

French Creek Stream Survey – 2015

On behalf of

The Regional District of Nanaimo

Drinking Water & Watershed Protection

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Introduction

The Regional District of Nanaimo Drinking Water & Watershed Protection program led by Julie Pisani had requested a community workshop and training session. The objective was to survey the habitat and physical characteristics of French Creek with the local stewardship group in the hopes of the participants gaining understanding of the health of their watershed, and become trained on data collection methods. This data is intended to serve as a reference to help inform the interpretation of water quality data collected by the Friends of French Creek as part of the RDN Community Watershed Monitoring Network. This culminates as an effort to monitor the state of the watershed and possibly guide restoration, remedial actions and/or further monitoring activities.

Methods

The Urban Salmon Habitat Program (USHP) survey¹ was utilized. This method of survey had been initiated in 1997 by the Ministry of Environment. The methodology has been adopted and used by the majority of stewardship groups on Vancouver Island and the lower mainland.

The data collection objective was to measure ten habitat units (pools or riffles) within each reach segment. Reach 1, 4 and 5 were surveyed on June 25 and 26, 2015.

The method collects up to 40 data points on each habitat unit. The data points are then entered into an excel program and the macro function compares the results of key habitat functions with BC standards.

The participants in the survey were; Julie Pisani and Lauren Fegan of the RDN as well as Friends of French Creek Society members (Dick Dobler, Ray Smith, Richard and Brenda Miller, Brad Jackson, Sandy Robinson, Shelly Goertzer, Don McConnel) and property owner Sunshine Goldsberry. The survey was instructed by David Clough RPBio.

Survey Area

French Creek is a moderately sized watershed of 68 km² area in the Regional District of Nanaimo. The headwaters are privately managed forest lands that drain into a farm belt terrace that then drains through a lower residential area and emptying into Georgia Strait at a busy developed commercial fishing harbour. The mainstem stream is approximately 25 km long with salmon access on the mainstem to 20.0 km (just above the Hydro lines) and its headwaters feed by Rowbotham Lake at approximately 1,000m elevation.

French Creek was split into five reach sections of which three were measured, they are briefly described below;

¹ Michalski, T.A., G.E. Reid, G.E. Stewart, 1997. Urban Salmon Habitat Program ,Assessment And Mapping Procedures for Vancouver Island. Ministry of Environment, Lands and Parks, Fisheries Section. Nanaimo B.C.

Reach1 : This reach is from the ocean to the E&N Rail Trestle. It is approximately 2.4 km long.

Reach 2: From the Rail Trestle at 2.4 km to the Highway 19 Bridge at 7.0 km.

Reach 3: Highway 19 upstream to the confluence of the West Fork (near Palmer Road). This reach ends at approximately 13.0 km from the ocean.

Reach 4; From West Fork (13.0 km) upstream to Winchester Road Bridge at 16.1 km.

Reach 5: From Winchester (16.1 km) upstream across Pratt Road and ending at the Hydro Lines at 20 km at the end of salmon access.

Figure 1: Survey Area – French Creek



Results and Discussion – French Creek Habitat Survey

The habitat was summarized for reach 1, 4 and 5 in Appendix 1, 2 and 3 respectively. These appendices show the raw data as well as the sums and averages of all the detailed parameters. In the reach summaries below, only the 12 most important habitat parameters are summarized, rated and scored. Scoring is based on the USHP rating system where a Good result is scored as a 1, a Fair result scored as a 3 and a Poor result scored as a 5. The lower the score, the better the habitat.

Reach 1:

This 2.4 km long reach, is located in the residential community of French Creek. It generally has a riparian setback on the residential properties. The survey was conducted off Lee Road upstream of the Marion Baker Fish Hatchery operated by the Parksville-Qualicum Fish and Game Club.

The survey began at the hatchery discharge pool just above the old fish counting fence. We measured five pools and four riffles over 232m. The average channel width was 18.1 m, and wetted width of 9.6m on a 0.6 % average channel gradient. The water temperature measured at 10 am was 16.5C . The results are shown in Table 1 below;

Table 1; Reach 1 Habitat Results

Habitat Parameter	R1	Ratings
% Pool Area	88.3	1
Large Woody Debris/Bankfull Channel Width	0.4	5
% Cover in Pools	1.3	5
Average% Boulder Cover	0.1	5
Average % Fines	20.8	5
Average % Gravel	26.1	not rated
% of Reach Eroded	8.6	3
Obstructions	0.0	0
% of Reach Altered	0.0	1
% Wetted Area	53.1	5
Dissolved Oxygen	10.2	1
pH	7.0	1
Totals		32

The survey was conducted in low flow during a record dry and warm year resulting in limited wetted area, the riffles were especially dry. The best reach 1 habitat scores were for % Pool Area, Water Quality parameters of Oxygen and pH. The poorest results were with LWD and Boulder Cover, Fine Sediments, and Wetted Area.

Reach 1 has unconfined meander corners that commonly overflow, sweeping forest soils into the creek channel. The LWD cover has long since been logged off or cut out by old stream cleaning programs by the agencies. There are occasional debris jams in this reach where Alder trees fall in after storms and plug the channel for a cycle and then blow out or are cut out by residents. This reach has a long history

of alteration due to jams and slides caused by human alteration. The active floodplain is increasing in width due to upland developments, resulting in the sedimentation and erosion. The pools are created by meander and scour due to lack of LWD. LWD placement in this reach is higher risk due to the large volume and energy of the flood water. Opportunistic anchoring of large conifer deadfalls may be the cheapest and safest option for generation of instream cover; some remnant older second growth Cedar occasionally falls in. Elimination of sediment sources; banks, channel and upland is more difficult and each requires its own prescription; bank sediment can be addressed by replanting exposed areas with flood resistant species (i.e. Cedar, Willow, Red Osier, Ninebark). Channel erosion requires stabilization of head cutting through rock crests and large wood placements which require site specific detail. There is one such installation over the Island gas transmission line in this reach. Upland sediments from storm ditches and developments are the easiest to address and most likely to succeed. The challenge is there are many ditches in the watershed. Use of the “Fish in the Ditch Atlas” by the RDN/MVIHES would help locate and prioritize the ditches. Remedial actions to undertake may be grass seeding, adding native plantings, adding sumps, rain gardens and re-direction.

The Riparian features of Reach 1 are shown in Table 2 below taken from the USHP summary tables.

Table 2; Reach 1 Riparian Results

Riparian Ratings		
Reach	R1	Ratings
Land Use	18.0	1
Riparian Slope	18.0	1
Bank Stability	26.0	1
% Crown Cover	76.1	1
% of Reach Accessed	12.9	3
Average Vegetation Depth	26.9	1
Totals		8

The riparian features of the reach are good. Although it was historically logged, It has a mixed canopy of Conifer (mostly Douglas Fir, Red Cedar, Hemlock, Balsam) and deciduous (Red Alder and Maple). The riparian values are all Good except Access due to the close proximity of the trails. The average Vegetation Depth of 27m from each bank is the most important factor. This riparian zone is getting flooded, trampled and was never sufficiently restocked with native species. Continued native planting is important, with selection of species and location mindful of winter floodplains and summer droughts. Ten years ago this reach riparian area was overwhelmed by invasive European Hogweed, but the control efforts of the community had made a huge difference and there were no adult plants observed.

Reach 4:

Reach 4 starts above the West Fork confluence and ends at Winchester Road Bridge. The reach is moderately confined in a valley with moderate meandering as well. It is a rural area reach with few crossings. The creek channel is relatively undisturbed adjacent farms with generally generous setbacks.

Our survey data was taken below Grafton Road near the outlet of Dudley Marsh creek. The valley walls were 3 to 10m height. The water temperature was 17.4C during a warm 25C day. The channel width average was 12.9m with a wetted width average of 4.7 m on a 1.1% gradient. The reach 4 fish habitat results are shown in Table 3 below;

Table 3; Reach 4 Habitat Results

Habitat Parameter	Reach 4	Ratings
% Pool Area	83.2	1
Large Woody Debris/Bankfull Channel Width	0.8	5
% Cover in Pools	6.2	3
Average% Boulder Cover	0.1	5
Average % Fines	28.8	5
Average % Gravel	48.5	not rated
% of Reach Eroded	9.9	3
Obstructions	0.0	0
% of Reach Altered	0.0	1
% Wetted Area	36.4	5
Dissolved Oxygen	8.6	1
pH	6.8	1
Totals		30

The USHP habitat parameters of Reach 4 indicate Good scores in % Pool Area, % Altered and water quality (D.O./pH). The Poor ratings for were LWD, Boulder Cover, Fines, and Wetted Area. The reach was historically logged, and the lack of old growth LWD inputs was consistent with the rest of the creek. Pools are generally shallow as a result.

The restoration options in this reach are limited due to the fact the channel is hard to access and the characteristics of the hydrology and substrates. This is a mid-watershed reach that is receiving runoff from farm land, roads and upland logging. There are storm surges that are moving blowdown trees through the channels with lots of destructive energy. Only well -designed instream projects are likely to survive the floods. A past project (2004) by French Creek Streamkeepers on Sunshine Goldberry's property is holding up but could use some additional pieces of wood where smaller debris has opened up holes. In 2015, the opposite bank on the Terry property was restored after the gravel bedload pushed the thalweg into a deeply eroded cutbank. This bank was rebuilt with rock ballast, due to the energy.

The riparian area of reach 4 was historically logged. There is no logging waste remaining but the trees are not yet strong enough to sustain directed bank erosion from sediment filled channels. The riparian condition is summarized below in Table 4.

Table 4; Reach 4 Riparian Results

Riparian Ratings		
Reach	Reach 4	Ratings
Land Use	24	1
Riparian Slope	36	2
Bank Stability	50	3
% Crown Cover	85	1
% of Reach Accessed by Livestock	0	0
Average Vegetation Depth	28	1
Totals		8

Reach 4 riparian results were Good or Fair. The 85% Crown Cover and 28m Vegetation Depth are the highlights of this reach. The stream flow was at a trickle but water quality remained fish sustainable due to the shade. The riparian area is on sloping ground (36%) and there are areas of concern where bank failure bringing a tree or two into the channel can be expected. In the undeveloped valley this is not going to result in too much human removal and may add cover to pools. Some of this material could be improved with repositioning and anchoring.

The Reach 4 riparian recovery options recommended are to; continue to plant native species along openings along the bank from old logging and pasture clearing. Most of the riparian area is well forested and needs nothing but time to grow bigger.

Reach 5:

This is the upper salmon bearing reach of French Creek. The salmon access ends at the increase in gradient at the hydro line. The logging was more recent in this reach and the trees are younger, there are more signs of old roads, ditches and skid trails that disrupt the drainage. From Winchester Road upstream, this reach is relatively flat gradient (2.3%) with an average channel of 4.7m and 2;4m wetted width. The stream was surveyed from Pratt Road Bridge upstream through an area where the Friends of French Creek partnered in 2013 with the land owner (Couverdon) and restored a channel disrupted by old logging debris. The Habitat Results for Reach 5 are shown in Table 5 below;

Table 5; Reach 5 Habitat Results

Habitat Parameter	Reach 5	Ratings
% Pool Area	27.3	5
Large Woody Debris/Bankfull Channel Width	1.3	3
% Cover in Pools	7.8	3
Average% Boulder Cover	4.8	5
Average % Fines	9.5	1
Average % Gravel	26.5	not rated
% of Reach Eroded	0.0	1
Obstructions	0.0	0
% of Reach Altered	2.8	1
% Wetted Area	33.5	5
Dissolved Oxygen	9.3	1
pH	6.8	1
Totals		26

Reach 5 habitat results are rated Good in; Erosion, Fines, Alteration, and Water Quality. It was Poor in Pool Area, Wetted Area, and Boulder Cover. The Good rating in Erosion (a first in this survey) is due to the bank restoration work done previously. Logs were tied to the banks in spurs and A-frames, and a considerable amount of accumulated sediment behind the old debris was excavated and placed in the riparian area and then seeded and planted. The Poor ratings in Pool habitat are expected as the reach is 2% gradient and riffles are higher in frequency. The 26% gravel substrate result is important; this material is abundant and clean. In the past restoration and assessments, it has been observed that Coho Salmon are heading to this location to spawn within days of the first fall freshet.

Reach 5 Riparian characteristics are shown in Table 6 below;

Table 6; Reach 5 Riparian Results

Reach	Reach 5	Ratings
Land Use	26	1
Riparian Slope	22	1
Bank Stability	52	3
% Crown Cover	75.5	1
% of Reach Accessed by Livestock	0	0
Average Vegetation Depth	27	1
Totals		8

The riparian characteristics of Reach 5 were overall Good. There is an average of 27m wide riparian area in this section (part of it is in a Riparian Areas Regulation setback). The second growth conifer forest is

only 40 to 50 years old. The canopy is relatively dense in many areas and quite diverse species, Douglas Fir, Red Cedar, Hemlock and Balsam as well as Red Alder and Maple. Replanting in this section is not a high need with the possible exception of road openings.

Table 7: Summary & Recommendations for Water Quality Improvement

French Creek Reach 1

Water Quality Impact	Recommended Remedial Action	Comments
Bank sediment – This riparian zone is getting flooded, trampled and was never sufficiently restocked with native species.	Replanting exposed areas with flood resistant species (i.e. Cedar, Willow, Red Osier, Ninebark).	USHP data identifies which parts of the reach are the most in need by the riparian width measures as well as erosion sites located.
Channel erosion	Stabilization of head cutting through installation of rock crests and large wood placements on the bed and in severely eroding corners. There is one such installation over the Island gas transmission line in this reach.	Requires site specific detail. Reach 5 at Pratt Road also has restoration examples.
Upland sediments from storm ditches and developments	Grass seeding, adding native plantings, adding sumps, rain gardens and re-direction.	Challenge is there are many ditches in the watershed. Use of the “Fish in the Ditch Atlas” by the RDN/MVIHES would help locate and prioritize the ditches.

French Creek Reach 4 - may act as a control reach and should be monitored to detect any changes

Water Quality Impact	Recommended Remedial Action	Comments
Low flow, as a symptom of lowered water table and limited wetland storage at Bell Lake and Dudley Marsh.	Stabilization of blowdown Large Woody Debris (LWD) to provide fish cover, reduce erosion and sedimentation Riparian understory planting of conifers in deciduous polygons.	Access is limited mid reach – LWD work would need to be done by hand cable and anchor. Some areas allow machine access such as done in 2006 and 2015 near Grafton.

Ditch flow potentially conveying contaminants from Grafton Road.	Each run should have a sump or bioswale of the entry point to the creek.	--
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French Creek Reach 5

Water Quality Impact	Recommended Remedial Action	Comments
No issues observed; However there are many creek crossings including Winchester and Pratt as well as private/recreational access with quads etc. that could introduce water quality concerns.	Continue to monitor water quality; educate property owners on creek crossing etiquette with machinery, horses and bikes.	Reach 5 has a good 30m or more riparian buffer for most of the reach. There were historic logging impacts but have mostly recovered. The 30-60 year old forest is providing good shade to the creek due to the width of the stand.

Other un-surveyed reaches with known issues:

Ditched channels along Virginia Road have Coho and Trout but lack riparian areas, lack pool/riffles, spawning gravel, wood cover and are often inundated with storm water and sediment due to the lack of buffer.

Conclusions

The habitat survey results of Reach 1, 4 and 5 are indicative of the health of the watershed. It is recovering from historic logging requires generous riparian reserve areas for the growing canopy to provide shade, bank stability, nutrients, wildlife habitat and instream habitat. Recovery appears to be occurring. An old growth forest requires 250 years or more to develop so it still has a ways to go. People can help; they must continue to monitor the watershed and defend its riparian areas. This includes the smallest waterways entering from the roads, houses and farms. There are suggestions in the results of each section that mostly recommend additional riparian planting as the key restoration activity. We also observed several successful instream habitat projects, but even these may require maintenance. It is evident from this survey that while the mainstem may have adequate protection, these other tributaries and drainages may be ignored. The smaller channels have little or no protection and must also be restored if the mainstem is going to recover. Ditched channels along Virginia Road have Coho and Trout

but lack riparian areas, lack pool/riffles, spawning gravel, wood cover and are often inundated with storm water and sediment due to the lack of buffer.

French Creek has benefitted from the stewardship groups such as of the Parksville-Qualicum Fish and Game Club, Parksville Streamkeepers and Friends of French Creek. The watershed has also been a key monitoring subject for the Regional District of Nanaimo through its Drinking Water and Watershed Protection Program. They have been helping Streamkeepers monitor water quality (via the Community Watershed Monitoring Network - CWMN). While this Habitat Survey identifies the physical characteristics that may impact water quality and points to restoration potential, the additional water quality data collected with the CWMN can help evaluate if the remedial actions recommended in this report are indeed working to improve water quality upon implementation. The information in this survey, coupled with the ongoing water quality monitoring, can be used for future comparisons and restoration planning.

Yours Truly,

A handwritten signature in black ink, appearing to read "David Clough". The signature is fluid and cursive, with the first name "David" being more prominent than the last name "Clough".

David R. Clough RPBio

Figure 1: Reach 1 Photo Page

Photo 1 & 2- Pool 1



Figure 2: Reach 4 Photo Page



1.) Pool 1 start



3.) Blow down LWD



2.) Riffle 4 gang.



4.) Terry Property bank erosion

Figure 3: Reach 5 Photo Page



1.) Start pool at Pratt Bridge



3) Last Riffle in R5 survey.



2.) Riffle in R5 clean gravel for spawning.



4.) Shallow pools and LWD

Appendix 2 - French Reach 4 Habitat Data

Stream Name	French Creek	Watershed Code	920-470700	Date	June 26th, 2015	Reach Name	Reach 4			Discharge Depth #1		Velocity																																								
Water Quality Information					Field Crew	FFCCS/RDN/DRC						T1	Site Length																																							
Dissolved Oxygen	8.60	pH	6.80	Total Dissolved Solids	350.00	Temp C	15.90	Chainage at Beginning of Reach	0.00	Discharge Depth #2		T2																																								
Velocity (m/s)		Average Depth (at flow site)		Wetted Width (at flow site)		Discharge (m3/s)		Chainage at End of Reach	202.00	Discharge Depth #3		T3																																								
Habitat Information (All Pool and Cross Section Data)																																																				
Habitat Type	Start (chainage at start)	Finish (chainage at end)	Unit Length	Wetted Width	Pool Area	Wetted Reach Area	%Pool Area	Habitat unit Depth (m)	Percent Gradient	Bankfull Width(m)	Average Percent Wetted Area	Substrate Percent					Percent Instream Cover					Percent Crown Cover	Large Woody Debris	LWD/bankfull channel width	Erosion Sites (length)	Altered Stream Sites (length)	Obstructions (number)	Off-Channel Habitat (length)	Off-Channel Habitat (width)	Off-Channel Habitat (bank side)	Land Use Right	Land Use Left	Vegetation Type		Riparian Slope Right	Riparian Slope Left	Stability		Vegetation Depth		Livestock Access		Photos	Comments								
												Bed	Blk	Cob	Grv	Fine	Bold	LWD	Cutbk	Veg	Other												Right	Left			Right	Left	Right	Left	Right	Left			Right	Left						
Pool	0.00	20.00	20.00	7.60	152.00	152.00		0.80	0.00	10.30		24	0	1	15	60	0	0	0	5	0	95.00	0		0	0	0	0	0	0	0	Nat	Nat	Mix	Mix	2	40	Med	High	30	30	0	0									
Riffle	20.00	49.00	29.00	3.80	0.00	110.20		0.07	2.00	14.40		0	1	40	40	19	0	0	0	0	0	85.00	0		0	0	0	0	0	0	Nat	Nat	Mix	Mix	15	5	Med	High	30	30	0	0										
Pool	49.00	73.00	24.00	5.80	139.20	139.20		0.20	0.00	9.90		0	5	5	50	40	0	0	5	0	0	85.00	0		0	0	0	0	0	0	Nat	Nat	Mix	Mix	35	5	Med	Med	30	30	0	0										
Riffle	73.00	87.00	14.00	2.40	0.00	33.60		0.04	1.50	12.30		0	0	20	60	20	0	0	0	0	0	85.00	1		0	0	0	0	0	Nat	Nat	Mix	Mix	50	2	Med	Med	30	30	0	0											
Pool	87.00	102.00	15.00	5.60	84.00	84.00		0.60	0.00	10.70		15	1	25	35	24	0	0	5	0	0	85.00	2		0	0	0	0	0	Nat	Nat	Mix	Mix	70	4	High	High	20	30	0	0											
Riffle	102.00	106.00	4.00	2.40	0.00	9.60		0.04	2.00	7.60		0	0	20	70	10	0	0	0	0	0	90.00	0		0	0	0	0	0	Nat	Nat	Mix	Mix	50	2	Med	Med	5	30	0	0											
Pool	106.00	130.00	24.00	5.70	136.80	136.80		0.60	0.00	17.90		40	0	0	25	35	1	0	5	0	0	85.00	2		0	0	0	0	0	Nat	Nat	Mix	Mix	70	4	Med	Med	15	30	0	0											
Riffle	130.00	154.00	24.00	5.40	0.00	129.60		0.04	2.00	15.20		0	1	20	70	10	0	5	1	0	0	70.00	3		20	0	0	0	0	FG	Nat	Mix	Mix	30	10	Med	Med	30	30	0	0											
Pool	154.00	192.00	38.00	7.40	281.20	281.20		0.50	0.00	18.00		0	0	10	50	40	0	15	10	0	0	70.00	4		0	0	0	0	0	FG	Nat	Mix	Mix	70	10	Med	Med	30	30	0	0											
Riffle	192.00	202.00	10.00	1.10	0.00	11.00		0.08	4.00	13.20		0	0	0	70	30	0	0	0	10	0	95.00	0		0	0	0	0	0	Nat	Nat	Mix	Mix	30	8	High	Med	30	30	0	0											
Reach Totals and Averages		202.00	121.00	4.72	793.20	953.44	83.19	0.30	1.15	12.95	36.45	8	1	14	49	29	0	2	3	2	0	84.50	12	0.77	10	0	0	0	0	14	10			26	10	26	24	25.00	30.00	0	0											

Appendix 4 -French R1/R4/R5 June 2015 Habitat Summary

Stream Name	French Creek	June 25/26 2015	Watershed Code	920-470700																	
Habitat Parameter	R1	Ratings	Reach 4	Ratings	Reach 5	Ratings															Total
% Pool Area	88.3	1	83.2	1	27.3	5															7
Large Woody Debris/Bankfull Channel Width	0.4	5	0.8	5	1.3	3															13
% Cover in Pools	1.3	5	6.2	3	7.8	3															11
Average% Boulder Cover	0.1	5	0.1	5	4.8	5															15
Average % Fines	20.8	5	28.8	5	9.5	1															11
Average % Gravel	26.1	not rated	48.5	not rated	26.5	not rated															-
% of Reach Eroded	8.6	3	9.9	3	0.0	1															7
Obstructions	0.0	0	0.0	0	0.0	0															0
% of Reach Altered	0.0	1	0.0	1	2.8	1															3
% Wetted Area	53.1	5	36.4	5	33.5	5															15
Dissolved Oxygen	10.2	1	8.6	1	9.3	1															3
pH	7.0	1	6.8	1	6.8	1															3
Totals		32		30		26															88
Off-Channel Habitat as % of Reach	0	5	0	5	0	5															15
Reach Lengths	232	not rated	202	not rated	106	not rated															540
Riparian Ratings																					
Reach	R1	Ave. Ratings	Reach 4	Ave. Ratings	Reach 5	Ave. Ratings															Total
Land Use	18.0	1	24	1	26	1															4
Riparian Slope	18.0	1	36	2	22	1															4
Bank Stability	26.0	1	50	3	52	3															7
																					-
% Crown Cover	76.1	1	84.50	1	75.50	1															3
% of Reach Accessed by Livestock	12.9	3	0	0	0	0															3
Average Vegetation Depth	26.9	1	28	1	27	1															3
Totals		8		8		8	0	0													24