26171	SS	Shingle Pt.		11-14/8/89	-21.900	14.290	138.450	AAP	1272	470	2	3	800	10
26164	SS	Shingle Pt.		11-14/8/89	-22.610	14.130	46.320	ALJ	811	403	1	6	4	
26162	SS	Shingle Pt.		11-14/8/89	-23.070	14.690	67.730	AAR	744	406	2	2	323	7
26168	SS	Shingle Pt.		11-14/8/89	-23.890	14.200	34.680	ALJ	861	416	1	6	3	5
26159	SS	Shingle Pt.		11-14/8/89	-22.160	15.750	151.490	AAP	1516	530	2	3	994	
26165	SS	Shingle Pt.		11-14/8/89	-23.270	14.120	34.790	AAP	613	369	1	8	271	6
26170	SS	Shingle Pt.		11-14/8/89	-22.830	14.000	46.940	ALJ	817	403	2	1	39	7
26160	SS	Shingle Pt.		11-14/8/89	-23.180	14.580	58.240	ALJ	830	418	1	6	1	5
26163	SS	Shingle Pt.		11-14/8/89	-22.590	14.980	150.810	AAR	1585	497	1	7	25	10
26166	SS	Shingle Pt.		11-14/8/89	-23.450	13.340	27.210	ALJ	543	354	2	1	15	5
26172	SS	Shingle Pt.		11-14/8/89	-22.060	15.930	167.210	AAP	2114	623	2	3	920	
26161	SS	Shingle Pt.		11-14/8/89	-24.230	14.370	73.510	ALJ	787	404	1	6	4	
26174	SS	Shingle Pt.		11-14/8/89	-22.170	14.850	48.700	ALJ	844	401	2	1	49	8
26082	SS	Thetis B.		27/7/89	-23.160	14.790	126.480	AAP	2832	635	1	8	1333	12
26085	SS	Thetis B.		27/7/89	-21.580	15.040	137.550	AAR	1958	565	2	2	485	11
26080	SS	Thetis B.		27/7/89	-22.650	13.870	38.030	ALJ	771	400	2	1	36	7
26087	SS	Thetis B.		27/7/89	-22.290	15.360	138.140	AAR	2068	553	2	2	817	14
26089	SS	Thetis B.		27/7/89	-22.600	15.690	131.470	AAR	1799	555	2	2	730	14
26081	SS	Thetis B.		27/7/89	-22.190	15.760	72.770	AAR	2505	635	1	7	41	13
26084	SS	Thetis B.		27/7/89	-23.310	13.930	44.000	ALJ	912	439	2	1	83	8
26083	SS	Thetis B.		27/7/89	-22.310	15.030	58.740	ALJ	875	438	2	1	81	8
34635	SS/LH	Babbage R.		1/9-10/91	-22.740	14.490	102.590	A	921	486	2	4	389	
34644	SS/LH	Babbage R.		1/9-10/91	-23.730	14.680	142.680	AAS	991	468	2	3	1897	
34636	SS/LH	Babbage R.		1/9-10/91	-22.860	14.250	154.770	A	815	489	2	4	233	
34641	SS/LH	Babbage R.		1/9-10/91	-24.570	13.280	30.230	ALJ	643	393	2	1	68	

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34638	SS/LH	Babbage R.		1/9-10/91	-22.400	15.200	130.830	A	669	472	2	4	153	
34602	SS/LH	Babbage R.		1/7-8/91	-23.520	13.020	39.140	AVA	795	427	2	1	70	
34626	SS/LH	Babbage R.		1/7-8/91	-22.640	14.610	119.640	AAP	1481	537	2	2	1196	
34573	SS/LH	Babbage R.		1/7-8/91	-23.940	14.680	94.510	AAP	1244	489	2	2	938	
34572	SS/LH	Babbage R.		1/7-8/91	-22.320	14.180	116.020	AAP	958	466	2	2	721	
34566	SS/LH	Babbage R.		1/7-8/91	-22.060	16.540	180.780	AAP	1553	550	2	2	1739	
34601	SS/LH	Babbage R.		1/7-8/91	-23.030	14.270	56.350	AVA	1054	459	1	6	10	
34629	SS/LH	Babbage R.		1/7-8/91	-22.940	14.790	99.510	AAP	1121	473	2	2	1246	
34627	SS/LH	Babbage R.		1/7-8/91	-22.170	15.880	167.390	AAP	1959	612	2	2	2307	
34583	SS/LH	Babbage R.		1/7-8/91	-21.960	16.190	111.560	AAP	1415	543	1	7	288	
34577	SS/LH	Babbage R.		1/7-8/91	-22.980	14.680	142.980	AAP	1203	493	2	2	1023	
34590	SS/LH	Babbage R.		1/7-8/91	-22.160	15.050	92.950	AAR	1510	571	1	10	20	
34585	SS/LH	Babbage R.		1/7-8/91	-22.140	15.260	67.690	AAR	1190	526	1	10	16	
34579	SS/LH	Babbage R.		1/7-8/91	-22.310	15.730	91.880	AAP	1594	550	1	7	532	
34582	SS/LH	Babbage R.		1/7-8/91	-22.000	16.480	131.250	AAP	1052	491	2	2	711	
34608	SS/LH	Babbage R.		1/7-8/91	-21.810	14.810	75.960	AVA	1131	520	1	6	13	
34589	SS/LH	Babbage R.		1/7-8/91	-22.800	13.730	48.080	AAP	1536	550	1	7	821	
34593	SS/LH	Babbage R.		1/7-8/91	-22.520	15.000	104.440	AAP	916	475	2	2	528	
34569	SS/LH	Babbage R.		1/7-8/91	-22.370	15.050	122.590	AAP	1086	495	1	7	403	
34605	SS/LH	Babbage R.		1/7-8/91	-22.230	15.490	134.150	AAP	1302	525	2	2	1190	
34586	SS/LH	Babbage R.		1/7-8/91	-22.730	14.570	77.880	AVA	972	465	2	1	143	
34642	SS/LH	Babbage R.		1/7-8/91	-22.690	15.500	110.480	A	870	462	2	4	337	
34637	SS/LH	Babbage R.		1/7-8/91	-23.650	15.280	94.010	AAS	899	473	2	3	1239	
34645	SS/LH	Babbage R.		1/7-8/91	-22.500	16.090	147.360	AAS	1104	503	2	2	2026	
34640	SS/LH	Babbage R.		1/7-8/91	-22.610	15.850	75.290	A	1023	480	2	5	108	
34643	SS/LH	Babbage R.		1/7-8/91	-22.470	16.120	170.340	A	843	476	2	4	703	
22530	SS/TS	Firth R.		17/9/88	-23.050	15.770	254.090	A						
22535	SS/TS	Firth R.		17/9/88	-21.960	15.790	158.490	A	2737	629	1	9	1360	
22533	SS/TS	Firth R.		17/9/88	-23.510	14.480	138.810	A						
22527	SS/TS	Firth R.		17/9/88	-24.250	14.420	172.260	A	3213	681	1	9	1185	12
22524	SS/TS	Firth R.		17/9/88	-21.960	15.300	161.040	A	1663	628	2	4	385	
22526	SS/TS	Firth R.		17/9/88	-22.240	14.920	154.510	A	1254	519	2	4	268	11

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22537	SS/TS	Firth R.		17/9/88	-22.360	14.990	196.940	A	1356	586	2	4	266	15
22529	SS/TS	Firth R.		17/9/88	-22.720	13.840	102.200	A	1130	505	2	4	191	
22538	SS/TS	Firth R.		17/9/88	-22.520	15.090	125.130	A	1150	524	2	4	216	11
22528	SS/TS	Firth R.		17/9/88	-22.780	14.040	152.080	A	1401	528	2	4	293	10
22534	SS/TS	Firth R.		17/9/88	-20.810	16.000	170.670	A	2896	670	1	9	1149	11
22532	SS/TS	Firth R.		17/9/88	-23.060	14.680	117.520	A	2571	656	1	9	920	11
22531	SS/TS	Firth R.		17/9/88	-22.420	14.930	161.490							
26906	SS/TS	Firth R.		18/9/88	-22.300	15.160	185.660	AAS	1786	542	2	3	3986	13
27389	SS/TS	Rat R.		26/9/88	-23.630	13.330	60.700	A	710	444	2	4	130	9
27391	SS/TS	Rat R.		26/9/88	-23.970	13.410	67.020	A	739	450	2	4	123	7
25938	SS/TS	Rat R.		26/9/88	-23.430	13.090	64.890	A	505	398	2	4	86	7
25933	SS/TS	Rat R.		26/9/88	-22.530	12.860	42.130	A	386	366	1	9	23	6
27393	SS/TS	Rat R.		26/9/88	-23.520	12.600	43.620	AAS	537	391	1	8	172	7
25950	SS/TS	Rat R.		26/9/88	-23.260	13.330	73.700	A	562	420	2	4	108	
25932	SS/TS	Rat R.		26/9/88	-23.740	13.040	117.800	APS	529	389	2	4	81	6
25936	SS/TS	Rat R.		26/9/88	-23.530	13.020	57.570	A	688	449	2	4	149	7
25935	SS/TS	Rat R.		26/9/88	-23.840	13.230	84.040	A	830	460	2	4	155	7
25942	SS/TS	Rat R.		26/9/88	-22.700	15.530	163.200	A	1121	473	1	9	277	
27392	SS/TS	Rat R.		26/9/88	-23.020	13.160	24.690	ALJ	395	331	1	6	1	7
25943	SS/TS	Rat R.		26/9/88	-21.760	13.990	49.480	ALJ	994	430	2	1	64	8
27390	SS/TS	Rat R.		26/9/88	-23.310	14.200	80.490	A	562	430	2	4	104	7
25928	SS/TS	Rat R.		26/9/88	-24.390	13.300	87.760	A	761	435	2	4	129	9
25941	SS/TS	Rat R.		26/9/88	-23.590	13.290	77.330	A	769	444	2	4	446	7
25945	SS/TS	Rat R.		26/9/88	-22.070	14.460	60.550	AAR	1750	519	1	10	31	10
27517	SS/TS	Rat R.		26/9/88	-22.850	14.400	121.070	A	1037	507	1	9	55	7
27518	SS/TS	Rat R.		26/9/88	-22.960	13.870	70.620	AAS	1055	500	1	8	153	
27516	SS/TS	Rat R.		26/9/88	-22.610	13.720	81.800	A	561	397	2	4	117	7
27395	SS/TS	Rat R.		26/9/88	-23.810	13.200	93.360	A	708	445	2	4	119	9
27399	SS/TS	Rat R.		26/9/88	-22.540	13.540	43.060	ALJ	1050	428	2	1	61	6
27501	SS/TS	Rat R.		26/9/88	-22.600	15.290	155.830	A	919	476	2	4	166	9
27400	SS/TS	Rat R.		26/9/88	-25.370	13.490	148.530	A	1022	506	2	4	132	
27398	SS/TS	Rat R.		26/9/88	-23.050	14.050	65.650	AAS	582	412	1	8	93	6

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	δ13C (‰)	δ15N (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
27394	SS/TS	Rat R.		26/9/88	-23.960	13.790	89.130	A	595	419	2	4	111	7
27396	SS/TS	Rat R.		26/9/88	-23.300	12.980	68.540	A	635	426	2	4	87	9
27397	SS/TS	Rat R.		26/9/88	-23.340	13.500	110.040	A	479	395	2	4	80	7
27388	SS/TS	Rat R.		26/9/88	-22.690	14.030	147.220	ALJ	1699	502	1	3	18	8
27387	SS/TS	Rat R.		26/9/88	-22.820	14.050	69.550	A	889	462	2	4	142	
25930	SS/TS	Rat R.		26/9/88	-23.290	13.620	82.920	A	702	433	2	4	118	7
22676	TS	Firth R.	59-1	-/-/86	-22.075	15.032	131.628	AAS	1221	563	2	5	225	
23812	TS	Firth R.	59-1	-/-/86	-22.621	15.907	97.111	AAS	835	500	2	5	187	
23820	TS	Firth R.	59-1	-/-/86	-24.194	14.182	53.929	AAS	779	411	2	3	923	7
23761	TS	Firth R.	59-1	-/-/86	-22.672	15.201	123.514	AAS	1298	556	2	5	263	12
22681	TS	Firth R.	59-1	-/-/86	-21.930	14.760	110.694	AAS	1231	507	1	9	324	
23763	TS	Firth R.	59-1	-/-/86	-23.883	13.972	48.915	AAR	714	408	2	1	29	
23757	TS	Firth R.	59-1	-/-/86	-23.005	14.913	88.878	AAS	938	463	1	6	5	8
25618	TS	Firth R.	59-1	-/-/86	-22.003	15.168	143.575	AAS	1023	531	2	5	236	10
23767	TS	Firth R.	59-1	-/-/86	-22.825	16.098	130.560	AAS	1140	554	2	5	251	9
25619	TS	Firth R.	59-1	-/-/86	-22.551	14.898	128.551	AAS	1082	471	2	4	2390	10
23814	TS	Firth R.	59-1	-/-/86	-22.036	15.957	142.093	AAS	905	489	2	4	1477	
23810	TS	Firth R.	59-1	-/-/86	-22.341	15.321	135.639	AAS	1401	531	2	4	3193	11
22671	TS	Firth R.	59-1	-/-/86	-25.106	14.457	43.968	AAS	597	391	1	9	172	8
22674	TS	Firth R.	59-1	-/-/86	-23.042	15.617	111.063	AAS	1269	511	1	10	453	
23759	TS	Firth R.	59-1	-/-/86	-22.413	15.889	140.436	AAS	1173	559	2	5	281	11
22678	TS	Firth R.	59-1	-/-/86	-22.254	15.826	129.809	AAS	1794	605	2	5	366	10
22679	TS	Firth R.	59-1	-/-/86	-21.945	16.239	123.405	AAS	2868	647	1	9	521	11
22673	TS	Firth R.	59-1	-/-/86	-22.940	15.095	102.182	AAS	683	454	2	5	176	
23816	TS	Firth R.	59-1	-/-/86	-23.418	14.566	43.784	AAS	1129	482	2	4	1934	
23808	TS	Firth R.	59-1	-/-/86	-21.655	16.047	179.826	AAS	1183	561	2	5	289	
23773	TS	Firth R.	59-1	-/-/86	-22.029	15.543	132.501	AAS	1385	562	2	5	306	12
23768	TS	Firth R.	59-1	-/-/86	-23.149	15.690	139.131	AAS	1042	512	2	5	200	10
22680	TS	Firth R.	59-1	-/-/86	-22.479	15.616	79.559	AAS	1230	517	2	5	183	9
23770	TS	Firth R.	59-1	-/-/86	-23.347	14.786	66.947	AAS	1031	480	1	6	6	8
23765	TS	Firth R.	59-1	-/-/86	-23.417	13.481	62.277	AAS	1271	500	2	3	2377	10
23771	TS	Firth R.	59-1	-/-/86	-21.824	15.600	142.755	AAS	1586	612	2	5	324	12

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23775	TS	Firth R.	59-1	-/-/86	-22.790	16.114	132.300	AAS	1263	551	2	5	273	11
23772	TS	Firth R.	59-1	-/-/86	-23.041	15.130	159.010	AAS	1997	598	2	4	3079	12
22682	TS	Firth R.	59-1	-/-/86	-21.181	16.087	116.981	AAS	1797	622	1	9	327	
25616	TS	Firth R.	59-1	-/-/86	-23.307	13.817	32.766	ALJ	576	395	1	6	6	5
3	TS	Firth R.		-/-/11	-24.169	15.105	199.523	A	700	510	2			
4	TS	Firth R.		-/-/11	-25.408	14.582	264.732	A	1500	573				
2	TS	Firth R.		-/-/11	-24.790	15.648	152.964	A	900	554	2			
No id	TS	Firth R.		-/-/11	-24.953	15.955	163.347	A	3100	558				
A	TS	Firth R.		-/-/12	-23.696	14.716	180.770	A						10
2	TS	Firth R.		-/-/12	-24.860	15.450	226.740	A	1000	540	1			11
1	TS	Firth R.		-/-/12	-23.480	14.490	112.000	A	800	500				8
4	TS	Firth R.		-/-/12	-23.768	15.414	197.920	A	3500	700	1			8
6	TS	Firth R.		-/-/12	-24.630	14.770	164.630	A	1200	560	2			6
8	TS	Firth R.		-/-/12	-24.360	15.070	114.390	A		710	1			8
23703	TS	Rat R.	63-1	-/-/86	-22.936	14.458	132.983	AAS	1310	540	2	5	195	8
23643	TS	Rat R.	63-1	-/-/86	-24.772	13.508	34.562	AAS	664	443	1	9	135	
23695	TS	Rat R.	63-1	-/-/86	-23.905	13.220	26.579	ALJ	527	373	2	2	23	
23691	TS	Rat R.	63-1	-/-/86	-24.521	12.136	23.586	ASJ	265	295	1	6	2	5
23656	TS	Rat R.	63-1	-/-/86	-23.531	15.083	152.819	AAS	1064	520	2	2	157	8
23658	TS	Rat R.	63-1	-/-/86	-24.449	13.073	28.808	AAS	620	380	1	6	7	7
23653	TS	Rat R.	63-1	-/-/86	-23.126	14.584	115.858	AAS	794	472	2	2	149	9
23692	TS	Rat R.	63-1	-/-/86	-25.038	12.222	23.376	A	425	332			2	
23606	TS	Rat R.	63-1	-/-/86	-22.020	14.902	85.608	AAS	932	496	1	10	111	8
23660	TS	Rat R.	63-1	-/-/86	-22.560	14.225	42.740	AAR	1623	542	2	2	193	7
23601	TS	Rat R.	63-1	-/-/86	-25.600	13.513	174.309	AAS	1077	537	2	5	194	
23697	TS	Rat R.	63-1	-/-/86	-24.854	12.800	36.201	ALJ	408	342	2	1	17	
23689	TS	Rat R.	63-1	-/-/86	-23.340	13.274	33.445	AAR	920	444	2	2	125	8
23690	TS	Rat R.	63-1	-/-/86	-23.940	13.999	58.258	AAS	538	394	2	5	108	
23609	TS	Rat R.	63-1	-/-/86	-24.520	12.964	48.423	ALJ	1008	452	1	6	4	6
23705	TS	Rat R.	63-1	-/-/86	-23.008	13.933	139.449	AAS	943	495	2	5	110	8
23647	TS	Rat R.	63-1	-/-/86	-22.795	14.832	114.646	AAS	1422	571	2	5	231	9
23661	TS	Rat R.	63-1	-/-/86	-23.115	15.326	170.581	AAS	1479	561	2	5	183	

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23665	TS	Rat R.	63-1	-/-/86	-24.767	13.829	93.152	AAS	1249	500	2	5	169	11
23649	TS	Rat R.	63-1	-/-/86	-23.729	13.624	86.233	AAS	2494	619	2	5	283	10
23608	TS	Rat R.	63-1	-/-/86	-25.131	13.635	41.491	AAR	968	431	2	2	82	8
23646	TS	Rat R.	63-1	-/-/86	-24.937	13.344	41.695	ALJ	758	402	1	6	6	
23702	TS	Rat R.	63-1	-/-/86	-24.158	14.181	116.808	AAR	1292	516	2	2	248	
23657	TS	Rat R.	63-1	-/-/86	-23.370	14.695	59.589	AAR	1785	556	2	2	209	9
23659	TS	Rat R.	63-1	-/-/86	-24.865	14.213	40.289	AAS	682	402	1	6	7	7
23648	TS	Rat R.	63-1	-/-/86	-24.656	13.943	60.664	ALJ	1443	519	2	1	161	
23603	TS	Rat R.	63-1	-/-/86	-24.073	13.133	48.733	AAS	1146	460	1	6	13	8
23693	TS	Rat R.	63-1	-/-/86	-24.262	13.543	39.609	AAS	1039	470	1	7	11	9
23700	TS	Rat R.	63-1	-/-/86	-23.749	13.552	30.232	AAR	879	426	2	2	106	8
23602	TS	Rat R.	63-1	-/-/86	-23.844	14.132	122.579	AAS	1231	502	2	5	156	9
1	TS	Rat R.		18/07/11	-25.146	13.911	138.989	A	1700	555	2	2		8
2	TS	Rat R.		18/07/11	-26.807	13.873	75.237	A	1000	490	1	7		8
3	TS	Rat R.		18/07/11	-24.278	14.464	186.162	A	1200	535	2	2		12
4	TS	Rat R.		18/07/11	-25.665	13.048	60.024	A	800	435	2	2		5
5	TS	Rat R.		18/07/11	-25.501	13.562	38.331	A	1050	470	1	7		7
6	TS	Rat R.		18/07/11	-25.063	13.616	214.475	A	1700	570	2	2		7
7	TS	Rat R.		18/07/11	-25.567	14.114	73.287	A	1200	520	2	2		7
8	TS	Rat R.		18/07/11	-24.543	13.619	132.831	A	800	445	2	2		
9	TS	Rat R.		18/07/11	-24.583	13.589	56.005	A	900	480	2	2		7
1	TS	Rat R.		-/-/13	-27.695	14.799	68.744	A	1400	515	1	7	99	6
2	TS	Rat R.		-/-/13	-27.314	16.048	93.227	A	1200	507	1	7	79	7
3	TS	Rat R.		-/-/13	-26.580	15.435	73.024	A	1000	485	1	7	68	7
4	TS	Rat R.		-/-/13	-27.114	14.852	86.560	A	2300	610	2	2	138	7
5	TS	Rat R.		-/-/13	-26.176	16.010	87.140	A	1050	504	2	2	113	
6	TS	Rat R.		-/-/13	-27.706	14.583	92.975	A	1300	525	1	7	84	6
7	TS	Rat R.		-/-/13	-26.611	15.226	75.049	A	2200	621	1	7	158	7
8	TS	Rat R.		-/-/13	-25.024	15.776	120.791	A	1400	548	2	2	119	8
9	TS	Rat R.		-/-/13	-27.069	15.302	86.209	A	1325	521	1	7	69	7
10	TS	Rat R.		-/-/13	-26.912	14.881	75.942	A	1150	510	2	2	95	5
11	TS	Rat R.		-/-/13	-26.917	14.020	82.449	A	1050	474	2	2	101	6

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12	TS	Rat R.		-/-/13	-26.205	14.576	73.658	A	1480	556	1	6	57	7
13	TS	Rat R.		-/-/13	-26.498	15.334	58.404	A	1000	485	2	2	96	7
14	TS	Rat R.		-/-/13	-24.590	15.801	165.595	A	1400	576	2	2	159	7
15	TS	Rat R.		-/-/13	-26.192	14.246	60.920	A	900	485	1	6		5
16	TS	Rat R.		-/-/13	-24.414	16.356	133.883	A	1525	550	2	2	153	9
17	TS	Rat R.		-/-/13	-25.786	16.076	156.449	A	1400	535	2	2	167	6
18	TS	Rat R.		-/-/13	-26.661	16.020	107.209	A	2350	641	1	7	145	9
19	TS	Rat R.		-/-/13	-24.146	15.585	180.511	A	1650	593	2	2	144	10
20	TS	Rat R.		-/-/13	-24.695	15.304	164.095	A	1650	575	2	2	229	10
21	TS	Rat R.		-/-/13	-26.334	14.910	93.903	A	1750	565	2	2	179	7
22	TS	Rat R.		-/-/13	-24.890	15.882	144.506	A	1750	576	2	2	153	
23	TS	Rat R.		-/-/13	-25.257	15.860	114.959	A	1800	580	2	2	148	7
24	TS	Rat R.		-/-/13	-25.051	15.552	206.652	A	1550	545	2	2	162	13
25	TS	Rat R.		-/-/13	-26.071	15.723	133.261	A	1850	584	2	2	208	10
26	TS	Rat R.		-/-/13	-25.695	15.558	127.648	A	1650	568	2	2	188	9
27	TS	Rat R.		-/-/13	-25.049	16.053	137.759	A	1950	617	2	2	186	9
28	TS	Rat R.		-/-/13	-26.720	14.649	70.412	A	1250	521	1	6		6
29	TS	Rat R.		-/-/13	-26.242	15.630	119.886	A	2400	625	1	7	157	8
30	TS	Rat R.		-/-/13	-25.791	14.793	97.732	A	1500	535	2	2	125	6
31	TS	Rat R.		-/-/13	-26.964	14.375	85.678	A	1600	520	2	2	133	6
10		Babbage R.		22/9/12			31.917	R	158	254	1	7		
11		Babbage R.		22/9/12			71.993	R	106	225	1	7		
21		Babbage R.		22/9/12			65.163	R	66	185	1	7		
20		Babbage R.		22/9/12			25.680	R	74	200	1	7		
9		Babbage R.		22/9/12			75.588	R	180	270	1	7		
14		Babbage R.		22/9/12			46.668	R	73	198	1	7		
18		Babbage R.		22/9/12			55.524	R	177	275	1	7		
15		Babbage R.		22/9/12			35.794	R	116	232	1	7		
13		Babbage R.		22/9/12			69.765	R	100	223	1	7		
8		Babbage R.		22/9/12			20.981	R	112	230	1	7		
16		Babbage R.		22/9/12			21.418	R	150	255	1	7		
7		Babbage R.		22/9/12			22.051	R	71	200	1	7		

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12		Babbage R.		22/9/12			35.456	R	129	236	1	7		
19		Babbage R.		22/9/12			77.509	R	77	202	1	7		
17		Babbage R.		22/9/12			27.976	R	132	236	1	7		
489		Babbage R. tagged from Shingle Pt.		-/7-8/12	-24.755	14.766		A	2655	630	1	7	89	
511		Babbage R. tagged from Shingle Pt.		-/7-8/12	-25.810	14.813		A	1941	561	1	7	33	
710		Babbage R. tagged from Shingle Pt.		-/7-8/12	-25.476	15.339		A						
474		Babbage R. tagged from Shingle Pt.		-/7-8/12	-25.266	16.204		A	1824	543	2	2	100	
491		Babbage R. tagged from Shingle Pt.		-/7-8/12	-24.344	14.789		A	2164	555	1	10		
523		Babbage R. tagged from Shingle Pt.		-/7-8/12	-26.304	13.826		A	1293	475	2	5		
488		Babbage R. tagged from Shingle Pt.		-/7-8/12	-24.766	13.865		A	2152	565	2	1	16	
824		Babbage R. tagged from Shingle Pt.		-/7-8/12	-25.888	13.293		A	1338	480	2	1		
407		Babbage R. tagged from Shingle Pt.		-/7-8/12	-25.866	14.519		A	1930	558	2	2		
18		Big Fish R.		15/8/12	-27.345	13.570	44.722	A	610	342	2	1		
27		Big Fish R.		15/8/12	-27.057	15.496	68.348	A	1810	545	1	7		
17		Big Fish R.		15/8/12	-26.669	16.259	144.964	A	2750	627	2	2		
22		Big Fish R.		16/8/12	-26.688	15.585	82.768	A	1820	528	2	2		
16		Big Fish R.		15/8/12	-26.640	14.960	78.824	A	2240	559	2	2		

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19		Big Fish R.		16/8/12	-26.763	14.718	86.700	A	1450	511	1	7		
15		Big Fish R.		15/8/12	-27.180	14.760	66.058	A	1490	496	2	2		
5		Big Fish R.		12/8/12	-26.886	15.388	84.509	A	2000	551	1	7		
14		Big Fish R.		15/8/12	-26.800	14.766	51.544	A	2740	628	1	7		
25		Big Fish R.		18/8/12	-27.391	14.926	64.622	A	1600	527	1	7		
29		Big Fish R.		19/8/12	-27.417	14.785	92.540	A	1590	521	1	7		
3		Big Fish R.		9/8/12	-27.352	14.536	81.586	A	1700	531	1	7		
11		Big Fish R.		14/8/12	-26.667	15.998	87.878	A	1810	554	1	7		
12		Big Fish R.		14/8/12	-27.355	15.229	74.586	A	1980	565	1	7		
1		Big Fish R.		8/8/12	-25.970	14.930	105.604	A	1950	523	2	2		
6		Big Fish R.		13/8/12	-25.720	15.580	117.966	A	2850	643	1	7		
9		Big Fish R.		13/8/12	-26.581	15.358	161.028	A	2375	595	2	2		
28		Big Fish R.		19/8/12	-26.088	16.193	87.625	A	2050	585	2	2		
13		Big Fish R.		14/8/12	-26.060	15.699	97.998	A	1450	489	1	7		
21		Big Fish R.		16/8/12	-27.395	15.485	52.079	A	1450	513	1	7		
23		Big Fish R.		16/8/12	-27.247	15.515	96.102	A	1995	572	1	7		
4		Big Fish R.		11/8/12	-25.935	15.507	70.337	A	1850	532	2	2		
2		Big Fish R.		9/8/12			77.841	A	1650	512	2	2		
24		Big Fish R.		17/8/12	-26.276	15.614	119.493	A	2230	604	2	2		
26		Big Fish R.		18/8/12	-27.586	15.341	40.803	A	1860	547	1	7		
5		Big Fish R.		23/9/12	-32.505	10.071	26.514	R	115	230	1	7		
6		Big Fish R.		23/9/12	-31.630	9.522	66.522	R	71	195	1	7		
2		Big Fish R.		23/9/12	-29.107	9.445	29.947	R	101	212	1	7		
4		Big Fish R.		23/9/12	-30.616	8.743	39.260	R	73	197	1	7		
17		Big Fish R.		24/9/12	-31.314	16.093	45.658	R	67	200	1	7		
14		Big Fish R.		23/9/12	-29.659	11.829	44.224	R	158	251	1	7		
13		Big Fish R.		23/9/12	-32.560	11.580	34.719	R	77	195	1	7		
11		Big Fish R.		23/9/12	-31.058	11.300	58.099	R	137	238	1	7		
12		Big Fish R.		23/9/12	-32.793	9.151	47.771	R	64	191	1	7		
16		Big Fish R.		24/9/12	-28.174	10.375	33.718	R	117	225	1	7		
9		Big Fish R.		23/9/12	-31.118	10.190	64.105	R	110	230	1	7		
8		Big Fish R.		23/9/12	-28.685	10.916	28.789	R	130	232	1	7		

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7		Big Fish R.		23/9/12	-28.454	10.797	43.462	R	153	252	1	7		
3		Big Fish R.		23/9/12	-30.058	12.926	52.900	R	136	250	1	7		
1		Big Fish R.		23/9/12	-32.704	11.163	51.744	R	110	230	1	7		
10		Big Fish R.		24/9/12	-29.904	10.009	161.450	R	95	210	1	7		
19		Big Fish R.		24/9/12	-33.413	12.137	33.527	R	61	178	1	7		
18		Big Fish R.		24/9/12	-29.340	10.036	24.344	R	98	220	1	7		
15		Big Fish R.		24/9/12	-29.629	10.846	48.130	R	91	210	1	7		
20		Big Fish R.		24/9/12	-30.519	11.145	48.253	R	98	210	1	7		
27099		Little Fish C.		-/-/88	-31.710	10.910	47.470	ISJ	36	138	2	1	1	3
27104		Little Fish C.		-/-/88	-33.660	6.441	31.859	IAS	54	159	1	8	27	2
27097		Little Fish C.		-/-/88	-34.690	10.039	49.652	ISJ	36	144	2	1	1	4
27107		Little Fish C.		-/-/88	-31.620	6.709	25.037	IAP	34	140	2	2	26	
27098		Little Fish C.		-/-/88	-33.390	8.798	45.648	ISJ	46	163	2	1	3	
27105		Little Fish C.		-/-/88	-32.040	10.792	23.553	IAS	33		1	8	23	2
27100		Little Fish C.		-/-/88	-32.540	11.331	27.238	ISJ	39	150	2	1	1	
27110		Little Fish C.		-/-/88	-31.280	9.184	41.689	ISJ	7	84				1
27106		Little Fish C.		-/-/88	-32.180	10.610	23.193	IAS	32	142	1	8	21	3
27103		Little Fish C.		-/-/88	-31.420	8.779	23.292	ISJ	17	109	2	1	1	2
27117		Little Fish C.		-/-/88	-30.260	7.057	32.151	ISJ	9					
27118		Little Fish C.		-/-/88	-30.640	9.020	30.120	ISJ	9					1
27111		Little Fish C.		-/-/88	-31.140	8.307	23.746	IAS	15	115	1	8	6	1
27113		Little Fish C.		-/-/88	-30.010	8.027	34.473	ISJ	11	99				1
27114		Little Fish C.		-/-/88	-30.360	8.467	28.895	ISJ	9	96				1
27116		Little Fish C.		-/-/88	-31.520	9.347	24.831	ISJ	11	97				1
27096		Little Fish C.		-/-/88	-34.560	10.057	30.982	ISJ	46	159	2	1	2	3
27112		Little Fish C.		-/-/88	-31.950	6.882	36.706	ISJ	16					1
27102		Little Fish C.		-/-/88	-32.170	10.898	30.811	IAS	32	139	1	8	22	3
27101		Little Fish C.		-/-/88	-31.840	9.674	26.474	IAS	40	153	1	8	25	3
27115		Little Fish C.		-/-/88	-31.100	10.012	25.289	ISJ	15	109	1	6	1	1
26896		Firth R.		18/9/88	-33.940	8.520	33.730	PSJ	37	158	1	6	1	
26887		Firth R.		18/9/88	-35.000	8.290	50.720	PSJ	22	126		1	1	2
26912		Firth R.		18/9/88	-36.650	8.900	15.600	PSJ	24	123	2	1	1	3

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26909		Firth R.		18/9/88	-36.220	6.590	37.940	PSJ	98	214	1	6	1	3
26898		Firth R.		18/9/88	-35.570	8.110	32.920	PSJ	55	169	2	1	1	3
26911		Firth R.		18/9/88	-37.110	6.460	12.710	PSJ	28	144	1	6	1	3
26897		Firth R.		18/9/88	-30.960	8.110	72.410	R	43	165	1	9	5	
26890		Firth R.		18/9/88	-33.550	7.380	27.680	PSJ	47	168		1	1	3
26892		Firth R.		18/9/88	-32.660	8.010	36.210	PSJ	55	170	2	1	1	4
26902		Firth R.		18/9/88	-34.830	7.100	49.150	PSJ	71	179	2	1	1	3
26899		Firth R.		18/9/88	-36.830	7.560	66.760	PSJ	58	177	1	6	1	
26905		Firth R.		18/9/88	-33.060	8.120	32.610	PSJ	101	201	2	1	1	3
26885		Firth R.		18/9/88	-33.350	7.010	18.930	RAS	31	133	1	8	8	4
26886		Firth R.		18/9/88	-36.860	5.430	9.130	PSJ	14		1	0		2
26901		Firth R.		18/9/88	-31.920	6.850	86.970	PSJ	70	189	1	6	1	
26888		Firth R.		18/9/88	-34.040	6.050	11.330	PSJ	21	128	2	0	1	3
41503		Firth R.	2-1	-/-/95	-22.181	16.270	155.507	A	1422	564	2	4	273	8
41494		Firth R.	2-1	-/-/95	-22.512	14.399	165.577	A	1212	541	2	4	182	9
41526		Firth R.	2-1	-/-/95	-22.534	14.829	214.668	A	1466	595	2	4	305	10
41489		Firth R.	2-1	-/-/95	-21.956	15.353	63.961	A	1703	568	1	9	674	10
41505		Firth R.	2-1	-/-/95	-23.768	14.699	149.827	A	1207	538	2	4	268	10
41513		Firth R.	2-1	-/-/95	-23.130	14.529	131.532	A	1242	540	2	4	307	8
41522		Firth R.	2-1	-/-/95	-22.738	15.574	173.106	A	1464	580	2	4	276	11
41501		Firth R.	2-1	-/-/95	-23.248	14.181	81.169	A	955	486	1	9	255	8
41528		Firth R.	2-1	-/-/95	-21.681	15.940	130.504	A	1086	543	2	4	260	10
41518		Firth R.	2-1	-/-/95	-22.581	15.294	134.053	A	1284	550	2	4	293	
41523		Firth R.	2-1	-/-/95	-22.359	14.182	53.616	A	1227	487	1	9	345	
41519		Firth R.	2-1	-/-/95	-23.351	14.233	82.381	AAS	1087	460	2	3	2152	7
41499		Firth R.	2-1	-/-/95	-22.301	15.861	152.534	A	1522	578	2	4	396	13
41516		Firth R.	2-1	-/-/95	-22.465	15.762	171.200	A	1289	524	2	4	247	10
41511		Firth R.	2-1	-/-/95	-21.798	16.179	138.191	A	1527	566	2	4	222	
41487		Firth R.	2-1	-/-/95	-22.547	14.514	87.285	A	2822	638	1	9	346	
41527		Firth R.	2-1	-/-/95	-22.393	14.894	125.011	A	3374	678	1	9	800	11
41488		Firth R.	2-1	-/-/95	-21.531	15.547	148.691	A	1826	608	1	9	297	9
41515		Firth R.	2-1	-/-/95	-23.418	13.155	87.459	A	1984	598	1	9	510	7

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41493		Firth R.	2-1	-/-/95	-22.439	15.377	131.175	AAS	1831	574	1	8	430	
41495		Firth R.	2-1	-/-/95	-24.378	14.340	110.044	A	1562	540	1	9	520	
41514		Firth R.	2-1	-/-/95	-22.910	13.769	60.941	A	2134	645	1	9	584	10
41512		Firth R.	2-1	-/-/95	-22.345	14.933	122.624	A	1012	516	2	4	173	9
41510		Firth R.	2-1	-/-/95	-22.181	15.084	88.173	A	2098	598	1	9	562	11
41509		Firth R.	2-1	-/-/95	-23.124	15.453	132.697	A	2531	670	1	9	666	12
41492		Firth R.	2-1	-/-/95	-23.409	14.782	143.874	A	1311	578	2	4	177	12
41497		Firth R.	2-1	-/-/95	-23.120	14.531	144.369	A	1486	582	2	4	277	10
41525		Firth R.	2-1	-/-/95	-23.273	15.405	257.091	AAS	2238	576	2	3	4372	12
41520		Firth R.	2-1	-/-/95	-23.665	14.049	105.241	A	1008	518	2	4	206	8
41531		Firth R.	2-1	-/-/95	-22.644	15.446	131.056	A	1038	499	2	4	196	11
1		Pauline C.		13/6/11	-23.400	15.230	117.065	A	1500	570	1			9
2		Pauline C.		16/6/11	-24.351	14.267	220.656	A	2000	530	1			8
3		Pauline C.		16/6/11	-24.354	14.589	186.587	A	1100	460	2			8
4		Pauline C.		16/6/11	-24.403	15.624	266.733	A	1500	540	2			9
5		Pauline C.		18/6/11	-25.093	14.159	182.554	A	2300	610	1			7
11		Pauline C.		30/6/11	-25.527	15.824	258.869	A	1500	590	2			11
12		Pauline C.		30/6/11	-25.626	14.762	307.205	A	1300	510	1			
13		Pauline C.		30/6/11	-28.149	14.153	293.655	A	1000	485	1			7
14		Pauline C.		1/7/11	-26.218	15.741	234.717	A	2000	600	1			8
15		Pauline C.		1/7/11	-26.238	15.629	223.061	A	1500	570	1			8
16		Pauline C.		1/7/11	-24.683	15.557	90.513	A	1100	520	1			6
17		Pauline C.		1/7/11	-23.666	13.975	41.881	A	800	540	1			6
18		Pauline C.		1/7/11	-25.167	15.451	267.396	A	1400	530	2			
19		Pauline C.		1/7/11	-25.701	16.151	223.894	A	2200	650	1			8
20		Pauline C.		1/7/11	-22.082	15.749	123.586	A	1800	620	1			8
21		Pauline C.		1/7/11	-24.608	14.571	117.877	A	900	510	2			8
22		Pauline C.		2/7/11	-24.172	14.500	165.596	A	1000	505	2			8
23		Pauline C.		2/7/11	-26.514	14.480	398.563	A	1100	480	2			6
24		Pauline C.		2/7/11	-25.392	13.996	64.882	A	1200	520	1			
25		Pauline C.		2/7/11	-24.679	14.459	158.302	A	1500	520	2			7
26		Pauline C.		2/7/11	-24.711	14.413	60.957	A	1000	490	1			6

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27		Pauline C.		2/7/11	-24.960	14.225	139.315	A	2700	640	1			8
28		Pauline C.		2/7/11	-23.432	14.678	127.646	A	1200	515	1			7
29		Pauline C.		2/7/11	-24.818	14.925	89.967	A	2600	610	1			7
30		Pauline C.		2/7/11	-24.079	14.001	144.218	A	1100	490	2			7
31		Pauline C.		2/7/11	-26.417	14.881	306.588	A	1500	560	1			7
32		Pauline C.		2/7/11	-25.460	14.782	224.545	A	1600	545	2			8
33		Pauline C.		2/7/11	-24.710	14.960	169.591	A	1000	500	1			8
34		Pauline C.		2/7/11	-26.860	15.600	164.803	A	2400	650	1			8
100		Pauline C.		4/8/11	-23.340	14.890	106.141	A	1700	490	2			7
71		Pauline C.		7/8/12	-23.813	14.233	64.506	A	1400	500	2	2		
75		Pauline C.		8/8/12	-26.620	15.385	148.027	A	2300	550	2	2		
72		Pauline C.		8/8/12	-24.713	15.700		A	3400	640	1	7		
74		Pauline C.		8/8/12	-25.413	14.367		A	1800	540	2	2		
70		Pauline C.		7/8/12	-24.684	16.842	118.163	A	5200	755	1	7		
68		Pauline C.		6/8/12	-25.014	15.048	108.191	A	1900	545	2	1		
77		Pauline C.		8/8/12	-26.260	14.352	59.479	A	1100	455	1	7		
90		Pauline C.		19/8/12	-21.937	15.453		A	2100	545	2	2		
79		Pauline C.		13/8/12	-24.322	14.868	53.976	A	1700	520	2	2		
73		Pauline C.		8/8/12	-26.191	14.931		A	2000	520	2	2		
50		Pauline C.		20/7/12	-25.666	15.213	82.593	A	2600	630	1			
3		Pauline C.		15/7/12	-24.215	14.442	64.558	A	1250	520	2			
6		Pauline C.		18/7/12	-25.733	14.538	58.441	A	1600	510	2	2		
2		Pauline C.		15/7/12	-25.495	13.758	61.762	A	1100	475	2			
76		Pauline C.		8/8/12	-24.431	15.350		A	3200	600	1	7		
67		Pauline C.		6/8/12	-25.360	14.988	54.744	A	1100	460	2	2		
78		Pauline C.		13/8/12	-26.740	14.640	100.106	A	2900	590	1	7		
66		Pauline C.		6/8/12	-24.116	15.246	78.734	A	3500	620	1	7		
1		Pauline C.		15/7/12	-24.817	14.599	97.548	A	2000	576	2			
4		Pauline C.		18/7/12	-25.124	15.682	78.200	A	2500	600	1	6		
53		Pauline C.		20/7/12	-25.150	15.030	118.906	A	1900	565	1			
5		Pauline C.		18/7/12	-26.710	15.121	49.560	A	1350	490	2	1		
51		Pauline C.		20/7/12	-25.210	15.011	114.730	A	2400	590	1			

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2		Ptarmigan B.		1/7/11	-27.559	14.457	107.593	A	1500	530	2			8
6		Ptarmigan B.		2/7/11	-25.524	15.087	166.009	A	2300	650	1			8
11		Ptarmigan B.		2/7/11	-24.795	14.754	106.039	A	1600	580	2			8
12		Ptarmigan B.		2/7/11	-26.928	14.954	272.240	A	1800	620	1			8
22		Ptarmigan B.		2/7/11	-23.771	14.122	120.180	A	1500	570	1			8
24		Ptarmigan B.		2/7/11	-23.813	15.161	102.201	A	1500	570	1			6
26		Ptarmigan B.		2/7/11	-23.270	15.110	85.630	A	1500	580	1			8
28		Ptarmigan B.		2/7/11	-23.829	14.980	269.713	A	2000	630	1			7
29		Ptarmigan B.		2/7/11	-26.293	16.083	176.602	A	500	420	1			5
31		Ptarmigan B.		2/7/11	-24.176	14.741	129.219	A	1700	520	1			7
33		Ptarmigan B.		2/7/11	-25.361	13.824	82.916	A	800	450	1			5
38		Ptarmigan B.		2/7/11	-23.381	14.246	110.412	A	1300	540	1			6
40		Ptarmigan B.		2/7/11	-23.080	14.520	92.110	A	2000	610	1			8
41		Ptarmigan B.		2/7/11	-25.302	14.977	243.266	A	2400	640	1			7
42		Ptarmigan B.		2/7/11	-26.735	14.478	247.816	A	1000	470	2			6
43		Ptarmigan B.		2/7/11	-24.470	14.259	36.171	A	700	490	1			6
44		Ptarmigan B.		2/7/11	-25.290	14.677	72.506	A	800	490	2			6
45		Ptarmigan B.		2/7/11	-25.089	15.526	137.695	A	1800	620	2			7
48		Ptarmigan B.		2/7/11	-25.562	14.958	208.373	A	1700	590	1			7
50		Ptarmigan B.		2/7/11	-23.547	13.939	27.929	A	600	430	2			6
52		Ptarmigan B.		2/7/11	-24.722	14.552	85.350	A	1900	630	1			8
54		Ptarmigan B.		3/7/11	-25.344	15.928	81.123	A	3100	700	1			8
63		Ptarmigan B.		3/7/11	-27.195	14.527	122.151	A	1000	510	2			7
64		Ptarmigan B.		3/7/11	-24.280	15.578	312.152	A	2300	650	2			10
71		Ptarmigan B.		3/7/11	-24.682	14.685	258.210	A	1600	580	1			7
75		Ptarmigan B.		3/7/11	-25.564	13.902	130.590	A	1400	530	2			6
78		Ptarmigan B.		3/7/11	-24.385	15.019	58.998	A	1300	550	1			8
82		Ptarmigan B.		3/7/11	-24.775	14.558	228.863	A	1800	610	1			7
88		Ptarmigan B.		4/7/11	-24.307	14.838	98.545	A	1400	570	1			6
93		Ptarmigan B.		4/7/11	-25.147	15.122	106.721	A	2500	680	1			8
41144		Rat R.	6-1	-/-/95	-23.077	13.232	64.528	A	563	410	1	9	45	8

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41153		Rat R.	6-1	-/-/95	-23.138	12.723	45.644	AAR	1033	442	2	5	52	5
41143		Rat R.	6-1	-/-/95	-22.705	13.686	71.909	A	700	452	1	9	36	6
41151		Rat R.	6-1	-/-/95	-23.319	13.577	55.517	AAR	857	413	2	5	70	6
41105		Rat R.	6-1	-/-/95	-22.795	13.888	70.027	A	680	468	1	9	25	
41128		Rat R.	6-1	-/-/95	-23.748	13.670	69.174	A	578	449	2	4	109	
41102		Rat R.	6-1	-/-/95	-24.474	13.566	84.491	A	511	420	2	4	99	7
41149		Rat R.	6-1	-/-/95	-26.169	11.677	66.645	A	411	374	2	4	70	5
41142		Rat R.	6-1	-/-/95	-22.521	14.059	118.022	A	1013	505	1	9	159	8
41121		Rat R.	6-1	-/-/95	-24.728	13.220	65.803	A	1458		1	10	27	8
41133		Rat R.	6-1	-/-/95	-24.182	13.916	87.377	A	641	423	2	4	231	7
41140		Rat R.	6-1	-/-/95	-23.617	12.744	54.812	AVA	1005	437	1	6	1	5
41150		Rat R.	6-1	-/-/95	-24.108	13.415	154.058	A	1280	540	2	4	201	7
41141		Rat R.	6-1	-/-/95	-22.838	13.705	120.033	A	1445	552	1	9	195	7
41113		Rat R.	6-1	-/-/95	-22.710	13.955	92.383	A	1012	500	1	9	36	8
41146		Rat R.	6-1	-/-/95	-23.292	13.396	120.746	A	669	448	2	4	106	6
41106		Rat R.	6-1	-/-/95	-22.743	14.100	101.424	A	810	466	1	9	39	8
41108		Rat R.	6-1	-/-/95	-23.318	13.443	85.515	A	812	485	2	4	154	8
41152		Rat R.	6-1	-/-/95	-23.793	12.738	61.375	AAR	785	408	2	5	31	4
41124		Rat R.	6-1	-/-/95	-23.340	12.416	41.153	A	831	422	2	5	42	5
41120		Rat R.	6-1	-/-/95	-23.743	13.940	82.378	A	1858	547	1	10	38	
41145		Rat R.	6-1	-/-/95	-23.504	13.210	89.458	A	677	458	2	4	116	6
41134		Rat R.	6-1	-/-/95	-23.773	13.790	141.857	A	725	450	2	4	152	6
41117		Rat R.	6-1	-/-/95	-23.961	13.464	60.598	A	1059	446	2	5	45	5
41107		Rat R.	6-1	-/-/95	-22.608	14.065	65.432	A	801	479	1	9	38	8
41114		Rat R.	6-1	-/-/95	-22.971	14.271	81.967	A	1122	505	1	9	148	6
41112		Rat R.	6-1	-/-/95	-22.865	13.131	81.639	A	915	462	1	9	46	8
41118		Rat R.	6-1	-/-/95	-24.111	12.816	28.548	A	960	446	2	5	69	6
41139		Rat R.	6-1	-/-/95	-23.707	12.455	45.886	AAR	989	425	2	5	61	5
41119		Rat R.	6-1	-/-/95	-23.502	12.723	41.114	A	1018	438	2	5	71	6
20		Shingle Pt.		22/7/11	-26.044	14.848	410.883	A	1136	465	1			
24		Shingle Pt.		22/7/11	-26.314	14.047		A	2135	593	1			
28		Shingle Pt.		23/7/11	-25.370	15.495	79.846	A	1154	482	2			
29		Shingle Pt.		23/7/11	-25.873	15.034	139.654	A	1561	518	2			

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
32		Shingle Pt.		23/7/11	-24.516	15.104	114.556	A						
34		Shingle Pt.		23/7/11	-23.829	13.906	53.190	A						
35		Shingle Pt.		23/7/11	-25.380	15.439	113.012	A	2240	605	1			
36		Shingle Pt.		23/7/11	-24.199	14.703	183.962	A	2000	564	1			
37		Shingle Pt.		23/7/11	-25.738	14.990	173.744	A	1449	505	2			
54		Shingle Pt.		2/8/11	-25.877	12.879	170.663	A	515	345	1			
55		Shingle Pt.		2/8/11	-25.592	13.269	170.932	A	1241	473	2			
56		Shingle Pt.		2/8/11	-24.151	14.228		A	1924	546	2			
57		Shingle Pt.		2/8/11	-26.081	14.226	257.876	A	1644	534	2			
58		Shingle Pt.		2/8/11	-24.001	15.050	186.435	A	1706	518	2			
67		Shingle Pt.		3/8/11	-27.097	13.577	582.318	A	601	370	1			
77		Shingle Pt.		3/8/11	-24.522	14.807	181.232	A	1503	505	2			
87		Shingle Pt.		4/8/11	-23.421	14.116	88.104	A	1815	542	1			
94		Shingle Pt.		5/8/11	-24.855	14.297	172.156	A	1556	495	2			
1552		Shingle Pt.		24/7/11	-23.798	14.873	320.936	A	1469	503	1			
1572		Shingle Pt.		28/7/11	-25.920	15.245	149.048	A	1717	544	2			
1596		Shingle Pt.		1/8/11	-24.982	14.390		A	1654	520	2			
1609		Shingle Pt.		1/8/11	-24.452	13.690	112.046	A	610	365	1			
1610		Shingle Pt.		1/8/11	-23.340	14.485	194.749	A	2131	569	1			
1611		Shingle Pt.		1/8/11	-26.930	13.984		A	697	380	1			
1612		Shingle Pt.		1/8/11	-25.760	13.693		A	763	383	2			
1615		Shingle Pt.		1/8/11	-23.473	13.796	118.738	A	1254	498	2			
1616		Shingle Pt.		1/8/11	-24.472	14.965	210.574	A	1860	551	1			
1618		Shingle Pt.		1/8/11	-25.361	14.275	185.561	A	975	424	2			
1640		Shingle Pt.		3/8/11	-25.834	13.516	164.227	A	606	367	2			
1667		Shingle Pt.		4/8/11	-25.782	13.620	98.576	A	575	360	1			
739		Shingle Pt.		-/7-8/12	-24.974	13.722	124.089	A	2088	540	2	2		
541		Shingle Pt.		-/7-8/12	-25.239	12.713	49.734	A	655	361	2	1		
811		Shingle Pt.		-/7-8/12	-27.742	11.357	43.181	A	507	352	1	6		
779		Shingle Pt.		-/7-8/12	-25.827	13.957	81.446	A	1582	510	2	2		
827		Shingle Pt.		-/7-8/12	-25.643	14.203	69.395	A	2390	596	1	8		
488		Shingle Pt.		-/7-8/12	-24.766	13.865	110.355	A						

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
740		Shingle Pt.		-/7-8/12	-26.260	13.464	64.586	A	1352	570	2	2		
823		Shingle Pt.		-/7-8/12	-27.770	13.300	43.330	A	723	386	1	6		
760		Shingle Pt.		-/7-8/12	-24.576	14.363	90.454	A	1763	518	2	2		
824		Shingle Pt.		-/7-8/12	-25.888	13.293	84.169	A						
830		Shingle Pt.		-/7-8/12	-26.005	12.002	31.879	A	328	289	1	6		
469		Shingle Pt.		-/7-8/12	-26.884	15.679	101.502	A	2547	631	1	7		
712		Shingle Pt.		-/7-8/12	-25.783	13.605	96.470	A	2688	620	2	2		
528		Shingle Pt.		-/7-8/12	-26.208	13.151	57.058	A	677	374	2	1		
407		Shingle Pt.		-/7-8/12	-25.866	14.519	112.687	A						
776		Shingle Pt.		-/7-8/12	-25.696	13.663	61.565	A	1172	465	1	6		
546		Shingle Pt.		-/7-8/12	-26.238	13.255	46.051	A	529	334	2	1		
770		Shingle Pt.		-/7-8/12	-24.911	13.753	69.115	A	1410	494	1	6		
490		Shingle Pt.		-/7-8/12	-23.972	14.759	144.528	A	2524	605	2	2		
542		Shingle Pt.		-/7-8/12	-28.172	13.343	47.844	A	410	322	1	6		
567		Shingle Pt.		-/7-8/12	-24.842	14.214	92.064	A	3510	637	1	8		
786		Shingle Pt.		-/7-8/12	-26.515	13.368	61.100	A	908	415	1	7		
751		Shingle Pt.		-/7-8/12	-26.604	14.083	64.760	A	523	350	1	6		
472		Shingle Pt.		-/7-8/12	-26.479	12.497	56.744	A	1270	458	1	6		
435		Shingle Pt.		-/7-8/12	-25.060	15.004	109.434	A	2063	585	1	7		
753		Shingle Pt.		-/7-8/12	-25.836	13.451	70.699	A	1075	445	2	2		
764		Shingle Pt.		-/7-8/12	-25.119	14.810	113.868	A	1783	530	2	2		
624		Shingle Pt.		-/7-8/12	-24.176	15.317	93.414	A	2646	611	1	7		
614		Shingle Pt.		-/7-8/12	-25.335	13.950	52.119	A	1097	438	2	1		
605		Shingle Pt.		-/7-8/12	-24.929	14.990	95.389	A	3711	688	1	7		
750		Shingle Pt.		-/7-8/12	-26.707	14.483	51.514	A	506	345	1	6		
516		Shingle Pt.		-/7-8/12	-27.034	14.078	67.762	A	877	405	1	6		
722		Shingle Pt.		-/7-8/12	-24.568	14.364	87.207	A	1710	534	2	2		
736		Shingle Pt.		-/7-8/12	-25.405	13.586	51.679	A	505	343	1	6		
477		Shingle Pt.		-/7-8/12	-25.538	15.067	97.480	A	3667	665	1	7		
833		Shingle Pt.		-/7-8/12	-26.818	13.671	77.012	A	558	348	1	6		
788		Shingle Pt.		-/7-8/12	-25.667	14.031	71.158	A	1270	470	2	1		
729		Shingle Pt.		-/7-8/12	-25.730	15.012	75.336	A	1892	530	2	2		

Sample #	Study	Location	Loc.-subloc. #	dd/mm/yy	δ13C (‰)	δ15N (‰)	THg (ng/g ww)	Hist.[a]	Wt (g)	FL (mm)	Sex 1=M 2=F	Mat.[b]	Gonad wt (g)	Age
793		Shingle Pt.		-/7-8/12	-26.753	12.208	65.985	A	426	325	2	1		
714		Shingle Pt.		-/7-8/12	-26.258	13.335	74.982	A	873	425	2	1		
606		Shingle Pt.		-/7-8/12	-25.426	14.838	113.951	A	1593	500	2	2		
573		Shingle Pt.		-/7-8/12	-27.468	12.555	51.059	A	243	275	1	6		

[a]History (Hist.): A=anadromous; AAP=anadromous adult prespawner; AAS=anadromous adult spawner; AAR=anadromous adult resting; AVA=anadromous virgin adult; ALJ=anadromous large juvenile; ASJ=anadromous small juvenile; IAP=isolate adult prespawner; IAS=isolate adult spawner; IAV=isolate adult virgin; ISJ=isolate small juvenile; APS=anadromous adult post-spawner; PSJ=post-smolt juvenile; R=resident; RAS=residual adult spawner; RVA=residual virgin adult

[b]Maturity: 1=immature female; 2=mature female; 3=ripe female; 4=spent female; 5=resting female; 6=immature male; 7=mature male; 8=ripe male; 9=spent male; 10=resting male

Appendix B. Locations of sampling for Northern Dolly Varden (Fig. 1) cross-referenced to all studies arranged by drainage basin and sub-basin from west to east for the Yukon (YT) and Northwest Territories (NT). Names in parentheses indicate synonyms or erroneous ones used in previous or other studies; NA = not applicable, A = anadromous, R = resident, and I = isolate. All coordinates given as degrees, minutes, and seconds with latitudes North and longitudes West.

Location (this report)	Gazetteer Coordinates[1]	Location and Coordinates (Tran et al. 2015)	Location and Coordinates (Tran et al. 2016)	Location and Coordinates (Tran et al. 2019)	Comments
Firth River (YT)	69 32 36; 139 31 12	68 40 12; 140 55 11	NA	68 40 12; 140 55 12	
Herschel Island (YT)					
Pauline Cove	69 34 19; 138 55 00	69 34 47; 138 52 12	NA	NA	
Thetis Bay	69 33 09; 139 00 29	69 32 59; 139 01 48	NA	NA	
Beaufort Sea Coast (YT)					
Ptarmigan Bay	69 29 20; 139 06 19	69 29 11; 139 01 12	NA	NA	
Shingle Point	68 59 20; 137 21 38	68 58 48; 137 31 12	NA	NA	
Babbage River (YT)					
Babbage River	69 10 38; 138 25 59	68 37 47; 139 22 12	68 37 59; 139 43 12 (A) 68 37 59; 139 43 12 (R)	NA	Anadromous and resident fish co-occur
Fish Hole Creek (Canoe River)	68 48 04; 138 46 56	68 46 11; 138 45 00	68 37 44; 139 21 14 (I)	NA	Above falls
Big Fish River (YT)					
Big Fish River	68 30 09; 136 26 54	68 27 00; 136 11 60	NA	NA	Longitude in Tran et al. 2015 rounded to 60 sec.
Little Fish Creek (Cache Creek)	68 13 55; 136 26 53	68 31 11; 136 13 47	NA	NA	
Rat River (NT)					
Fish Creek	67 42 35; 136 16 00	67 46 48; 136 19 11	NA	67 46 48; 136 19 12	

1. Gazetteer sources are Gazetteer of the Yukon for 2019 (www.yukonplacenames.ca) and Gazetteer of the Northwest Territories; January 2017 (NWT Cultural Places Program, Prince of Wales Northern Heritage Centre).