nx̌ʷyaɬpítkʷ Kettle River Watershed

Evaluation of Specked Dace (*Rhinichthys osculus*)Critical Habitat Areas in the nx̌ʷyaɬpítkʷ Kettle River Watershed

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Cover Photos:

Top: Speckled Dace emerging from interstitial cover in the nx̌ʷyaɬpítkʷ Critical Habitat Area September 19 2024. Photo by Evan Smith, Okanagan Nation Alliance.

Bottom: Backpack electrofishing for Speckled Dace upstream of the nxʷyntkʷitkʷ Critical Habitat Area on September 12 2025. Photo by Evan Smith, Okanagan Nation Alliance.

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Executive Summary

Speckled Dace is a small cyprinid with a distribution limited to western North America. In Canada, Speckled Dace are endemic to the nx̌ʷyaɬpítkʷ (Kettle River) watershed in British Columbia. In 2009, SDC were listed under the Species at Risk Act (SARA; 2002). A Recovery Strategy and Action Plan have since been created for the species. In 2012, Speckled Dace Critical Habitat Protected Areas were established within the west nx̌ʷyaɬpítkʷ (Kettle River), nx̌ʷyaɬpítkʷ, and nxʷyntkʷitkʷ (Granby River) by Fisheries and Oceans Canada to protect Speckled Dace from impacts like rural development, water withdrawal, forestry, and land clearing. However, Fisheries and Oceans Canada identified certain knowledge gaps that required further study. This project focused on the questions regarding Speckled Dace abundance and habitat quality within the Critical Habitat Areas. Year 1 (2024) of this project focused on the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ Critical Habitat Areas.

Speckled Dace indexing surveys were completed at four sites within each Critical Habitat Area, and four sites upstream of each Critical Habitat Area. Indexing sites were fifty-metres long and included backpack electrofishing on the right-downstream bank, left-downstream bank, and the centre-channel (two-metre width for each transect). To assess abundance, the linear Speckled Dace density was calculated for each site and then averaged to determine the linear density for the Critical Habitat Area. The minimum and maximum error for the average (with 95% confidence) was used to estimate the abundance range. If Speckled Dace density was significantly different between the bank sites and the centre channel site, the linear density estimates were stratified accordingly. Speckled Dace abundance was compared between Critical Habitat Areas and between Critical Habitat Areas and their respective upstream reaches. Habitat parameters (flow, water depth, cover type) were recorded every ten metres for each transect within the fifty-metre indexing site. These parameters were compared to habitat functions, features and attributes for inclusion in critical habitat identified by Fisheries and Oceans Canada. Habitat attributes were also compared between Critical Habitat Areas and between Critical Habitat Areas and their respective upstream Reaches.

Speckled Dace abundance was an estimated 4,392 Speckled Dace (3,036 – 6,049 Speckled Dace) in the nx̌ʷyaɬpítkʷ Critical Habitat Area and 24 Speckled Dace (1 – 71 Speckled Dace) in the nxʷyntkʷitkʷ Critical Habitat Area; both abundance estimates were below the 7,000 Speckled Dace target population. Speckled Dace abundance appeared to higher upstream of the nx̌ʷyaɬpítkʷ Critical Habitat Area (7,708 Speckled Dace with a range of 2,581 – 13,214 Speckled Dace) but was not deemed significant compared to the Critical Habitat Area due to the variability of the estimate. The sampled Critical Habitat Areas had an abundance below Fisheries and Oceans Canada target population because site-specific Speckled Dace densities were lower than the density used to establish the length of Critical Habitat Areas. Flow, water depth, and substrate measured in the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ Critical Habitat Areas at the time of sampling were consistent with the habitat functions, features and attributes for inclusion in critical habitat identified by Fisheries and Oceans Canada. This report relies on the western science perspective and is aimed to evaluate Critical Habitat Areas based on Fisheries and Oceans Canada criteria and methodology. An additional review from the Syilx knowledge perspective would provide a more wholistic approach and would offer additional concepts not discussed in this report.

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Glossary

nsyilxcən	English
Waterbody	
nx̌ʷyaɫpítkʷ	Kettle River
west nx̌ʷyaɫpítkʷ	West Kettle River
nxʷyntkʷitkʷ	Granby River
Place Names	
snɫuxʷqnm	Castlegar
stqaʔtkʷɫniw̓t	Westbank
nk̓mk̓mcinm	Grand Forks
ncaʔm	Christina Lake
kiláwnaʔ	Kelowna
Fish Names	
xʷuminaʔ	Rainbow Trout

"nsyilxcən is the language spoken by and distinguishes the Syilx Okanagan from other indigenous peoples. It is part of the Salish language family which is distinct from our Salish neighbors, like the Spokane, the Nlaka'pamux, and the Secwepemc. nsyilxcən is spoken in all the districts of the Syilx Okanagan territory with varying dialects." https://www.syilx.org/

1.0 Introduction

Speckled Dace (*Rhinichthys osculus;* SDC) are a small cyprinid typically between 50 – 90 mm with a distribution limited to western North America (McPhail 2007). In Canada, SDC are endemic to the nx̌ʷyaɫpítkʷ (Kettle River) watershed in British Columbia; primarily in the nx̌ʷyaɫpítkʷ, west nx̌ʷyaɫpítkʷ (West Kettle River), and nxʷyntkʷitkʷ (Granby River; Wade et *al*. 2025; DFO 2018). Recent observations have also confirmed SDC presence in Burrel Creek, a tributary to nxʷyntkʷitkʷ (Pers. Comm. Sherri McPherson, Lotic Environmental, Dec 12 2024). SDC were listed as a species of Special Concern 1980, and later re-assessed it as Endangered in 2002, 2006, and 2016 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), citing the isolation from downstream populations via Cascade Falls and anthropogenic activities (irrigation, forestry, agriculture, and climate change; COSEWIC 2016; DFO 2018). In 2009, SDC were listed under the Species at Risk Act (SARA; 2002). A Recovery Strategy (DFO 2018) and Action Plan (DFO 2020) have since been created for the species.

In 2012, Speckled Dace Critical Habitat Protected Areas (CHAs) were established within the west nx̌ʷyaɫpítkʷ, nx̌ʷyaɫpítkʷ, and nxʷyntkʷitkʷ by Fisheries and Oceans Canada (DFO) to protect SDC from impacts like rural development, water withdrawal, forestry, and land clearing (Brown et *al*. 2012; Figure 1). The locations of these CHAs were based on the most upstream detection of SDC in a 2008 Simon Fraser University Masters project (Batty 2010; Brown et *al*. 2012), while the length of these CHAs (2.4 km) were based on an estimated mature SDC density of 0.23 fish/m (rounded to 3.0 fish/m) in the nx̌ʷyaɫpítkʷ watershed and a target abundance of 7,000 SDC for the maintenance of the population (Reed et *al*. 2003; Batty 2010; Brown et *al*. 2012). DFO listed the following research needs to fill data gaps and verify the proposed CHAs would achieve their intended goals (Brown et *al*. 2012):

1. Verify that the geospatial areas proposed as critical habitat do indeed contain suitable habitat, and confirm abundance estimates within these proposed critical habitat sections;
2. Examine SDC winter life history, over-wintering habitat and seasonal movements. Purpose: would help confirm assumptions regarding downstream dispersal from areas designated critical habitat and establish patterns of seasonal habitat use;
3. Develop accurate biophysical descriptions of the proposed critical habitat locations and establish monitoring programs at each location. Purpose: confirm suitability of proposed reaches and enable long term monitoring of abundance. Annual monitoring is not required; a well conceived, periodic index program is likely sufficient to detect serious trends;
4. Sample the stream sections immediately above the delineated critical habitat for SDC. Purpose: refine observations of Batty (2010), confirm suitability of proposed reaches and verify range of dace; and
5. Study the relationship between discharge and SDC productivity. Purpose: would help to replace assumptions with direct observations to assist in preserving SDC in the event of a sustained drought.

This project is expected to benefit National Priorities by contributing to SDC Broad Recovery Strategy 1: increase understanding of population and distribution trends, natural variability, and any linkages to threats by developing and implementing standardized long term monitoring program within the CHAs and

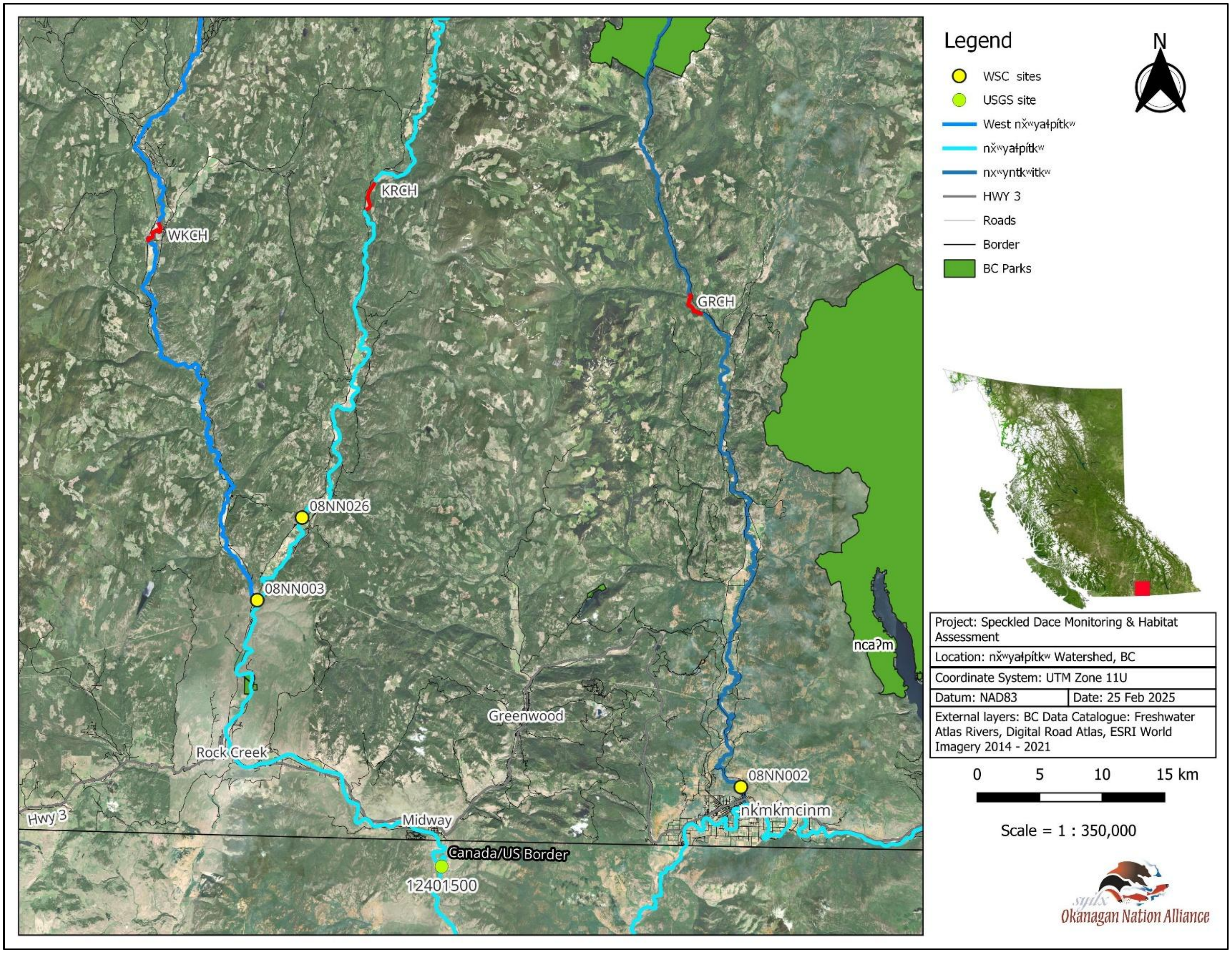

Figure 1. Location of Speckled Dace Critical Habitat Areas (red) in the west nx̌ʷyaɬpítkʷ (WKCH), nx̌ʷyaɬpítkʷ (KRCH), and nxʷyntkʷitkʷ (GRCH) in relation to nk̓mk̓mcinm and Water Survey of Canada (WSC)/United States Geological Service (USGS) discharge monitoring stations.

Broad Recovery Strategy 4: Support local stewardship groups to advance SDC recovery, listed in the Recovery Strategy for the Speckled Dace in Canada (DFO 2018). This project will contribute to Strategy 1 by evaluating SDC CHAs as recommended by DFO (Brown et *al*. 2012) to confirm (1) suitable habitat is present in the established CHA's, and (2) density estimates used to determine the length of CHA's are accurate. Strategy 4 will be addressed by engaging and educating government and stewardship groups on Speckled Dace identification, ecology, and threats.

1.1 Management Questions and Hypotheses

The following management questions (MQ) and associated null hypotheses were developed to address the research needs identified by DFO:

MQ #1: Do the geospatial areas proposed as critical habitat contain a sustainable population at each location?

H_0^1 = *Each CHA has an estimated abundance of ≥ 7,000 SDC.*

H_0^1 has two primary assumptions: the population target determined by DFO (7,000 individuals) is adequate for a sustainable population of SDC and the sustainable population target includes both immature and mature individuals.

MQ #2: Do the geospatial areas proposed as critical habitat contain suitable habitat?

H_0^2 = *Each CHA has suitable habitat for SDC.*

H_0^{2a} = *Flow in CHAs was < 0.24 m/s for immature rearing and/or between 0.18 – 0.45 m/s for mature rearing.*

H_0^{2b} = *Water depth in CHAs was < 0.40 m for immature rearing and/or between 0.20 – 0.50 m for mature rearing.*

H_0^{2c} = *Substrate size in CHAs was gravel (2 mm – 16 mm) and cobble (64 mm – 256 mm) for immature rearing and/or boulder (> 256 mm) and cobble (64 mm – 256 mm) for mature rearing.*

H_0^2 has one primary assumption: the habitat features and attributes identified by DFO as appropriate for inclusion in SDC critical habitat are correct.

MQ #3: Is SDC abundance different between CHAs and upstream reaches?

H_0^3 = *There is no difference in SDC abundance between CHAs and upstream reaches.*

2.0 Methods

SDC Indexing Surveys were used to collect SDC abundance and density data within and upstream (within 2.4 km) of CHAs. Abundance and density information was used to address H_0^1 and H_0^3. Habitat association data were collected at each SDC Indexing Site to address H_0^2; these data included wetted width (m), water depth (m), flow (m/s), substrate size, river feature, and cover type. Habitat data were compared to parameters identified by DFO, between CHAs and upstream reaches, and CHAs to assess differences in habitat composition and whether those differences related to abundance.

Each CHA and upstream reach will be sampled twice to account for annual variability. The Schedule for sampling is provided in Table 1.

Table 1. Schedule of Project Sampling 2024 – 2026.

Year	Study Location
2024	nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ Critical Habitat Areas (and upstream reaches)
2025	west nx̌ʷyaɬpítkʷ and nx̌ʷyaɬpítkʷ Critical Habitat Areas (and upstream reaches)
2026	west nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ Critical Habitat Areas (and upstream reaches)

Historic water temperatures (°C) and discharges (cms) were downloaded from the Water Survey of Canada (WSC) for the upper nx̌ʷyaɬpítkʷ (Station: 08NN026; WSC 2025[1]), and nxʷyntkʷitkʷ (08NN002; WSC 2025[2]).

2.1 Estimating Speckled Dace Abundance

Twenty-four SDC indexing sites were randomly selected for surveys, four within each CHA and four upstream of each CHA within 2.4 km. An additional 24 oversample sites were also identified if selected sites were unable to be sampled (Figure 3 and Figure 4 in Appendix 1); for instance if more than 50% of a selected site could not be sampled with backpack electrofishing (large pools and/or fast-flowing water). Site locations were based on river metres (rm; see Section 2.4 *Data Management and Mapping*) where each 100 rm within the study area was a potential site (24 potential sites per 2.4 km). A random number generator was used to select sample sites and oversample sites. The following rules were followed when selecting sites:

- The most upstream and downstream site was rejected to ensure sampling was completed completely within the study area; and
- Sites (sample and/or oversample) could not be next to each other to ensure some measure of distribution throughout the site.

Selected sites and oversample sites were numbered based on the order of selection (1 – 4 for selected sites and 5 – 8 for oversample sites). If required, oversample sites had to be completed in order (if one selected site was rejected, then Oversample Site 5 was the replacement).

SDC indexing sites were 50 m in length and consisted of single pass backpack electrofishing (Model: Smith-Root LR24 backpack electrofisher) on the right-downstream bank (river right), left-downstream bank (river left), and up the centre channel (2-m sample width per transect). Crews began electrofishing on a given shoreline, moving downstream to upstream. Once the first shoreline site was complete, the centre channel was sampled downstream to upstream; the opposite shoreline was sampled last. The electrofisher operator would extend the anode in-front and turn on the power once the anode was submerged; then they would steadily pull the anode back toward them in a sweeping motion. If SDC were observed, they were netted and placed into a bucket of river water and a survey flag was placed in the capture location. Once complete, the elecrofisher operator would then take a few steps forward and repeat the process. Observed fish that evaded capture were recorded as “observed” on the datasheet.

All captured fish were collected in buckets of river water and identified using keys provided in McPhail (2007). Active sampling did not occur when water temperatures exceeded 20°C as per permitting conditions. On hot days (air temperatures > 25°C) or when water temperatures were at the higher range of the allowable permitted sampling temperature (17 – 19°C), frozen water bottles were placed in the bucket to manage water temperatures. In addition, an oxygen system (oxygen tank connected to a diffuser through a regulator) was added to the bucket during processing to prevent suffocation.

SDC fork length (FL; mm) and weight (g) were recorded and a Passive Integrated Transmitter (PIT) tag (Biomark Mini HPT8 PL 8.4 mm 134.2kHz ISO FDX-B) was implanted in individuals over 60 mm for mark-recapture/migration monitoring. Prior to tagging, SDC were briefly placed in a separate bucket with a sedative dose of anesthetic (MS-222; as per Ackerman et *al*. n.d.) to reduce stress while handling. After processing, SDC were placed in an oxygenated bucket of clean river water to recover. When individuals appeared to be fully recovered (swimming upright and alert), they were released into the river. Non-target species were identified, and the number of individuals and their respective FL were recorded. In instances where many non-target species were captured, the number of individuals from that species were counted and a range of FL (minimum/maximum) were recorded.

2.2 Assessing Speckled Dace Habitat

Habitat parameters were recorded at 10-m intervals along each transect (from 0 m to 50 m for river right, river left, and centre channel) including flow and depth measurements 1 m from the wetted edge (mid-point of the sample width) and at the centre of the centre channel transect to represent general site characteristics, dominant substrate, descriptions of habitat types (riffles, pools, runs), and features (cover types). These 10-m intervals are referred to has “habitat units”. A summary of site parameters including the instrument used to measure and its accuracy is available in Table 2.

Table 2. Site variables recorded at each Speckled Dace Indexing Site, including the instrument used to measure the variable and the associated accuracy/description. Substrate classification from Environment Canada (2012).

Variable	Instrument	Accuracy/Description
Date	-	Day, Month, Year
Start and End Time	-	24 hour
Downstream and Upstream Easting/Northing	62st Garmin Handheld GPS	± 3 m; UTM Zone 11U
Water Temperature	OAKTON CTSTESTR 50P Waterproof Pocket Conductivity/TDS/Salinity Tester	± 0.5°C
Conductivity	OAKTON CTSTESTR 50P Waterproof Pocket Conductivity/TDS/Salinity Tester	± 1% (0.1 µs – 20 ms)
Site Length/Wetted Width	Eslon Tape Measure	± 0.1 m
Water Flow	Hach FH950 Digital Flow Meter	± 2% (0 m/s – 3.04 m/s); ± 4% (3.04 m/s – 4.87 m/s)
Water Depth	Metric Flow Meter Wading Rod	± 0.02 m
Dominant Substrate	Caliper or Measure Tape	Boulder = > 256 mm Large Cobble = 128 mm – 256 mm Small Cobble = 64 mm – 128 mm Large Pebble = 32 mm – 64 mm Small Pebble = 16 mm – 32 mm Gravel = 2mm – 16 mm Coarse Sand = 1 mm – 2 mm Silt/fine sand/clay = < 1 mm

A pebble count was conducted at a location within each CHA, and in the upstream reaches, to determine the substrate size (D_{50}). Pebble counts were conducted using methods described in the Canadian Benthic Invertebrate Network Field Manual (Environment Canada 2012). Discharge was measured at the upstream end of CHAs to document conditions at the time of the surveys. To calculate discharge, velocity (m/s) and water depth (m) were measured at set intervals across the wetted width of the stream perpendicular to flow. Measurement intervals were determined by:

$$Q_i = \frac{WW}{20}$$

Where:	Q_i	=	*discharge interval*
	WW	=	*wetted width (m)*
	20	=	*the number of intended intervals*
	Note:		*The first measurement is at $Q_i/2$*

2.3 Analyses

The Mann-Whitney U Test was used to assess SDC preference of stream-margin (shoreline) habitats or centre-channel habitats. This test is used to compare two sample means that come from the same population and is used to test whether two sample means are equal or not. This test is a non-parametric test, so it does not include any assumptions related to the distribution of the data; the assumptions for this test are:

1. There is a dependant variable that is measured at a continuous (hours, kg, etc.) or ordinal (rankings: 7-point scale from “strongly agree” to “strongly disagree”) level.
2. There is an independent variable that consists of two categorical, independent groups.
3. There is an independence of observations; there is no relationship between the observations in each group of the independent variable or between the groups themselves.
4. Determine whether the distribution of data for both groups in the independent variable have the same shape or a different shape. If the two distributions have a different shape, the test is used to determine whether there are differences in the distributions of the two groups. However, if the two distributions are the same shape, the test is used to determine whether there are differences in the medians of the two groups.

The number of captured and observed SDC at each site were separated into “margin” or “centre channel” based on their capture/observed location; tests included data from CHAs and upstream reaches. If a site had an elevated bar in the centre channel, the centre channel for that site was classified as margin habitat. Separate tests were conducted for the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ and a preference was accepted if the p-value (p) = < 0.05 (95% confidence). If p = < 0.05 then it was assumed SDC density was stratified between margin and centre-channel habitats. The Mann-Whitney U Test was used because two of the three analysis of variance (ANOVA) assumptions could not be met: the datasets were not normally distributed, even when transformed (using Log +1) and equal variances could not be assumed (based on the F-Test for equal variances). Margin habitat was assumed to include two meters from the wetted edge.

To assess whether the density used to determine CHA length (3.0 SDC/m) was representative of site-specific densities within CHAs, the site specific SDC density was calculated for each location. If stratification of SDC density was observed between margin and centre-channel habitats, separate calculations were completed for each habitat type then added together for the total site estimate. First, the number of SDC that could have been captured at each site was estimated:

$$N_i = \left(\frac{N_{si}}{a_i}\right) \times A_i$$

Where:	N_i	=	*# SDC that could have been captured at site i (rounded down)*
	N_{Si}	=	*# SDC captured + observed in all three transects (river right, river left, centre channel) at site i*[1]
	a_i	=	*Area (m²) sampled per site i*
	A_i	=	*Estimated total area (m²) of site i (wetted width [m] x site length [m])*
	M_i	=	*Possible number of channel quadrats that could have been sampled at site i*

If stratification between margin and centre-channel habitats occurred, it was assumed 100% of the SDC were captured or observed in the margin habitat type. The estimated total area for the centre channel was calculated by subtracting the width of the margin sites (4 m total) from the site wetted width, then multiplying by the site length. This calculation was used for all SDC (mature and immature) and mature SDC to compare the difference between the total density and the estimated spawning density. SDC were considered mature at > 56 mm FL based on maturity-at-length analyses by Batty (2010).

The linear density of SDC (SDC/m) per site was then calculated by:

$$D_i = \left(\frac{N_i}{s_i}\right)$$

Where:	D_i	=	*Estimated linear density (SDC/m) at site i*
	N_i	=	*# SDC that could have been captured at site i*
	s_i	=	*Length of the site sampled (m)*

If stratification between margin and centre-channel habitats occurred, the linear density of the two habitat types were added together for each respective site to obtain the total site density. A one-sample t-Test was used to determine whether the mean SDC/m for a given area (CHA or upstream reach) was different than 3.0 SDC/m. It was assumed the averaged density from sample sites were representative of the respective 2.4 km study areas (not stratified by reach length). Results were deemed significant if the p = < 0.05. The assumptions of a one-sample t-Test are:

1. The population is normally distributed,
2. Values are independent and continuous,
3. Samples are randomly collected.

To assess whether the CHAs were maintaining a target abundance of 7,000 individuals, the D_i was averaged by reach with 95% confidence intervals (CI) and then multiplied by reach length (2,400 m) to estimate the abundance of SDC within the reach. The minimum and maximum of the D_i average were used to estimate

[1] For mature SDC abundance estimates only the number of captured SDC was used.

error in the abundance estimate. If the error margin was large enough to result in a minimum estimate lower than the number of SDC captured, the number of SDC captured was used as the minimum estimate.

A single factor ANOVA was used to determine whether SDC abundance was different in CHAs compared to upstream reaches, or between CHAs. A difference in abundance was accepted if $p < 0.05$. The assumptions of an ANOVA are:

1. The populations from which the samples are obtained are normally distributed,
2. Observations for within and between groups must be independent,
3. The variances among populations are equal (homoscedastic), and
4. Data are interval or nominal.

The datasets used in these analyses were not normally distributed, so the first assumption was not met. However, ANOVA has shown to be robust against Type 1 error (false positive) when departures from normality and sample size occur (Blanca et *al*. 2017). An F-test was used to assess the similarity of variances between samples. Only samples with similar variances (p = > 0.05) were tested.

Habitat parameters such as water depth, flow, and D_{50} substrate size were compared between CHAs and upstream reaches using the Mann-Whitney U Test to determine similarity of habitat. The Mann-Whitney U Test was used for similar reasons described for the comparison of SDC density between margin and centre-channel habitats. DFO identified specific habitat parameters that should be included in SDC critical habitat (Table 3; Brown et *al.* 2012). A one-sample t-Test was used to determine if measured water depth and flow were similar to DFOs recommended values for immature rearing and mature rearing (p = < 0.05 significance).

Table 3. Summary of habitat functions, features, and attributes. Table adapted from Table 3 in Brown et *al*. (2012).

Life Stage	Function	Feature	Attributes
Immature	Rearing	Pool, Run, Margin	- Small gravel/cobble - Flow < 0.24 m/s - Depth < 0.40 m - Low to moderate embeddedness
Mature	Rearing	Run and Riffle	- Boulder/Cobble - Flow 0.18 – 0.45 m/s - Depth 0.2 – 0.5 m (can be > 1 m) - Low Embeddedness
	Spawning	Run and Riffle	- Large, Clean Cobble

2.4 Data Management and Mapping

All mapping was completed in Q-GIS (version: 2.18.28) while in-field GIS data were collected on a Garmin 64ST handheld GPS unit (± 3 m accuracy). River meters (rm) and river kilometres (rkm) were developed to assist with distribution analyses and site descriptions. To create rm and rkm, the Freshwater Atlas geospatial layer (open source) was downloaded from the BC Data Catalogue (BC 2024). The Freshwater Atlas layer only includes data within British Columbia; since a portion of the nx̌ʷyaɬpítkʷ is in the United States, an additional stream network shapefile was downloaded from the Washington State Open

Geospatial Data Portal (WS 2024). From the Washington State shapefile attributes associated with the nx̌ʷyaɬpítkʷ were isolated and exported into a new feature; this feature was then merged with the Freshwater Atlas layer for the nx̌ʷyaɬpítkʷ to complete the dataset. The west nx̌ʷyaɬpítkʷ in the Freshwater Atlas file was incomplete, as it did not include some reaches in the headwaters. Therefore, the mainstem was manually traced from satellite imagery (open source; ESRI 2024) from the end of the Freshwater Atlas layer to the headwaters at St. Margaret Lake in the mountains east of kiláwnaʔ (Kelowna, BC) near Jubilee Mountain. This newly traced layer was saved as a new feature class and merged to the existing Freshwater Atlas dataset. River features in the Freshwater Atlas dataset are comprised of multipart line features, to create a rm and rkm layer all three river layers (west nx̌ʷyaɬpítkʷ, nx̌ʷyaɬpítkʷ, nxʷyntkʷitkʷ) were merged into a single line feature (per river) so each river was a singular continuous feature. Once complete, the "Generate Points Along Line" Tool was used to add point features to each river line feature at 100-meter intervals, thus establishing rm and rkm along all three river segments.

3.0 Results

Sampling was conducted at the nx̌ʷyaɬpítkʷ (Sep 17 – 20) and nxʷyntkʷitkʷ (Sep 10 – 12) CHAs in Year 1. Two selected sites were rejected in each CHA; oversample sites were completed in their place (Appendix 2). SDC were encountered at all sites in the nx̌ʷyaɬpítkʷ (CHA and upstream) while only one site in the nxʷyntkʷitkʷ CHA had SDC present; two sites upstream of the nxʷyntkʷitkʷ CHA had SDC (Figure 5 and Figure 6 in Appendix 1). SDC capture data, including length, weight, and tag number if applicable is provided in Appendix 3.

The average-daily water temperature at the time of sampling was 13 – 14°C in the nx̌ʷyaɬpítkʷ at WSC station 08NN026 (WSC 2025[1]; Figure 7 in Appendix 4); site-specific water temperatures ranged from 10 – 16°C. Average-daily water temperatures in the nxʷyntkʷitkʷ were 17 – 18°C at WSC station 08NN002 (WSC 2025[2]) but were cooler at sampled sites (11 – 15°C). Site specific discharge at the time of sampling was 2.30 cms in the nx̌ʷyaɬpítkʷ CHA 1.08 cms in the nxʷyntkʷitkʷ CHA. On average, discharge in the nx̌ʷyaɬpítkʷ was 1.5 cms lower than the 45-year average for September and October 2024 (± 0.3 cms with 95% CI; Figure 8 in Appendix 4). Similarly, discharge in the nxʷyntkʷitkʷ was 2.0 cms lower than the 45-year average for September and October 2024 (± 0.2 cms with 95% CI).

Brook Trout (*Salvelinus fontinalis*) were the only non-native species captured during sampling (n = 4). All Brook Trout were captured upstream of the nx̌ʷyaɬpítkʷ CHA. Other species encountered included xʷuminaʔ (Rainbow Trout; *Oncorhynchus mykiss*), Mountain Whitefish (*Prosopium williamsoni*), and other cyprinid and cottid species. A summary of observed species, including the capture reach, date, and fork length is provided in Appendix 5.

3.1 Speckled Dace Abundance

Significantly more SDC were captured in margin habitat than centre-channel habitat in the nx̌ʷyaɬpítkʷ, indicating stratification. In contrast, there was no difference in captures between margin habitat and centre-channel habitat in the nxʷyntkʷitkʷ; likely due to low capture numbers (Table 4. Comparison of Speckled Dace (SDC) captures (mean SDC by river) in centre-channel habitat vs margin habitat using a Mann-Whitenay U Test. Results were considered significant when the p-value (p) was less than 0.05 (95% confidence).Table 4). Therefore, density estimates in the nx̌ʷyaɬpítkʷ were stratified by margin and centre-channel habitat types, while density in the nxʷyntkʷitkʷ was not stratified.

Table 4. Comparison of Speckled Dace (SDC) captures (mean SDC by river) in centre-channel habitat vs margin habitat using a Mann-Whitenay U Test. Results were considered significant when the p-value (p) was less than 0.05 (95% confidence).

Location	Average # SDC		Significance (p)
	Centre Channel	Margin	
nx̌ʷyaɬpítkʷ	3 SDC ± 3 SDC (n = 7 sites*)	74 SDC ± 33 SDC (n = 8 sites)	0.003
nxʷyntkʷitkʷ	< 1 SDC ± < 1 SDC (n = 8 sites)	< 1 SDC ± < 1 SDC (n = 8 sites)	0.608

* n = 7 due to an elevated bar in the centre channel of one site.

SDC density was significantly lower than 3.0 SDC/m in both CHAs sampled (Table 5). The only location where SDC density was not significantly different than 3.0 SDC/m was upstream of the nx̌ʷyaɬpítkʷ CHA. The reach upstream of the nx̌ʷyaɬpítkʷ CHA also had the highest mature SDC density of sampled reaches.

Table 5. Comparison of site-specific Speckled Dace (SDC) density (mean SDC/m; all and mature) by location and the estimated density used to determine the length of Critical Habitat Areas (3.0 SDC/m) using a one-sample t-Test (n = 4 sites each). Results were considered significant when the p-value (p) was less than 0.05 (95% confidence).

Location	Area	Category	Average (SDC/m)	Significance (p)
nx̌ʷyaɬpítkʷ	Critical Habitat Area	All SDC	1.83 ± 0.65	0.039
		Mature SDC	0.30 ± 0.16	<0.001
	Upstream Reach	All	2.73 ± 1.09	0.655
		Mature SDC	0.82 ± 0.47	0.003
nxʷyntkʷitkʷ	Critical Habitat Area	All	0.01 ± 0.02	<0.001
		Mature SDC	0.01 ± 0.02	<0.001
	Upstream Reach	All	0.10 ± 0.12	<0.001
		Mature SDC	0.08 ± 0.09	< 0.001

The estimated abundance of both CHAs were below 7,000 SDC; indicating the CHAs are not meeting target population goals (Table 6). The reach upstream of the nx̌ʷyaɬpítkʷ CHA was the only section with an estimated abundance above 7,000 SDC, though the estimate was more variable than CHAs.

Table 6. Abundance estimates for Speckled Dace (SDC) in the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ Critical Habitat Areas and upstream reaches for all age classes and only mature, including the estimated range.

Location	Category	Critical Habitat Area	Upstream Reach
nx̌ʷyaɬpítkʷ	All SDC	4,392 (3,036 – 6,049)	7,708 (2,581 – 13,214)
	Mature SDC	708 (568 – 1,203)	2,464 (568 – 4,375)
nxʷyntkʷitkʷ	All	24 (1 – 71)	228 (7 – 503)
	Mature SDC	24 (1 – 71)	192 (6 – 412)

There was no significance between the mean number of captured/observed SDC per site (all age classes and mature only) between nx̌ʷyaɬpítkʷ CHA and upstream reach (Table 7). Due to low capture rates, statistical analyses could not be completed between the nxʷyntkʷitkʷ CHA and the upstream reach, but the estimated abundance appeared to be higher in the upstream reach (Table 6).

Table 7. Comparison of average Speckled Dace (SDC) abundance (all and mature) using an analysis of variance between the nx̌ʷyaɬpítkʷ Critical Habitat Area and the reach upstream (n = 4 sites each). Results were considered significant when the p-value (p) was greater than 0.05 (95% confidence).

Category	Mean # SDC per Site		Significance (p)	F-Test
	Critical Habitat Area	Upstream Reach		
All SDC	91 ± 32	136 ± 54	0.217	0.212
Mature SDC	14 ± 7	40 ± 23	0.085	0.051

3.2 Critical Habitat Area Characteristics

The dominant habitat type in the nx̌ʷyaɬpítkʷ CHA was run habitat (89% of described habitat units in the CHA; n = 132 habitat units). In contrast, riffle habitat dominated the nxʷyntkʷitkʷ CHA (82% of described habitat units in the CHA; n = 132 habitat units). Substrate size measured in the nxʷyntkʷitkʷ CHA (227 mm ± 49.5 mm with 95% CI; n =100) was significantly larger than substrate measured at the location upstream of the CHA (144 mm ± 18.6 mm with 95% CI, n = 100; p = 0.027), and in the nx̌ʷyaɬpítkʷ CHA (89 mm ± 17.1 mm with 95% CI, n = 100; p = < 0.001). Substrate in the nx̌ʷyaɬpítkʷ CHA was also smaller than the nxʷyntkʷitkʷ upstream of the CHA (p = <0.001). Based on these measurements, the nxʷyntkʷitkʷ CHA and upstream reach primarily comprised of large cobble while the nx̌ʷyaɬpítkʷ CHA was primarily small cobble. Pebble counts were not completed upstream of the nx̌ʷyaɬpítkʷ CHA, though substrate size appeared to be similar to the CHA. Embeddedness was estimated to be low in all sites.

Mean flow and depth in the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ CHAs were within the identified parameters for immature and mature SDC rearing identified by DFO (Brown et *al*. 2012; Table 8). Mean flow in the nx̌ʷyaɬpítkʷ CHA was < 0.24 m/s and mean depth was < 0.40 m, these parameters were at the lower range of mature SDC habitat attributes (flow = 0.18 m/s and depth = 0.20 m) but were not significantly different. The results were consistent in the reach upstream of the nx̌ʷyaɬpítkʷ CHA. Mean flow and depth in the nxʷyntkʷitkʷ CHA was not significantly different than the maximum values for immature rearing (flow = 0.24 m/s and depth = 0.40 m) and were within the range of mature rearing (flow = 0.18 – 0.45 m/s and depth = 0.20 – 0.50 m).

Table 8. Comparison of mean flow (m/s) and depth (m) in the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ Critical Habitat Areas and upstream reaches, and critical habitat parameters identified by DFO (Brown et *al*. 2012) for immature Speckled Dace (flow = < 0.24 m/s, water depth = < 0.40 m) and mature Speckled Dace (flow = 0.18 – 0.45 m/s; depth = 0.20 – 0.50 m) using a one-sample t-Test (n = 4 sites each). Results were considered significant when the p-value (p) was less than 0.05 (95% confidence).

Location		Category	Average	Immature	Mature*
nx̌ʷyaɬpítkʷ	Critical Habitat Area	Flow (m/s)	0.17 ± 0.04 (n = 59 measurements)	0.002	0.585
		Depth (m)	0.18 ± 0.03 (n = 72 measurements)	< 0.001	0.063
	Upstream Reach	Flow (m/s)	0.13 ± 0.06 (n = 18 measurements)	0.003	0.122
		Depth (m)	0.19 ± 0.04 (n = 73 measurements)	< 0.001	0.633
nxʷyntkʷitkʷ	Critical Habitat Area	Flow (m/s)	0.23 ± 0.05 (n = 72 measurements)	0.801	0.025
		Depth (m)	0.41 ± 0.04 (n = 72 measurements)	0.796	< 0.001
	Upstream Reach	Flow (m/s)	0.17 ± 0.04 (n = 69 measurements)	0.001	0.658
		Depth (m)	0.35 ± 0.04 (n = 72 measurements)	0.005	< 0.001

* all p-values for the higher range of mature habitat attributes (flow = 0.45 m/s and depth = 0.50 m) were < 0.001.

Flow and water depth were significantly higher in the nxʷyntkʷitkʷ CHA than the nx̌ʷyaɬpítkʷ CHA (Table 9). There was also more flow in the nxʷyntkʷitkʷ CHA compared to the reach upstream, but the water depth was similar. There were no significant differences between flow or depth between the nx̌ʷyaɬpítkʷ CHA and the upstream reach.

Table 9. Comparison of mean flow and depth measured at Speckled Dace indexing sites in the nx̌ʷyaɬpítkʷ Critical Habitat Area, nxʷyntkʷitkʷ Critical Habitat Area, and respective upstream reaches using the Mann-Whitney U test. Results were considered significant (highlighted orange) when the p-value (p) was greater than 0.05 (95% confidence).

	Parameter	**nx̌ʷyaɬpítkʷ Critical Habitat Area**	**nxʷyntkʷitkʷ Critical Habitat Area**	**Significance (p)**
Test 1	Mean Flow (m/s)	0.17 ± 0.04 (n = 59 measurements)	0.23 ± 0.05 (n = 72 measurements)	0.046
	Mean Depth (m)	0.18 ± 0.03 (n = 72 measurements)	0.41 ± 0.04 (n = 72 measurements)	< 0.001
	Parameter	**nx̌ʷyaɬpítkʷ Critical Habitat Area**	**nx̌ʷyaɬpítkʷ Upstream Reach**	**Significance (p)**
Test 2	Mean Flow (m/s)	0.17 ± 0.04 (n = 59 measurements)	0.13 ± 0.06 (n = 18 measurements)	0.247
	Mean Depth (m)	0.18 ± 0.03 (n = 72 measurements)	0.19 ± 0.04 (n = 73 measurements)	0.324
	Parameter	**nxʷyntkʷitkʷ Critical Habitat Area**	**nxʷyntkʷitkʷ Upstream Reach**	**Significance (p)**
Test 3	Mean Flow (m/s)	0.23 ± 0.05 (n = 72 measurements)	0.17 ± 0.04 (n = 69 measurements)	0.037
	Mean Depth (m)	0.41 ± 0.04 (n = 72 measurements)	0.35 ± 0.04 (n = 72 measurements)	0.117

Cover type varied between CHAs, with boulders the primary cover in the nxʷyntkʷitkʷ CHA (82% of described habitat units in the CHA) and interstitial habitat the primary cover in the nx̌ʷyaɬpítkʷ CHA (85% of described habitat units in the CHA; Figure 2). The reach upstream of the nxʷyntkʷitkʷ CHA area had more interstitial habitat (77% of described habitat units in the CHA) than the CHA (11% of described habitat units in the CHA).

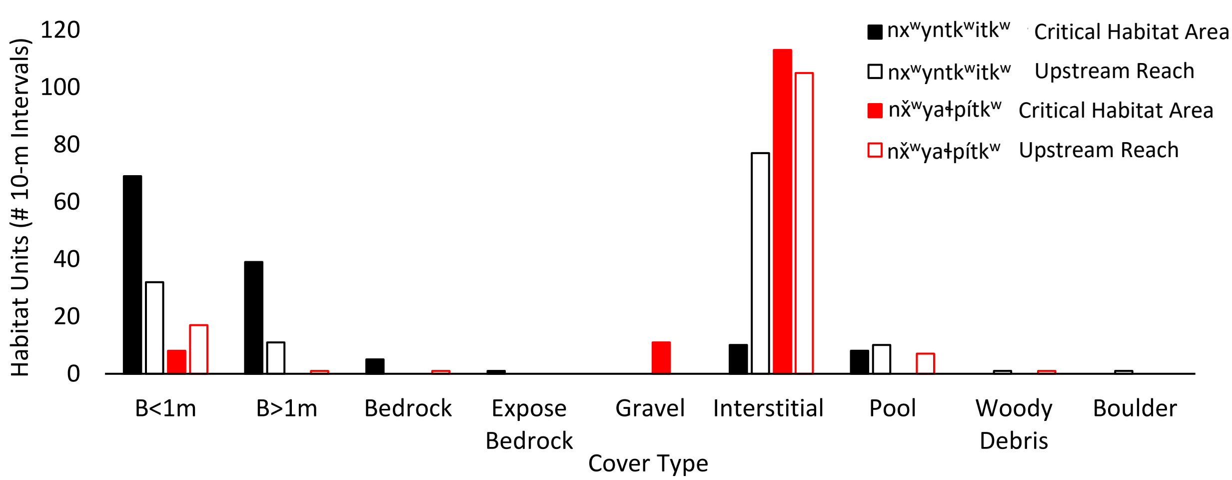

Figure 2. Frequency of cover types recorded at 10-m intervals in Speckled Dace Indexing sites for the nx̌ʷyaɬpítkʷ Critical Habitat Area (red-filled) and nxʷyntkʷitkʷ Critical Habitat Area (black-filled), and the respective upstream reaches (nx̌ʷyaɬpítkʷ = red-lined; nxʷyntkʷitkʷ = black-lined); where B<1m = boulders less than 1 m and B>1m = boulders greater than 1 m.

4.0 Discussion

This report relies on the western science perspective and is aimed to evaluate the CHAs based on DFO's criteria and methodology for implementing the CHA. An additional review from the Syilx knowledge perspective would provide a more wholistic approach and would offer additional concepts not discussed in this report.

Results to date are limited to the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ CHAs and upstream reaches. The west nx̌ʷyaɬpítkʷ was not surveyed in 2024, therefore, results discussed are not applicable to the west nx̌ʷyaɬpítkʷ CHA. These findings are considered preliminary as only one year of data has been collected and the natural variation of SDC abundance is unknown.

4.1 Do the Geospatial Areas Proposed as Critical Habitat Contain a Sustainable Population at each Location?

H_0^1 = Each CHA has an estimated abundance of ≥ 7,000 SDC.

H_0^1 is not supported as the estimated SDC abundance in the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ CHAs were less than 7,000 SDC; therefore, these CHAs do not have a sustainable population based on DFO criteria. A density of 3.0 SDC/m was used by DFO to determine CHA length based on the target population of 7,000 SDC (Brown et *al*. 2012), this density was based on the estimated mature SDC density of 0.22 SDC/m from 2008 (Batty 2010). The 2008 estimate was a total estimate for the nx̌ʷyaɬpítkʷ – nxʷyntkʷitkʷ system based on all sample sites from the nx̌ʷyaɬpítkʷ CHA to nk̓mk̓mcinm, and nk̓mk̓mcinm to the nxʷyntkʷitkʷ CHA (Batty 2010). It is assumed DFO expanded the estimate from 0.22 mature SDC/m to 3.0 SDC/m to account for all age classes and possible error. The measured SDC density at each CHA was lower than 3.0 SDC/m in the nx̌ʷyaɬpítkʷ (1.83 SDC/m) and nxʷyntkʷitkʷ (0.01 SDC/m) CHAs. Local density estimates help refine the understanding of SDC distribution in the watershed which can inform future management decisions.

SDC density in the nx̌ʷyaɬpítkʷ CHA was influenced by stratification between margin and centre-channel habitats. Most of the SDC were captured in the margin habitat. The assumptions of the analyses assume SDC density is related to proximity to shore (2 m). However, SDC density is likely a result of habitat parameters (substrate, flow, depth) which may be present beyond 2-m from shore. This is supported by the discrepancy between the number of SDC captured in the centre-channel within the nx̌ʷyaɬpítkʷ CHA (2 SDC) and the reach upstream (23 SDC). The substrate in the CHA centre-channel was predominantly gravel with few interstitial spaces to provide cover, while the reach upstream of the CHA had more cobble (pers. obs.). Cover type was recorded in each habitat unit, but substrate size was not; identifying substrate size in habitat units would provide more understanding of SDC distribution.

The nxʷyntkʷitkʷ CHA had a low SDC density (0.01 SDC/m) based on one SDC capture in four sites (representing ~ 8% of the CHA length). This is consistent with past surveys, where one SDC was captured in 2023 (one site sampled) and zero SDC were captured in 2021 (one site sampled; ONA 2025). Prior to 2024, SDC were not detected upstream of the nxʷyntkʷitkʷ CHA; this included sampling at sites 2.9 km and 9.3 km upstream of the nxʷyntkʷitkʷ CHA in 2008 (Batty 2010) and 9.3 km upstream of the nxʷyntkʷitkʷ CHA in 2021 and 2023 (ONA 2025). A possible explanation on why SDC were not detected at these upstream sites is a cascade/pool system approximately 1.4 km from the nxʷyntkʷitkʷ CHA which may be a barrier to SDC; SDC indexing sites within this cascade/pool system were rejected for sampling due to high flows and deep pools not conducive to backpack electrofishing. SDC were detected in the 1.4 km reach between the nxʷyntkʷitkʷ CHA and the cascade/pool system, though density was still low (0.10 SDC/m; based on seven SDC captures in four sites sampled and a reach of 1,400 m). This indicates SDC density is likely low throughout the upper reaches of the nxʷyntkʷitkʷ.

This assessment assumes DFOs definition of 7,000 SDC is adequate for a sustainable population. A more detailed review of population metrics can be completed to determine if 7,000 SDC is suitable for a sustainable population, or if this target should be adjusted.

4.2 Do the Geospatial Areas Proposed as Critical Habitat Contain Suitable Habitat?

H_0^2 = Each CHA has suitable habitat for SDC.

H_0^{2a} = Flow in CHAs was < 0.24 m/s for immature rearing and/or between 0.18 – 0.45 m/s for mature rearing.

H_0^{2b} = Water depth in CHAs was < 0.40 m for immature rearing and/or between 0.20 – 0.50 m for mature rearing.

H_0^{2c} = Substrate size in CHAs was gravel (2 mm – 16 mm) and cobble (64 mm – 256 mm) for immature rearing and/or boulder (> 256 mm) and cobble (64 mm – 256 mm) for mature rearing.

H_0^2 is supported in-part. H_0^{2a} and H_0^{2b} are supported as flow and water depth in the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ CHAs were within the parameters for immature and mature SDC described by DFO as acceptable for SDC habitat at the time of sampling (Brown et *al*. 2012; Table 10). Flow and water depth in the nxʷyntkʷitkʷ CHA were at the higher end recommended for immature SDC but were not high enough to be statistically significant. In contrast, flow and water depth in the nx̌ʷyaɬpítkʷ CHA were at the lower end recommended for mature SDC, though were still statistically similar to the recommended lower range.

Table 10. Habitat attributes (substrate, flow m/s, depth m, and estimated embeddedness) recommended for Speckled Dace critical habitat (Brown et *al.* 2012) and those measured in the nx̌ʷyaɬpítkʷ CHA and nxʷyntkʷitkʷ Critical Habitat Area, and respective upstream.

Attributes	Category/Site	Substrate	Flow (m/s)	Depth (m)	Embeddedness
Recommended Attributes	Immature Rearing	Gravel/Cobble	< 0.24 m/s	< 0.40 m	Low/moderate
	Mature Rearing	Boulder/Cobble	0.18 – 0.45 m/s	0.2 – 0.5 m	Low
Critical Habitat Area	nx̌ʷyaɬpítkʷ	small cobble	0.17 m/s ± 0.04 m/s	0.18 m ± 0.03 m	Low
	nxʷyntkʷitkʷ	large cobble	0.23 m/s ± 0.05 m/s	0.41 m ± 0.04 m	Low
Upstream Reach	nx̌ʷyaɬpítkʷ	small cobble	0.13 m/s ± 0.06 m/s	0.19 m ± 0.04 m	Low
	nxʷyntkʷitkʷ	large cobble	0.17 m/s ± 0.04 m/s	0.35 m ± 0.04 m	Low

H_0^{2c} is supported in-part. Documentation of substrate in CHAs was completed with a single pebble count. Substrate in the nx̌ʷyaɬpítkʷ CHA was smaller than the nxʷyntkʷitkʷ CHA but both were classified as cobbles. In Addition, boulders were the dominant cover type described in the nxʷyntkʷitkʷ CHA. This indicates substrate in the nx̌ʷyaɬpítkʷ CHA may be more suited for immature SDC, while substrate in the nxʷyntkʷitkʷ CHA is more suited for mature SDC. This is supported by the difference in adult to juvenile ratio between all sites in the nx̌ʷyaɬpítkʷ (CHA and upstream reach = 1:4) and the nxʷyntkʷitkʷ (CHA and upstream reach = 7:1); though sample size in the nxʷyntkʷitkʷ was low (n = 8). More detailed substrate data is required to sufficiently address H_0^{2c} as pebble counts at one site may not represent the variability of the reach. In addition, observations in 2024 suggest SDC presence may be higher in substrates with interstitial spaces to use for cover, than in areas with smaller gravel. A more detailed documentation of substrates at these sites is required for statistical analyses (see recommendations).

The habitat parameters like flow and water depth change seasonally and annually. The data represented in this report were collected in September 2024 which is typically a time of relatively low flows (compared to May – August). This data should be interpreted as habitat during low-flow conditions. Therefore, during low flows there should be adequate habitat in both the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ CHAs for mature and immature SDC.

4.4 Is Speckled Dace Abundance Different Between Critical Habitat Areas and Upstream Reaches?

H_0^3 = There is no difference in SDC abundance between CHAs and upstream reaches.

H_0^3 is uncertain. The mean estimated abundance in the nx̌ʷyaɬpítkʷ CHA (4,392 SDC) was lower than the mean estimated abundance upstream of the CHA (7,708 SDC) but, due to the high variability in the upstream reach, the difference in mean SDC per site was not statistically significant. This variability may suggest distribution of SDC is less uniform upstream of the CHA than within. The mean abundance upstream of the nx̌ʷyaɬpítkʷ CHA met DFOs target for a sustainable population (7,000 SDC). Habitat (flow, water depth, substrate, cover type) was similar between the nx̌ʷyaɬpítkʷ CHA and upstream reach. Additional sampling is required to assess the differences in abundance between the nx̌ʷyaɬpítkʷ CHA and upstream reach.

Similar to the nx̌ʷyaɬpítkʷ, the mean estimated abundance in the nxʷyntkʷitkʷ CHA (24 SDC) was lower than the than the mean estimated abundance upstream of the CHA (228 SDC). However, due to the low capture rates statistical analyses could not be completed. Flow upstream of the nxʷyntkʷitkʷ CHA was significantly slower than within the CHA, and cover type was dominated by interstitial habitat rather than boulder habitat as seen in the CHA. These differences in habitat may contribute to higher SDC abundance, but further sampling is required to test this hypothesis.

4.5 Implications for Recovery Measures

This project focused on Recovery Strategies 1 and 4 in the *Recovery Strategy for the Speckled Dace (Rhinichthys osculus) in Canada* (DFO 2018). These Recovery Strategies directly relate to Recovery Measures 1 and 4 in the *Speckled Dace (Rhinichthys osculus): Action Plan* (DFO 2020). Table 11 provides a description of these Recovery Measures and Strategies.

Table 11. Recovery Strategies (DFO 2018) and Measures (DFO 2020) addressed by this project. Descriptions of Recovery Strategies and Measures have been summarised to only include components which this project addresses and may not include the full strategy/measure in its entirety.

Recovery Strategies	Recovery Measures
Broad Recovery Strategy 1: Increase understanding of population and distribution trends, natural variability, and any linkages to threats by developing and implementing standardized long term monitoring program within the CHAs	**Recovery Measure 1.** Develop a monitoring plan to assess Speckled Dace population and distribution trends, variability and response to threats. Monitoring efforts may also include: • abundance and distribution estimates • Speckled Dace density • presence of aquatic invasive species (AIS)
Broad Recovery Strategy 4: Support local stewardship groups to advance SDC recovery, listed in the Recovery Strategy for the Speckled Dace in Canada	**Recovery Measure 4.** Implement the monitoring plan for Speckled Dace.

This project involved the development of a monitoring plan to evaluate SDC CHAs as recommended by DFO (Brown et *al*. 2012; DFO 2018). This monitoring plan included SDC abundance and density estimates, and documentation/removal of AIS. Preliminary results indicate variability of SDC density by reach, which is notable when establishing protected areas for a species. In addition, the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ CHAs do not appear to be meeting the target population of 7,000 SDC. When complete, this project will provide recommendations to improve SDC CHAs based on results from the monitoring program.

Brook Trout were the only AIS observed during 2024 SDC indexing surveys and were only observed upstream of the nx̌ʷyaɬpítkʷ CHA. Brook Trout were also the only documented AIS in other SDC indexing surveys (ONA 2025).

5.0 Project Recommendations

The recommendations provided in this report pertain to the remaining years of the field program. Management recommendations will be provided in the Year 3 synthesis report (2027).

1. Use Speckled Dace Indexing data to estimate survival

The survival rate of SDC in the nx̌ʷyaɬpítkʷ watershed is unknown. Sites in the nx̌ʷyaɬpítkʷ and west nx̌ʷyaɬpítkʷ appear to be good candidates for this analysis as SDC have been captured in these areas in higher numbers than the upper reaches of the nxʷyntkʷitkʷ (ONA 2025). The nx̌ʷyaɬpítkʷ and west nx̌ʷyaɬpítkʷ will be sampled in consecutive years; survival can be estimated using:

$$S = \frac{A_i}{J_k + A_k}$$

Where:	*S*	=	*survival*
	A	=	*# of adults captured*
	J	=	*# of juveniles captured*
	i	=	*# individuals captured in the most recent year*
	k	=	*# individuals captured the year prior to i*

Information on survival can provide additional insight into the definition of a sustainable population, and whether the mature population should be of focus.

2. **Record substrate type in addition to cover type**

Substrate type/size should be recorded in more detail at indexing sites. This can be done by adding a “Substrate” field when recording habitat parameters for habitat units. Substrates should be defined consistently with the methods described in Section 2.2 (*Assessing Speckled Dace Habitat*). Documenting substrate size will assist with assessing habitat preferences, specifically when comparing centre-channel and margin habitats. In addition, pebble counts should occur at each indexing site, rather than one per CHA, to capture variability throughout the respective CHAs. It will be assumed site-specific substrate size does not change annually.

3. **Collect LiDAR data and digital areal imagery of study sites**

Area imagery should be collected at each study site (of each CHA and the 2.4 km reach upstream of each CHA). From this imagery, habitat and substrate can be more accurately mapped. This, coupled with Recommendation 2, should provide an opportunity to refine the definition of margin habitat and improve density/population estimates. LiDAR data can be used to develop stream profiles to compare gradient of CHAs and upstream reaches.

4. **Review recommendations for a sustainable population to determine if 7,000 SDC is an acceptable assumption**

Conduct a literature review on sustainable populations with emphasis on SDC or cyprinids to determine if 7,000 SDC is an acceptable assumption for a sustainable SDC population. This will help to improve the CHA evaluation process by testing assumptions.

5. **Review Speckled Dace Critical Habitat attribute recommendations to determine if identified flow, water depth, and substrate parameter assumptions are acceptable**

Use habitat data, specifically flow, water depth, and substrate size collected during SDC Indexing surveys to assess whether the habitat attributes identified by DFO are consistent with in-field observations. This will help to improve the CHA evaluation process by testing assumptions.

6. **Complete a parallel assessment from the Syilx knowledge perspective**

This project uses a western science approach to evaluate SDC CHAs based on DFOs own criteria. Conducting a parallel assessment from the Syilx knowledge perspective would provide additional insight on CHA development and provide guidance on how CHAs should be changed if required.

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Appendix 1: Maps

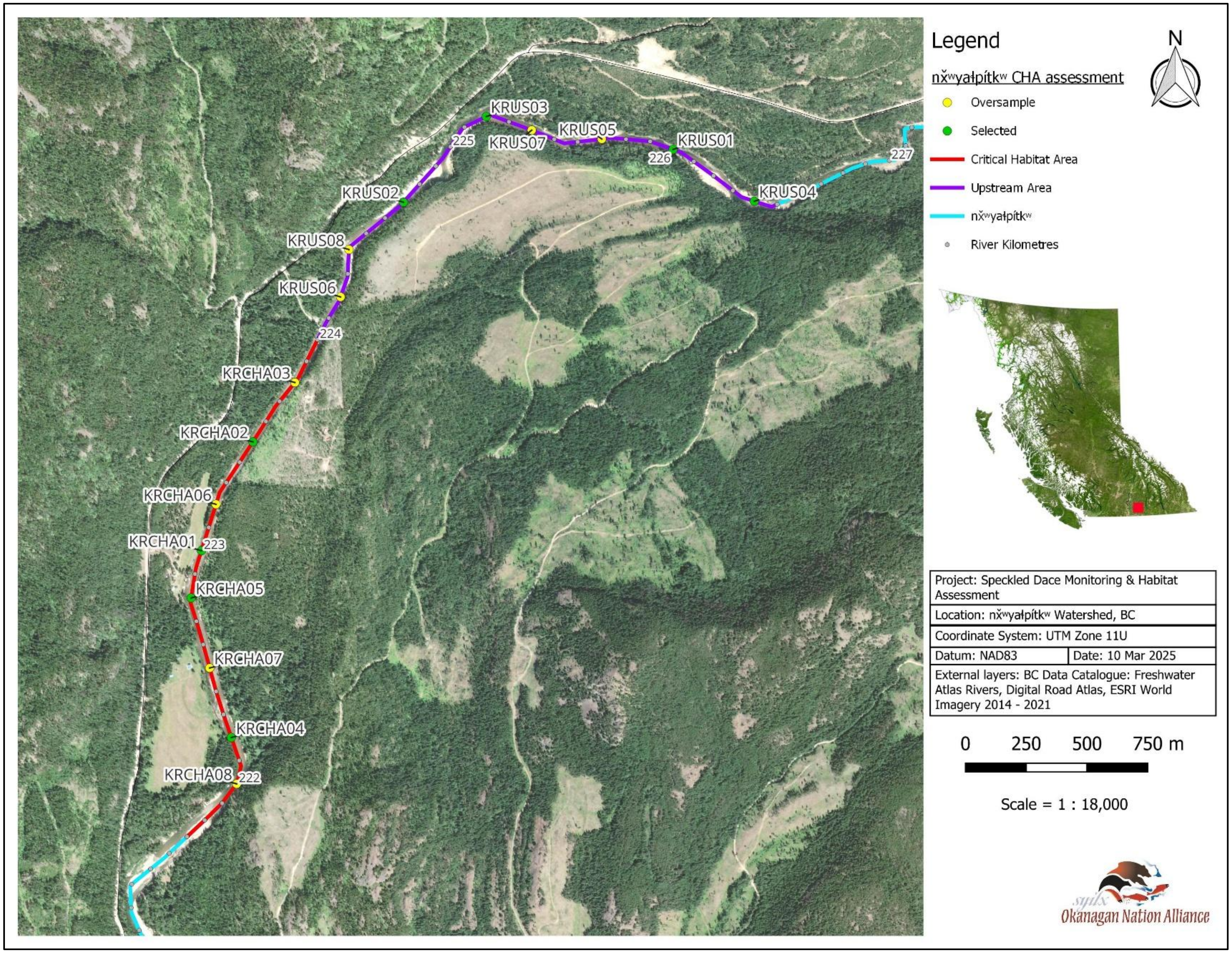

Figure 3. Study Area in the nx̌ʷyaɫpítkʷ Critical Habitat Area (CHA; red) and upstream reach (purple), including randomly selected sample sites (green) and oversample sites (yellow).

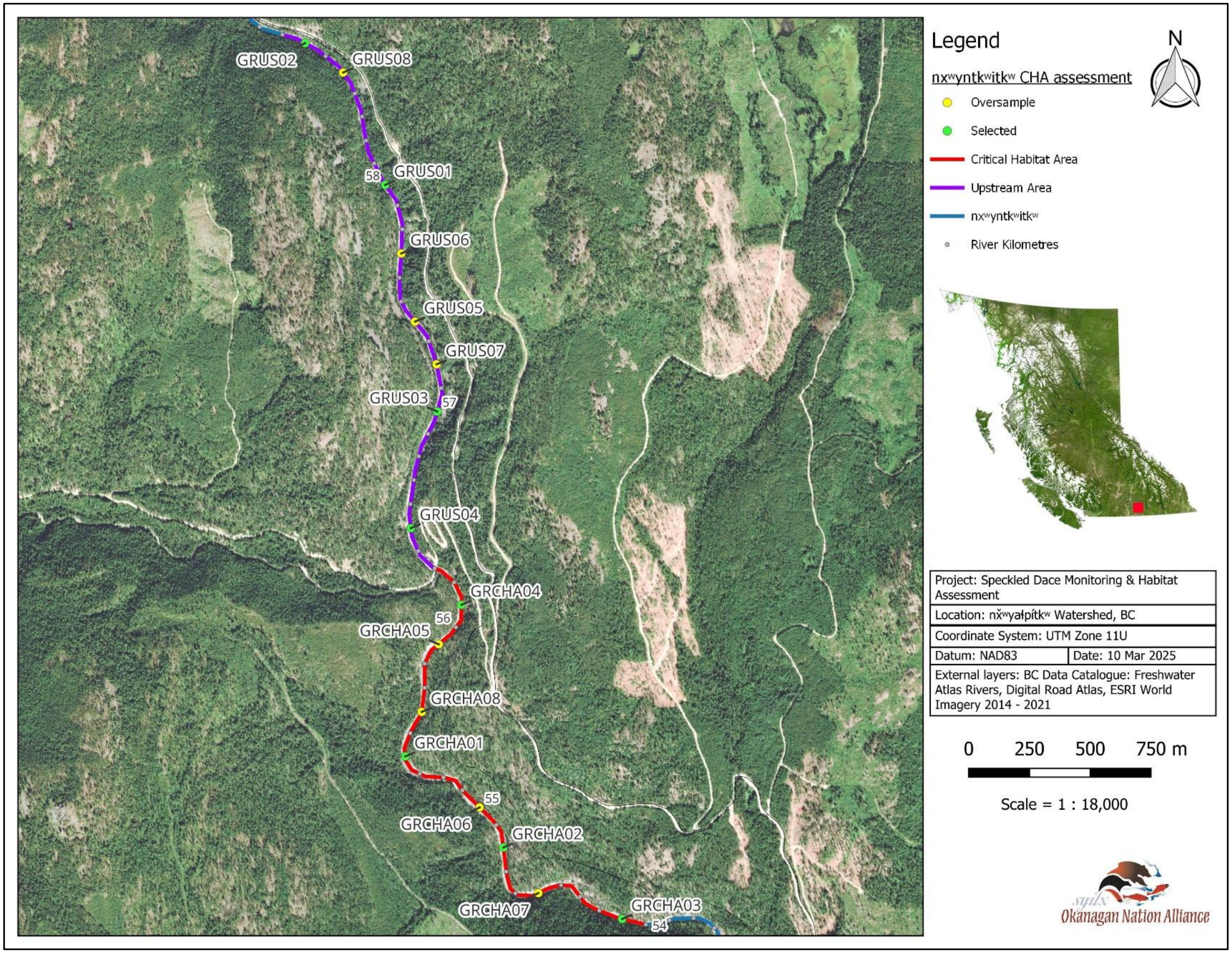

Figure 4. Study Area in the nxʷyntkʷitkʷ Critical Habitat Area (CHA; red) and upstream reach (purple), including randomly selected sample sites (green) and oversample sites (yellow).

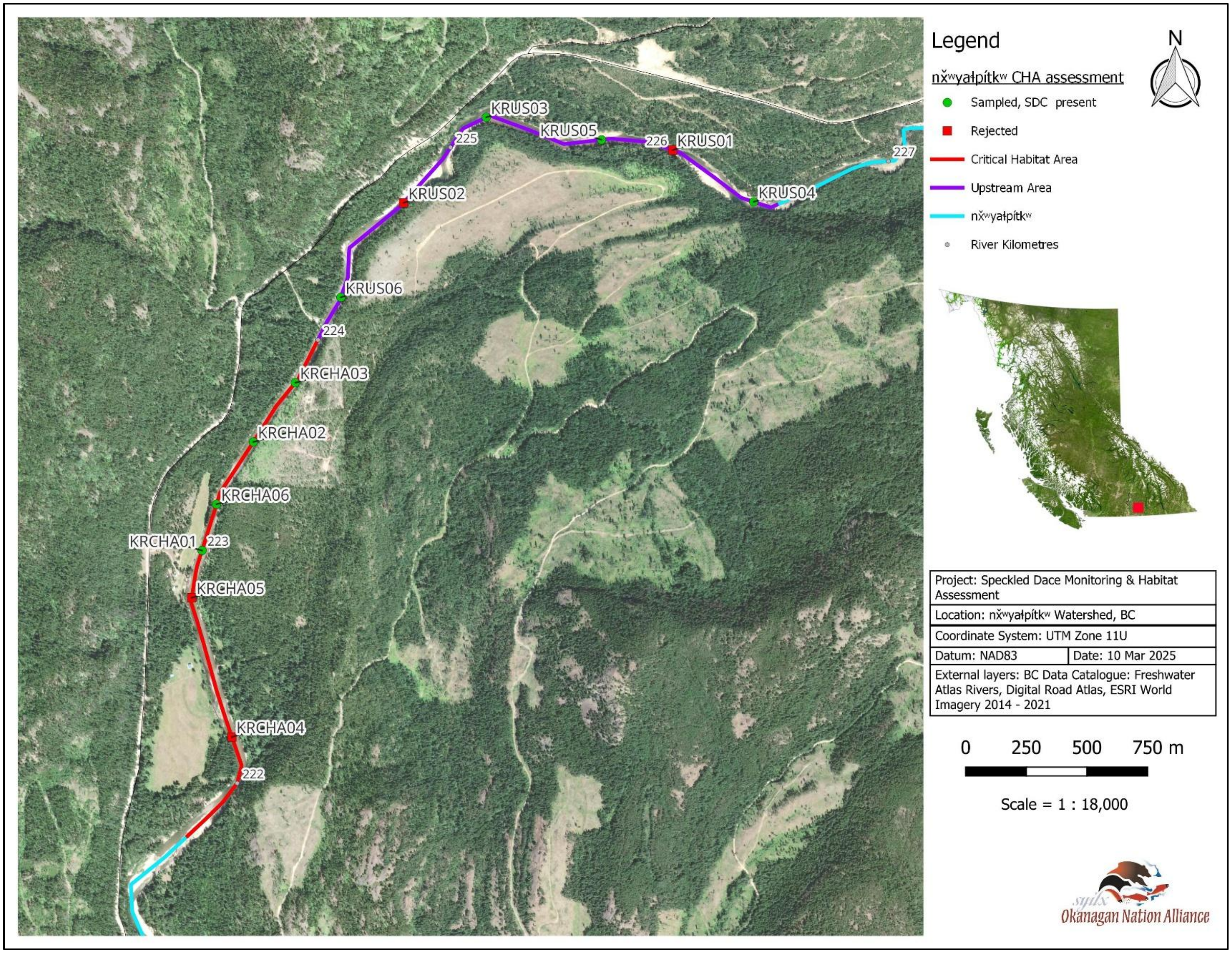

Figure 5. Location of sampled sites (green) and rejected sites (red) in the nx̌ʷyaɬpítkʷ study area, including the Critical Habitat Area (red line) and upstream reach (purple).

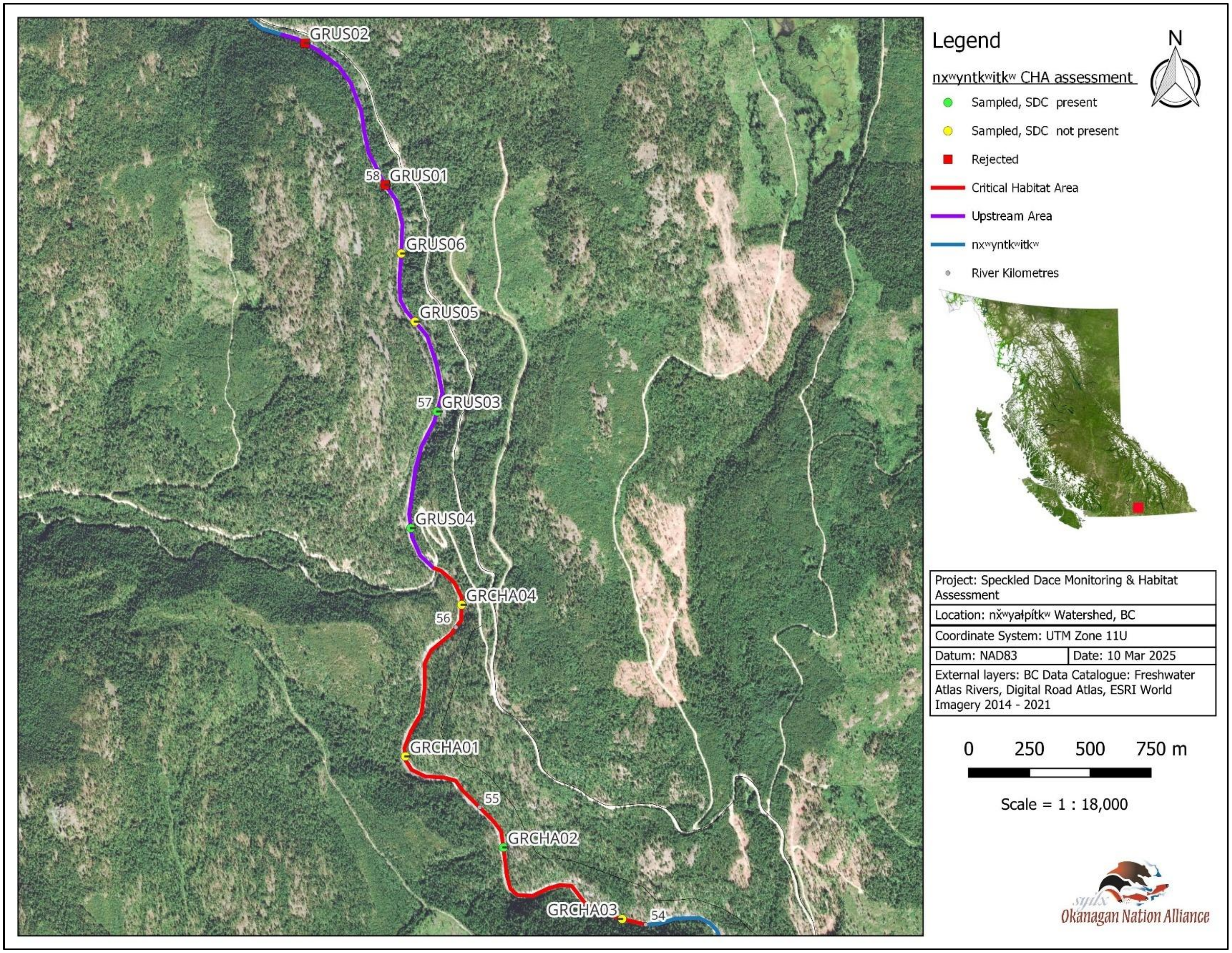

Figure 6. Location of sampled sites with Speckled Dace (SDC; green) and without SDC (yellow), and rejected sites (red) in the nxʷyntkʷitkʷ study area, including the Critical Habitat Area (red line) and upstream reach (purple).

Appendix 2: Site Locations

Table 12. Location information (UTM coordinates and river kilometer [rkm]) for randomly selected sample sites and oversample sites in nx̌ʷyaɫpítkʷ, including the sites status. Where KRCHA = Critical Habitat Area and KRUS = the upstream reach.

Label	Type	rkm	UTM Zone 11U Easting	UTM Zone 11U Northing	Status	Comments
KRCHA01	Selected	223.0	364918	5480657	Sampled	
KRCHA02	Selected	223.5	365131	5481104	Sampled	
KRCHA03	Selected	223.8	365321	5481333	Sampled	
KRCHA04	Selected	222.2	365048	5479881	Rejected	Pool > 50% of site, too deep to sample
KRCHA05	Oversample	222.8	364878	5480457	Rejected	Pool > 50% of site, too deep to sample
KRCHA06	Oversample	223.2	364972	5480846	Sampled	
KRCHA07	Oversample	222.5	364968	5480181	Not Required	
KRCHA08	Oversample	222.0	365066	5479680	Not Required	
KRUS01	Selected	226.0	366863	5482308	Rejected	Pool > 50% of site, too deep to sample
KRUS02	Selected	224.7	365764	5482084	Rejected	Pool 100% of site, too deep to sample
KRUS03	Selected	225.2	366098	5482441	Sampled	
KRUS04	Selected	226.4	367199	5482095	Sampled	Pool 15 m of site at downstream end, moved site upstream 15 m to sample
KRUS05	Oversample	225.7	366568	5482348	Sampled	
KRUS06	Oversample	224.2	365492	5481703	Sampled	
KRUS07	Oversample	225.4	366274	5482380	Not Required	
KRUS08	Oversample	224.4	365527	5481898	Not Required	

Table 13. Location information (UTM coordinates and river kilometer [rkm]) for randomly selected sample sites and oversample sites in nxʷyntkʷitkʷ, including the sites status. Where KRCHA = Critical Habitat Area and KRUS = the upstream reach.

Label	Type	rkm	UTM Zone 11U Easting	UTM Zone 11U Northing	Status	Comments
GRCHA01	Selected	55.4	390541	5471860	Sampled	
GRCHA02	Selected	54.8	390936	5471481	Sampled	
GRCHA03	Selected	54.1	391426	5471188	Sampled	
GRCHA04	Selected	56.1	390775	5472477	Sampled	
GRCHA05	Oversample	55.9	390677	5472310	Not Required	
GRCHA06	Oversample	55.0	390852	5471648	Not Required	
GRCHA07	Oversample	54.5	391081	5471270	Not Required	
GRCHA08	Oversample	55.6	390612	5472037	Not Required	
GRUS01	Selected	58.0	390449	5474211	Rejected	Flow too fast for electrofishing; large pool
GRUS02	Selected	58.7	390120	5474798	Rejected	Flow too fast for electrofishing; large pool
GRUS03	Selected	57.0	390663	5473277	Sampled	
GRUS04	Selected	56.5	390558	5472789	Sampled	
GRUS05	Oversample	57.4	390579	5473644	Sampled	
GRUS06	Oversample	57.7	390525	5473931	Sampled	
GRUS07	Oversample	57.2	390666	5473460	Not Required	
GRUS08	Oversample	58.5	390284	5474670	Not Required	

Appendix 3: Speckled Dace Capture Data

Table 14. Speckled Dace capture data for indexing surveys complete in September 2024 in the nx̌ʷyaɬpítkʷ Critical Habitat Area (KRCHA), upstream of the nx̌ʷyaɬpítkʷ Critical Habitat Area (KRUS), in the nxʷyntkʷitkʷ Critical Habitat Area (GRCHA), and upstream of the nxʷyntkʷitkʷ Critical Habitat Area (GRUS) including the site, sub-sample, date of capture, fork length (mm), weight (g), and Passive Integrated Transponder (PIT) tag number if applicable.

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
GRCHA02	River-left Bank	10-Sep-24	60	2.4	982091066197805
GRUS03	River-right Bank	12-Sep-24	58	1.8	-
GRUS03	Centre Channel	12-Sep-24	58	2.5	-
GRUS03	Centre Channel	12-Sep-24	55	1.9	-
GRUS03	River-left Bank	12-Sep-24	87	9.0	982091066197773
GRUS04	River-left Bank	11-Sep-24	58	2.1	-
GRUS04	River-left Bank	11-Sep-24	69	3.6	892091066197801
GRUS04	Centre Channel	11-Sep-24	63	2.7	982091066197795
KRCHA01	River-left Bank	17-Sep-24	37	0.7	-
KRCHA01	River-left Bank	17-Sep-24	32	0.4	-
KRCHA01	River-left Bank	17-Sep-24	39	0.8	-
KRCHA01	River-left Bank	17-Sep-24	42	0.9	-
KRCHA01	River-left Bank	17-Sep-24	34	0.4	-
KRCHA01	River-left Bank	17-Sep-24	25	0.3	-
KRCHA01	River-left Bank	17-Sep-24	45	1.0	-
KRCHA01	River-left Bank	17-Sep-24	40	0.7	-
KRCHA01	River-left Bank	17-Sep-24	37	0.4	-
KRCHA01	River-left Bank	17-Sep-24	27	0.2	-
KRCHA01	River-left Bank	17-Sep-24	40	0.6	-
KRCHA01	River-left Bank	17-Sep-24	39	0.6	-
KRCHA01	River-left Bank	17-Sep-24	37	0.6	-
KRCHA01	River-left Bank	17-Sep-24	36	0.5	-
KRCHA01	River-left Bank	17-Sep-24	30	0.3	-
KRCHA01	River-left Bank	17-Sep-24	42	0.8	-
KRCHA01	River-left Bank	17-Sep-24	36	0.6	-
KRCHA01	River-left Bank	17-Sep-24	49	1.3	-
KRCHA01	River-left Bank	17-Sep-24	50	1.4	-
KRCHA01	River-left Bank	17-Sep-24	54	1.9	-
KRCHA01	River-left Bank	17-Sep-24	57	2.4	-
KRCHA01	River-right Bank	17-Sep-24	34	0.5	-
KRCHA01	River-right Bank	17-Sep-24	57	2.1	-
KRCHA01	River-right Bank	17-Sep-24	43	1.0	-
KRCHA01	River-right Bank	17-Sep-24	47	1.2	-
KRCHA01	River-right Bank	17-Sep-24	49	1.3	-
KRCHA01	River-right Bank	17-Sep-24	52	1.7	-
KRCHA01	River-right Bank	17-Sep-24	51	1.5	-
KRCHA01	River-right Bank	17-Sep-24	31	0.4	-
KRCHA01	River-right Bank	17-Sep-24	51	1.5	-
KRCHA01	River-right Bank	17-Sep-24	60	2.5	982091066197718
KRCHA01	River-right Bank	17-Sep-24	39	0.7	-
KRCHA01	River-right Bank	17-Sep-24	63	3.0	-
KRCHA01	River-right Bank	17-Sep-24	54	2.0	-
KRCHA01	River-right Bank	17-Sep-24	50	1.4	-
KRCHA01	River-right Bank	17-Sep-24	78	5.8	982091066197770
KRCHA01	River-right Bank	17-Sep-24	58	2.2	-
KRCHA01	River-right Bank	17-Sep-24	55	2.2	-
KRCHA01	River-right Bank	17-Sep-24	53	1.7	-
KRCHA01	River-right Bank	17-Sep-24	52	1.6	-
KRCHA01	River-right Bank	17-Sep-24	54	1.9	-
KRCHA01	River-right Bank	17-Sep-24	50	1.5	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRCHA01	River-right Bank	17-Sep-24	58	2.2	-
KRCHA01	River-right Bank	17-Sep-24	39	0.5	-
KRCHA01	River-right Bank	17-Sep-24	54	1.8	-
KRCHA01	River-right Bank	17-Sep-24	51	1.4	-
KRCHA01	River-right Bank	17-Sep-24	56	2.0	-
KRCHA01	River-right Bank	17-Sep-24	54	1.9	-
KRCHA01	River-right Bank	17-Sep-24	55	2.2	-
KRCHA01	River-right Bank	17-Sep-24	41	0.8	-
KRCHA01	River-right Bank	17-Sep-24	61	2.7	982091066197755
KRCHA01	River-right Bank	17-Sep-24	49	1.3	-
KRCHA01	River-right Bank	17-Sep-24	43	0.9	-
KRCHA02	River-right Bank	18-Sep-24	50	1.5	-
KRCHA02	River-right Bank	18-Sep-24	52	1.7	-
KRCHA02	River-right Bank	18-Sep-24	49	1.2	-
KRCHA02	River-right Bank	18-Sep-24	51	1.3	-
KRCHA02	River-right Bank	18-Sep-24	49	1.6	-
KRCHA02	River-right Bank	18-Sep-24	44	1.0	-
KRCHA02	River-right Bank	18-Sep-24	48	1.4	-
KRCHA02	River-right Bank	18-Sep-24	48	1.4	-
KRCHA02	River-right Bank	18-Sep-24	54	1.9	-
KRCHA02	River-right Bank	18-Sep-24	43	-	-
KRCHA02	River-right Bank	18-Sep-24	42	0.8	-
KRCHA02	River-right Bank	18-Sep-24	40	0.7	-
KRCHA02	River-right Bank	18-Sep-24	58	2.4	-
KRCHA02	River-right Bank	18-Sep-24	45	1.1	-
KRCHA02	River-right Bank	18-Sep-24	58	2.3	-
KRCHA02	River-right Bank	18-Sep-24	47	1.3	-
KRCHA02	River-right Bank	18-Sep-24	61	2.4	982091066197804
KRCHA02	River-right Bank	18-Sep-24	55	1.9	-
KRCHA02	River-right Bank	18-Sep-24	41	0.8	-
KRCHA02	River-right Bank	18-Sep-24	82	6.0	982091066197796
KRCHA02	River-right Bank	18-Sep-24	50	1.4	-
KRCHA02	River-right Bank	18-Sep-24	65	3.4	982091066197760
KRCHA02	River-right Bank	18-Sep-24	59	2.4	-
KRCHA02	River-right Bank	18-Sep-24	58	2.2	-
KRCHA02	River-right Bank	18-Sep-24	22	-	-
KRCHA02	River-right Bank	18-Sep-24	50	-	-
KRCHA02	River-right Bank	18-Sep-24	59	2.2	-
KRCHA02	River-right Bank	18-Sep-24	41	-	-
KRCHA02	River-right Bank	18-Sep-24	49	-	-
KRCHA02	River-right Bank	18-Sep-24	48	-	-
KRCHA02	River-right Bank	18-Sep-24	48	-	-
KRCHA02	River-right Bank	18-Sep-24	53	-	-
KRCHA02	River-right Bank	18-Sep-24	60	2.3	982091066197765
KRCHA02	River-right Bank	18-Sep-24	44	-	-
KRCHA02	River-right Bank	18-Sep-24	48	-	-
KRCHA02	River-right Bank	18-Sep-24	54	-	-
KRCHA02	River-right Bank	18-Sep-24	51	-	-
KRCHA02	River-right Bank	18-Sep-24	40	-	-
KRCHA02	River-right Bank	18-Sep-24	53	-	-
KRCHA02	River-right Bank	18-Sep-24	42	-	-
KRCHA02	River-right Bank	18-Sep-24	40	-	-
KRCHA02	River-right Bank	18-Sep-24	51	-	-
KRCHA02	River-right Bank	18-Sep-24	48	-	-
KRCHA02	River-right Bank	18-Sep-24	38	-	-
KRCHA02	River-right Bank	18-Sep-24	40	-	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRCHA02	River-right Bank	18-Sep-24	37	-	-
KRCHA02	River-right Bank	18-Sep-24	36	-	-
KRCHA02	River-right Bank	18-Sep-24	52	-	-
KRCHA02	River-right Bank	18-Sep-24	37	-	-
KRCHA02	River-right Bank	18-Sep-24	37	-	-
KRCHA02	River-right Bank	18-Sep-24	48	-	-
KRCHA02	River-right Bank	18-Sep-24	42	-	-
KRCHA02	River-right Bank	18-Sep-24	39	-	-
KRCHA02	River-right Bank	18-Sep-24	58	-	-
KRCHA02	River-right Bank	18-Sep-24	56	-	-
KRCHA02	River-right Bank	18-Sep-24	61	2.4	982091066197757
KRCHA02	River-right Bank	18-Sep-24	50	-	-
KRCHA02	River-right Bank	18-Sep-24	55	-	-
KRCHA02	River-right Bank	18-Sep-24	42	-	-
KRCHA02	Centre Channel	18-Sep-24	52	1.6	-
KRCHA02	Centre Channel	18-Sep-24	60	2.8	982091066197737
KRCHA02	River-left Bank	18-Sep-24	29	0.3	-
KRCHA02	River-left Bank	18-Sep-24	28	0.2	-
KRCHA02	River-left Bank	18-Sep-24	49	1.3	-
KRCHA02	River-left Bank	18-Sep-24	37	0.7	-
KRCHA02	River-left Bank	18-Sep-24	41	0.7	-
KRCHA02	River-left Bank	18-Sep-24	43	0.9	-
KRCHA02	River-left Bank	18-Sep-24	55	1.9	-
KRCHA02	River-left Bank	18-Sep-24	25	0.2	-
KRCHA02	River-left Bank	18-Sep-24	39	0.7	-
KRCHA02	River-left Bank	18-Sep-24	43	0.9	-
KRCHA02	River-left Bank	18-Sep-24	62	2.7	982091066197774
KRCHA02	River-left Bank	18-Sep-24	37	0.6	-
KRCHA02	River-left Bank	18-Sep-24	54	1.7	-
KRCHA02	River-left Bank	18-Sep-24	36	0.7	-
KRCHA02	River-left Bank	18-Sep-24	43	0.9	-
KRCHA02	River-left Bank	18-Sep-24	35	0.6	-
KRCHA02	River-left Bank	18-Sep-24	47	1.2	-
KRCHA02	River-left Bank	18-Sep-24	54	1.7	-
KRCHA02	River-left Bank	18-Sep-24	36	0.6	-
KRCHA02	River-left Bank	18-Sep-24	56	0.9	-
KRCHA02	River-left Bank	18-Sep-24	45	1.1	-
KRCHA02	River-left Bank	18-Sep-24	52	1.7	-
KRCHA02	River-left Bank	18-Sep-24	41	0.8	-
KRCHA02	River-left Bank	18-Sep-24	40	0.8	-
KRCHA02	River-left Bank	18-Sep-24	49	1.3	-
KRCHA02	River-left Bank	18-Sep-24	45	-	-
KRCHA02	River-left Bank	18-Sep-24	38	-	-
KRCHA02	River-left Bank	18-Sep-24	37	-	-
KRCHA02	River-left Bank	18-Sep-24	41	-	-
KRCHA02	River-left Bank	18-Sep-24	39	-	-
KRCHA02	River-left Bank	18-Sep-24	42	-	-
KRCHA02	River-left Bank	18-Sep-24	37	-	-
KRCHA02	River-left Bank	18-Sep-24	46	-	-
KRCHA02	River-left Bank	18-Sep-24	39	-	-
KRCHA02	River-left Bank	18-Sep-24	50	-	-
KRCHA03	River-right Bank	18-Sep-24	34	0.5	-
KRCHA03	River-right Bank	18-Sep-24	25	0.1	-
KRCHA03	River-right Bank	18-Sep-24	55	1.5	-
KRCHA03	River-right Bank	18-Sep-24	68	3.7	982091066197810
KRCHA03	River-right Bank	18-Sep-24	63	2.9	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRCHA03	River-right Bank	18-Sep-24	61	2.4	982091066197785
KRCHA03	River-right Bank	18-Sep-24	37	0.6	-
KRCHA03	River-right Bank	18-Sep-24	66	3.2	982091066197759
KRCHA03	River-right Bank	18-Sep-24	44	0.8	-
KRCHA03	River-right Bank	18-Sep-24	65	3.0	982091066197811
KRCHA03	River-right Bank	18-Sep-24	60	2.9	982091066197809
KRCHA03	River-right Bank	18-Sep-24	60	2.8	982091066197777
KRCHA03	River-right Bank	18-Sep-24	45	0.8	-
KRCHA03	River-right Bank	18-Sep-24	46	0.9	-
KRCHA03	River-right Bank	18-Sep-24	53	1.6	-
KRCHA03	River-right Bank	18-Sep-24	50	1.4	-
KRCHA03	River-right Bank	18-Sep-24	36	0.6	-
KRCHA03	River-right Bank	18-Sep-24	37	0.7	-
KRCHA03	River-right Bank	18-Sep-24	54	1.8	-
KRCHA03	River-right Bank	18-Sep-24	33	0.3	-
KRCHA03	River-right Bank	18-Sep-24	46	0.9	-
KRCHA03	River-right Bank	18-Sep-24	62	3.1	982091066197516
KRCHA03	River-right Bank	18-Sep-24	57	1.8	-
KRCHA03	River-right Bank	18-Sep-24	59	2.3	-
KRCHA03	River-right Bank	18-Sep-24	52	1.7	-
KRCHA03	River-right Bank	18-Sep-24	58	-	-
KRCHA03	River-right Bank	18-Sep-24	51	-	-
KRCHA03	River-right Bank	18-Sep-24	31	-	-
KRCHA03	River-right Bank	18-Sep-24	46	-	-
KRCHA03	River-right Bank	18-Sep-24	50	-	-
KRCHA03	River-right Bank	18-Sep-24	38	-	-
KRCHA03	River-right Bank	18-Sep-24	39	-	-
KRCHA03	River-right Bank	18-Sep-24	52	-	-
KRCHA03	River-right Bank	18-Sep-24	43	-	-
KRCHA03	River-right Bank	18-Sep-24	53	-	-
KRCHA03	River-right Bank	18-Sep-24	53	-	-
KRCHA03	River-right Bank	18-Sep-24	37	-	-
KRCHA03	River-right Bank	18-Sep-24	52	-	-
KRCHA03	River-right Bank	18-Sep-24	40	-	-
KRCHA03	River-right Bank	18-Sep-24	54	-	-
KRCHA03	River-right Bank	18-Sep-24	52	-	-
KRCHA03	River-right Bank	18-Sep-24	45	-	-
KRCHA03	River-right Bank	18-Sep-24	49	-	-
KRCHA03	River-right Bank	18-Sep-24	44	-	-
KRCHA03	River-right Bank	18-Sep-24	42	-	-
KRCHA03	River-right Bank	18-Sep-24	49	-	-
KRCHA03	River-right Bank	18-Sep-24	42	-	-
KRCHA03	River-right Bank	18-Sep-24	46	-	-
KRCHA03	River-right Bank	18-Sep-24	40	-	-
KRCHA03	River-right Bank	18-Sep-24	56	-	-
KRCHA03	River-left Bank	18-Sep-24	54	1.5	-
KRCHA03	River-left Bank	18-Sep-24	52	1.4	-
KRCHA03	River-left Bank	18-Sep-24	43	0.8	-
KRCHA03	River-left Bank	18-Sep-24	45	1.0	-
KRCHA03	River-left Bank	18-Sep-24	55	2.2	-
KRCHA03	River-left Bank	18-Sep-24	59	2.4	-
KRCHA03	River-left Bank	18-Sep-24	37	0.7	-
KRCHA03	River-left Bank	18-Sep-24	40	0.9	-
KRCHA03	River-left Bank	18-Sep-24	39	0.7	-
KRCHA03	River-left Bank	18-Sep-24	58	2.2	-
KRCHA03	River-left Bank	18-Sep-24	44	1.0	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRCHA03	River-left Bank	18-Sep-24	53	1.7	-
KRCHA03	River-left Bank	18-Sep-24	61	2.4	982091066197564
KRCHA03	River-left Bank	18-Sep-24	64	2.7	982091066197570
KRCHA03	River-left Bank	18-Sep-24	55	1.8	-
KRCHA03	River-left Bank	18-Sep-24	62	2.8	982091066197601
KRCHA03	River-left Bank	18-Sep-24	82	7.4	982091066197605
KRCHA05	River-left Bank	17-Sep-24	29	0.1	-
KRCHA05	River-left Bank	17-Sep-24	50	1.8	-
KRCHA05	River-left Bank	17-Sep-24	48	1.4	-
KRCHA05	River-left Bank	17-Sep-24	56	1.9	-
KRCHA05	River-left Bank	17-Sep-24	53	1.7	-
KRCHA05	River-left Bank	17-Sep-24	51	1.6	-
KRCHA05	River-left Bank	17-Sep-24	51	1.5	-
KRCHA05	River-left Bank	17-Sep-24	58	2.2	-
KRCHA05	River-left Bank	17-Sep-24	57	2.1	-
KRCHA05	River-left Bank	17-Sep-24	50	1.5	-
KRCHA05	River-left Bank	17-Sep-24	46	1.1	-
KRCHA05	River-left Bank	17-Sep-24	55	1.8	-
KRCHA05	River-left Bank	17-Sep-24	43	0.8	-
KRCHA05	River-left Bank	17-Sep-24	47	1.2	-
KRCHA05	River-left Bank	17-Sep-24	43	0.9	-
KRCHA05	River-left Bank	17-Sep-24	43	1.0	-
KRCHA05	River-left Bank	17-Sep-24	50	1.7	-
KRCHA05	River-left Bank	17-Sep-24	37	0.6	-
KRCHA05	River-left Bank	17-Sep-24	54	1.6	-
KRCHA05	River-left Bank	17-Sep-24	53	1.7	-
KRCHA05	River-left Bank	17-Sep-24	52	1.4	-
KRCHA05	River-left Bank	17-Sep-24	44	0.8	-
KRCHA05	River-right Bank	17-Sep-24	52	1.4	-
KRCHA05	River-right Bank	17-Sep-24	37	0.6	-
KRCHA05	River-right Bank	17-Sep-24	38	0.5	-
KRCHA05	River-right Bank	17-Sep-24	48	1.4	-
KRCHA05	River-right Bank	17-Sep-24	53	1.8	-
KRCHA05	River-right Bank	17-Sep-24	36	0.5	-
KRCHA05	River-right Bank	17-Sep-24	62	3.5	982091066197733
KRCHA05	River-right Bank	17-Sep-24	46	1.3	-
KRCHA05	River-right Bank	17-Sep-24	39	0.7	-
KRCHA05	River-right Bank	17-Sep-24	64	2.9	-
KRCHA05	River-right Bank	17-Sep-24	27	0.3	-
KRCHA05	River-right Bank	17-Sep-24	42	0.6	-
KRCHA05	River-right Bank	17-Sep-24	47	1.3	-
KRCHA05	River-right Bank	17-Sep-24	54	2.1	-
KRCHA05	River-right Bank	17-Sep-24	38	0.7	-
KRCHA05	River-right Bank	17-Sep-24	23	0.1	-
KRCHA05	River-right Bank	17-Sep-24	43	0.9	-
KRCHA05	River-right Bank	17-Sep-24	43	0.8	-
KRCHA05	River-right Bank	17-Sep-24	55	1.9	-
KRCHA05	River-right Bank	17-Sep-24	51	1.6	-
KRCHA05	River-right Bank	17-Sep-24	46	1.5	-
KRCHA05	River-right Bank	17-Sep-24	52	7.8	-
KRCHA05	River-right Bank	17-Sep-24	39	0.6	-
KRCHA05	River-right Bank	17-Sep-24	45	0.9	-
KRCHA05	River-right Bank	17-Sep-24	59	2.2	-
KRCHA05	River-right Bank	17-Sep-24	48	1.0	-
KRCHA05	River-right Bank	17-Sep-24	29	0.3	-
KRCHA05	River-right Bank	17-Sep-24	52	1.5	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRCHA05	River-right Bank	17-Sep-24	57	2.4	-
KRCHA05	River-right Bank	17-Sep-24	55	2.0	-
KRCHA05	River-right Bank	17-Sep-24	55	1.9	-
KRCHA05	River-right Bank	17-Sep-24	55	1.8	-
KRCHA05	River-right Bank	17-Sep-24	55	1.9	-
KRCHA05	River-right Bank	17-Sep-24	48	1.3	-
KRCHA05	River-right Bank	17-Sep-24	46	1.1	-
KRCHA05	River-right Bank	17-Sep-24	37	0.6	-
KRCHA05	River-right Bank	17-Sep-24	42	0.8	-
KRCHA05	River-right Bank	17-Sep-24	49	1.1	-
KRCHA05	River-right Bank	17-Sep-24	41	1.0	-
KRCHA05	River-right Bank	17-Sep-24	63	2.6	982091066197793
KRCHA05	River-right Bank	17-Sep-24	40	0.9	-
KRCHA05	River-right Bank	17-Sep-24	55	1.8	-
KRCHA05	River-right Bank	17-Sep-24	52	1.4	-
KRCHA05	River-right Bank	17-Sep-24	39	0.6	-
KRCHA05	River-right Bank	17-Sep-24	42	0.7	-
KRCHA05	River-right Bank	17-Sep-24	36	0.7	-
KRCHA05	River-right Bank	17-Sep-24	44	0.9	-
KRCHA05	River-right Bank	17-Sep-24	35	0.6	-
KRCHA05	River-right Bank	17-Sep-24	37	0.6	-
KRCHA05	River-right Bank	17-Sep-24	50	1.4	-
KRCHA05	River-right Bank	17-Sep-24	43	1.0	-
KRCHA05	River-right Bank	17-Sep-24	39	0.7	-
KRCHA05	River-right Bank	17-Sep-24	51	1.7	-
KRCHA05	River-right Bank	17-Sep-24	66	3.2	982091066197763
KRCHA05	River-right Bank	17-Sep-24	58	2.2	-
KRCHA05	River-right Bank	17-Sep-24	44	0.9	-
KRUS03	River-right Bank	19-Sep-24	26	0.1	-
KRUS03	River-right Bank	19-Sep-24	22	0.1	-
KRUS03	River-right Bank	19-Sep-24	23	0.1	-
KRUS03	River-right Bank	19-Sep-24	31	0.2	-
KRUS03	River-right Bank	19-Sep-24	45	1.0	-
KRUS03	River-right Bank	19-Sep-24	54	1.5	-
KRUS03	River-right Bank	19-Sep-24	54	1.7	-
KRUS03	River-right Bank	19-Sep-24	41	0.9	-
KRUS03	River-right Bank	19-Sep-24	48	1.1	-
KRUS03	River-right Bank	19-Sep-24	51	1.6	-
KRUS03	River-right Bank	19-Sep-24	60	2.2	982091066197540
KRUS03	River-right Bank	19-Sep-24	40	0.7	-
KRUS03	River-right Bank	19-Sep-24	51	1.5	-
KRUS03	River-right Bank	19-Sep-24	56	2.1	-
KRUS03	River-right Bank	19-Sep-24	50	1.4	-
KRUS03	River-right Bank	19-Sep-24	55	1.8	-
KRUS03	River-right Bank	19-Sep-24	67	3.8	982091066197529
KRUS03	River-right Bank	19-Sep-24	58	2.1	-
KRUS03	River-right Bank	19-Sep-24	55	1.9	-
KRUS03	River-right Bank	19-Sep-24	35	0.5	-
KRUS03	River-right Bank	19-Sep-24	51	1.4	-
KRUS03	River-right Bank	19-Sep-24	58	2.1	-
KRUS03	River-right Bank	19-Sep-24	53	1.7	-
KRUS03	River-right Bank	19-Sep-24	49	1.4	-
KRUS03	Centre Channel	19-Sep-24	35	0.0	-
KRUS03	Centre Channel	19-Sep-24	38	0.5	-
KRUS03	Centre Channel	19-Sep-24	34	0.5	-
KRUS03	Centre Channel	19-Sep-24	57	1.8	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRUS03	Centre Channel	19-Sep-24	48	1.2	-
KRUS03	Centre Channel	19-Sep-24	67	3.5	982091066197543
KRUS03	Centre Channel	19-Sep-24	63	3.0	982091066197556
KRUS03	Centre Channel	19-Sep-24	49	1.4	-
KRUS03	Centre Channel	19-Sep-24	57	2.0	-
KRUS03	Centre Channel	19-Sep-24	52	1.8	-
KRUS03	Centre Channel	19-Sep-24	43	0.9	-
KRUS03	Centre Channel	19-Sep-24	54	1.7	-
KRUS03	Centre Channel	19-Sep-24	48	1.3	-
KRUS03	Centre Channel	19-Sep-24	51	1.5	-
KRUS03	Centre Channel	19-Sep-24	50	1.3	-
KRUS03	Centre Channel	19-Sep-24	35	0.4	-
KRUS03	Centre Channel	19-Sep-24	43	0.9	-
KRUS03	Centre Channel	19-Sep-24	35	0.5	-
KRUS03	Centre Channel	19-Sep-24	27	0.2	-
KRUS03	Centre Channel	19-Sep-24	48	1.2	-
KRUS03	Centre Channel	19-Sep-24	45	1.0	-
KRUS03	River-left Bank	19-Sep-24	67	3.6	982091066197545
KRUS03	River-left Bank	19-Sep-24	57	1.9	-
KRUS03	River-left Bank	19-Sep-24	52	1.6	-
KRUS03	River-left Bank	19-Sep-24	39	0.8	-
KRUS03	River-left Bank	19-Sep-24	42	0.9	-
KRUS03	River-left Bank	19-Sep-24	42	0.8	-
KRUS03	River-left Bank	19-Sep-24	36	0.5	-
KRUS03	River-left Bank	19-Sep-24	55	1.9	-
KRUS03	River-left Bank	19-Sep-24	61	2.5	982091066197539
KRUS03	River-left Bank	19-Sep-24	59	2.3	-
KRUS03	River-left Bank	19-Sep-24	50	1.5	-
KRUS03	River-left Bank	19-Sep-24	48	1.3	-
KRUS03	River-left Bank	19-Sep-24	39	0.6	-
KRUS03	River-left Bank	19-Sep-24	47	1.3	-
KRUS03	River-left Bank	19-Sep-24	47	1.1	-
KRUS03	River-left Bank	19-Sep-24	52	1.4	-
KRUS04	River-right Bank	20-Sep-24	29	0.2	-
KRUS04	River-right Bank	20-Sep-24	43	0.8	-
KRUS04	River-right Bank	20-Sep-24	28	0.1	-
KRUS04	River-right Bank	20-Sep-24	25	0.1	-
KRUS04	River-right Bank	20-Sep-24	44	0.8	-
KRUS04	River-right Bank	20-Sep-24	42	0.8	-
KRUS04	River-right Bank	20-Sep-24	38	0.6	-
KRUS04	River-right Bank	20-Sep-24	42	0.9	-
KRUS04	Centre Channel	20-Sep-24	53	1.6	-
KRUS04	Centre Channel	20-Sep-24	47	1.1	-
KRUS04	Centre Channel	20-Sep-24	40	0.8	-
KRUS04	Centre Channel	20-Sep-24	56	1.9	-
KRUS04	Centre Channel	20-Sep-24	59	2.5	-
KRUS04	Centre Channel	20-Sep-24	58	2.0	-
KRUS04	Centre Channel	20-Sep-24	68	3.7	982091066197572
KRUS04	Centre Channel	20-Sep-24	88	8.2	982091066197524
KRUS04	River-left Bank	20-Sep-24	60	2.5	982091066197541
KRUS04	River-left Bank	20-Sep-24	56	1.9	-
KRUS04	River-left Bank	20-Sep-24	33	0.9	-
KRUS04	River-left Bank	20-Sep-24	62	2.7	982091066197562
KRUS04	River-left Bank	20-Sep-24	28	0.2	-
KRUS04	River-left Bank	20-Sep-24	50	1.4	-
KRUS04	River-left Bank	20-Sep-24	57	1.8	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRUS04	River-left Bank	20-Sep-24	51	1.7	-
KRUS04	River-left Bank	20-Sep-24	48	1.3	-
KRUS04	River-left Bank	20-Sep-24	49	1.3	-
KRUS04	River-right Bank	20-Sep-24	52	1.3	-
KRUS04	River-right Bank	20-Sep-24	50	1.5	-
KRUS05	River-right Bank	19-Sep-24	55	1.8	-
KRUS05	River-right Bank	19-Sep-24	53	1.6	-
KRUS05	River-right Bank	19-Sep-24	45	1.0	-
KRUS05	River-right Bank	19-Sep-24	59	2.1	-
KRUS05	River-right Bank	19-Sep-24	52	1.6	-
KRUS05	River-right Bank	19-Sep-24	53	1.4	-
KRUS05	River-right Bank	19-Sep-24	37	0.5	-
KRUS05	River-right Bank	19-Sep-24	51	1.4	-
KRUS05	River-right Bank	19-Sep-24	86	6.6	982091066197602
KRUS05	River-right Bank	19-Sep-24	74	4.3	982091066197568
KRUS05	River-right Bank	19-Sep-24	54	1.7	-
KRUS05	River-right Bank	19-Sep-24	56	1.9	-
KRUS05	River-right Bank	19-Sep-24	40	0.7	-
KRUS05	River-right Bank	19-Sep-24	54	1.8	-
KRUS05	River-right Bank	19-Sep-24	37	0.5	-
KRUS05	River-right Bank	19-Sep-24	43	0.7	-
KRUS05	River-right Bank	19-Sep-24	59	2.0	-
KRUS05	River-right Bank	19-Sep-24	37	0.4	-
KRUS05	River-right Bank	19-Sep-24	58	2.3	-
KRUS05	River-right Bank	19-Sep-24	40	0.7	-
KRUS05	River-right Bank	19-Sep-24	49	1.3	-
KRUS05	River-right Bank	19-Sep-24	44	0.9	-
KRUS05	River-right Bank	19-Sep-24	55	1.9	-
KRUS05	River-right Bank	19-Sep-24	61	2.7	982091066197525
KRUS05	River-right Bank	19-Sep-24	40	0.8	-
KRUS05	River-right Bank	19-Sep-24	45	-	-
KRUS05	River-right Bank	19-Sep-24	53	-	-
KRUS05	River-right Bank	19-Sep-24	41	-	-
KRUS05	River-right Bank	19-Sep-24	51	-	-
KRUS05	River-right Bank	19-Sep-24	40	-	-
KRUS05	River-right Bank	19-Sep-24	35	-	-
KRUS05	River-right Bank	19-Sep-24	47	-	-
KRUS05	River-right Bank	19-Sep-24	51	-	-
KRUS05	River-right Bank	19-Sep-24	47	-	-
KRUS05	River-right Bank	19-Sep-24	57	-	-
KRUS05	River-right Bank	19-Sep-24	53	-	-
KRUS05	River-right Bank	19-Sep-24	56	-	-
KRUS05	River-right Bank	19-Sep-24	56	-	-
KRUS05	River-right Bank	19-Sep-24	39	-	-
KRUS05	River-right Bank	19-Sep-24	40	-	-
KRUS05	River-right Bank	19-Sep-24	43	-	-
KRUS05	River-right Bank	19-Sep-24	55	-	-
KRUS05	River-right Bank	19-Sep-24	50	-	-
KRUS05	River-right Bank	19-Sep-24	42	-	-
KRUS05	River-right Bank	19-Sep-24	45	-	-
KRUS05	River-right Bank	19-Sep-24	44	-	-
KRUS05	River-right Bank	19-Sep-24	53	-	-
KRUS05	River-right Bank	19-Sep-24	60	2	982091066197599
KRUS05	River-right Bank	19-Sep-24	64	3	982091066197500
KRUS05	River-right Bank	19-Sep-24	48	-	-
KRUS05	River-right Bank	19-Sep-24	52	-	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRUS05	River-right Bank	19-Sep-24	47	-	-
KRUS05	River-right Bank	19-Sep-24	42	-	-
KRUS05	River-right Bank	19-Sep-24	47	-	-
KRUS05	River-right Bank	19-Sep-24	40	-	-
KRUS05	River-right Bank	19-Sep-24	49	-	-
KRUS05	River-right Bank	19-Sep-24	56	-	-
KRUS05	River-right Bank	19-Sep-24	48	-	-
KRUS05	River-right Bank	19-Sep-24	52	-	-
KRUS05	River-right Bank	19-Sep-24	50	-	-
KRUS05	River-right Bank	19-Sep-24	42	-	-
KRUS05	River-right Bank	19-Sep-24	41	-	-
KRUS05	River-right Bank	19-Sep-24	52	-	-
KRUS05	River-right Bank	19-Sep-24	47	-	-
KRUS05	River-right Bank	19-Sep-24	40	-	-
KRUS05	River-right Bank	19-Sep-24	41	-	-
KRUS05	River-right Bank	19-Sep-24	50	-	-
KRUS05	River-right Bank	19-Sep-24	58	-	-
KRUS05	River-right Bank	19-Sep-24	41	-	-
KRUS05	River-right Bank	19-Sep-24	42	-	-
KRUS05	River-right Bank	19-Sep-24	55	-	-
KRUS05	River-right Bank	19-Sep-24	41	-	-
KRUS05	River-right Bank	19-Sep-24	53	-	-
KRUS05	River-right Bank	19-Sep-24	51	-	-
KRUS05	River-right Bank	19-Sep-24	52	-	-
KRUS05	River-right Bank	19-Sep-24	49	-	-
KRUS05	River-right Bank	19-Sep-24	40	-	-
KRUS05	River-right Bank	19-Sep-24	48	-	-
KRUS05	River-right Bank	19-Sep-24	42	-	-
KRUS05	River-right Bank	19-Sep-24	41	-	-
KRUS05	River-right Bank	19-Sep-24	39	-	-
KRUS05	River-right Bank	19-Sep-24	58	-	-
KRUS05	River-right Bank	19-Sep-24	55	-	-
KRUS05	River-right Bank	19-Sep-24	63	-	-
KRUS05	River-right Bank	19-Sep-24	57	-	-
KRUS05	River-right Bank	19-Sep-24	51	-	-
KRUS05	River-right Bank	19-Sep-24	54	-	-
KRUS05	River-right Bank	19-Sep-24	47	-	-
KRUS05	River-right Bank	19-Sep-24	48	-	-
KRUS05	River-right Bank	19-Sep-24	46	-	-
KRUS05	River-right Bank	19-Sep-24	54	-	-
KRUS05	River-right Bank	19-Sep-24	49	-	-
KRUS05	River-right Bank	19-Sep-24	54	-	-
KRUS05	River-right Bank	19-Sep-24	44	-	-
KRUS05	River-right Bank	19-Sep-24	51	-	-
KRUS05	River-right Bank	19-Sep-24	37	-	-
KRUS05	River-right Bank	19-Sep-24	52	-	-
KRUS05	River-right Bank	19-Sep-24	52	-	-
KRUS05	Centre Channel	19-Sep-24	48	1.2	-
KRUS05	Centre Channel	19-Sep-24	50	1.5	-
KRUS05	Centre Channel	19-Sep-24	49	1.3	-
KRUS05	Centre Channel	19-Sep-24	61	2.8	982091066197607
KRUS05	River-left Bank	19-Sep-24	55	1.6	-
KRUS05	River-left Bank	19-Sep-24	53	1.5	-
KRUS05	River-left Bank	19-Sep-24	47	1.2	-
KRUS05	River-left Bank	19-Sep-24	59	1.9	-
KRUS05	River-left Bank	19-Sep-24	57	1.6	-

Site	Sub-Sample	Date	Fork Length (mm)	Weight (g)	PIT Tag #
KRUS05	River-left Bank	19-Sep-24	50	1.1	-
KRUS05	River-left Bank	19-Sep-24	50	1.4	-
KRUS05	River-left Bank	19-Sep-24	69	3.9	-
KRUS05	River-left Bank	19-Sep-24	62	2.9	982091066197613
KRUS05	River-left Bank	19-Sep-24	61	2.7	982091066197590
KRUS05	River-left Bank	19-Sep-24	63	2.9	982091066197549
KRUS05	River-left Bank	19-Sep-24	59	2.0	-
KRUS05	River-left Bank	19-Sep-24	48	1.3	-
KRUS05	River-left Bank	19-Sep-24	56	2.1	-
KRUS05	River-left Bank	19-Sep-24	48	1.2	-
KRUS05	River-left Bank	19-Sep-24	51	1.5	-
KRUS05	River-left Bank	19-Sep-24	38	0.6	-
KRUS05	River-left Bank	19-Sep-24	39	0.7	-
KRUS05	River-left Bank	19-Sep-24	55	1.9	-
KRUS05	River-left Bank	19-Sep-24	51	1.5	-
KRUS05	River-left Bank	19-Sep-24	37	0.5	-
KRUS05	River-left Bank	19-Sep-24	51	1.5	-
KRUS05	River-left Bank	19-Sep-24	36	0.6	-
KRUS05	River-left Bank	19-Sep-24	55	1.8	-
KRUS05	River-left Bank	19-Sep-24	48	1.3	-
KRUS05	River-left Bank	19-Sep-24	37	-	-
KRUS05	River-left Bank	19-Sep-24	53	-	-
KRUS05	River-left Bank	19-Sep-24	38	-	-
KRUS05	River-left Bank	19-Sep-24	55	-	-
KRUS05	River-left Bank	19-Sep-24	46	-	-
KRUS05	River-left Bank	19-Sep-24	45	-	-
KRUS05	River-left Bank	19-Sep-24	40	-	-
KRUS05	River-left Bank	19-Sep-24	50	-	-
KRUS05	River-left Bank	19-Sep-24	49	-	-
KRUS05	River-left Bank	19-Sep-24	41	-	-
KRUS05	River-left Bank	19-Sep-24	49	-	-
KRUS06	River-right Bank	20-Sep-24	54	1.9	-
KRUS06	River-right Bank	20-Sep-24	40	0.7	-
KRUS06	River-right Bank	20-Sep-24	39	0.7	-
KRUS06	River-right Bank	20-Sep-24	44	1.0	-
KRUS06	River-right Bank	20-Sep-24	26	0.1	-
KRUS06	River-right Bank	20-Sep-24	28	0.2	-
KRUS06	Centre Channel	20-Sep-24	41	0.8	-
KRUS06	Centre Channel	20-Sep-24	50	1.5	-
KRUS06	Centre Channel	20-Sep-24	50	1.5	-
KRUS06	Centre Channel	20-Sep-24	53	1.7	-
KRUS06	Centre Channel	20-Sep-24	56	2.1	-
KRUS06	Centre Channel	20-Sep-24	59	2.4	-
KRUS06	Centre Channel	20-Sep-24	60	2.5	98209106697573
KRUS06	Centre Channel	20-Sep-24	58	2.4	-
KRUS06	Centre Channel	20-Sep-24	61	2.8	982091066197561
KRUS06	Centre Channel	20-Sep-24	64	3.1	982091066197512
KRUS06	River-left Bank	20-Sep-24	57	2.3	-

Appendix 4: Temperature and Discharge Data

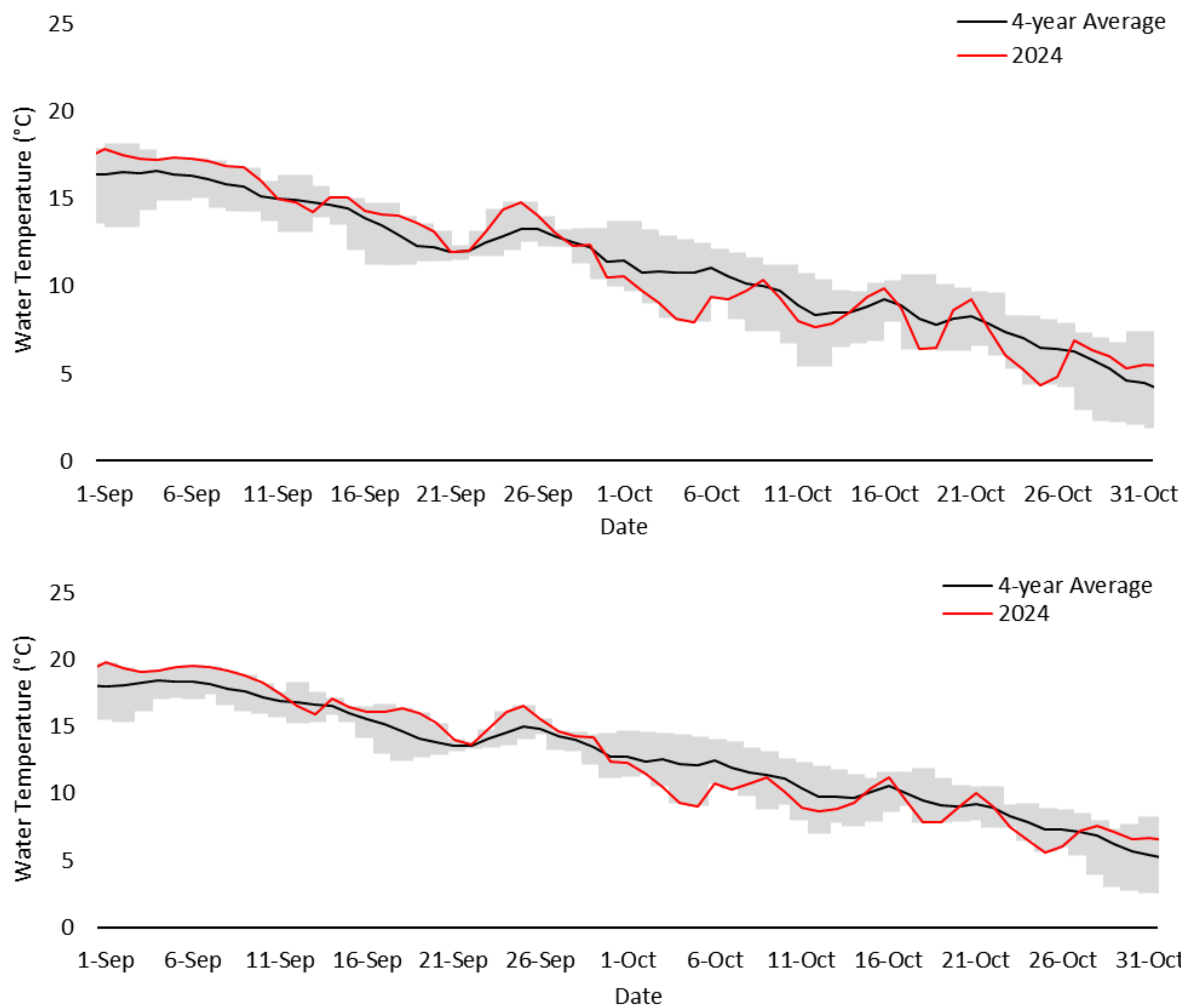

Figure 7. Water temperature (°C) at Water Survey of Canada Stations 08NN026 (nx̌ʷyaɫpítkʷ; top) and 08NN002 (nxʷyntkʷitkʷ; bottom) in September and October 2024 (red) compared to the 4-year average (black) including minimum and maximum daily values (greyed area; WSC 2025[1]; WSC 2025[2]).

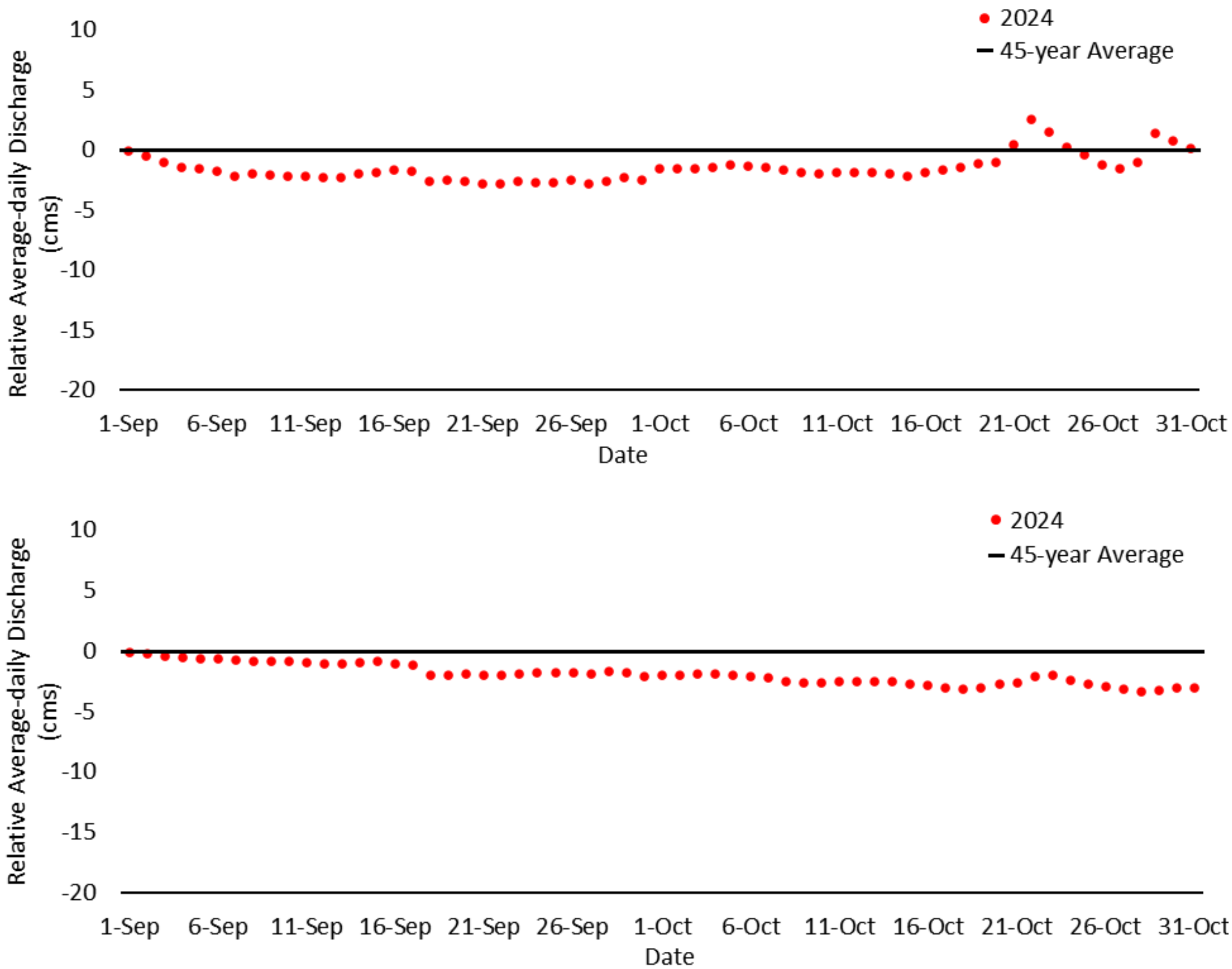

Figure 8. Relative average-daily discharge (cms) at Water Survey of Canada Stations 08NN026 (nx̌ʷyaɬpítkʷ; top) and 08NN002 (nxʷyntkʷitkʷ; bottom) in September and October 2024 (red) compared to the 45-year average (represented as "0"; black line) where negative values are below average and positive values are above average (greyed area; WSC 2025[1]; WSC 2025[2]).

Appendix 5: Summary of Non-target Fish Species

Table 15. Summary of non-target species captured during Speckled Dace indexing surveys within the nx̌ʷyaɬpítkʷ and nxʷyntkʷitkʷ Critical Habitat Areas and upstream reaches in September 2024 including the number of individuals captured, the mean fork length (mm) and the error of the mean with 95% confidence intervals. Non-native species highlighted in orange.

Reach	Scientific Name	# of Fish	Mean Fork Length (mm)	Err (mm)
nx̌ʷyaɬpítkʷ Critical Habitat Area				
Longnose Dace	*Rhinichthys cataractae*	2	31	25
Redside Shiner	*Richardsonius balteatus*	16	31	10
Sculpin	*Cottid sp.*	95	51	3
Sucker	*Catostomid sp.*	5	31	2
xʷuminaʔ	*Oncorhynchus mykiss*	15	62	10
nx̌ʷyaɬpítkʷ Upstream Reach				
Brook Trout	*Salvelinus fontinalis*	4	85	41
Longnose Dace	*Rhinichthys cataractae*	7	29	1
Northern Pikeminnow	*Ptychocheilus oregonensis*	1	89	-
Redside Shiner	*Richardsonius balteatus*	14	32	7
Sculpin	*Cottid sp.*	27	54	5
Sucker	*Catostomid sp.*	1	31	-
xʷuminaʔ	*Oncorhynchus mykiss*	14	78	14
nxʷyntkʷitkʷ Critical Habitat Area				
Longnose Sucker	*Catostomus catostomus*	4	166	23
Mountain Whitefish	*Prosopium williamsoni*	1	332	-
Sculpin	*Cottid sp.*	15	52	11
xʷuminaʔ	*Oncorhynchus mykiss*	15	121	18
nxʷyntkʷitkʷ Upstream Reach				
Sculpin	*Cottid sp.*	40	69	8
xʷuminaʔ	*Oncorhynchus mykiss*	19	117	21